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HUMAN CAPITAL, INSTITUTIONAL ECONOMICS AND ENTREPRENEURSHIP AS A DRIVER FOR QUALITY & SUSTAINABLE ECONOMIC GROWTH[*]

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Abstract. The Indonesian government policy in encouraging sustainable economic growth to reduce unemployment, poverty and inequality is threatened to fail, because economic growth does not reach targets and is not of quality. The purpose of this research is to explain the four pillars of growth and development namely; human capital, social capital, institutional economics and entrepreneurship as the main drivers of quality and sustainable economic growth. This research method used primary data on entrepreneurship and SMEs in the provinces of Central Java and Yogyakarta. The correlational form of recursive model path analysis was used as analytical method. The research results show the very strong role of human capital as the main key in driving economic growth both directly and indirectly. The existence of human capital and social capital will further encourage new economic institutions, furthermore new economic institutions will encourage the competitiveness of productive entrepreneurship and high, quality, and sustainable regional economic growth. The policy implication is that high, quality, and fundamentally sustainable economic growth must be built on the four main pillars basis namely; human capital, social capital, institutional and entrepreneurship in order to be more successful in reducing development problems; unemployment, poverty and income inequality.

Keywords: human capital; social capital; institutional; entrepreneurship; economic growth

1. Introduction

Indonesia's economic growth is largely supported by foreign investment and inappropriate consumption sector, resulting in low, unqualified and high cost economic growth. In modern economic theory, quality economic growth is determined by technological factors and the accumulation of human capital as the main determinant in the industry and the economy as a whole (Prasetyo, 2008; Ganeva, 2010 Acemoglu, 2014). The argument is

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because human capital is able to create efficiency, influenceiveness, creativity, innovation and better productivity. Over the last few decades much economic research has focused on the accumulation of human resources and their impact on the economy. Theoretically and empirically, human capital is conclusively believed to be positively associated with economic growth (Altinok, 2007; Hanushek, 2007; Prasetyo, 2008, 2019; Ganeva, 2010; Acemoglu, 2012, 2014; Skare, 2015; Ali, 2018; Baltgailis, 2019; Vigliarolo, 2020). That is, theoretically, the human capital factor has long been believed to be positively associated with quality and sustainable economic growth. While empirically, this said relationship does not always hold for several reasons (Afzal, 2010; Pelinescu, 2015). Afzal et al. (2010) argue that the relationship between school education and economic growth is negative in the short term. Meanwhile, Ramos et al. (2009) have explained the negative influences on unemployment can be explained by the influences of an overpopulation of tertiary education, which does not meet the needs of the regional labor market. Furthermore, Pilinescu, (2015) found a negative influence from the endowment factor of human capital on growth and unemployment, especially in agricultural areas. The argument is because some of the population of highly educated people who live in agricultural areas work elsewhere in areas close to the city. However, it can be stated that these studies still state that there is a negative relationship between human capital and economic growth because in general their data is very limited dan using simple measuring dimensions. For example the human capital factor is only measured by the level of education which is not representative to measure the dimensions of human capital.

Cohen's research (2007) resulted in a strong and significant positive relationship between human capital and economic growth. The results of Cohen's research (2007) confirms that the limited and poor human capital measurement model produces poor results. In addition, the results of Estrin's research (2016) with multilevel human capital measurement dimensions found that specific entrepreneurial human capital is relatively more important in commercial entrepreneurship, and general human capital is more important in social entrepreneurship, while the influence of human capital depends on the rule of law (institutional system) . Estrin (2016) explains that since the level of information content is low in measuring the human capital dimension of the education level the previous literature has found that increasing education is not related to economic growth. Furthermore, the results of Ali's recent empirical research (2018), based on data of 132 countries over 15 years, have also found that human capital plays a positive role in GDP growth per capita, and is strongly and positively related to economic growth. The empirical fact is economic opportunities strengthen the influence of human capital, business and trade growth, domestically and internationally. Ali's research (2018) also found that the inconclusive results in the previous empirical study of human capital and growth might be due to the bias of the omitted variables, because the study did not include variables related to social capabilities. Thus, the urgency of this research result article tends to be more supportive of a positive and significant link between human capital and economic growth both theoretically and empirically.

The objective of the unemployment, poverty and inequality of income distribution reduction policy strategy is difficult to achieve without quality, high and sustainable economic growth driven by the capacity of smart, skilled, knowledgeable, inclusive, creative, innovative, productive and adaptive human capital (Prasetyo, 2008; 2019; Cadil, 2014). At present, the empirical fact is that many economic opportunities require human capital, and subsequently human capital further strengthens economic growth and competitiveness and social welfare (Prasetyo, 2019). The role of human capital is an important and significant key factor in promoting quality economic growth (Cohen, 2007; Estrin, 2016; Ali, 2018; Prasetyo, 2008, 2019). The novelty of the purpose of this article is to describe the important role of human capital in creating new economic institutions, which in turn encourage entrepreneurial competitiveness and quality economic growth in a sustainable manner. This research article uses fundamental micro empirical data. Novelty of the dimensions of fundamental micro empirical data for the human capital variables in this article are measured more comprehensively through the ratio dimension of education level, skill, experience, level of productivity, and level of maturity (Prasetyo, 2017, 2019). If the Government of Indonesia's policy strategy in encouraging economic growth to reduce unemployment, poverty and inequality is only driven by foreign investment and consumption levels, without paying more attention to the potential accumulation of human capital capacity, then the policy strategy will never succeed, and will clearly fail

again (Prasetyo, 2011, 2019). High-quality, modern and sustainable economic growth must be created by quality factors and human capital capacities that are accommodating and driven by an entrepreneurial culture (Prasetyo, 2008, 2011, 2019), since there is no significant economic growth in any country without adequate human resource development (Sankay, 2010).

In addition, the results of Doran's research (2018) using macro data from the GEM (Global Entrepreneurship Monitor) show that entrepreneurial attitudes are found to stimulate GDP per capita in high-income countries only, while entrepreneurial activities are found to have negative influences on the middle and low income economy. Meanwhile, (Baudreaux, 2019) still using data from the GEM that measures entrepreneurship and institutions with the EFC (Entrepreneurial Framework Conditions) found that entrepreneurship only encourages economic growth in developed countries, but not in developing countries. Boudreaux, (2019) also found that the country's institutional environment also only contributed to economic growth in more developed countries, but not in developing countries. The results of the research (Doran, 2018; Baudreaux, 2019) actually become important arguments for the growing urgency of the article that the authors propose and future research as well. Doran (2018) also realized that different aspects of entrepreneurship were found to affect growth differently, but the micro data in GEM was not available. Doran (2018) recommends the need for further development of GEM data, at the regional level, to facilitate regional entrepreneurship analysis. Research results conducted by Dvoulety, 2018 have also stated that they have failed to prove the impact of entrepreneurship on the HDI (Human Development Index). Based on the results of the study, (Dvoulety, 2018) has also recommended that there are still many efforts that need to be made to better understand various forms of entrepreneurial activities in developing countries, such as its institutional context, and its relation to regional economic development. For the sake of this article, we try to do dispositions and novelty and the urgency of using micro fundamental empirical survey data on MSME entrepreneurship households at the regional level of the DIY and Central Java Provinces of Indonesia, to analyze macroeconomic data, specifically on the variable quality of economic growth in question in this article.

2. Literature review

Theorically and empirically, economic growth is largely determined by a number of investments. Many forms of investment, whether physical or non-physical, and increasing the capacity of human capital are included in the type of non-physical investment that requires a long process and economic freedom in order to develop better. Empirically, the combination of the use of both types of physical and non-physical investment can increase economic growth, create employment opportunities and reduce poverty, (Seran, 2018). Human capital investment theory is often based on a number of empirical evidence that "educated and skilled individuals" almost always have a tendency to produce better than others. It seems that the basic concept of the theory has now been increasingly developed to be applied in the field of entrepreneurship consistently. According to Davidsson (2003) in a theoretical perspective, understanding the relationship between social capital exploitation and human capital is an important area of future research. Davidsson (2003) has recommended advancing our understanding of the role of social capital, human capital and social relations and newborn entrepreneurial networks and learning the best ways to facilitate them is an important activity for future entrepreneurial research.

In an economically free society, every individual in the community succeed or fail based on their own individual efforts and abilities. Meanwhile, free and open community institutions do not discriminate against them (Miller, 2019). The results of Boudreaux's research (2019) have provided suggestive evidence that economic freedom not only channels individual efforts to productive entrepreneurial activities, but also influences the degree to which individual socio-cognitive resources tend to be mobilized and lead to entrepreneurship and high economic growth. Human development and democratic progress are the main keys in economic freedom, (Miller, 2019). Feldmann (2017) has empirically studied the impact of economic freedom on human capital investment. As a result, there is a strong correlation between the two and economic freedom increases investment in human capital. Hindle et al. (2009) have emphasized that the entrepreneurship development process is shaped by human resources. The capacity of human resources with knowledge, skills, and self-efficiency can lead to entrepreneurial behavior,

(BarNier, 2012, Marvel, 2016). Meanwhile, the results of Anaduaka's research (2014) and Ogunleye, (2017) imply that capacity building and quality of human resources are indispensable in achieving sustainable and quality economic growth in developing countries such as Nigeria, because there is an increase in economic performance for every increase in resource development human.

Based on the results of recent literature studies it can be learnt that human capital and institutional factors encourage entrepreneurial opportunities to achieve higher levels of economic growth (Aparicio, 2016; Bjornskov, 2016; Bosma, 2018; Acs, 2018; Chitsaz, 2019). Research results by Aparicio, 2016 found that informal institutions have a higher impact on entrepreneurial opportunities than formal institutions do. Regarding policy implications, Aparicio's research results also show that it can be possible to obtain economic growth that encourages the right institutions to increase entrepreneurial opportunities. The results of Bosma's research (2018) have examined the extent and how the quality of institutions in encouraging productive entrepreneurship, which in turn is able to encourage economic growth. Furthermore, the results of Bosma's research (2018) show that a quality economic growth model can be significantly improved in that direction, taking into account the quality of institutional and joint entrepreneurial activities. The growth of UMKM entrepreneurship is also increasingly regarded as the main engine of long-term local economic growth than any large foreign company that previously existed (Bell, 2013). Acs' research results (2018) found support for the role of the entrepreneurial ecosystem in economic growth; where the results of the Acs' research (2018) shows that NSE (National Systems of Entrepreneurship) is positively and significantly related to economic growth. Whereas, the results of Bjornskov's research (2016) have found substantial evidence to support the claim that entrepreneurial activities have positive long-term economic consequences in terms of wealth, productivity and economic growth.

Meanwhile, the results of Chitsaz's research, (2019) have used two types of human and social capital to study entrepreneurship; in which to evaluate social capital communicative, structural and cognitive dimensions are used. Meanwhile, to investigate the human capital focus knowledge, skills and self-efficacy dimensions are used. According to Chitsaz (2019), entrepreneurship development is a complex, long-term, and comprehensive procedure with a major role in developing the country's economy. The results of Chitsaz's research (2019) show a significant influence of the dimensions of human and social capital on entrepreneurial activities. Furthermore, Ehrlich, (2017) has modeled investments in Entrepreneurial Human Capital (EHC), which are allocated in commercial and innovative industry knowledge. The results of Ehrlich's research (2017) have specifically found that human capital drives economic growth. Ehrlich's (2017) research model shows that, institutional factors that support the free market for goods, ideas and higher educational attainments from employers and workers are able to increase edogenous economic growth by increasing investment efficiency in the EHC rather than exclusively on their own.

Furthermore, Vide (2016) has explored State competitiveness and entrepreneurship as drivers of economic growth. Meanwhile, the results of Boudreaux's research (2019) found three things: (1) entrepreneurship encourages economic growth, but not in developing countries; (2) the institutional environment of a country as measured by Entrepreneurial Framework Conditions (EFCs) contributes to economic growth in developed countries, but not in developing countries; (3) entrepreneurship driven by opportunities encourages economic growth in developed countries, while entrepreneurship driven by needs impedes economic growth in developing countries. However, all sources of literature mentioned above are still only partially explaining about the human capital, social capital, institutional economics and entrepreneurship roles on economic growth. In this article the empirical disposition and basic theory are combined into an original theoretical basis from R.M. Solow (1956) and J.A. Schumpeter (Elliott, 2017), as well as examined by the path analysis model approach, so that both the theoretical basis and the method approach of this article are more comprehensive. In addition, the novelty critical disposition of this article is that a more representative dimension of measurement is used by utilizing the Gini ratio index, which is generally the basic concept familiar to the reader. Meanwhile, empirical data sources were obtained with various disciplinary approaches: socio-economic-cultural and institutional.

3. Research method

This article is the result of an empirical study that was examined using a descriptive-analytic-quantitative research method using the correlational form of recursive model path analysis. Main data sources are used as primary data and secondary data is used as supplementary data. Quantitative data material was obtained by doing field survey on 125 respondents of entrepreneurial household samples which were taken responsively using simple random sampling technique. Quantitative and qualitative empirical data material in this article were collected with various disciplinary approaches, namely economic-sociology, economic-geographical, economic-cultural and institutional economics. Meanwhile, for interpreting the data obtained, the basic concepts of the approach of economic freedom of local wisdom which are humanist, and economic-social-cultural, especially; sociology economics, informal economics, institutional economics, political economics, as well as cultural economics and geographical gravity economics are preferable to use. In theoretical and methodological concepts, this research method is a better integration research method, because it is a method of integration of related and broader various disciplines in socio-economic related fields, as well as integration of the original theoretical approaches to economic growth in R.M. Solow (1956) and the original theory of economic development of J.A. Schumpeter (Elliott, 2017).

The measurement dimension of all variables in this research is used to measure the modified model dimensions of the Gini ratio or Gini Index (GI). The argument is that the general basic formula of IG values is simple, useful and widely known. The formula is as follows:

$$IGx = 1 - \sum_{i=1}^{n} f_i (Y_i - Y_{i-1})$$

Where; IGx (the index value of the variable Xn used); fi is the percentage (%) of variable income of the i-class entrepreneurship household group; Yi is the cumulative percentage (%) of income or expenses in the i-class entrepreneurship household. Thus, some of the main Xn variables referred to and used in this research article are measured by Human Capital Index (HCI), Social Capital Index (SCI), Social Entrepreneur Index (SEI), Intitutional Economic Index (IEI), Entrepreneurship Competitiveness Index (ECI), and Quality Economic Growth (QEG) dimensions. Furthermore, the final value of the magnitude of the variable is between zero to one, according to the standard value on the original Gini index mentioned.

After knowing a number of variables that are used in the path analysis model, then it must first be arranged a structural equation model to find out the value of the path analysis coefficient. The purpose of this path analysis method is to trace the real role of the main explanatory variables namely human capital and social capital exogenous variables towards endogenous variables of economic growth quality, both directly and indirectly through variables of economic institutions and entrepreneurship competitiveness and their total influence. Meanwhile, the meaning of the form of the structure of the reconciliation system in question is the relationship and the direction of the path between the exogenous variables to the endogenous variables, so that they are easier to understand. Meanwhile, the form of the structural path analysis system equation model referred to is arranged as follows:

$$Y1 = \rho_{Y1.}X_1 + \rho_{Y1.}X_2 + \rho_{Y1.}X_3 + \mathcal{E}_1 \quad\text{...........…………….…………………..} \quad (1)$$

$$Y2 = \rho_{Y2.}X_1 + \rho_{Y2.}X_2 + \rho_{Y2.}Y_1 + \mathcal{E}_2 \quad\text{…………………………………………..} \quad (2)$$

$$Z = \rho_{Z.}X_1 + \rho_{Z.}X_2 + \rho_{Z.}Y_2 + \mathcal{E}_3 \quad\text{…………………….………….……......…} \quad (3)$$

$$Z = \rho_{Z.}X_1 + \rho_{Z.}X_2 + \rho_{Z.}Y_1 + \mathcal{E}_4 \quad\text{……………………….………….……........} \quad (4)$$

Meanwhile, the path Figure 1 form for the path analysis equation model of the dual path system referred to in the article of this research is as follows:
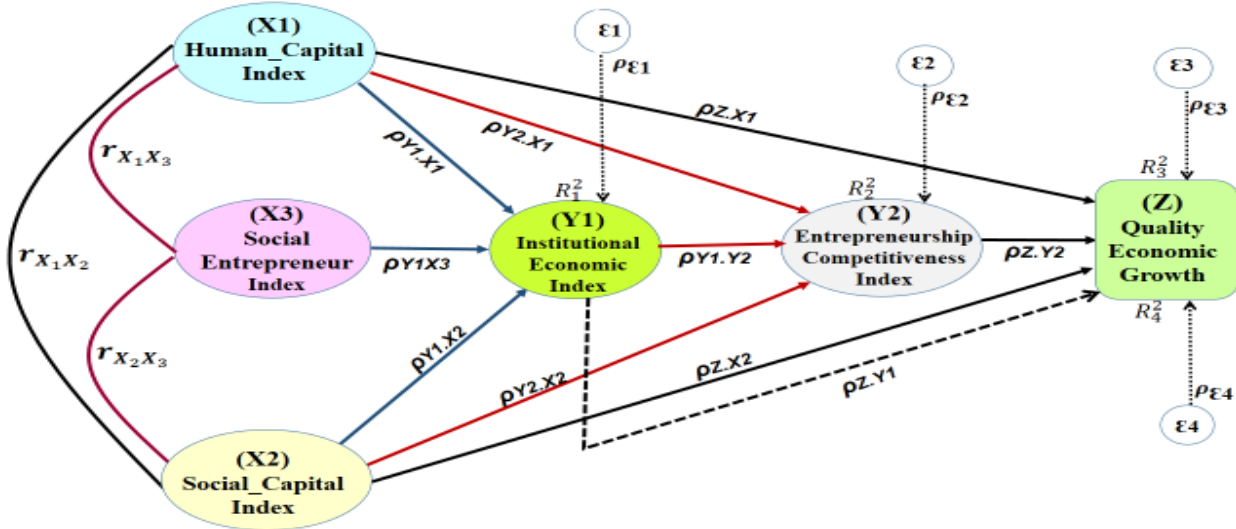
Figure 1. Correlational path analysis model of dual path system

The theoretical basic concept built on the framework of this path analysis model in Figure-1, is an amalgamation of the two basic concepts of the original theory of modern economic growth of The New Growth Theory R.M. Solow (1956) and The Theory of Economic Development of Joseph A. Schumpeter (Elliott, 2017). The keywords of Solow's original theory of economic growth (1956) were mainly explained from the factors of increasing human capital capacity and internal institutional factors. Whereas, the key factors in Joseph A. Schumpeter's original theory of economic development (Elliott, 2017) were mainly explained by external institutional and entrepreneurial factors. Furthermore, the model value of parameter values in the form of path analysis can be formed and generated from the correlation values and standard regression coefficients, so that the path coefficient values have a standardized quantity value. Furthermore, based on the path analysis Figure in Figure-1 above, it can be clearly described the direction and magnitude of the value of the path analysis coefficient, both direct influence, indirect influence and total influence. Where, the value of the highest total influence of the exogenous variables on endogenous variables is considered as the most important, dominant, core and strong factor contributing to quality economic growth.

4. Results

The results of the research from the four structural equation form models of path analysis regression above (model: 1-4), the complete results can be seen in Table 1. Based on Table-1 it appears that the value of the standardized coefficients of the regression will be interpreted and examined further in this article. Next, the standard regression coefficient values in Table-1 together with the partial correlation coefficient values in Table-3 are used to form the path analysis coefficient results in Figure-2 and in Table-4. Meanwhile, the value of the results of the research in Table-2 is the value reflected from the model used to determine the total strength of the model. Based on the results in Table-2 it can be seen that the strength of the model proposed in the path analysis is good and strong. The argument, because based on the coefficients reflected in Table-2, it is known that the R-multiple value is above 80%, and the average R-square value is greater than 70%, and the R-square adjusted value is close to the R-square value, then the model is declared good, strong and credible. Then, after the model is declared good, the results of the research in Table-1 and Table-2 can be employed to build the path analysis model as referred to in Figure-2 and Table-4. In addition, the results of the regression research in Table-1 and Table-2 are also known to be consistent, and the results of the research in Table-2 and Table-3 are also consistent with the correlation value, so that the results of this research can be stated consistent and getting better and credible.

Table 1. Research results from standardized standardized regression coefficients for structural equation path analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T-statistics	Significance
		B	Std. Error	Beta		
1	(Constant)	.180	.023		7.934	.000
	Human_Capital Index	.391	.046	.483	8.516	.000
	Social_Capital Index	.280	.080	.315	3.492	.001
	Social_Entrepreneur Index	.164	.073	.195	2.237	.027
2	(Constant)	-.131	.033		-3.999	.000
	Human_Capital Index	.215	.068	.216	3.180	.002
	Sosial_Capital Index	.193	.073	.176	2.635	.010
	Institutional_Economic Index	.685	.104	.556	6.582	.000
3	(Constant)	.025	.029		.877	.382
	Human_Capital Index	.410	.073	.397	5.645	.000
	Social_Capital Index	.122	.077	.108	1.593	.114
	Entrepreneurship_Competitiveness Index	.444	.086	.430	5.155	.000
4	(Constant)	-.045	.039		-1.162	.248
	Human_Capital Index	.481	.080	.466	6.029	.000
	Sosial_Capital Index	.182	.086	.161	2.117	.036
	Institutional_Economic Index	.366	.123	.287	2.986	.003

a) Model-1: Dependent Variable: Institutional_Economic Index
b) Model-2: Dependent Variable: Entrepreneurship_Competitiveness Index
c) Model-3: Dependent Variable: Quality Economic_Growth
d) Model-4: Dependent Variable: Quality Economic_Growth

Source: processed primary data

Based on Table 1, the research results from structural equations in Model-1, Model-2 and Model-4, all exogenous variables that are used have are positive influence on endogenous variables and significant at confidence levels above 95% or at the level of 5% significance level. That is, the model is theoretically good and acceptable. Meanwhile, in Model-3 it appears that the exogenous variables of human capital and entrepreneurship still have positive and significant influence on the 99% confidence level of the endogenous variables of quality economic growth. Meanwhile, the conditions for exogenous social capital variables in Model-3 appear to have a positive and not significant influence on quality economic growth. However, if we look back at Model-4, when the social capital variable is moderated by economic institutional variables, its role remains positive and becomes significant again towards quality economic growth. This shows the meaning that the role of the quality of community economic institutions is quite successful and needed in regulating social order entrepreneurial behavior of the local community to encourage high-quality, sustainable and sustainable economic growth in the region. Meanwhile, the significance value of constants in Model-3 and Model-4 is not significant, because the research model in Model-3 and Model-4 is a conditional model (see Table 2).

Table 2. Results of determinant analysis of the path analysis structural model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.845ᵃ	.714	.707	.110068	.714	100.713	3	121	.000	1.486
2	.862ᵃ	.743	.737	.128573	.743	116.530	3	121	.000	1.975
3	.840ᵃ	.706	.699	.142112	.706	96.852	3	121	.000	2.045
4	.816ᵃ	.666	.658	.151460	.666	80.441	3	121	.000	2.255

Model-1: a. Predictors: (Constant), Human_capital, Social_capital, & Social_entrepreneur   b. Dependent Variable: Institutional
Model-2: a. Predictors: (Constant), Human_capital, Social_capital, & Instituional   b. Dependent Variable: Entrepreneurship
Model-3: a. Predictors: (Constant), Human_capital, Social_capital, & Entrepreneurship   b. Dependent Variable: Economic_Growth
Model-4: a. Predictors: (Constant), Human_capital, social_capital, & Instituional   b. Dependent Variable: Economic_Growth

Source: processed primary data

If seen from the correlation values determined by R-muliple in Table-2 and partial correlation in Table 3, the results of the research appear to be consistent; there is a positive and strong correlation between exogenous variables and endogenous variables used in this analysis, both determinant and partial. In Table-3, it appears that there is a positive partial correlation and the strongest is the correlation between the entrepreneurship and the institution that is equal to 84.10%. The value of the second largest correlation correlates between social capital and social entrepreneur, which is 83.0%. However, the association of social entrepreneur factors with other factors is weak and has been detected when during the experimental model, which is known that the influence is not significant on economic growth, so that the social entrepreneurial variables are not included further in the next stage of the analysis model selection. Meanwhile, there is a strong partial correlation between institutional factors with entrepreneurship that can be felt that the two are interrelated to develop; where institutions that occur both externally and externally will be endeavored to encourage stronger entrepreneurship and vice versa, the productive entrepreneurship will further strengthen the quality of existing institutions.

Table 3. Value of partial correlation of Karl Pearson product moment matrix

Vaiable	Economic Growth	Entrepreneurship Competitiveness	Institution Economic	Human Capital	Social Capital	Social Entrepreneur
Economic Growth	1	0.788	0.746	0.759	0.607	
Entrepreneurship Competitivness	0.788	1	0.841	0.688	0.713	
Institution Economic	0.746	0.841	1	0.733	0.723	0.679
Human Capital	0.759	0.688	0.733	1	0.510	0.460
Social Capital	0.607	0.713	0.723	0.510	1	0.830
Social Entrepreneur			0.679	0.460	0.830	1

Source: processed primary data

Based on the values in Table-1 and Table-3, the path analysis Figure can be constructed as in Figure 2. Furthermore, based on the values in the Figure-2, it can also produce path analysis coefficient values as shown in Table-4. In Figure-2, it can be seen that the beginning of the largest arrow indicates the strength of the role of the exogenous variable against the endogenous variable. Meanwhile, the values of the path analysis coefficient quantities in Table-4 show the magnitude of the direct influence, indirect influence and the total influence of each exogenous variable on endogenous variables of high-quality and sustainable economic growth in the regions.
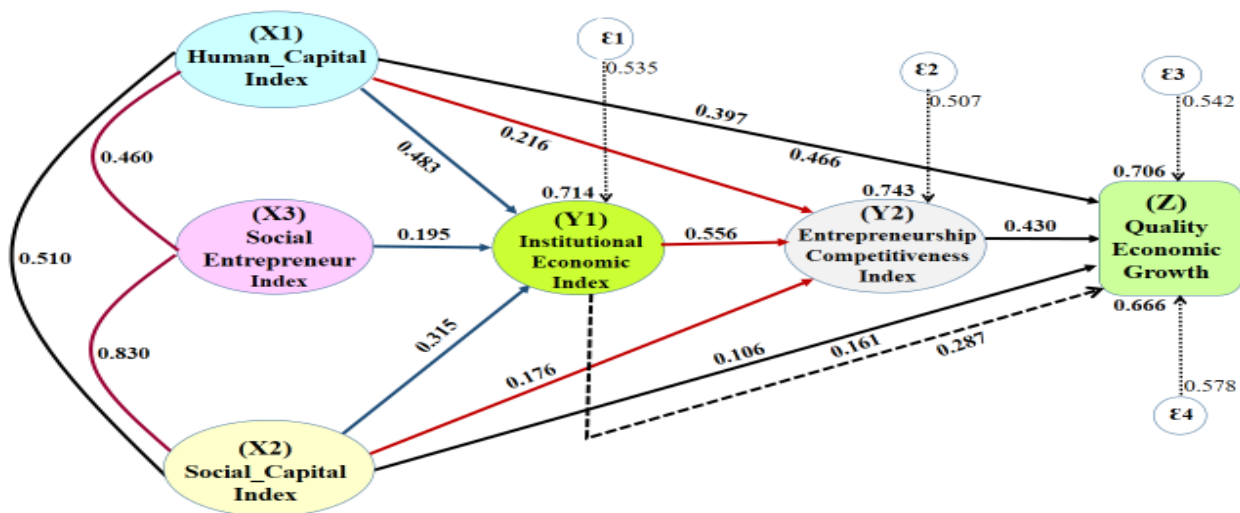
Figure 2. The results of the path analysis coefficient values from the correlational model, form a dual path system

The values of the results of the path analysis research in Table 4 are the results of research built based on the results of the research in Table-1, Table-3 and the coefficient values in the form of Figure-2 above. Based on the value of the path coefficient in Table-4, it can be seen the value of the influence of exogenous variables in total by 87.5%, direct displacement of 51.2% and indirect influence of 36.3% on endogenous variables of economic growth in the model on the path Figure-2. In Table-4, it appears that the greatest total major influence is obtained from the human capital variable, which is 32.9%. These results prove the author's statement above, that human capital is the first and foremost key in promoting quality and sustainable regional economic growth in Indonesia. The argument, because each arrow in the path of path analysis is the first largest begins from the contribution of human capital factors both direct influence and total influence is the first largest total. The magnitude of the influence of total human capital on economic growth is 32.9% which consists of a direct influence of 21.7% and an indirect influence of 11.2%, and more interesting is a direct influence greater than indirect. Likewise the entrepreneurial factor is able to provide a second contribution in total to economic growth, which is 26.2% consisting of a direct influence of 18.5% and an indirect influence of 7.7%, and interestingly the same, its direct influence on growth greater economy. This empirical fact shows that the factors of human capital and entrepreneurship are the main determinants in driving quality, high and sustainable economic growth. However, these two main factors still gain competition from institutional and social capital factors.

Table 4. Result of direct influence, indirect influrnce, and total influence on the quality of economic growth

Vaiable	Direct influence	Indirect influence					Total Influence
		Human Capital	Social Capital	Institutional	Entrepreneurship	Sub Total	
Human Capital	0.217		0.033	0.036	0.043	0.112	0.329
Social Capital	0.026	0.033		0.014	0.008	0.055	0.081
Institutional	0.084	0.036	0.014		0.069	0.119	0.203
Entrepreneurship	0.185	0.043	0.008	0.069		0.077	0.262
Total	**0.512**					**0.363**	**0.875**

Source: processed primary data

Furthermore, the sequence of the next total influence on economic growth is the third economic institutional factor of 20.3%; and the fourth or the last factor from social capital, which is 8.1%. Meanwhile, the magnitude of the influence of institutional factors and social capital factors actually the value of the contribution seems to be greater indirectly on economic growth than the direct influence. This shows that the facts of the phenomenon of the results of the above research strengthen the arguments of the two main factors of human capital and entrepreneurship, so that this fact phenomenon is more interesting to be further discussed in the next sub-topic.

5. Discussion

Based on the results of empirical research in figure-2 and table-4, we have found directly and indirectly, in terms of microeconomics, with the capacity and quality of human capital possessed, it has shown morale, motivation, better creativity and innovation, thereby increasing the productivity potential of workers as well as increasing their and family's income. Furthermore, in terms of macroeconomics, human capital which has the potential for productivity in all these entrepreneurial businesses has had a positive impact in increasing economic quality growth. That is, the basic theory of economic growth R.M. Solow, which states that human capital has a positive impact on economic growth empirically is still proven to be true. Likewise empirically for Schumpeter's theory of economic development which states that entrepreneurship must have a positive influence in society such as economic growth is also true. Thus, the results of this empirical research still support the original theory of *The New Growth Theory* of R.M. Solow and support the original *The Theory of Economic Development* of J.A. Schumpeter. Likewise, through Model-4 it has been proven that the role of existing institutions both from the internal side (RM Solow) and the external side (JA Schumpeter) has been proven to significantly encourage high

quality and high economic growth, and has strengthened the human capital and social capital factors in encourage quality and sustainable economic growth.

A very important and new thing from this article is that both human capital and entrepreneurship have been empirically proven to have a positive and strong and significant correlation in driving quality economic growth in Indonesia. Thus, the results of this research do not fully support the results of previous research conducted by (Afzal, 2010; and Pelinescu, 2015). It is possible that the previous research was conducted in a micro-scale with very narrow data and measurement dimensions. If human capital is only measured in one rural area and only based on one dimension of education level with a small sample, human capital does not always have a positive influence and can even have a negative influence (Prasetyo, 1998). However, the results of this latest empirical research support research conducted by (Cohen, 2007; Estrin, 2016, Ehrlich, 2017; Ali, 2018; Chitsaz, 2019) which confirms that human capital and entrepreneurship have a positive and strong influence on a country's economic growth. Meanwhile, on the other hand, if Indonesia is still included in a middle or low income country, this research also does not fully support previous research conducted by Doran (2018) and Baudreaux (2019) which states that entrepreneurship only has positive influence and significant on economic growth for high-income countries and not on middle and low-income countries. However, it is also realized that we as researchers cannot provide further and more powerful documentation, because this level of research is empirical research which is limited to the case of one country in Indonesia and not to compare to high, middle and low income countries.

In Figure 2 we have also examined the role of human capital in influencing economic institutions and subsequently these institutions are able to encourage competitiveness of productive entrepreneurship and encourage economic growth. In addition, we also examined how the quality of institutions in encouraging productive entrepreneurship competitiveness, which in turn encourages economic growth. The results of our research have obtained better estimation values about the role of human capital in encouraging the formation of new institutions. Furthermore, these institutions encourage competitiveness of productive entrepreneurship and better economic growth. That is, the results of our research support the results of previous research conducted by Bosma, (2017) even though the facts are slightly different. The research results in this article are in fact explicitly the same; having considered entrepreneurial channels through institutional quality in influencing economic growth. The difference is, in this research the importance of the role of human capital both directly and indirectly and the total role is still large, even though the institutional role of the contribution of human capital to economic growth has strengthened. In this article, through the entrepreneurial channel research model whose role has been shown to be reduced to economic growth is merely a factor of social capital.

However, the fact (in Model-4) is the role and function of the correlation of the quality of economic institutions increasingly able to strengthen the role of human capital and social capital in driving quality and sustainable economic growth significantly. Meanwhile, in Bosma's research results (2017) the role of human capital has been proven to be reduced. Thus, it can be reiterated that what is very important in encouraging quality economic growth, staying high and sustainable in Indonesia is the quality factor and the capacity of human capital as the first key factor, as well as the quality factor and the capacity of human capital and productive entrepreneurship competitiveness as the main factors. Meanwhile, the next very important factor in encouraging and maintaining quality and sustainable economic growth are institutional quality and social capital factors. In other words, there are four main capacity pillars in promoting quality economic growth to remain high and sustainable in Indonesia, namely human resources, entrepreneurship, institutional and social capital capacities. Where high quality, remains high and sustainable economic growth is more driven by factors of human capital and entrepreneurship. Meanwhile, quality and sustainable economic growth is more encouraged and maintained by institutional quality factors and social capital.

Thus, all elements of the Indonesian nation must be self-aware and must have a strong joint commitment to continually strive to build the capacity of human resources to produce quality production outputs and work productivity potentials that continue to improve and be able to have strong competitiveness. To achieve this

desire, of course, a new and more credible, new economic institution (NIE) must be needed, and able to encourage increased economic freedom. Based on the data in Table 5, the real conditions of institutions in Indonesia in terms of government integrity, investment freedom, and labor freedom are still repressed. That is, cases of corruption that occurred in Indonesia have had a negative impact especially on government integrity, freedom of investment and freedom of workers who are increasingly depressed, and institutions that are not qualified. This must be overcome immediately so that Government spending can be better utilized, precise and well targeted for the prosperity of all Indonesian people and not for corruption. The results of this research indicate that government spending that has occurred so far, both directly and through bank credit is not able to encourage entrepreneurial and MSMEs growth and economic growth. Government spending so far in Indonesia, besides being corrupted a lot, also only benefits the banking service sector and does not have a positive effect on economic growth, investment, employment opportunities, as well as industry and MSMEs.

Table 5. Index of world economic freedom index in 2019. Tax Burden

World Rank	Regional Rank	Country	Overall Score	Change from 2018	Property Rights	Judicial Effectiveness	Government Integrity	Tax Burden	Government Spending	Fiscal Health	Business Freedom	Labor Freedom	Monetary Freedom	Trade Freedom	Investment Freedom	Financial Freedom
39	5	Jamaica	68.6	-0.5	60.7	49.2	45.0	80.2	76.0	80.0	78.0	73.6	82.6	68.4	80.0	50.0
40	6	Uruguay	68.6	-0.6	68.3	58.9	69.2	77.2	67.5	69.9	74.3	71.9	72.9	78.6	85.0	30.0
41	20	Malta	68.6	0.1	69.8	50.4	50.3	64.2	56.1	94.5	67.1	61.3	78.2	86.0	85.0	60.0
42	21	Romania	68.6	-0.8	66.7	51.9	39.8	89.7	69.0	89.3	63.1	64.5	82.7	86.0	70.0	50.0
43	10	Thailand	68.3	1.2	53.7	45.9	36.4	81.3	85.8	96.5	82.5	63.9	75.2	83.0	55.0	60.0
44	22	Cyprus	68.1	0.3	73.1	48.1	43.7	74.9	55.2	80.3	76.9	59.5	84.0	86.0	75.0	60.0
45	7	Peru	67.8	-0.9	56.1	34.0	31.8	80.6	86.1	88.5	67.8	63.5	83.9	86.4	75.0	60.0
46	23	Poland	67.8	-0.7	62.3	44.0	49.8	74.9	48.8	86.4	65.4	63.9	82.1	86.0	80.0	70.0
47	24	Armenia	67.7	-1.0	57.2	46.3	38.6	84.7	79.0	53.0	78.3	71.4	77.8	80.8	75.0	70.0
48	25	Belgium	67.3	-0.2	81.3	61.6	72.5	47.1	15.2	73.4	78.1	61.0	76.1	86.0	85.0	70.0
49	8	Colombia	67.3	-1.6	59.2	34.3	33.5	74.3	75.0	79.2	71.4	78.5	75.6	76.0	80.0	70.0
50	9	Panama	67.2	0.2	60.4	30.1	34.1	85.0	85.3	91.3	73.6	43.4	79.4	79.2	75.0	70.0
51	26	Kosovo	67.0	0.4	57.2	53.5	44.7	92.5	77.7	96.0	73.8	64.9	78.3	70.8	65.0	30.0
52	27	Albania	66.5	2.0	54.8	30.6	40.4	86.3	73.9	80.6	69.3	52.7	81.5	87.8	70.0	70.0
53	4	Jordan	66.5	1.6	58.4	52.6	50.3	91.4	73.4	60.6	61.8	52.7	85.0	81.4	70.0	60.0
54	5	Bahrain	66.4	-1.3	63.5	50.7	53.6	99.7	62.7	3.7	71.4	71.1	81.6	83.8	75.0	80.0
55	10	St. Vincent and The Grenadines	65.8	-1.9	36.5	63.8	50.5	71.2	74.3	85.0	76.5	73.5	82.2	66.6	70.0	40.0
56	11	Indonesia	65.8	1.6	52.2	53.5	39.5	83.7	91.4	88.1	69.3	49.3	77.4	79.8	45.0	60.0

Note: Limitation of Economic Freedom Score: 80-100 (Free); 70-79.9 (Mostly Free); 60-69.9 (Moderately Free); 50-59.9 (Mostly Unfree) and 0-49.9 (Repressed).

Source: Miller, T. (2019)

The score for the index of ranking of world economic freedom for Indonesia in 2019 is 65.8 and is in 11 regional ranks and ranks 56th in the world of 180 countries measured. Although there is a slight increase of 1.6 points from that of the 2018, it is still considered moderately free, and it is still far from being free. The highest index value is obtained from Government spending (91.4), and the lowest score of 39.5 actually occurs in the Government integrity sector and is classified repressed; and in Indonesia there are still three sectors that are still

classified as repressed namely government integrity (39.5), investment freedom (45.0) and labor freedom (49.3). Economic freedom that is expected to encourage the quality of human capital, economic institutions and entrepreneurship in Indonesia has not yet occurred. In addition, even though fiscal health can be said to be good, there is a heavy tax burden and coupled with very high bank loan interest rates, and rigid banking services often become a burden and make it difficult for new investment and entrepreneurship to grow in Indonesia. Thus, the existence of credible new institutional quality in every line of society and sectors that have high and strong integrityis highly necessary. Based on the values in Table-5, it can be interpreted that it is urgently needed to increase the integrity and capacity of human capital investment, especially in terms of the human character of all elements of the nation in Indonesia. With the increasing integrity, capacity and quality of the character of Indonesian human resources, there will also be increased economic freedom in terms of labor, investment and trust in the government and vice versa. Thus, the issue of investment in human capital or capacity building and quality of human resources in Indonesia is a must do job and cannot be negotiable and replaced again.

The development policy of increasing human capital investment in Indonesia is very urgent to be carried out immediately and is always be improved. If human capital capacity building is getting better, then economic freedom will also be better and vice versa. The better social benefits of economic freedom will be better able to help reduce unemployment, poverty and inequality problems. Countries with higher levels of economic freedom with index values above 80.6 such as Hong Kong, Singapore, New Zealand, Switzerland and Australia, they have been able to enjoy a higher level of development of overall human capital capacity. Therefore, the policy of the Indonesian government must be immediately directed to further improve literacy, education, and economic literacy of its citizens in a higher standard of living for all citizens and not just its officials. Because, the higher capacity and quality of human capital the higher the economic freedom and the sooner of achieving the prosperity of the State stated in the fift principle of Pancasila. If a joint policy and commitment to build the capacity building and quality of the Indonesian human resources cannot be done immediately, then the goal of achieving a developed country in 2045 supported by the golden generation of Indonesia will be threatened with failure and only a mere dream.

Conclusion

In this article, we have discussed four very important pillars for regional economic development in Indonesia through high, quality, and sustainable economic growth. The four important pillars namely; human capital, social capital, institutional and entrepreneurship. We conclude; firstly, there is a very strong correlation and positive and significant influence between human capital and quality economic growth, so it can be concluded that human capital is the main and first key in encouraging quality, high and sustainable economic growth. Second, entrepreneurship as measured by the dimensions of competitiveness of productive entrepreneurship is a key factor in driving high and sustainable economic growth. Third, the important role of social capital more appears to be prioritized to maintain remains high and sustainable economic growth rather than encourage quality economic growth. Fourth, institutions as measured by the dimensions of the quality of new economic institutions that function as rules of the game or act as facilitators and dynamists have been able to bridge and further strengthen and complex interdependence with factors: human capital, social capital and entrepreneurship for encouraging economic growth quality, hight, and sustainable. Fifth, better economic freedom is very needed to improve the quality of existing institutions, human capital capacity and productive entrepreneurship competitiveness and vice versa. The argument is that human development and democratic progress are the main keys to economic freedom, (Miller, 2019). This article provides policy implications that in order to encourage economic growth that remains high, quality and fundamentally sustainable it must be driven through a policy of capacity building and quality of the four main pillars of development namely human capital, entrepreneurship, institutional and social capital. Furthermore, if the policy is successful, then the achievement of economic growth will be increasingly able to reduce the unemployment, poverty and inequality problems.

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THE CRITICALLY THINKING EMPLOYEE: EMPLOYERS' POINT OF VIEW*

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Abstract. Critical thinking is one of the most significant skills and abilities, which have direct impact on individual success and society's welfare. Especially loud is the voice of employers drawing attention to the need for critical thinking skills in the labour market and in a rapidly changing world in general. The World Economic Forum (2018) indicated the ten most wanted and needed skills in the labour market of 2020: critical thinking was placed at number two, following problem solving at number one. The American Management Association (AMA) Critical Skills Survey (2010, 2012) revealed that, according to employers, employees need to think critically, solve problems, innovate, collaborate, and communicate more effectively – they must excel at the "four Cs": critical thinking, communication, collaboration, and creativity. The goal of this article is to find out what and how employers with different managerial experience see critically thinking employees in today's labour market. The research is based on phenomenography methodology and is the first such type of research about critical thinking in Lithuania. The phenomenography study revealed three hierarchically interconnected categories: A-decision to act here and now; B- verified and assured decision to act. C- innovative decisions for operational improvement. Empirical data allows identifying critical thinking related expectations of employers who anticipate that their employees could deal with emerging situations and are able to reason chosen decisions. Employers state that the critically thinking employee could give innovative suggestions; research participants describe critical thinking as higher order reasoning which gives added value to an organisation. Such understanding

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reflects the definition of critical thinking as a cognitive endeavour, directed to functionality in making decisions and solving particular problems. Employees' critical thinking manifests at personal, interpersonal and societal levels.

1. Introduction

Critical thinking is one of the most significant of skills and abilities which have direct impact on individual success and society's welfare. The importance of critical thinking can be judged by the growing interest in scientific and public life areas. Especially load is voice of employers inviting to pay attention to the need of critical thinking skills in the labour market and in a rapidly changing world in general. The World Economic Forum (2018) indicated the ten most wanted and needed skills in labour market in 2020, where critical thinking was placed at number two following problem solving placed at number one. The American Management Association (AMA) Critical Skills Survey (2010, 2012) revealed that, according to employers, employees need to think critically, solve problems, innovate, collaborate, and communicate more effectively – they must excel at the "four Cs": critical thinking, communication, collaboration, and creativity.

Critical thinking is a desirable competency which employers expect from their prospective employees (Hassan, Madhum 2007). It is integral not only to carrying out direct functions well but also to enable employees to raise valid, critical questions leading towards right and better solutions, being able to reflect on their own and other people's activities as well as making respective adjustments, understanding the importance of their personal contribution to the development of the organisation and society in general (Penkauskiene et al. 2019). When organisations ignore the importance of including critical thinkers as a part of the organisation new ideas may not emerge, current processes may not be challenged, and changes may not occur. This results in organisations becoming stagnant, having outcomes that stay the same (Bednarz 2013). Natale, Ricci (2006) emphasise that critical thinking within teams improves organisational performance. It also enhances training and development initiatives. Employers associate critical thinking with the skill to make critical decisions. This skill is considered to be of great importance in complex situations. Penkauskienė et al. (2019) state that critical thinking by employers is recognised mostly as the capacity to avoid mistakes and make the right decisions; to correct and regulate oneself; and to be socially responsible.

However, much research does not take into account the employers' perspective or workplace characteristics (Grosemans et al. 2017), and empirical studies aiming to characterise how critical thinking is needed, understood and applied in the workplace remain scarce (Moore 2013). Among those few studies that do include the employers's perspective, the AMA Surveys (2010, 2012) could be mentioned. The AMA Critical Skills Survey (2012) questioned 768 managers and other executives, who said that critical thinking, communication, collaboration, and creativity skills and competencies have been articulated within their organisations as priorities for employee development, talent management, and succession planning. The majority agreed that their employees are measured in these skills during annual performance appraisals, and job applicants are assessed in these areas during the recruitment process. Three out of four (74.6%) managers and executives who responded to the AMA survey said that they believe these skills and competencies will become more important for their

organisations in the next three to five years. However, according to the survey more than half of respondents say there is significant room for improvement in these competencies among their employees. Most respondents accept that their employees are average, at best, in the four Cs areas.

Research shows that there is a big gap between declarations in policy documents and the situation in the labour market. Scientists (Pithers, Soden 2000; Burbach et al. 2004; Andrews, Higson 2008) emphasise the need to look more seriously at relevance of critical thinking and its factual manifestations in real labour market situations. Research (Lai 2011; Ennis 2018; Arum, Roksa 2011) also indicates low correspondence of critical thinking education with critical thinking practical application. Since the '80s employers have complained about the quality of higher education graduates due to an important skills mismatch: rapid technological change and global competition require a more skilled and flexible workforce and the people entering the labour market do not have sufficient skills to meet the challenges of a high-performance workplace. The knowledge, skills and abilities that employers were looking for refer to: interpersonal skills, communication (both oral and written), critical thinking, motivation and personal attitudes, ability to work with data and information, and ability to apply mathematics (Van Horn 1995). Presenting the research, Lazányi (2012) says that more than 50 per cent of new employees do not meet the standards for basic skills – such as communication, interpersonal relations, critical thinking and problem solving. The AMA 2012 Critical Skills Survey (2012) shows that managers and executives believe it is easier to develop these skills in students and recent graduates (59.1%) than in experienced workers (27.1%), suggesting that students and recent graduates may be more open to new ideas, versus experienced workers with established work patterns and habits. Mentoring and in-house job training were identified as the most effective methods to improve employees' skill levels in these areas, followed by one-to-one coaching, job rotation, and professional development.

The lack of research, the contradictions between declarations and labour market reality and inadequacy between training of critical thinking skills and organisations' needs presupposes the relevance of this article which aims to fill the evidence-based knowledge gap. The goal is to find out what and how employers with different managerial experience see as critically thinking employees in today's labour market. The research is based on phenomenography methodology and is the first such type of research about critical thinking in Lithuania.

2. Methodology

Research type. In order to reveal how employers experience critical thinking, phenomenography methodology was applied. This approach was chosen as best matching the research object and research question – how employees' critical thinking is experienced by employers. Phenomenography allows investigating the experience and understanding of particular phenomenon (Marton 1981). It aims to reveal different ways of understanding (perception), variety of conception and to find out their interrelations. This research seeks to find out different expression of employees critical thinking in the labour market.

Research participants. 28 employers (managers) have participated in the research. Phenomenography does not require a large number of research participants; in order to find out diversity of experience and to manage research data it is recommended to include about 20 participants (Larson, Holmstrom 2007; Trigwell 2000). These selection criteria were used: not less than one year's managerial experience; heterogeneity of economic activity; and heterogeneity of organisational type.

Characteristics of research participants. Main characteristics of research participants are presented in Table 1.

Table 1. The main characteristics of the participants

ID of research participant	Gender	Economic activity	Managerial experience	Age	Type of organisation
A1	Male	Social services	20	46	Nongovernmental organisation
A2	Male	Education	15	49	Public institution
A3	Female	Commerce	12	48	Business
A4	Male	Pharmacy	20	50	Business
A5	Male	Ecology	30	60	Public institution
A6	Male	Public health	30	60	Public institution
A7	Male	Construction	12	50	Public institution
A8	Male	Insurance	25	57	Business
A9	Female	Education	20	56	Public institution
A10	Male	Social services	15	41	Public institution
A11	Male	Information technology	19	41	Public institution
A12	Male	Pharmacy	15	50	Business
A13	Female	Social services	3	32	Public institution
A14	Female	Information technology	10	55	Public institution
A15	Male	Commerce	23	41	Business
A16	Male	Real estate	15	43	Business
A17	Female	Education	10	51	Public institution
A18	Female	Social services	10	54	Public institution
A19	Male	Transport and logistic	14	45	Business
A20	Male	Construction	22	53	Business
A21	Female	Social services	12	54	Public institution
A22	Female	Education	2	45	Public institution
A23	Female	Education	6	35	Nongovernmental organisation
A24	Female	Social services	15	56	Public institution
A25	Male	Accounting	9	40	Business
A26	Female	Public health	10	47	Public institution
A27	Male	Information technology	9	42	Business
A28	Male	Ecology	15	48	Public institution

According to the type of organisation there were managers from 15 public institutions, 11 business and 2 nongovernmental organisations. According to the type of economic activity there were managers from 6 social services, 5 educational, 3 information technology, 2 public health, 2 pharmacy, 2 reconstruction, 2 ecology, 2 commerce, 1 real estate, 1 transport and logistics, 1 accountant, 1 insurance enterprises. Managerial experience ranged from 5 to 30 years. 11 women and 17 men participated in the research; they were from 32 to 60 years old.

Data collection. The open-ended question was asked: how do you understand that your employees think critically? Interviewers encouraged research participants to share their personal experience about critical thinking, therefore the main interview question was accompanied with other leading questions which arose naturally during the interviews: what expectation do you have in relation to employees' critical thinking? What is the most remarkable example of critical thinking? Why that one? Interviews were recorded and transcribed. The duration of interviews ranged between 30 to 45 minutes.

Data analysis. Data analysis started immediately after all data collection and transcription. This approach was chosen for several reasons. First, researchers wanted to be able to get acquainted with all ideas and compare different perceptions and this was only possible having all data at hand. Second, the team was composed of six researchers who shared the workload. They worked in two groups, each consisting of three researchers. Each group had a chief researcher who was more knowledgeable in a phenomenography research approach and/or had practical experience. Each group member had to read the whole transcribed text several times to gain an overall impression; then to read the text again and mark answers to the interview questions. Following those two steps, groups of three gathered to discuss findings and to verify and validate the initial analysis. Those discussions were valuable in terms of the possibility to get a true, in-depth understanding of the phenomenon under investigation – to argue, to reason, and to return to the transcribed text (in some cases into audio material) to check meaning. All members of the groups had to come to a common agreement about an answer to the question. In cases of disagreement, researchers asked the opinion of experts (for example, Prof. K. Dahlberg). Afterwards researchers continued to work: noted similarities and differences in the statements; and determined descriptive categories of conceptions. Then again groups of three researchers gathered to discuss findings that were checked, approved or corrected within the group. One member of the group was in charge of preparing the final, joint version of categories with illustration of their meaning. The final stage of analysis included: detection and description of non-dominant ways of understanding; finding a structure in the outcome space; and assigning a name to each category of description. The steps of the data analysis were in line with the common way used in phenomenography studies (Larson, Holmstrom 2007). Two groups of researchers had regular meetings to discuss the results of the analysis process and to consult with each other. All final decisions – on descriptive categories and on a structure of outcome space were made collegially. In such a way, the validity of the research was ensured as Lepp, Ringsber (2011, p.118) state *"In phenomenography studies it is common for the researcher to have a co-examiner who is assigned to test the validity of categories"*. In this research case there was not only one co-examiner in each group, but all group members played a "trustworkers" role.

3. Results

During qualitative data analysis three categories were composed: A – a decision to act here and now; B – a verified and assured decision to act; C – innovative decisions for operational improvement.

Category A – Critical thinking manifests as a decision to act here and now. This category reveals that research participants relate critical thinking with problem solving in everyday situations. It is important for employers to know that in unexpected situation employees could make an immediate decision. The skill to make decisions is important not only in a crisis situation but also in everyday activity when any deviation from everyday activity happens. Research participants suppose that critically thinking people develop their own ideas based on their experience and facts; employees' courage is a strong weapon in an organisation. Employers assess expression of critical thinking from specific situations, in which employees show courage and determination to make decisions:

<...> ability to make decisions quickly; they could be essential every day, every week, because there are urgent situations, problems, everyone goes to the manager if the situation becomes irregular. Therefore, based on many years' experience I could say that this is the biggest challenge, and this is a skill – to make decisions quickly. Determination, it is not important if this decision is right or wrong. You switch on critical thinking, all experience, knowledge and make a decision <...>. You say: it could be otherwise, but I am making this decision, it is my decision, it is not important any more whether is it right or wrong, because I have taken it after assessing all possibilities.[A19]

Category A also encompasses employees' skill to make decisions independently. Employers define independence as the skill to decide what actions are needed and to suggest the alternatives for problem solving. Research

participants say that good employees should seek the best results and be able to make final decisions, therefore they should be independent:

There was no request for consultation or for support. The main measure in our life is time. And you understand that the manager was not bothered regarding the issues which are not his business. The employee made the decision. The result is without your manager's interference. There could not be a better identification of critical thinking. [A2]

Based on the data it could be assumed that the contemporary labour market needs employees who are independent and able to take responsibility for decision making. Responsibility is understood as maturity of personality and self-control. Critically thinking employees know the boundaries of their responsibility and what results are expected from them:

In our work we don't use such terminology as "critical thinking", we say "lack of responsibility", not willingness to take responsibility, because this is the easier way <...> every time the situation is a little bit unique, but it happens repeatedly, and people don't take responsibility, they delegate it to the head of department, they get rid of it. [A 9]

Critical thinking in this category is described not only as independent and responsible action, but also as a skill to make decisions based on arguments. Employers value these decisions which are justified, based on professional experience or an independently made problem analysis. Critically thinking employees develop their own problem solving decisions and justify them with strong arguments and convincing motives. Critical thinking manifests when employees understand that there is more than one decision and try to prove why their decisions are the best for an organisation. Critical thinking manifests when employees are able to reason why they took such a decision and demonstrate that their decision is based on analysis:

<..> all decisions should be based on arguments; it is important in an enterprise's activity, also, as I have mentioned, the client, for whom we are making a decision, doing a proposal, they anyway ask such questions "and what if...". We have to have ready answers before the client asks, so an employee should do this homework. [A27]

Category B – Critical thinking manifests as a verified and assured decision to act. This category encompasses disposition to doubt and aspiration to verify information: the skill to analyse a situation and one's own activity.

This category reveals that research participants relate critical thinking with permanent searching for truth, doubts and questions "why; how it could be done differently"? Research participants explain that doubt is a part of critical thinking. Verification of doubts and comprehensive analysis of the problem helps one to reach the best solution for an organisation in a crisis situation, selling products or providing services. The main emphasis in this category is put on appropriate scepticism. Critically thinking employees should be curious and seek to explore the problem by formulating various hypothesis and searching for evidence-based arguments:

I always pay most attention to people who come and ask – why? For example, why do you mix these blocks but not those? Why does he need to do that? Why I am doing this? And then I understand, he is my kind of person, now we could talk. That is important for us <...>. There is a sixth sense. But there are people at work who are working and they don't question why they should do that. [A23]

Critical thinking reveals itself also as a permanent analysis of one's own activities. Self-analysis is a prerequisite for the professional development of every person. The experience of every employee is useful and applicable if it

is analysed. Research data show that employers stimulate analysis of activities as an expression of critical thinking by initiating self-assessment questionnaires, discussions of self-assessment, and interviews:

Everyone is different: one can act very impulsively, and think afterwards; another doesn't say anything but you see from his behaviour, his writing, that he has paid attention. But there are cases – I do everything perfectly, you are looking for faults. <...> assessment, which is not only in writing, we share various forms with each other, but there are also personal conversations, we talk with them, what training do they need, in which direction does he want to develop.[A17]

Critical thinking in category B is also expressed as the skill to act by purposefully applying theory to practice. Research participants say that critical thinking appears with the understanding of tasks, not only the skill to explain the task in theory but also to do it in practice. Critical thinking reveals itself as employees' understanding how to perform a theoretically grounded specific task. Employers emphasise that newcomers very often lack the skill to apply theory to practice:

In talking about practical application, because in business there is always a practical part, you need to understand very clearly what you are doing, how are you doing it, how to do it with minimum resources or how to get the best quality, so this is very obvious when a student arrives. He only talks, talks, very creatively, freely, but when you ask about applicability, there is a big gap. [A15]

Research participants assume that to know theoretically how to act is not critical thinking. Critical thinking starts to manifest when employees apply theoretical knowledge to practice. Employers encourage application of theoretical knowledge to practice by joint activities, stimulation to discuss with colleagues, trying various approaches to solutions.

Category C – Critical thinking manifests as innovative decisions for operational improvement. This category reveals that research participants relate critical thinking with employees' initiatives in suggesting solutions which enable an organisation to develop added value. Original solutions are very important for the success of an organisation in the contemporary labour market, therefore research participants recognise critical thinking when employees suggest original, innovative decisions:

One person came and said what is wrong not only in structure, but also analysed from various perspectives and what could be better in a new system, the dangers if it goes uncorrected, what risks should be accepted, how much should be invested for particular purposes, how much it would save for a company. I was surprised, because I was not expecting that. I thought that a person in two three minutes will tell what is right, what is wrong, what to keep in mind. But when you see the structure, the prepared tables, you are surprised. He exceeded expectations, that this was a surprise. [A10]

Employers say that employees who give original/innovative suggestions tend to take a risk, but this is assessed as a prerequisite for an organisation's success. Therefore, research participants emphasise that critically thinking people have greater ambitions and greater aspirations in their professional career. They also say that such employees tend to try suggested innovations themselves.

Critical thinking in category C also manifests as skill to make suggestions for changing commonly accepted decisions. Organisations which want to be successful need to progress by applying science and technological innovations; therefore, employers value employees' different points of view and associate them with critical thinking:

There are processes, we have a quality management system, and everything is going well when suddenly there appears a person who says: "look, this is nonsense, it is a pointless step, we can do differently." What is it? It is real critical thinking. He took decisions which had been operating for years and years and changed them. He gave arguments which we accepted, we said, why not?[A9]

Data analysis shows that three categories: a decision to act here and now; a verified and assured decision to act; and innovative decisions for operational improvement, are expressed at different levels presenting how critical thinking manifests (Picture 1).
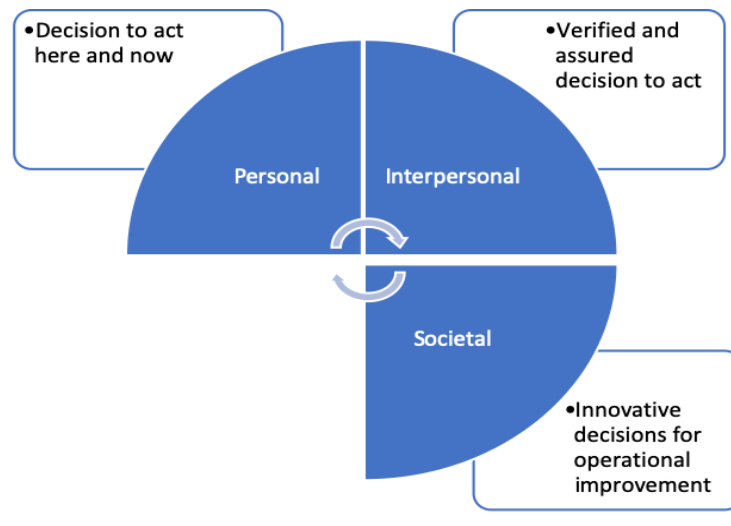
Picture 1. Defined categories
Source: developed by authors

The decision to act here and now as the expression of critical thinking is oriented to the personal level and describes a particular specific employee. Employers associate critical thinking with quick decision making by every employee. Research participants emphasise that there are many situations when an employee needs to react immediately and to make decision personally:

Because I represent a large pharmaceutical company, as I say, I don't need soldiers, I need paratroopers – they are sent to some specific area and they can do all kinds of things from idea to final implementation.[A4]

Thus, the employee assumes responsibility for deciding how to act in a way which is related to making decisions that are important to the organisation at the individual level.

A verified and assured decision to act as the expression of critical thinking is oriented to employees' activities in interaction with other members of the organisation. Decision making in this category is a collective process, when reasoned decisions are made in regard to the majority of a group's activities, opinions or positions. Employers emphasise that teamwork, by discussing and listening to others' arguments, enables good results to be reached:

And then something happens, we stick together as different elements, as various professionals from different fields working together – you alone cannot come up with a decision – everyone has to think and to suggest the best possibilities from their profession. You put it together and have a decision.[A13]

This category is connected with the interpersonal level and action in the best interests of an organisation.

Innovative decisions for operational improvement as the expression of critical thinking are oriented to employees' action with all members of an organisation. Employers emphasise that in seeking recognition and willingness to do better than others, progressive solutions are being developed and the added value of an organisation increases:

An employee says to me, but, manager, we can make better forms. Maybe we can look differently, flexibly. No, I can't work with these forms, it is a waste of time. After that follow arguments, that we have to suggest, to improve, make better, we are better, we can't go back. No, no, manager, I will not do that. A person sees much more. [A26]

This category is connected with the societal level, when critical thinking manifests as employees' interaction with others in order to reach innovative decisions, which would add value to an organisation.

While analysing the research data, the search was not only for the answer to the question how does critical thinking manifest, but it was also an attempt to find out what inspires manifestation of critical thinking in every category.

In Category A, internal and external inspiration relates to a person: internal inspiration comes from a person's courage: *"How do I make a decision? You just turn on critical thinking, analyse and make a decision. You say: whatever else I accept, this is my decision. Whether it is right or not is irrelevant because I made the decision after considering all the circumstances" [A19],* external inspiration comes from professional skills: "*a student comes and he knows everything, and you tell him, take a cable, here are pliers, here's a tip, please affix it. He does it at the fifth attempt, and you ask have you fixed it properly, he replies yes. He has no experience. When you explain what the standard is, how it should be, he becomes upset. But you encourage him by suggesting watching a training film."[A15]*

In Category B, a verified and assured decision to act is inspired by internal person's attitude and desire to understand the professional activity better: *"and you ask yourself, which would be the best, which combination would be the best. And you are searching for this. Maybe critical thinking is not in the first place, but it is, because it is important not only to find a decision for you but to find the best out of many"[A27].* External inspiration relates to a manager's expectations for a reasoned decision: *"Everything in our work should be assessed, analysed from all perspectives. We have meetings every Monday and we discuss everything, analyse, and prepare for the whole week. Our activity is focused and prepared in advance. To assess the situation quickly and to find a solution, I think, also is critical thinking, or at least part of it."[A14]*

In Category C, innovative decisions for operational improvement, internal inspiration is personal traits such as creativity and initiative: *"<...> employees are more active, they make suggestions, they don't sit calmly waiting to be told what to do. Not everyone. But there are success stories when employees come with their ideas, with initiatives."[A13].* External inspiration for new ideas is conditions created by the manager that enable employees to do so: *"<...> while giving the task, you encourage. The best examples are these people who work 110%. Their primary value changes at the end and you see that they did not 100%, but 110% or 120%. Such people as a rule have critical thinking. It is the best example of what kind of people are successful and their progress is much higher."[A2]*

In sum, phenomenography data analysis revealed three distinctive categories: a decision to act here and now (A); a verified and assured decision to act (B), and innovative decisions for operational improvement (C). These categories are supplemented by data variations. A decision to act here and now relates to reasoned decisions; a verified and assured decision is connected with analysing; innovative decisions are associated with new ideas for organisational progress. Research data show that critical thinking manifests at three levels: personal, interpersonal and societal. All categories are in hierarchical order: Category A is supplemented by the elements of Category B, Category C is complemented by the elements of Categories A and B, meaning that there are common traits in dominant employers' opinions.

4. Discussion

Research data show that research participants' experience about the expression of critical thinking of employees is in expanding focus from lower to higher order, e.g. from a decision to act here and now (Category A), via a verified and assured decision to act (Category B), to innovative decisions for operational improvement (Category C). Category A reflects the main direction of managers' reasoning about critical thinking, as the main attention is paid to quick and urgent decision making. Category B reflects a wider viewpoint as research participants experience critical thinking not only as decision making here and now but as a verified and assured decision to act. Category C is even wider as research participants relate manifestation of critical thinking with innovative suggestions which are viewed as progress of an organisation. Therefore, three categories represent the hierarchy, where Category B is considered as more inclusive than Category A, as it inevitably had features that characterise Category A. Similarly, Category C is considered as more inclusive than Category B as it has inherent features that characterise Categories A and B (Picture 2).
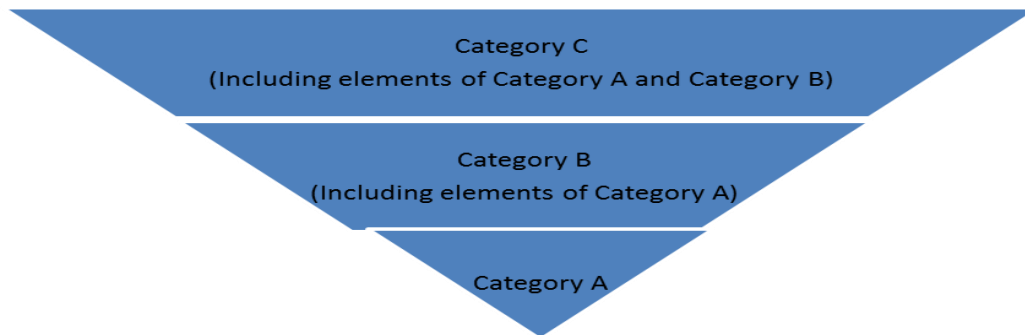
Picture 2. Hierarchic interconnection between categories

Source: developed by authors

This hierarchical order could be illustrated by data from a particular case. For example, a research participant explains: *"If an employee solves a here and now situation and only tells you that this was such a situation and he dealt with it in such and such a way, and you see that he did well, in a way you would do (or even better than you), then you understand that you should promote that person and he definitely has critical thinking" [A19].* In Category B fall his words that it is not enough to make decision here and now, it is necessary to analyse the situation and to reason one's own decision: *"How to make a decision? You switch on critical thinking, analyse, and make the decision" [A 19].* This example shows that every higher category has additional categories which enrich it and which were not part of the lower categories. Research data reveal structural aspects which describe employers' experience of manifestation of critical thinking in every category: at personal, interpersonal and societal levels. Category A relates to employers' attention to particular employees' activities when they need to

make decisions in an urgent situation in the workplace. Category B relates not only to urgent solutions, but also that they would be verified and assured. Category C is complemented with elements from Categories A and B – the verified and assured decision should be made here and now and be innovative, contributing to the progress of an organisation.

Research findings about employees' critical thinking correspond to previous research but also give new insights. Many authors (Penkauskienė et al. 2019; Powley, Taylor 2014; AMA 2012; Kreitzberg, Kreitzberg 2011) agree that employers value employees' skill to react quickly to changing situations and to make decisions. Penkauskienės et al. (2019) emphasise that employers relate critical thinking to employees' skills to avoid mistakes and make the right decisions, to correct and regulate themselves, and with social responsibility. Powley, Taylor (2014) argue that critical thinking manifests and helps more in making decisions in crisis, facing the challenges. The American Management Association survey (AMA 2012) showed that employers define these critical thinking skills: to make decisions, solve problems and to take action. According to Kreitzberg, Kreitzberg (2011) in the contemporary business world employees should quickly think and make decisions in uncertain, complex, and changing situations. Manifestation of critical thinking relates to the skill to make a reasoned decision to act and to act confidently. Similar findings are in research by Rahman (2019), Özgenel (2018), Franco et al. (2017), and Grossman et al. (2014). Findings of the research correspond to the data about reasoned decision making (Ganzer-Ripoll et al. 2019; Hansson, Hirsch Hadorn 2018; Bouwmeester 2013). Ganzer-Ripoll et al. (2019) analysed the group decision making process and the role of reasoning in the process. Bouwmeester (2013) discussed the role of reasoning in strategic decision making.

The research has revealed new insights into manifestation of critical thinking as innovative decision making. According to researchers (Bektaş et al. 2019; Terzić 2019) innovation is the main indicator of economic growth, which facilitates effectiveness and profit. It could be assumed that employers who value the progress of the organisation see critical thinking manifestation in it. Critically thinking employees are able to generate new ideas and unafraid to reject the old ones in the best interests of the organisation

5. Conclusions

The findings of the research have theoretical, methodological and practical significance. This is the first phenomenography research in Lithuania of employers' experience about the expression of critical thinking of employees. Research about the match of employees' critical thinking skills with the expectations of employers and labour market needs in Lithuania extends the field of phenomenography studies worldwide about critical thinking.
Empirical data allow identifying critical thinking related expectations of employers who anticipate that their employees could deal with emerging situations and are able to reason chosen decisions. Employers state that the critically thinking employee could make innovative suggestions; research participants describe critical thinking as higher order reasoning which gives added value to an organisation. Such understanding reflects the definition of critical thinking as a cognitive endeavour, directed to functionality in making decisions and solving particular problems.
Critical thinking by employees manifests at personal, interpersonal and societal levels. Employers explain critical thinking as employees' skills to make decisions and to justify them as reasonable at all levels. Another important element of critical thinking is employees' skill in working together with others.

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BAIL-IN AND INTERBANK CONTAGION RISK: AN APPLICATION OF FSQCA METHODOLOGY[*]

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Abstract. This work uses fuzzy set theory and qualitative comparative analysis (QCA) to determine the causal configurations leading to interbank contagion in a resolution event. This study pioneers the introduction of fsQCA methodology in banking crisis analyses. The event providing the necessary data for this study is the resolution of the Spanish bank Banco Popular. We develop sufficient and necessary condition analyses to find the key metrics that lead to interbank contagion. The results demonstrate that weak solvency metrics, low asset quality and belonging to the same country where the resolution has been triggered tend to lead to higher contagion.

Keywords: bail-in; banking resolution; FSQCA; contagion risk

1. Introduction

Most of the benefits of the post-global financial crisis banking regulations are well known and include improving the resilience of the banking sector, strengthening risk management and corporate governance practices, increasing transparency and minimizing the use of public funds to recapitalize the banking sector in the event of a banking crisis. However, most of the side effects of the new resolution framework remain unknown, with limited academic research focused on these topics.

A particularly important side effect of the new banking resolution framework comes as a consequence of the contagion effect that could take place between banks when a resolution is triggered. This paper starts with the proposition that the resolution of a banking entity entails a contagion effect that impacts other banks' subordinated debt and equity instruments.

This effect can be seen in the resolution of Banco Popular, where the subordinated and equity instruments of several European banks reacted to the write-down and conversion of Banco Popular equity and subordinated debt instruments. The resolution of Banco Popular is the first case within the European Union where the regulator used the write-down and conversion powers to resolve a banking entity. On June 6th, 2017, after shareholders and subordinated bondholders lost their entire investment, Banco Popular was sold to Banco Santander for EUR1 following the sale of a business tool described in the Bank Recovery and Resolution Directive, BRRD (European Commission, 2014).

The resolution of Banco Popular is used as a case study aiming to understand the reaction of the equity and subordinated debt instruments of a sample of EU banks directly supervised by the European Central Bank (ECB). Financial metrics such as solvency, asset quality, profitability or size are taken into account, allowing us to draw conclusions about which banks are more prone to suffer from bail-in contagion while others remain less volatile. In particular, the subordinated debt instruments of Spanish banks with weak solvency and asset quality metrics clearly suffered a strong contagion effect, while others remained almost unaffected after the resolution announcement.

A methodology approach based on fuzzy sets qualitative comparative analysis (fsQCA) is used to determine the causal configurations that lead a bank to suffer higher contagion when the resolution of a bank takes place. Despite rapid development in the use of fsQCA in the field of finance, its use in the area of banking crises is nonexistent according to the authors' best knowledge. This work shows the suitability of fsQCA to study the spillover effects of banking resolutions, therefore opening the door to a new wave of publications on similar subjects. The results of this analysis are relevant from an academic viewpoint and are also particularly important for practitioners including regulators, banks and investors, among other market participants. The findings could be considered helpful in predicting the contagion effects in a potential new case of resolution and, hence, optimizing the portfolio's returns.

This work is structured as follows: the introduction is followed by a theoretical background, section 3 focuses on the methodology, and then section 4 presents the results, followed by the conclusions section.

2. Theoretical framework

The resolution of a banking entity is understood as the procedure where one or more resolution tools are applied to achieve the objectives of safeguarding public interest by ensuring the continuity of the bank's critical functions and financial stability at a minimal cost for taxpayers (Single Resolution Board, 2016). In Europe, this process is triggered when the ECB determines that a bank is "failing or likely to fail", after the recovery plan proposed by the single supervisory mechanism (SSM) has failed. The Single Resolution Board (SRB), the central resolution authority within the Banking Union, has the responsibility of deciding whether a resolution is in the public interest and no other supervisory or private measures can restore confidence in the bank, or if the entity has to be liquidated. In the case of liquidation, the national insolvency laws will apply and the SRB will not be in charge of leading the process. This was the case for Banca Popolare Vicenza, Veneto Banca and ABLV Bank in 2017 and early 2018, respectively (Single Resolution Board, 2017a, 2017b, 2018).

If conditions for resolution are met and the European Commission approves the resolution scheme, the SRB will go ahead with the resolution process and apply a resolution tool, or a combination of them. As stated by the single resolution mechanism (Single Resolution Board, 2016), before any resolution tool is applied, the capital instruments of the entity must be converted into equity or written down. This implies that in any resolution case, equity and subordinated debt instruments should be impacted; hence, this work focuses on interbank contagion risk by analyzing the market performance of these instruments.

There is a small but growing body of literature on the subject of the unintended consequences of the new banking resolution procedures and particularly on the spillover effects of the bail-in tool (Avgouleas & Goodhart, 2015; De Grauwe, 2013; Hüser et al., 2017). Among the many spillover effects linked to the current banking resolution framework, financial contagion is a relevant effect, attracting the interest of researchers and practitioners. Financial contagion has been traditionally widely explored by academia due to its significant importance in both financial crises and the real economy (Allen & Gale, 2000; Pericoli & Sbracia, 2003).

As highlighted in previous literature, the bail-in tool or the write-down and equity conversion powers of debt and equity instruments can cause contagion across the banking sector (Havemann, 2018). Therefore, this work focuses on the degree of contagion between banks by analyzing the performance of such instruments in secondary markets in the event of a resolution.

Among the several channels through which financial contagion could take place, information contagion is one of the most relevant within the banking sector (Ahnert & Georg, 2012). There are diverse reasons for banks' investors to consider information about other banks as a key input for their investment decisions. First, two given banks could have equity and debt cross-holdings as well as interbank loans. Second, both banks could share exposure to the same kind of assets. This should imply that the information about the solvency or asset quality of a given bank could provide relevant insights about the financial soundness of other banks (Acharya & Yorulmazer, 2008).

In this work, we leverage the information contagion theory to analyze direct contagion across banks streaming from a bank resolution event. Following Iyer and Peydró, we use their broad definition of contagion between banks: "contagion takes place when the failure of a bank triggers a significant negative externality to other banks" (Iyer & Peydró, 2010). In particular, we measure this externality in the equity and subordinated debt market in our work. We acknowledge that measuring contagion risk and obtaining conclusions is not new. However, when focusing strictly on contagion arising from a bank resolution, the academic literature is almost nonexistent, which contrasts with its relevant implications for regulators, bank supervisors and market participants. Therefore, this work focuses on answering which causal configurations lead to interbank contagion in a resolution scenario.

3. Methodology

3.1. Case study and method

The case under study is the resolution of Banco Popular. We will draw relevant conclusions regarding interbank contagion from data compiled during the Banco Popular resolution event. On June 6th, 2017, the ECB notified the SRB that Banco Popular was "failing or likely to fail" on the grounds of a severe deterioration of the liquidity situation, given the solvency concerns linked to the extraordinary provisions disclosed in February 2017 and several downgrades from rating agencies, among other factors (European Parliament, 2017). Following the notification, the SRB, in coordination with the Spanish Resolution Fund (FROB) deemed that resolution was in the public interest and that no other feasible private options were available and therefore triggered the resolution procedure. The resolution tool applied was the sale of the business to Banco Santander with a previous write-

down and conversion of capital instruments. In practical terms, this is very similar to the use of the bail-in tool for junior subordinated and subordinated instruments.

To achieve the goal of understanding the key variables that lead to interbank contagion following the announcement of a bank resolution, this work uses the fuzzy set qualitative comparative analysis (fsQCA) methodology. This work contributes to the development of fsQCA as a technique to deal with banking crises. We find some references using fsQCA methodology to deal with bankruptcy from a general viewpoint (Boratyńska, 2016; Boratyńska & Grzegorzewska, 2018) or even to understand fiscal policy reactions or regulatory responses to the global financial crisis (Hörisch, 2013; Young & Park, 2013). However, the current literature using fsQCA in the field of banking financial analysis is scarce, with Pinto and Picoto (2018) being one of the few articles where the methodology is used. In particular, the authors use fsQCA to explore whether the levels of loan loss provisions can be explained by the banks' size and the level of nonperforming loans.

fsQCA is an analytical technique that combines the use of fuzzy set theory, Boolean algebra and comparison techniques (Ragin, 1987, 2000, 2008). Fuzzy sets are considered to be an extension of the classic set theory and can be defined as sets whose elements have different degrees of membership (Zadeh, 1965). Many authors concur that the calibration of fuzzy sets is a key step when dealing with methodologies where fuzzy set theory is involved (Woodside & Zhang, 2013). In line with the literature, the calibration of fuzzy sets implies a transformation process of the original variables into fuzzy numbers that represent a degree of membership.

Once the calibration of fuzzy sets has been completed, the use of QCA methodology allows the identification of the presence (absence) of a given attribute necessary or sufficient for the presence (absence) of a particular output. In our study, this output is financial contagion. fsQCA methodology consists of simultaneously performing a necessary condition and a sufficiency condition analysis. In the necessary condition test, a condition is called necessary if the outcome cannot take place without this condition (Ragin, 2014). Regarding the sufficiency test, a condition or causal configuration is called sufficient if it is enough to reach a given outcome. However, this does not rule out other ways to obtain the outcome (Ragin, 2014).

In this methodology, variables are known as conditions allowing the identification of different configurations that lead to a given outcome. In our study, the outcome is interbank contagion through equity and the banks' subordinated debt instruments, and the conditions are key credit fundamental metrics.

One of the key strengths of fsQCA is its ability to identify causal relationships behind a given outcome, which is particularly relevant in highly uncertain environments where several variables are somewhat related to the output. Our work exploits the fsQCA capacity to detect such conditions and allows us to draw relevant conclusions regarding interbank contagion through equity and debt financial markets in the event of a bank resolution. In addition, fsQCA does not require a large dataset to apply the method, which is particularly relevant in our case where we study a single resolution event and the dataset contains information about a limited number of European banks under the supervision of the ECB (Fiss, 2011).

3.2. Data

We make use of two databases that we have developed for the purpose of this work. The first one contains fundamental data from the sample of EU banks included in this analysis. The sample is composed of 37 European banks directly supervised by the ECB that satisfy the condition of having at least one of the following instruments traded actively in a secondary market at the time of Banco Popular's resolution: equity, Additional Tier 1 and Tier 2. Data for this database are obtained as of 1Q17 from the banks' quarterly reports; when no quarterly data are available, the information is obtained from the 2016 annual accounts. In particular, we focus on 5 key fundamental metrics including solvency, asset quality, profitability, size, and country. We have chosen these

conditions since they are commonly used to rate the banks' credit quality. Table 1 summarizes the information stored in both databases.

Table 1. *Description and data sources*

Outcome/Conditions	Description/Measure	Source	Database
Solvency	Common Equity Tier 1 ratio	Company reports	Database 1
Asset quality	Nonperforming loans ratio	Company reports	Database 1
Profitability	Return on Equity	Company reports	Database 1
Size	Total Assets	Company reports	Database 1
Country	Country where the parent company is based	Company reports	Database 1
Contagion effect (Outcome)	Market performance of: i) Equity, ii) AT1, and iii) Tier 2	Market data - Bloomberg	Database 2

Source: Authors

The second database that we use in this study contains data on the different securities issued by the banks in our sample, including equity, Additional Tier 1 and Tier 2, and their weekly trading levels since early 2016 until the date of the resolution of Banco Popular. Data are obtained from Bloomberg, and we exclude Additional Tier 1 and Tier 2 instruments that are not actively traded in a secondary market. We use the performance of equity, AT1 and Tier 2 instruments during the month prior to the resolution of Banco Popular until the day that the resolution was announced. This allows us to capture not just the impact of the resolution announcement but also the rumors and leaks about a potential resolution that led market participants to start anticipating a resolution of the bank some days prior to the official announcement. Next, we describe the calibration approach followed for each condition.

3.3. Conditions and calibration

As part of the fsQCA methodology, each condition and outcome is calibrated to identify if it belongs to a given set. In short, we have identified the degree of membership of each condition to the set. For example, the calibration of "Contagion effect" consists of identifying if a bank belongs to the set "contagion" (fuzzy value of 1) or does not belong at all (value of 0). Furthermore, the degree of membership could take any value from 1 to 0. In this work, the calibration method applied is the direct method proposed by (Ragin, 2014). The use of this calibration method implies that 3 thresholds have to be defined: full membership, full non-membership and the maximum ambiguity point.

The conditions related to the contagion effect under analysis are as previously described: asset quality, solvency, profitability, size and country. Next, we elaborate on the condition and define the calibration approach followed in each case.

To measure the banks' asset quality, we use the variable "Non Performing Loans" ratio (NPL), since this is the most commonly used metric to analyze the asset quality of a bank (European Parliament, 2018). To define the threshold, we use the European Banking Authority (EBA) threshold levels, which allow us to classify the banks in 3 groups depending on their asset quality levels (European Banking Authority, 2018). In particular, we classify banks with NPL ratios below 3% as strong asset quality banks and above 8% as having a weak asset quality. The crossover point was considered the average between the 2 thresholds.

With regard to solvency, in line with the ECB, the EBA and most of the international organizations, we use the CET1 ratio, which is calculated as Common Equity Tier 1 capital divided by risk weighted assets. Following the EBA classification, we consider banks having a CET1 ratio above 14% as having a strong asset quality, and weak

asset quality as those banks with a ratio below 11.5%. Once again, the maximum ambiguity point is defined as the average between the 2 thresholds.

Regarding profitability, we use the return on equity (RoE), which is also a very common indicator for profitability and is used by several regulatory and supervisory bodies. Again, we have followed the thresholds used by the EBA. We establish the following thresholds: high profitability (RoE >10%), low profitability (RoE<0%) and the maximum ambiguity point, which was considered the average between the 2 thresholds.

Regarding the size of the banking entity, we follow the ECB approach, classifying the banks' size based on their total assets. In this case, we have slightly changed the thresholds used by the ECB to adapt to our sample of banks and obtain more insightful results. The classification is as follows: very large international institutions (total assets>EUR500bn), small size banks (total assets<EUR50bn), and the crossover point was considered to be the average between the 2 thresholds. Finally, we also take into account the condition "country", which refers to the country where the parent company of each banking group is based. Table 2 summarizes the main descriptive statistics and the anchors of calibration for the conditions.

Table 2. Descriptive statistics and conditions calibration

Conditions/Outcome	Fully In	Crossover Point	Fully out	Max	Min	*M(SD)*
Asset quality	2	5.5	8	58.23	0.50	12.02 (13.11)
Solvency	14	12.75	11.5	19.50	8.15	13.72 (2.25)
Profitability	10	5	0	15.81	-36.07	2.26 (9.88)
Size	500	275	50	2076.96	7.04	381.99 (505.17)
Country	Dichotomous conditions. Presence (1) or Absence (0) of the bank in the country where the resolution takes place (Spain).					

Source: Authors

Regarding the outcome, we use the equity, Additional Tier 1 (AT1) and Tier 2 market performance to classify banks. Focusing on the performance of the three asset classes, we have classified banks into four categories: i) no contagion, ii) low contagion, iii) moderate contagion and iv) high contagion. The next table shows the thresholds we have used in the different asset classes to classify banks in the four groups just mentioned. In the case of equity instruments, we have used the monthly share price performance from one month prior to the resolution announcement until June 6th, 2017, when the resolution took place as inputs. Regarding the AT1 and Tier 2 instruments, we use the asset swap spread (ASW) performance in basis points (bp) during the same timeframe.

Table 3. Calibration of the outcome

	No Contagion	Low Contagion	Moderate Contagion	High Contagion
Equity	ΔEquity$\geq$0%	0%>ΔEquity$\geq$3%	-3%>ΔEquity$\geq$-10%	Δ Equity<-10%
AT1	ΔAT1$\leq$0 bp	0 bp<ΔAT1$\leq$10 bp	10 bp<ΔAT1$\leq$25 bp	ΔAT1>25 bp
Tier 2	ΔTier2$\leq$0 bp	0 bp<ΔTier2$\leq$10 bp	10 bp<ΔTier2$\leq$20 bp	ΔTier2>20 bp
Degree of membership for the outcome (Contagion)	0	0.25	0.75	1

Source: Authors

4. Results and interpretation

4.1. Conditions and calibration

Table 4 shows the results of the necessary condition analysis. At first glance, it is evident in the first two columns (fs_cont) that there is no necessary condition that leads to contagion because the consistency values are lower than 0.9 (García Álvarez-Coque, Mas-Verdú, & Roig-Tierno, 2017). However, when focusing on the absence of contagion, we find that not being in the country where the resolution took place is a necessary condition to avoid contagion (consistency 0.9). In addition, we have identified solvency as an almost necessary condition to avoid contagion (Schneider, Schulze-Bentrop, & Paunescu, 2010). The results are in line with our initial proposition highlighting that solvency and the country where the bank's parent company is based are particularly relevant. We acknowledge that in complex scenarios where several conditions can play a key role, finding a necessary condition to determine a given output is rare. Therefore, the sufficient condition analysis that we develop next highlights the combination of conditions that lead to contagion.

Table 4. Necessary condition analysis

Conditions tested	Contagion		Absence of Contagion	
	Consistency	Coverage	Consistency	Coverage
Solvency	0.546157	0.533206	**0.879387**	0.553634
~Solvency	0.542793	0.874666	0.258550	0.268669
Asset quality	0.430186	0.669929	0.506002	0.508147
~Asset quality	0.684163	0.682305	0.671322	0.431733
Profitability	0.569733	0.714858	0.525064	0.424840
~Profitability	0.541605	0.638781	0.647591	0.492534
Size	0.439986	0.681020	0.426008	0.425210
~Size	0.628645	0.629407	0.680421	0.439308
Country	0.280374	0.833333	0.086957	0.166667
~Country	0.719626	0.550000	**0.913043**	0.450000

Note. The suffix "fs" means that the condition is calibrated, and "~" means the absence of the condition.

Source: Authors

4.2. Analysis of sufficient condition

The next table shows the results of the sufficiency analysis. We have developed two different models to deal with the sufficiency condition analysis. Model 1 focuses on the *solvency*, *asset quality*, *profitability* and *size* conditions, while Model 2 adds the *country* condition. The fact that Model 1 has three possible configurations while Model 2 has six is explained by equifinality, one of the key properties of fsQCA. In this context, we understand equifinality as the existence of multiple paths or solutions to a particular outcome (Elliot, 2013). For each of the models, we find a group of combinations that lead to contagion. According to (Ragin, 2014), the results obtained in both models are consistent (solution consistency >0.75). We present the results in the next table, following Fiss (2011).

Table 5. Sufficiency analysis

	Contagion (Model 1)			Contagion (Model 2)					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
Solvency	◯	◯		◯	◯	◯		●	◯
Asset Quality	○		◯	●		○	○	○	○
Profitability		●	○	●	●	○	●	○	○
Size			⬤		●	○	○	●	
Country							⬤	⬤	○
Unique coverage (cov.u)	0.436	0.315	0.185	0.188	0.201	0.237	0.113	0.056	0.218
Raw coverage (cov.r)	0.175	0.095	0.045	0.044	0.035	0.022	0.023	0.012	0.031
Consistency (incl.)	0.904	0.927	0.859	0.953	0.924	0.900	1.000	1.000	0.855
Solution coverage		0.577				0.525			
Solution consistency		0.883				0.917			

Note. As in Fiss (2011), ● means the presence of the condition. ○ means the absence of the condition. Large circles mean the core condition, and small circles mean the peripheral condition.

Source: Authors

Regarding Model 1, we observe three different sufficiency configurations that could lead to interbank contagion in the case of resolution. In particular, the first combination shows that banks with very low solvency levels combined with low asset quality will experience contagion. The second combination again highlights weak solvency as one of the key drivers for contagion, while the third configuration highlights a very weak asset quality combined with a large volume of total assets.

Regarding the second model, when including the country condition, the results are in line with those obtained in Model 1 and highlight the lack of solvency as one of the main drivers that lead to contagion. In addition, a weak asset quality is once again relevant with regard to contagion. Finally, we clearly observe that belonging to the country where the resolution has been triggered is also extremely relevant, as seen in combinations 4 and 5 in Model 2.

Regarding the profitability and size conditions, the analysis shows mixed results, hence suggesting that these two conditions are not key items for predicting contagion in a resolution environment.

5. Conclusion

As per the best of the authors' knowledge, this work represents the first study to use fsQCA methodology in the field of banking crises and banking resolution. This methodology proves to be particularly adequate in analyzing complex causal relationships, therefore opening the door to the use of fsQCA in the study of financial crises and the spillover effects of banking regulatory frameworks, among other areas.

Overall, the results indicate that banks with weak solvency metrics and a low asset quality tend to suffer higher contagion when a resolution is announced. In addition, a bank belonging to the country where the resolution has been triggered also tends to be related to a higher contagion risk. On the other hand, profitability and size seem to be much less relevant with regard to interbank contagion.

In particular, from the necessary condition analysis, we can conclude that there is not a single condition that could lead to contagion on a stand-alone basis. However, when focusing on the necessary conditions to avoid contagion, we do observe that banks with high solvency ratios and/or banks not based in the country where the resolution takes place generally do not suffer from contagion. Regarding a sufficient condition analysis, the conclusions are straightforward, demonstrating that solvency, asset quality and the country where the bank is based are the three key conditions that explain contagion.

The implications of this work may be relevant from an academic's and practitioner's viewpoint. Particularly from a methodological viewpoint, this study opens the door to the use of fsQCA in the field of banking crises and banking resolution. We believe that fsQCA, which combines fuzzy sets theory and quantitative qualitative approaches, could become a widely used methodology to deal with uncertain and complex environments such as financial crisis analysis in the future. Furthermore, this methodology could be used in future resolution cases, which would increase the accuracy and the relevance of the conclusions obtained from the sufficient and necessary condition analyses. Regarding the practical implications of this work, the conclusions reached contribute to the banking supervisors and regulators' better understanding of the contagion mechanism across banks. In addition, the results highlight which banks could be subject to higher contagion as a result of triggering a bank resolution. The findings of this study could also be used by investors and other market participants to fine-tune investment strategies in scenarios in which the risk of banking resolution is high.

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STIMULATION OF ENTREPRENEURS' INNOVATIVE ACTIVITY: EVIDENCE FROM KAZAKHSTAN

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Abstract. In recent years, Kazakhstan's innovation policy has enjoyed a noticeable rally: ways to support innovation are being actively discussed, a suitable "toolbox" is developing, the susceptibility of decision-makers to the mechanisms for encouraging innovation is increasing. Nevertheless, effective levers of influence on business, in which innovation activity could manifest locally, have not been found yet. Although this does not change the overall economic situation. Following on from the results of a survey of various level business managers and factor analysis performed prior, the authors study the influence of incentive mechanisms on entity activities and their "inquiry" on the public policy content. The authors come to the conclusion that most of the tools to stimulate innovation entrepreneurship in Kazakhstan are currently aimed at successful market players, creating conditions for technological modernization of existing industries, and at improving the level of entrepreneurs' business and technological competencies. According to a study conducted in Kazakhstan, it is necessary to increase the participation of universities, research institutes, local executive and legislative authorities in the development of management mechanisms and the promotion of innovation entrepreneurship.

1. Introduction

The state's awareness of the role of innovation in sustainable economic growth has given a certain dynamism to the policy in this area, the support of which has become one of the national priorities. Stimulating measures are being discussed, appropriate tools are being intensively developed. Many of these take no more than a year to be

tangibly embodied. A certain array of specialized literature has been accumulated, where the need for government intervention in innovation is substantiated, and associated negative practices are analyzed. Experts regularly pay attention to certain examples of the dynamic development of medium-sized businesses, of a substantial increase in innovation expenditures within a number of large companies, of an increase in business interest in the results of research and development (R&D) and further expanding cooperation with domestic scientific and academic institutions.

Nevertheless, in the midst of these positive processes, qualitative changes in the overall macroeconomic situation of Kazakhstan are still to be observed. Within 2011-2017, only 8.1-9.6% of entities would implement innovations while the share of innovative products in the total output would remain below 1.6%, and there were no prerequisites for these indicators to grow whatsoever.

The aim of this article is to conduct a study of the impact of incentive mechanisms on the activities of companies and their "request" on the public policy content on the basis of a factor analysis and a sociological survey of Kazakhstan company managers of various levels.

2. Literature review

The issue of the state innovation policy effectiveness, and effectiveness of the set of measures adopted has become particularly relevant. According to experts (Howie, 2018), (Odinokova, 2019), (Kireyeva et al., 2018), (Kurmanov et al., 2016), (Labunska et al., 2017), (Kolechkina et al, 2019), (Mikhailov et al, 2018) unrelated state activities may significantly hamper the innovation performance (Naama, 2001; Naama, 2011). In addition, it largely depends on the specifics of various areas and the capabilities of incentive mechanisms. In Kazakhstan, a shortage of empirical study is observed, which is the means of assessing the contribution of various measures to the development of corporate innovations, their relationship with competitiveness and productivity, and researching the models of innovative behavior of firms. In this context, notable publications such as (Onyusheva, 2017), (Smirnova, 2016), (Tumalavičius et al., 2017), (Ivanov et al., 2012), (Caurkubule et al., 2020), (Chehabeddine, Tvaronavičienė, 2020), (Vigliarolo, 2020) are to be singled out. There are even fewer works that would systematically examine the impact of public policy on the behavior of business entities at the micro level (Jumakulov et al., 2019), (Musaripov et al., 2019), (Kurmanov et al., 2019), (Popova et al., 2019), (Pukala & Petrova, 2019), (Lazarova et al, 2015), (Yankovyi et al., 2019), (Zbierowski, 2017), (Zahars & Stivrenieks, 2018), (Pachura, 2015), (Lincényi, Čársky, 2020).

Thus, an assessment of the state support tools' contribution that encourage entities to innovate is to be combined with an analysis of the main factors that determine the overall "value" of the corresponding motivation and behavior of innovatively active firms. The effectiveness of innovative activities of entities cannot only be judged on the basis of innovation gross indicators. It is important to determine the sensitivity, orientation of business representatives to them, and behavioral effects. Microeconomic studies of the behavior of entities that are innovative form the basis for such conclusions.

3. Methods and information sources of research

As a rule, the assessment of the state policy impact on innovatively active entities, is carried out on the basis of the expert opinion study. It is important to note that the final conclusions are quite sensitive to the selection of experts, and moreover, it happens to be rather rare to ensure the joint activities of various professional group representatives.

The sociological study hypothesis is an assumption of the positive role of incentives and policies in Kazakhstan entities' innovative activities.

The analysis of state support tools for innovation entrepreneurship is based on a survey of the managers of Kazakhstan's 60 industrial establishments held as part of the Global Challenges Summit 2018 at the XXI Astana Economic Forum in 2018.

The selection of companies included in the survey can be considered balanced on all parameters critical for further analysis. It covers a wide range of businesses of very different levels (both in terms of production and the employee number), age, industry affiliation, etc. The sample structure is shown in table 1.

Table 1. Brief characteristics of the sample

Name	Entity share *(%)*
Entity life	
Less than 5 years	12.0
5 to 10 years	16.7
10 to 20 years	31.5
More than 20 years	39.8
Scope of activity	
Crude oil and gas production	44.7
Chemical production	12.2
Machinery and equipment manufacture	5.9
Metallurgy	18.7
Telecommunications	3.7
Fuel industry	8.6
Energetics	6.2
Employee number	
Less than 250	35
250 to 500	30.5
501 to 1000	21.7
More than 1000	12.8
Export availability	
To the former USSR countries	54.6
To foreign countries	32.8
Ownership structure	
Foreign owner participation	43.7
State participation	14.8
Financial health	
Good	27.7
Satisfactory	69.2
Bad	3.1

Source: compiled by the authors

A sociological study in this article is aimed at studying incentives for the innovative activities of entities and their "request" for the content of state innovation policy. In this regard, the heads of Kazakhstan companies were asked two main questions:
1) what incentives have the greatest / the least impact on innovation activity?
2) how do state support tools influence the innovation activity of entities?

The survey allows constructing a system of indicators that describe the innovative behavior of entities in the real sector of the economy and the factors that determine it, as well as compare the estimates with the results of other studies.

The empirical data on the behavioral strategies of Kazakhstan entities obtained during the study makes it possible to clarify the role and importance of the existing state support mechanisms for innovation in business, to assess the "requests" of businesses for the state industrial and innovation policy content to further increase their competitiveness.

Following the analysis of the tools stimulating businesses to innovate during the study. These were classified as follows:

- horizontal incentives which are preferred for horizontally organized economy areas ready to compete with foreign players. These are driven by the example of other players;
- vertical incentives which are peculiar to vertically organized industries. These are due to the transition of major consumers and product suppliers to new technologies;
- technological incentives which are closely related to the offer of technological solutions by experts, scientific and academic institutions;
- coercive incentives which are implemented by the state through the influence of the authorities on the behavior of entities, changing the nature of public procurement, and tightening the requirements of technical regulations.

Preliminary results of the factor analysis of manufacturers' demand for technological innovations and for various tools to stimulate innovation have formed the basis for this article. Factor analysis has revealed factors explaining more than half of the variance of respondents' answers.

4. Results

In 2017, in the framework of the scientific theme "Modern mechanisms of innovation management in the development of entrepreneurship in the Republic of Kazakhstan" (Kirdasinova, Kurmanov, 2017), a sociological study was conducted based on a survey of the managers of Kazakhstan's 60 industrial establishments. According to the results of the study, incentives for innovative activities ranked according to the survey of the managers of innovatively active businesses in Kazakhstan (figure 1).

See Figure 1 for the incentives for innovative activities for 2015-2017 ranked according to the survey of the managers of innovatively active businesses in Kazakhstan.
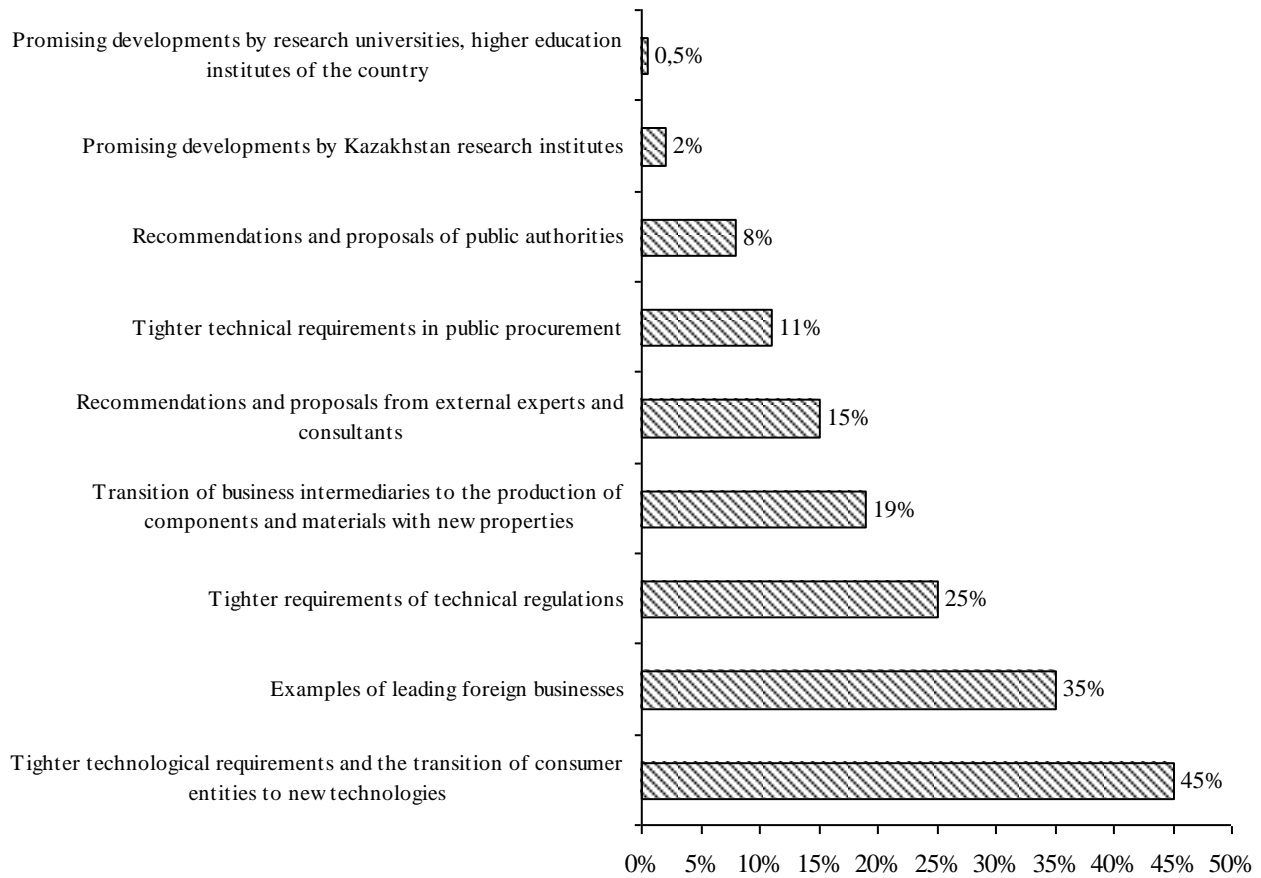
Fig. 1. Incentives for Kazakhstan business innovation activity in 2015-2017

Source: compiled by the authors according to the results of a sociological study

The results of the study in Figure 1 indicate the highest popularity of horizontal and vertical incentives for innovation activity among innovatively active entities in Kazakhstan (45% and 35%, respectively).

So far, the state's incentive for the implementation of innovation activities by the entities is manifested in the form of tightening requirements of technical regulations. Only 11% of domestic innovative businesses note the positive role of public procurement. The contribution of innovation proposal from the Kazakhstan research institutes and research universities seems very limited.

The factor analysis in table 2 has revealed the factors that explain more than half of the variance of respondents' answers.

Table 2. The results of factor analysis of incentives for innovation at the micro level

Innovation activity incentive	Component factor load			
	Vertical cooperative	Innovation proposal	Foreign practices	Active state influence
Tighter technological requirements and the transition of consumer entities to new technologies	*0.730*	-0.096	0.054	0.160
Examples of leading foreign businesses	-0.080	0.141	*0.754*	-0.266
Tighter requirements of technical regulations	0.180	-0.180	*0.640*	0.325
Transition of business intermediaries to the production of components and materials with new properties	*0.707*	0.175	-0,024	-0.188
Recommendations and proposals from external experts and consultants	-0.245	*0.615*	0.345	0.084
Tighter technical requirements in public procurement	0.078	0.230	-0.002	*0.530*
Recommendations and proposals of public authorities	-0.096	-0.060	-0.017	*0.726*
Promising developments by Kazakhstan research institutes	0.009	*0.740*	-0.069	0.130
Promising developments by research universities, higher education institutes of the country	0.165	*0.628*	-0.050	-0.040

Source: compiled by the authors on the basis of estimates of business managers and calculations by the method of principal components

The revealed factors have coincided practically with the initial assumptions on the main groups of incentives:
- vertical cooperative factor that is associated with the processes of technological updating and the structure of value chains of industrial cooperation. It is important for metallurgy, production of equipment and electric machines, large enterprises.
- proposal of innovation. This factor comes from the external environment of the entity (recommendations and suggestions from consultants and experts, promising developments of domestic research institutes and universities). It stimulates innovation activity in businesses, manufacturers of machinery and electrical equipment, oil and gas sector representatives, players focusing on demand from large businesses and the state.
- foreign practices that is associated with the tightening of technical regulations, often implying the reduction of internal technical standards to the standards of the most developed countries. It is important for large enterprises with the participation of foreign companies and shareholders who are subject to fierce competition with domestic and foreign players, especially in the engineering.
- the active influence of the state. This factor manifests in increasing the technical requirements of public procurement, as well as recommendations and suggestions including informal ones by authorities. It is typical for companies focused on state orders and government sponsored enterprises, primarily in the production of equipment and machinery.

The susceptibility of entities to one or another incentive tool depends on both the individual peculiarities of their activities and objective parameters. Given this circumstance, the relationships of these factors with two main features of the innovation process at the micro level are further considered:
- a positive assessment of the "contribution" to the innovation activity of a competition;
- the constant process of introducing innovations as a mechanism to strengthen the entity's market position.

The first of the features has shown a clear negative relationship with the "active influence of the state." Significantly positive is correlation of this feature with the "innovation proposal" at about 10%. The lack of an explicit linking of the first feature to "foreign practices" can be explained by a direct correlation of this indicator with the intensity of pressure from foreign players – a phenomenon not inherent in optimistic assessments.

The second situation is simpler. It demonstrated a positive dependence only on "foreign practices" and almost complete independence from the other 3 factors.

In general, we can conclude that measures related to "manual control" and public procurement are primarily sensitive for businesses that are not ready for serious competition and depend largely on the state. In their turn, actions aimed at "pulling up" to the level of leading foreign companies, positively affect Kazakhstan businesses operating in competitive markets and developing according to an innovative model. Thus, in modern conditions, the two most common schemes in Kazakhstan are:

- a horizontal one, based on the experience of foreign companies in conditions of strong competition;
- a vertical one, based on partnership.

At the same time, it should be noted that the model of "innovative supply" bears significant potential in Kazakhstan. It involves technological modernization of businesses in vertically organized sectors and the strengthening of incentives for innovation in their cooperation chains.

Table 3 shows a set of tools that stimulate Kazakhstan entities to carry out innovative activities selected for further analysis.

Table 3. Description of tools for stimulating Kazakhstan entities to implement innovative activities

Tools	Year of application	Resource volume, million tenge
Tax support		
Tax relief when investing into R&D	2008	n/a
Benefits for special economic zone (SEZ) participants	2011	n/a
Direct financing		
1% of the total annual income of subsoil users in R&D	2017	1%
Financing through development institutions		
"Startup Kazakhstan" program (stimulating the development of high-tech start-up companies that are focused on solving technological problems)	2016	1 881,2
Government of Kazakhstan and the World Bank Joint Project "Promoting Productive Innovation"	2016	$110 million
Innovation funding (for the technological development of industries, the technological development of existing businesses, the commercialization of technologies)	2015	17 773,5
Innovation infrastructure		
Regional technology park development including integration with universities considering their geographical location	2015	266,9
Technology center development with the involvement and co-financing by transnational corporations	2016	1 333,9
"ITP" Innovation Cluster and its participants development	2016	1 691,6
Nazarbayev University's Business Campus Astana infrastructure development	2015	4 219
Regulation		
Technical regulation development, formation of new standards and regulations in the EAEU	2004*	-
Interaction organization		
Promotion and coverage of innovation activity	2015	1136,4
National Innovation Competition holding	2015	281,5
Note:*- in accordance with the Law of the Republic of Kazakhstan On Technical Regulation. 2004		

Source: compiled by the authors

Table 3 shows the complex of selected tools stimulating Kazakhstan businesses to carry out innovation activities, which are somewhat "biased" towards innovation infrastructure and financing through development institutions. This is due to current accents in the State program of industrial and innovation performance of the Republic of Kazakhstan for 2015-2019 (SPIID-2) (SPIID for 2015-2019, 2014). They seem to be very "noticeable" in the eyes

of the expert community, diverse in nature and the expected effects, while they do not have a clear industry focus. This selection, while relatively small in size, clearly reflects the aforementioned trends: "diversification" of support tools and activation of innovation policy.

The heterogeneity of the incentives for the implementation of innovation activities by businesses initially allows to assume a significant difference in the scale of their application. In our opinion, non-selective measures of state support should affect "on average" a wider range of knowledge-based businesses (Koval et al., 2018; Drobnic, 2019).

In general, the interviewed respondents have confirmed the hypothesis about positive contribution of state policy to the business innovation activity (Figure 2).
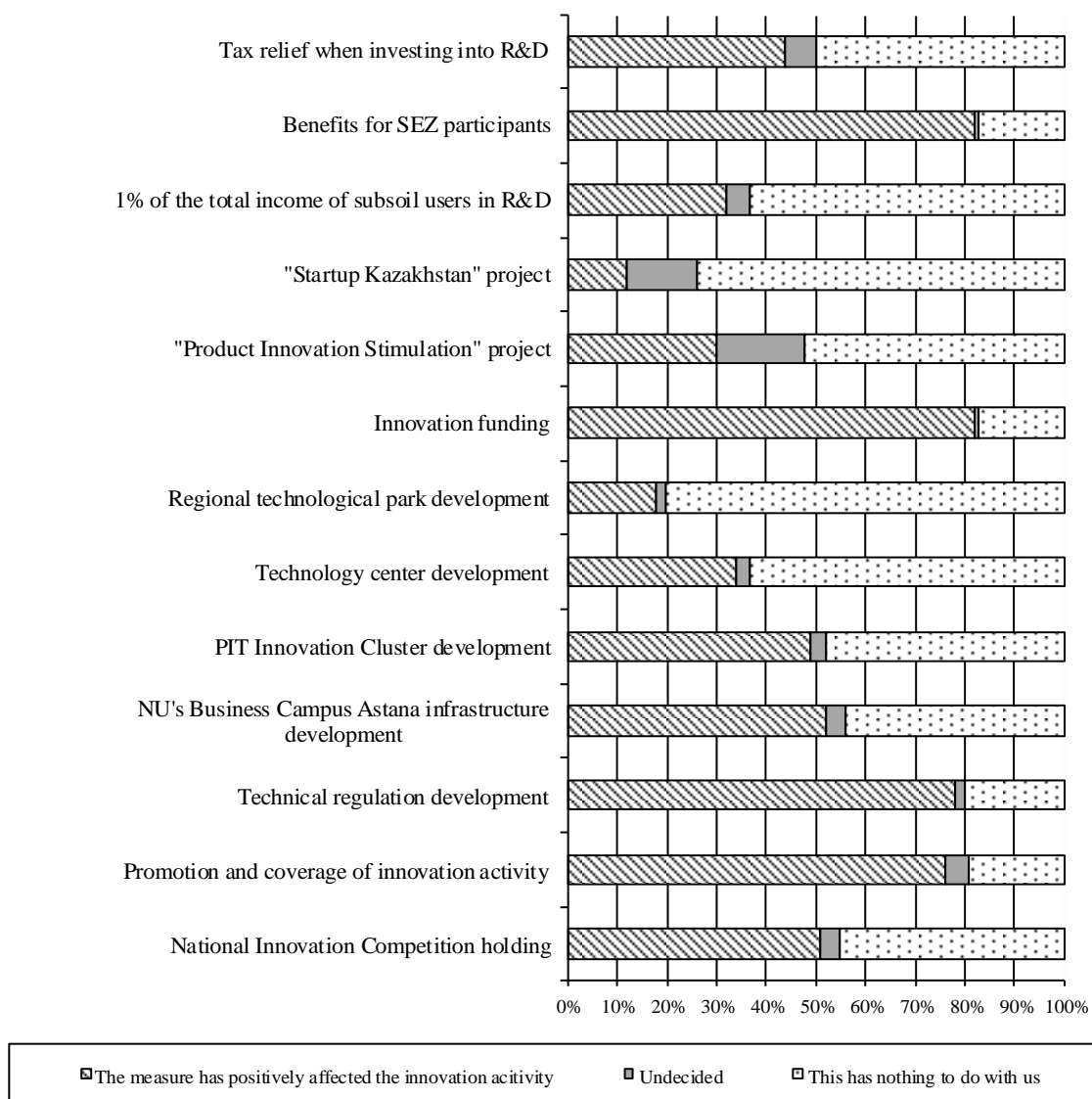
Fig. 2. The impact of state support tools on innovation activities of businesses

Source: Compiled by the authors

As seen from Figure 2, the focus of tax policy in Kazakhstan on supporting innovative entities is visible to a greater extent on the example of tax relief and preferences provided to payers in the zones with special legal and tax regimes. In the Republic of Kazakhstan, the basic tax rates for the entities engaged in innovation activities in the territories of "ITP" and "Astana-Technopolis" SEZ are reduced by 100%.

The Tax Code of the Republic of Kazakhstan has been introduced with tax incentive measures for the contribution of subsoil users and businesses in R&D. Among those is a direct tax on subsoil users on R&D in the amount of 1% of the total annual income and deductions from the tax base of businesses on R&D in the amount of 50%.

It is important to note that a study of the effectiveness of tax relief aimed at developing innovation and innovation entrepreneurship in Kazakhstan is still to be conducted. In 2011-2012, at the request of the Government of the Republic of Kazakhstan, the UN Economic Commission for Europe conducted a study to assess the innovation performance of Kazakhstan. During this study, the existing tax benefits for knowledge-based businesses have been studied. So, for example the UN Review concludes that the existing system of state support measures for innovation in the country is insufficient and it needs to be expanded in a number of areas. UN experts do not focus on the need to significantly expand the list of tax incentives for innovative businesses. In their opinion, this is due to the fact that Kazakhstan has more powerful factors impeding the transition to the development of an innovative economy than the unfavorable tax regime:
- imperfection of the framework conditions of the NIC;
- insufficient direct funding of science (UNECE, 2012).

The fact that some tax benefits were introduced in Kazakhstan relatively recently is to be considered, and, in our opinion, their effect is yet to manifest itself. Thus, at the moment, assessing the effectiveness of tax incentive measures aimed at stimulating innovation entrepreneurship and innovation performance seems premature.

In our study, a direct tax for subsoil users on research and development in the amount of 1% of the total annual income was attributed to direct financing of innovative activities of entities. So, in accordance with the new Tax Code of the Republic of Kazakhstan, these funds will be transferred to the ITP Autonomous Cluster Fund (ITP ACF) and the Nazarbayev University Autonomous Educational Center (Nazarbayev University AEC).

On June 14, 2018, a joint decree was signed by the Ministry of Industry and Infrastructural Development (MIID) and the Ministry of Education and Science of the Republic of Kazakhstan (MES) on the "Rules for financing research, scientific, technical and development works in the amount of 1% of the extraction costs incurred by subsoil user in the previous year." In accordance with this decree, a subsoil user in Kazakhstan receives a legal mechanism to send one percent of their total income over the last year to R&D. According to the Tax Code of the Republic of Kazakhstan, these funds are sent to Nazarbayev University AEC, ITP ACF, and to the universities accredited in the Ministry of Education and Science of the Republic of Kazakhstan system.

According to the MIID officials, in the period between January 1st and November 11 2018, about 1 billion tenge has been attracted from subsoil users to ITP ACF as part of the implementation of the innovation cluster projects and the obligations to finance R&D. During this period, 22 projects were funded for a total of 695 million tenge in the following areas: energy, subsoil use, geological exploration, safety engineering, Industry 4.0, etc. Currently, 11 projects are on the way.

It is important to note that subsoil users will be able to use these funds to organize research laboratories and conduct targeted R&D involving local and foreign universities, research institutes and scientists.

Currently, Kazakhstan is offered a wide range of tools for financing innovation through development institutions. One of the most important of those is an incentive tool of innovation grants, that is, state reimbursement of costs to innovators who have passed special selection for the implementation of innovative ideas. This tool has already approved itself among entrepreneurs; the demand for it is growing annually.

Among non-tax measures of state support, technical regulation and the formation of new standards and regulations were mentioned often. It should be noted that in Kazakhstan innovation grants are provided for the following: technological development of industries, technological development of existing enterprises, commercialization of technologies. The technological development of industries in Kazakhstan is governed by the Rules for the provision of innovation grants for the technical development of the industry, and the technological development of enterprises is governed by the Rules for the provision of innovation grants for the technological development of existing enterprises.

The combination of tools used to stimulate the innovative activity of businesses seems important to investigate (table 4).

Table 4. The results of factor analysis of tools to stimulate the innovative activity of businesses

Stimulation tools	Component factor load			
	Vertical cooperative	Innovation proposal	Foreign practices	Active state influence
Tax relief when investing into R&D	0.132	*0.628*	0.004	0.175
Benefits for SEZ participants	0.152	*0.835*	0.052	0.119
1% of the total annual income of subsoil users in R&D	0.818	*0.070*	0.159	0.056
"Startup Kazakhstan" Program	0.211	0.162	*0.698*	0.047
"Promoting Productive Innovation" project	0.134	0.192	*0.494*	0.174
Providing funding	*0.480*	0.196	*0.721*	0.247
Regional technology park development	*0.706*	0.256		
Technology center development with the involvement and co-financing by TNCs	*0.568*	0.182	0.151	0.310
"ITP" Innovation Cluster development	*0.818*	0.146	0.268	0.214
Nazarbayev University's Business Campus Astana infrastructure development	*0.829*	0.248	0.148	0.236
Technical regulation development, formation of new standards and regulations	0.159	0.280	-0.250	*0.705*
Promotion and coverage of innovation activity	0.124	0.017	0.252	*0.800*
National Innovation Competition holding	0.167	0.050	0.354	*0.701*

Source: compiled by the authors by the method of principal components

The results of factor analysis have revealed 4 groups of measures corresponding to one of the directions of the policy in innovation performance:
- innovation infrastructure;
- tax relief;
- state financing of innovative projects;
- a "hard" guiding hand (technical regulation, adoption of directives, introduction of standards and norms) or a "soft" one (organization and coordination of interaction).

Support of companies within the framework of the "Promoting Productive Innovation" Project and innovative funding are found between the innovation infrastructure and direct financing. Their relative "proximity" to the infrastructure block, which includes quasi-state funding models, is obvious as priorities of the SPIID-2 and activities of innovation development institutions coincide.

It is important to note that some incentives for innovation activity at the micro level are combined one way or another with external barriers for its implementation. Thus, manufacturers that felt the influence of tax relief have indicated the difficulty in attracting project investments and the insufficient prevalence of budget co-financing of innovations less often. The first problem is less typical for those who conduct their activities in technology centers and SEZ. Recipients of direct financing (businesses performing innovations), are rather concerned about the insufficient purchases of innovative products by the state.

A clear clustering of government support measures in the areas of policy indicates a connection with significantly different advantages and disadvantages of their application for entities. At the same time, on the one hand, there are obstacles to the complementarity of heterogeneous tools, and on the other hand, the widest possible "coverage" of innovatively active businesses is ensured.

5. Discussion

Currently, the number of production entities affected by state stimulation of innovations is very large. Within the analyzed selection, its positive impact has been noted by the majority (60%) of innovative business heads. Contrary to popular belief, state support is mainly addressed to successful companies rather than outsiders. The maximum "coverage" is peculiar to tax incentives, and by virtue of their specificity, they contribute to a greater extent to the expansion of innovative activity, not to its "start." Only a small part of the measures is focused on a dynamic development of existing and creation of new businesses, and their effectiveness is largely limited by the administration quality. We agree with the study (Jumakulov et al., 2019) that the vast majority of functioning, resource-rich incentive tools is addressed to traditional areas. However, in our opinion, changing business perceptions of technological modernization increases the relevance of developing new, "smart" mechanisms for stimulating innovation, which are proactively adaptable to changing corporate demand for technology.

The low level of innovation is largely associated not only with the difficulties of their implementation, but also with poor business motivation. A significant potential for the impact of competition on innovation remains as well. The share of innovation segment in public procurement is still relatively small (Vazov, 2019), (Kurmanov et al., 2019b). The motivation of entities to innovate is greatly enhanced by tightening technical standards.

The unstable business environment and internal corporate bureaucratization that limit the innovative susceptibility of the business are serious barriers to expanding innovation. Since even positive changes create uncertainty and increase risks, especially for long-term projects, one of the most important tasks is to ensure the stability of management and regulation (Koval, Pukała, 2017). In markets in need of change, appropriate adjustments should be as predictable as possible for the business community. Creating an attractive investment environment would expand the number of innovative businesses. Combining such measures with promoting innovative initiatives focused on demonstration effects and supporting relatively young start-up companies in need of risk sharing is advised as well.

Most companies' choice of import substitution is justified, because they still do not have the necessary potential to promote high-tech products to world markets. However, such mechanisms should not limit competition with foreign players, otherwise the motivation of domestic manufacturers to innovate sharply decreases and conditions for technological borrowing and adaptation worsen.

Conclusions

The results of the study of tools to stimulate innovation entrepreneurship indicate that the incentive on the part of the state to carry out innovative activities by entities so far manifests itself in the form of tightening requirements under technical regulations. Only a small part of domestic innovative businesses notes the positive role of public procurement. The contribution of innovation proposal from the Kazakhstan research institutes and universities seems very limited.

In general, the study has confirmed the hypothesis about the positive contribution of public policy to the innovative activities of entities. The current stage of innovation policy performance is characterized, on the one hand, by the creation of a sufficiently diversified toolbox for stimulating innovation entrepreneurship, and, on the other, by the search for new opportunities to activate innovation policies in the context of the fourth industrial revolution.

However, most of the tools to stimulate innovation entrepreneurship at the moment are aimed at successful market players, at creating conditions for the technological modernization of existing industries, and at improving the level of entrepreneurs' business and technological competencies.

According to the study, Kazakhstan needs to increase the participation of universities, research institutes, local executive and legislative authorities in the development of management mechanisms and stimulation of innovation entrepreneurship. It is necessary to create mechanisms able to interest local authorities, development institutions and main participants of the national innovation system in matters of implementing state programs for stimulating entities to innovate.

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MANAGER COMPETENCY ASSESSMENT MODEL IN THE CONDITIONS OF INDUSTRY 4.0

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Abstract. The approaches to modeling competencies have been explored in the article and a model of a strategically oriented approach to the development of management competencies of the company "Industry 4.0" has been built. An algorithmic "fuzzy logic" model to assess the input managers' competencies and obtain a final assessment as a parameter for achieving strategic goals has been formed. A methodology for using the "fuzzy logic" toolkit to assess managers' competencies in obtaining the pair impact assessment, which forms a new level of the comprehensive assessment of managers' work, has been developed.

Keywords: Industry 4.0, competencies; "fuzzy logic" model; input and output parameters of the model; strategically oriented approach; membership function

1. Introduction

The modern global economy exists in conditions of increasing competition, powerful economic crises, and the daily aging of technology and knowledge, therefore success is achieved by those companies in which the key factor among all resources is the human factor, especially management personnel (management). The post-industrial stage of the development of world society (Industry 4.0) contributes to changes in the existing traditional technologies of personnel management to more adaptive and organic, which, accordingly, requires the continuous development of managers at all levels of the hierarchy (Meissner et. al., 2017). Therefore, the development of a managerial competencies model in the knowledge economy is an important theoretical and practical task. The above circumstances testify to the need for a search of various mechanisms and models for the development of managerial personnel, the involvement of a fuzzy logic model, which determines the actual nature, scientific and practical interest of the topic of the article.

2. Literature Survey

In modern companies operating in the conditions of Industry 4.0, managers' competency models play an important role in personnel policy. As noted by the scientists (Bucker and Poutsma (2010), Makedon et. al. (2019), Mathis & Jackson (2003), Zoni et. al. (2012), competencies are primarily used as an assessment tool, allowing company owners to evaluate work performance and "analyze, not only what management has achieved over the past period but also how it was done" (Schwab (2016), Tessier & Otley (2012). Moreover, management features leave an imprint on the requirements for the managers' competency profile. To maintain the competitiveness of activities in the market, the company needs to develop managerial personal with limited resources in a short period of time.

3. Methods

In the methodological field of our research, the following ideological and scientific-methodological directions are distinguished. 1) A scientific and methodological approach to a differentiation of types of managerial competencies, where the assessment of the effectiveness of introducing a competency model is assessed in the sense of: a) knowledge competencies, which are characterized by a practical or theoretical understanding of the nature of the managerial work; b) competencies of skills and abilities based on the ability of the manager to carry out managerial actions to carry out strategic tasks taking into account the interests of the company (Carnall (2007), Mabin, Forgeson and Green (2001); Bernardi, (2019); 2) Methodology of key competencies. In the framework of its use, three main types of competencies are distinguished: key, technical, and managerial: a) key competencies are knowledge, skills, and personality traits; b) technical competencies are inherent in professional areas/roles; c) management competencies (Ferreira & Otley (2009), Dzwigol et.al. (2018, 2019)). 3) Methodology for assessing managerial work on the basis of fuzzy logic, where the contact areas of qualitative assessment are distinguished: a) development level – the possession of the general theoretical and practical knowledge of the profession, the ability to solve complex problems, and the ability to work independently under minimal supervision; b) advantage level - knowledge of the trends of the profession, ongoing research, legislative framework used by the manager to develop its own strategies, standards, and processes, completely independent performance of the work (Afshari et. al. (2014), Chang et. al. (2000), Drobyazko et. al. (2019a,b), Rezk et al. (2019)).

4. Results

We propose to distinguish three approaches to the development of the company management competencies: 1) The resource approach considers management competence (knowledge, skills, abilities) as a source of the company's competitive advantage; 2) The purpose of the behavioral approach to the development of managers is to create the necessary conditions for the realization of their creative abilities, to build knowledge, and develop skills in the process of functioning of the company; 3) A strategic approach to management development is to ensure a sustainable competitive advantage of the company, by increasing the competitiveness of management and ensuring the guarantee of its professional growth and development for the long term. Based on the selected approaches, a strategically competent approach to the development of management competencies is offered, which contributes to: a) the achievement of competitive advantages for managers; b) planning and organizing the development of knowledge, skills, and abilities in accordance with the level of management and the corresponding company strategy (Dechow et. al. (2007), Draganidis, Mentzas (2006), Kwak et al. (2003); Tvaronavičienė (2018)). The level model of using the strategic competency-based approach in the company's management mechanism is presented in Figure 1.
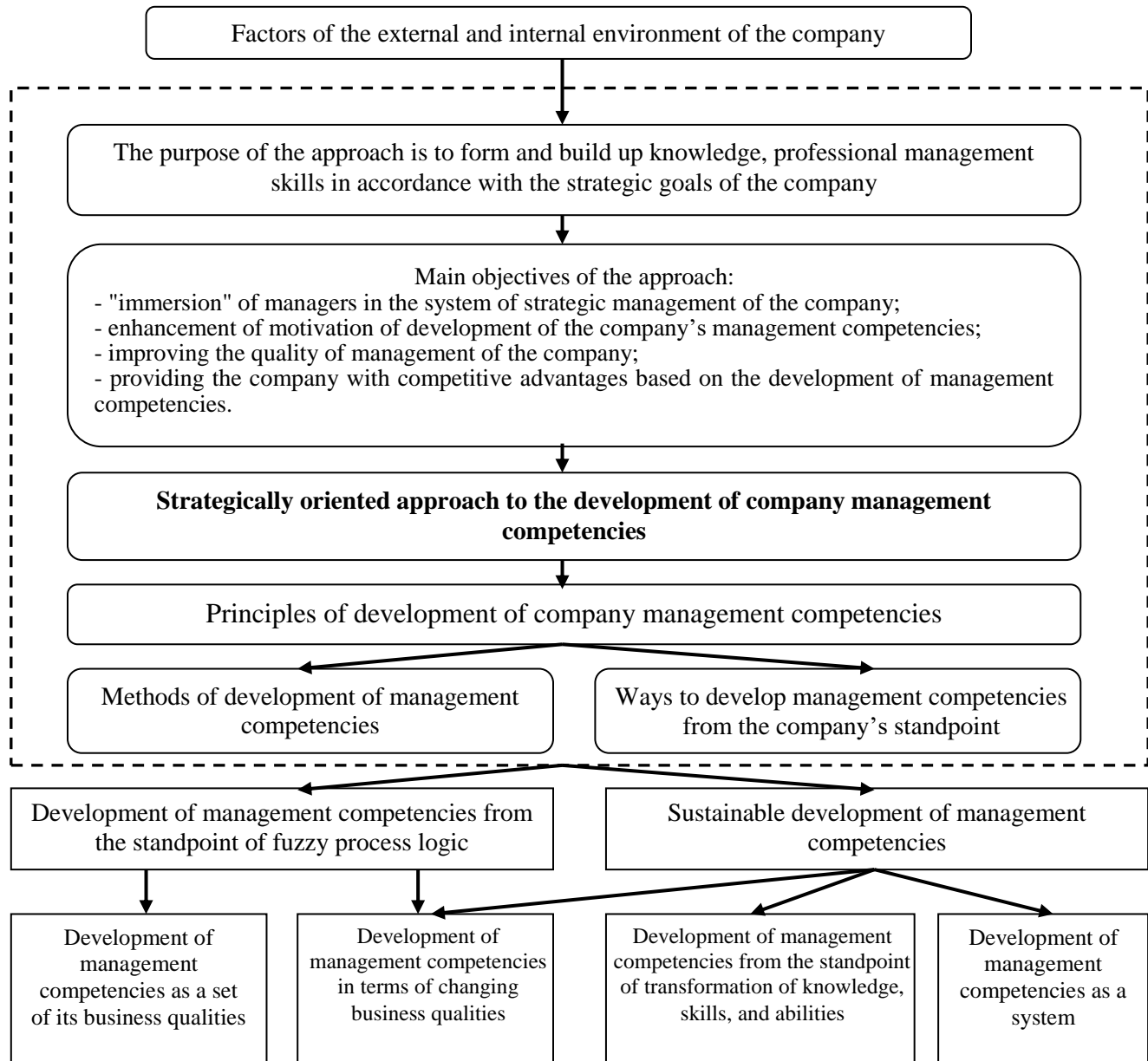
Figure 1. A level model of a strategically oriented approach to the development of company management competencies
Source: the authors

Speaking about the competency-based approach to the development of managers, the principles of choosing competencies and designing models should be highlighted. Competencies should be: comprehensive, cover the functional responsibilities of a particular position; discrete, characterize a separate type of activity, distinguishing it from others; focused, that is, clearly defined; understandable; congruent (compatible), forming within the framework of the organizational culture and strengthening it in accordance with the company's strategy; relevant, that is, updated in a timely manner, reflecting the current and future needs of the company (Lin (2010), Snell, Morris and Bohlander (2016), Vakola, Tsaousis & Nikolaou (2004), Dźwigoł-Barosz, Wolniak (2018)). The basic groups for assessing the competencies of managers who are most in demand on the part of Industry 4.0 companies are defied and presented in Table 1.

Table 1. The basic model of competencies of company management in the conditions of Industry 4.0

Competency group	Description of competencies
X1. Experience and term of work	*Characteristics:* - special knowledge and skills acquired in the course of labor activity; - functional accuracy and experience; - management of personal learning and development; *Assessment options:* - 0-10 years; - 10-20 years; - more than 20 years.
X2. Education, cognitive and creativity potential	*Characteristics:* - basic education, second education, academic degree; - professionalism, entrepreneurial abilities; - effective time management. *Assessment options:* - Bachelor (basic education) - Master/MBA degree; - Doctor of Philosophy (PhD).
X3. Effective goal setting and development	*Characteristics:* - development of planning and goal setting skills; - organization of the activity process in accordance with the functions of management; - ability to make decisions; - ability to effectively delegate authority. *Assessment options:* - achievement of goals within six months; - achievement of goals within one year; - achievement of goals in more than a year.
X4. Communicative, leadership function and managerial orthobiosis	*Characteristics:* - communications and interpersonal and group communication skills; - ability to resist manipulation; - ability to respond constructively to criticism. - a healthy, reasonable lifestyle; - corporate culture of the organization of the work process, workloads, and leisure. *Assessment options:* - the number of direct communications up to 7 points; - the number of direct communications from 7 to 14 points; - the number of direct communications is more than 14 points.

Source: the authors

The basic model of managers' competencies can be for a company that operates under the conditions of Industry 4.0: the model of good practice, based on which the company and management will be able to increase their productivity and work efficiency; the standard, the goal of improving management, which will allow the company to clearly formulate requirements for managers; the template, in relation to which the company can evaluate the existing management, form programs for its development, and carry out improvements.

Possibilities of using "fuzzy logic" tools in company management

The presence of simultaneously different types of uncertainty in a complex multilevel hierarchical management system of a company makes it necessary to use the fuzzy sets theory for decision making, which allows adequately taking into account the existing types of uncertainty. Such an approach allows bringing together all available heterogeneous information: deterministic, statistical, linguistic, and interval regarding the formation and

development of management competencies (Granlund & Mouritsen (2003)). With the most abstract approach to the system, the criterion for the functioning of such a management competency analysis system, in the language of the theory of fuzzy sets, can be represented in the form of maximizing the degree of admissibility and effectiveness of decisions made. Therefore, a subset of admissible and effective values of the parameter x is chosen as a subset (Zongmin et. al. (2017); Kwilinski (2018, 2019)). The subset of effective values of the parameter x is fuzzy for real systems since it cannot be said that only one value, for example $x^2 = 4$, is effective, and all other values of x are ineffective (Figure 2), i.e. $\mu_A(4)=1$, $\mu_A(x)=0$ для $x\neq4$.
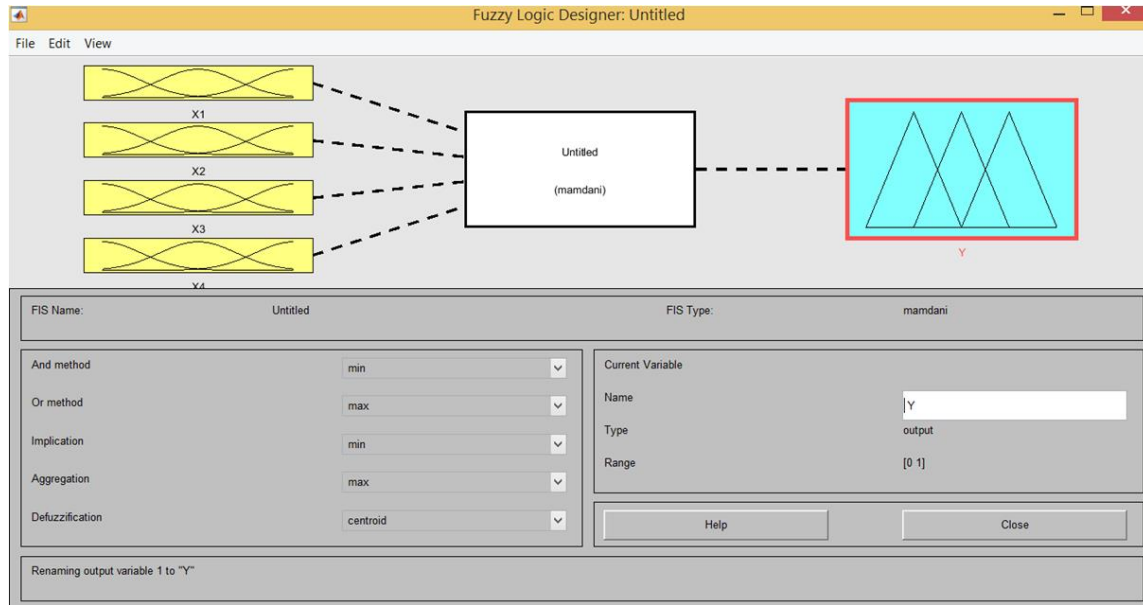
Figure 2. Algorithmic view of the "fuzzy logic" model

In reality, there is no such a boundary since an insignificant change in x leads only to a small change in $\mu_A(x)$, therefore, membership functions of the form are more consistent with reality. Thus, the use of an expression of the form "should be close to x^2", which is not a precisely formulated goal, can be modeled by a fuzzy subset with a membership function. A fuzzy goal means a goal that can be described as a fuzzy set in the corresponding space. Thus, the value X is a given set of alternatives. Then, the fuzzy goal, or simply the goal, G will be determined by a fixed fuzzy set G in X. In the usual approach, the preference function that is used in the process of determining competencies serves to establish linear ordering on the set of alternatives (Dursun, Karsak (2010) Jana et. al. (2017)). Obviously, the membership function $\mu_G(x)$ of the fuzzy goal performs the same task and can be obtained from the advantage function using normalization, which preserves the established linear ordering.

Similarly, a fuzzy constraint or simply a constraint C in the space X is defined as some fuzzy set in X. An important point here is that both the goal and the constraints are treated as fuzzy sets in the space of alternatives; this makes it possible not to distinguish between them when forming a solution. A solution is essentially the choice of one or more of the existing competencies. The decision-making problem in fuzzy conditions is interpreted as the complex effect of the fuzzy goal G and fuzzy restriction C on the choice of alternatives and it is characterized by the intersection $G \times C$, which forms a fuzzy set of alternatives for the choice of management competencies D, i.e. $D = G \times C$ (Gungor et. al. (2009)).

The membership function for the set of solutions is defined by the relation:

$$\mu_D(x) = \mu_G(x) \wedge \mu_C(x)$$
(1)

In the more general case, if there are n goals and m constraints, then the resulting solution is determined by the intersection of all given goals and constraints, ie:

$$D = G_1 \cap ... \cap G_n \cap C_1 \cap ... \cap C_m$$
(2)

and accordingly,

$$\mu_D = \mu_{G1} \wedge ... \wedge \mu_{Gn} \wedge \mu_{C1} \wedge ... \wedge \mu_{Cm}$$
(3)

In the above definition, fuzzy goals and restrictions enter the expression for D in exactly the same way. Such a definition of a solution as a fuzzy set in the space of alternatives may seem somewhat artificial. In fact, it is quite natural, since a fuzzy solution can be considered as some kind of "instruction", the fuzziness of which is a consequence of the inaccurate formulation of goals set and restrictions in the ranking and allocation of competencies of company managers (Thompson & Martin (2010)).

In many cases, it is still reasonable to choose those alternatives that have the maximum degree of belonging to the set D. If there are several such elements, then they form the usual set, which is called the optimal solution, and each element of this set maximizes the solution (Varmazyar, Nouri (2014); Czyżewski et. al. (2019)). The more general case when the goals and restrictions are fuzzy sets in different spaces is of practical interest. Let's the mapping be from X to Y, with the variable x denoting the "input" effect and y the corresponding "output". Let's suppose that the purpose of competency choice is given as a fuzzy set G in Y, while a restriction is a fuzzy set C in the space X. Having a fuzzy set G in Y, one can find a fuzzy set G in X, which induces G in Y. Membership function $\bar{G}$ in Y is given by the equation:

$$\mu_{\bar{G}}(x) = \mu_G(f(x))$$
(4)

After this solution, D can be expressed by the section of the sets G and C. Using the preliminary relation, one can write:

$$\mu_D(x) = \mu_G(f(x)) \wedge \mu_C(x)$$
(5)

Thus, the case when goals and restrictions in the question of choosing competencies are set as fuzzy sets in different spaces can be reduced to the case when they are set in the same space (Tzuu-Hseng et. al. (2008)). In addition, the basic concepts are the fuzzy concepts "growth of the level of competencies" and "decrease in the level of competencies", and the relationship between them is presented in the form of a compositional inference rule:

$$f\_U\_then\_E$$
(6)

where Ŭ and Ẽ are fuzzy concepts that are judgments about the competence of the manager for consideration, respectively. The membership function corresponds to a fuzzy conditional operator S, where a fuzzy subset U is defined on the judgment area X, a fuzzy subset E in the area Y:

$$\mu_S(y, x) = \min\left[\mu_U(x), \mu_E(y)\right], x \in X; y \in Y$$
(7)

The complex system of behavior is described by a set of fuzzy instructions using "or" operations:

$$f\_U_1\_then\_E_1\_or\_U_2\_then\_E_2 \tag{8}$$

with membership function:

$$\mu_S(y,x) = \max\left\{\min\left[\mu_{U1}(x), \mu_{E1}(y)\right]; \min\left[\mu_{U2}(x), \mu_{E2}(y)\right]\right\} \tag{9}$$

In this form, the strategy for choosing managers' competencies for a company operating in the conditions of Industry 4.0 may be an expression of a fuzzy operator. The basis for deciding on competencies $\tilde{E}$ with a known input $\tilde{U}$ and a given relation between fuzzy sets is the Zadeh's compositional rule:

$$\mu_E(y) = \max_x \min\left[\mu_U(x), \mu_S(y,x)\right] \tag{10}$$

When controlling a specific process, the input can also be point (clear) x_0. In this case, the compositional rule of output is simplified since the input x_0 can be interpreted as a fuzzy input $\tilde{U}$ with membership function $\mu_U(x)$, which is everywhere equal to zero, except for the measuring point x_0 where it is equal to unity:

$$\mu_E(y) = \mu_S(y, x_0) \tag{11}$$

To make a clear decision on the competencies of managers, it is necessary to choose a control y_0 that maximizes the resulting membership function:

$$\mu_E(y_0) = \max_y \max_x \min\left[\mu_U(x), \mu_S(y,x)\right] \tag{12}$$

Let's give a description of the principles of construction and operation of a fuzzy control model for the simplest process (one "input" - one "output"), in which each instruction *"i"* associates the fuzzy concept of assessment of the quality of competence *"p"* with the fuzzy concept of achievement of the strategic goals of the company *"q"* from their membership function:

$$\mu_i(p) \Rightarrow \gamma_i(q), i = \overline{1,n} \tag{13}$$

For the case (13), a clear value for the achievement of strategic goals q_o can be found using the following algorithm with an unchanged set of competencies "p_0":

1. For each instruction *"i"*, the degrees of assessment of the quality of competencies of managers are determined:

$$\mu_1(p_0), \mu_2(p_0)...\mu_n(p_0) \tag{14}$$

2. Membership functions that define the fuzzy concept of achieving strategic goals for each instruction are found:

$$\beta_i(q) = \min\left[\mu_i(p_o), \gamma_i(q)\right], i = \overline{1,n} \tag{15}$$

and then the complete fuzzy concept of strategic goals:

$$\beta(q) = \max_i \min\left[\mu_i(p_o), \gamma_i(q)\right] \tag{16}$$

3. A clear control impact q_o is calculated, which ensures the maximum membership function $\beta(q)$:

$$\beta(q) = \max_q \max_i \min\left[\mu_i(p_o), \gamma_i(q)\right] \tag{17}$$

The initial construction of membership functions can be performed using exponential functions with their subsequent adaptation according to the quality criterion for choosing managers' competencies using the fuzzy logic model used. For control, it is possible to build several types of models that differ in the type of information used: only deviations from a given value, deviations and the value of its first derivative, and the like are measured. A specific type of algorithm is selected for each case, based on an analysis of the various strategic goals that are put before the management.

5. Practice of applying the "fuzzy logic" technique to assess the competencies of managers in the conditions of Industry 4.0

In general, the fuzzy logical inference mechanism should include four steps: 1) phasification (introduction of fuzziness); 2) fuzzy conclusion; 3) composition; 4) dephasification (bringing to clarity). Interpretation of the fuzzy model involves selecting and specifying the input and output variables of the corresponding fuzzy output system (Regina (2012), Shipley & Johnson (2009), Sutton, Watson (2013)). Managers' competencies will be assessed using the Fuzzy Interference System (FIS) framework, which is the basic concept of the MATLAB software package's Fuzzy Logic Toolbox module. Using the data in Table 1, a rule base for determining the output variable for assessing the managers' competencies is formulated. The model "X" is the competency designation/input variables, the output variable "Y" is "achievement of the strategic goals of the company".

Table 2. Fuzzy rule base for determining the input variable of competencies of managers

Input variables	Values of the terms of the input variables		
	Low level (L)	Middle level (M)	High level (H)
X1. Experience and term of work	0-10 years	10-20 years	More than 20 years
X2. Education, cognitive, and creative potential	Bachelor's Degree (Basic education)	Master / MBA degree	Doctor of Philosophy (PhD)
X3. Effective goal setting and development	achievement of goals for more than a year	achievement of goals within one year	achievement of goals in a period up to six months
X4. Communicative, leadership function and managerial orthobiosis	number of direct communications more than 14 points	number of direct communications from 7 to 14 points	number of direct communications up to 7 points

Appendix 1 provides assessments of the logical rules for assessing managers' competencies. A choice in favor of trapezoidal accessory functions was made. A demonstration of the "fuzzy logic" technique is presented in Figure 3.

For the input variable X1:
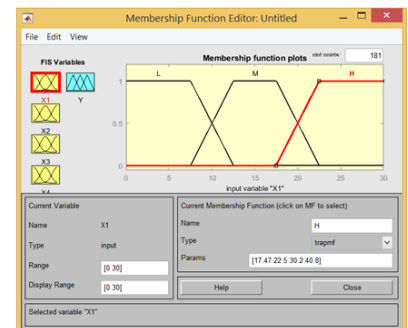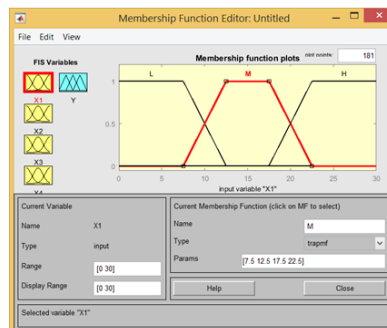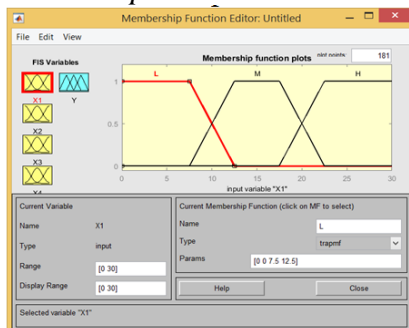
For the input variable X2:
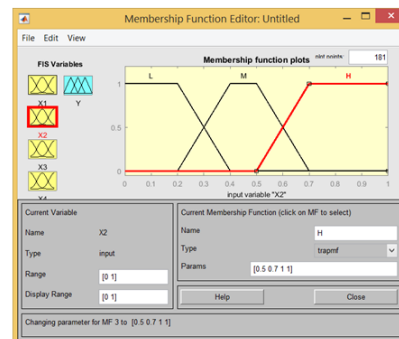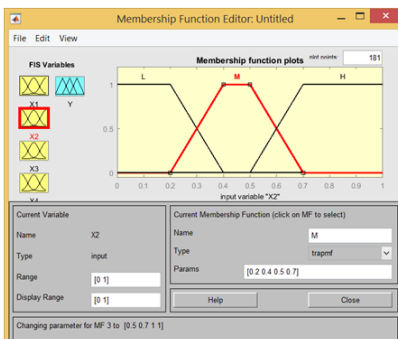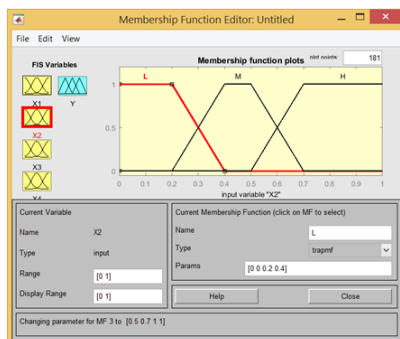
For the input variable X3:
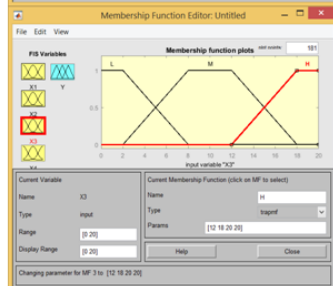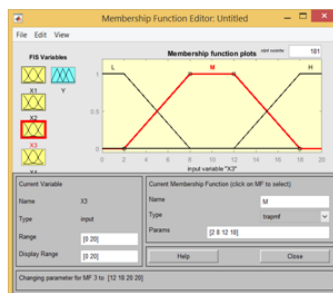
For the input variable X4:
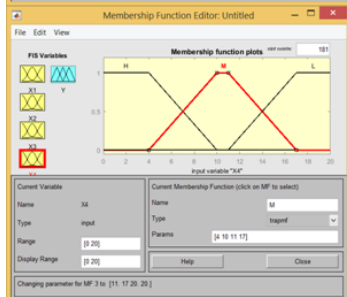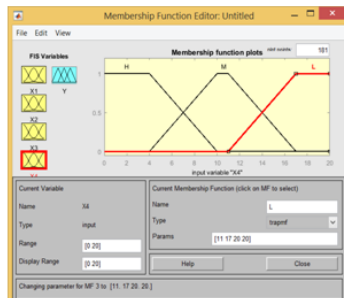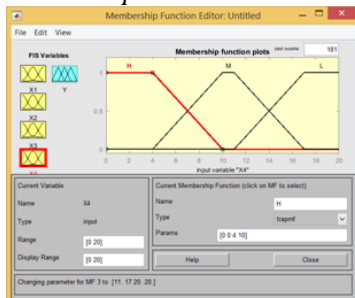
For the output value Y:
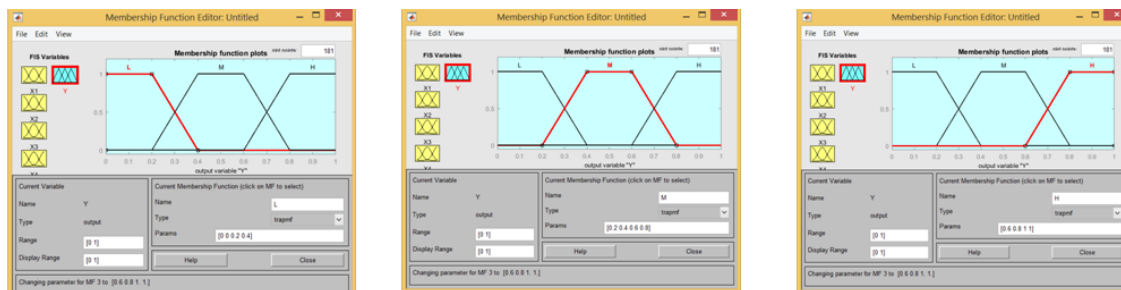
Figure 3. Membership function graphs for input linguistic variables (manager competencies) X1 - "experience and term of work", X2 - "education, cognitive and creative potential", X3 - "effective goal setting and development", X4 - "communicative, leadership function and managerial orthobiosis »

The constructed model of fuzzy inference allows setting values for the input variables *X1, X2, X3, X4* that correspond to the competencies from the table 2 and evaluate the parameter *Y* - "level of achievement of the strategic goals of the company". The "fuzzy logic" visualization is presented in Figure 4.
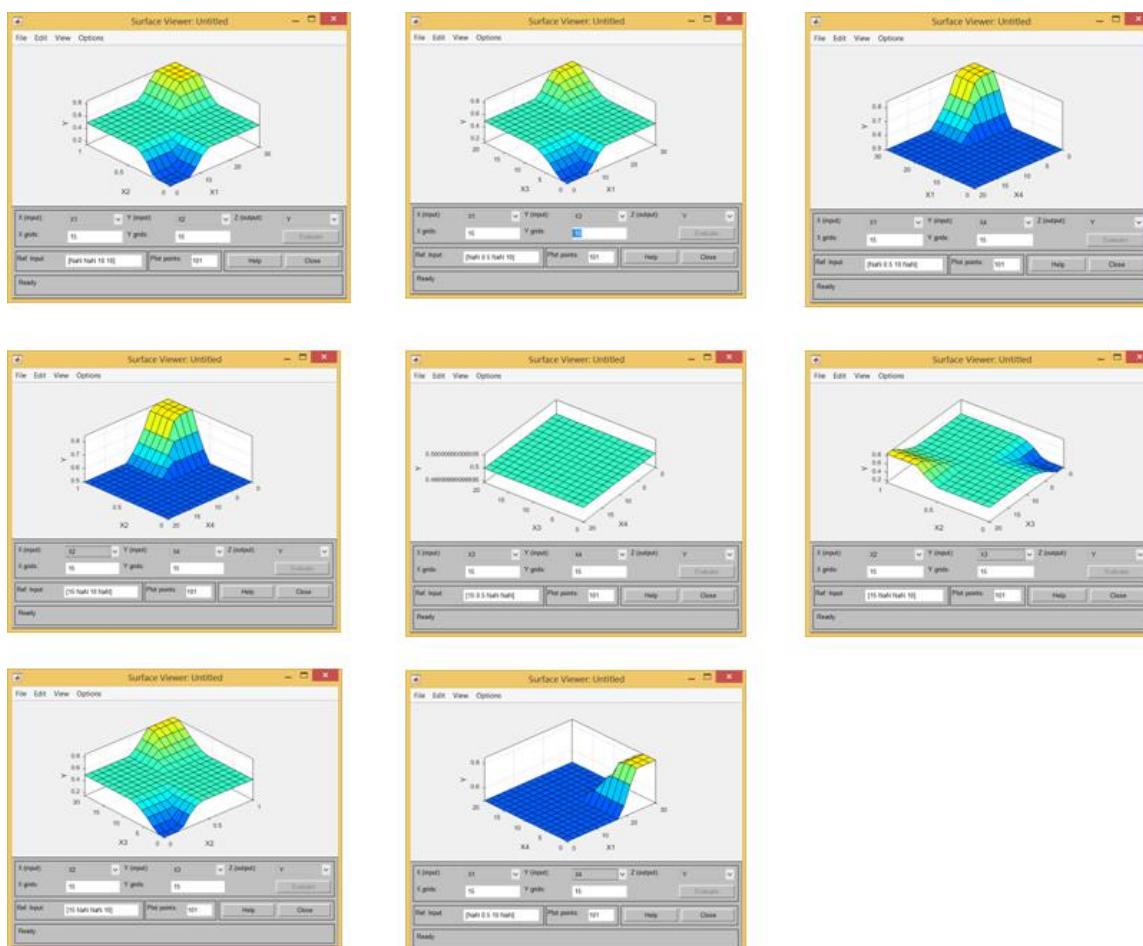
Figure 4. The surfaces of the fuzzy inference of the output value "the level of achievement of strategic goals of the company" from the input variables X1 - "experience and term of work", X2 - "education, cognitive and creative potential", X3 - "effective goal setting and development", X4 - "communicative, leadership function and managerial orthobiosis"

Thus, the fuzzy set method allows determining the dependence of the risk level of corporate mergers and acquisitions on the probability of failure of transactions, exceeding transaction costs and exceeding the terms of the transaction. The response surface in Figure 2 is constructed taking into account logical rules, phasification of input variables, and dephasification of the output variable.

6. Discussion

Further research can be conducted into the study of complex paired combinations of managerial competencies at the level of organizations and companies. In the course of this, an analysis of the hierarchy of management, consideration of functional links between organizational units, familiarization with the charter, staffing schedule, and distribution of duties of managers of the company based on the competencies and challenges of Industry 4.0 will be developed. As well, the system of promotion of positions and managers of the company, the component of which is the competency assessment system, will be improved.

Improving the "fuzzy logic" assessment method will allow the company to obtain objective and comprehensive information about the potential of managers. Managers at different levels of management will feel more confident in their positions. Thus, the proposed assessment method will improve the quality and accuracy of the organizational decisions made.

Conclusions

In the course of the research, the author reflected the main methodological approaches and evaluation tools for determining the effectiveness of the company's management. During the research principles and basic approaches to forming of competences of managers have been studied. Based on the resource, behavioral, and strategic approaches in the development of competencies, a model of a strategic-oriented approach to the development of competencies of managers of Industry 4.0 has been built. A methodology for using the "fuzzy logic" toolkit to assess managers' competencies has been developed.

The surface fuzzy inference of the output value "level of achievement of strategic goals of the company" from the input variables "experience and term of work", "education, cognitive and creative potential", "effective goal setting and development", and "communicative, leadership function, and management orthobiosis" have been built in application software packages.

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Appendix 1. Linguistic rules for assessing the competencies of managers

№	X1	X2	X3	X4	Y
1.	L	L	L	L	L
2.	L	L	L	M	L
3.	L	L	L	H	L
4.	L	L	M	L	L
5.	L	L	M	M	L
6.	L	L	M	H	L
7.	L	L	H	L	L
8.	L	L	H	M	L
9.	L	L	H	H	L
10.	L	M	L	L	L
11.	L	M	L	M	L
12.	L	M	L	H	L
13.	L	M	M	L	M
14.	L	M	M	M	M
15.	L	M	M	H	M
16.	L	M	H	L	M
17.	L	M	H	M	M
18.	L	M	H	H	M
19.	L	H	L	L	L
20.	L	H	L	M	L
21.	L	H	L	H	L
22.	L	H	M	L	M
23.	L	H	M	M	M
24.	L	H	M	H	M
25.	L	H	H	L	M
26.	L	H	H	M	H
27.	L	H	H	H	H
28.	M	L	L	L	L
29.	M	L	L	M	L
30.	M	L	L	H	L
31.	M	L	M	L	M
32.	M	L	M	M	M
33.	M	L	M	H	M
34.	M	L	H	L	L
35.	M	L	H	M	M
36.	M	L	H	H	M
37.	M	M	L	L	M
38.	M	M	L	M	M
39.	M	M	L	H	M
40.	M	M	M	L	M
41.	M	M	M	M	M
42.	M	M	M	H	M
43.	M	M	H	L	M
44.	M	M	H	M	M
45.	M	M	H	H	M
46.	M	H	L	L	L
47.	M	H	L	M	M
48.	M	H	L	H	M
49.	M	H	M	L	M
50.	M	H	M	M	M
51.	M	H	M	H	H
52.	M	H	H	L	M
53.	M	H	H	M	H
54.	M	H	H	H	H
55.	H	L	L	L	L
56.	H	L	L	M	L
57.	H	L	L	H	L
58.	H	L	M	L	M
59.	H	L	M	M	M
60.	H	L	M	H	M
61.	H	L	H	L	M
62.	H	L	H	M	M
63.	H	L	H	H	H
64.	H	M	L	L	L
65.	H	M	L	M	M
66.	H	M	L	H	M
67.	H	M	M	L	M
68.	H	M	M	M	M
69.	H	M	M	H	H

70.	H	M	H	L	M
71.	H	M	H	M	H
72.	H	M	H	H	H
73.	H	H	L	L	H
74.	H	H	L	M	H
75.	H	H	L	H	H
76.	H	H	M	L	H
77.	H	H	M	M	H
78.	H	H	M	H	H
79.	H	H	H	L	H
80.	H	H	H	M	H
81.	H	H	H	H	H

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IMPACT OF INVESTMENT ON GDP AND NON-OIL GDP IN AZERBAIJAN[*]

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Abstract.The causal relationship among, investment and growth is mixed and controversial both the oretically and empirically. There is large empirical literature which examines the investment-growth nexus. This paper examines the causal relationship among, investment and economic growth in Azerbaijan using months' time series data from 2010-2019. Results for Augmented Dickey–Fuller (ADF), Phillips−Perron (PP) and Kwiatkowski−Phillips−Schmidt−Shin (KPSS) unit root tests show that all variables under consideration are I(1). Result from the Auto Regressive Distributed Lag Bounds Testing (ARDLBT) indicates that there exists cointegration among gross domestic investment, gross domestic product. İnvestment have significant positive effect on economic growth of Azerbaijan both in the short-run and in the long-run.

Keywords: GDP; non-oil GDP; economic growth; investment; Auto Regressive Distributed Lag Bounds Testing (ARDLBT) approach

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1. Introduction

As the economy turned into a science, the relationship between investments and economic growth began to worry economists. The common belief that investment and economic growth are interrelated is that deposits contribute to increased investment and, therefore, GDP growth in the short term (Mohan, 2006; Baltgailis, 2019). However, there are different views on the relationship between these variables and how they affect each other.

Modern economic data show that economic growth is unstable for most countries, with the exception of high-income countries per capita. Due to the unevenness and instability of the economic growth process, the same country may face economic growth, stagnation, rise and other variations over several decades.

In this context, investment becomes an important factor affecting positive rates of economic growth. Various factors can be caused by the boom. Investing in support of growth and reinforcing growth on the eve of the boom phase is an important tool for building production capacity and additional knowledge and new technologies. At the same time, adequate provision of the national economy with local investments becomes an important prerequisite, as foreign investment complicates macroeconomic regulation and may eventually lead to growth crises (Gutierrez and Solimano, 2007; Tvaronavičienė, 2019).

Encouraging economic growth through investments has become the focus of many countries around the world (Verma, 2007). Thus, according to the theory of endogenous growth (Agrawal, 2000), high investment rates have a strong positive correlation with GDP growth rates.

However, the relationship between economic growth and investment is also in the opposite direction from positive ones (Jappelli and Pagano 1994).

Thus, the macroeconomic theory is that, in most developing countries, such as Azerbaijan, increased domestic investment will lead to economic growth.

Economic growth is a major goal of both developing and developed countries. As investment in many of the countries of the world is primarily an economic factor, it is important to address existing problems in this area, to ensure the participation of national enterprises in the international production process, and to maximize the benefits of investment and commodity exchange between countries.

Growth of sources of economic growth of the national economy is one of the main problems in economic science. The impact of investment on economic growth is a matter of debate. However, many empirical studies do not answer the question of the link between investment and economic growth.

2. Investment policy in Azerbaijan

Global investment trends will be taken into account in Azerbaijan, which is interested in investment that will ensure sustainable economic growth in the future. The Economic Growth Model, implemented using oil revenues for 2004–2015, has been instrumental in achieving the goals set for the period, characterized by "active investment in fixed assets". One of the highlights of this period is the slowdown in economic growth after 2011. Despite the increase in investments in the economy during this period, there has been a decline in economic activity. The capital accumulation model has since reached its "intension" level. It is noteworthy that large investments in the non-oil sector have allowed the sector to grow significantly. Since 2010, the main driving force of economic growth in the country has been the transformation from the oil sector to the non-oil sector.

The model of leaping economic growth has been characterized as "capital accumulation", resulting in a large-scale and modern socio-economic infrastructure in the country. During this period, Azerbaijan used the model of "state capitalism" implemented in the fastest growing Southeast Asian countries of the world. The most active wing of macroeconomic policy of the state capitalism was fiscal policy. The main channel for directing large volumes of oil revenues to the economy was the state budget investment expenditures. High investment activity was observed in Azerbaijan in 2004-2015.

Expansion of financial opportunities of our country and further improvement of the investment climate as a result of own ownership of the natural resources of the state of Azerbaijan has led to steady increase in investment. The main source of high investment activity during the period was Azerbaijan's high oil revenues.

In the final assessment of the economic situation, the following can be mentioned in the SWOT analysis:

Strengths - state support for entrepreneurship development, export stimulation, diversification of the economy and creation of favorable investment climate;

Weaknesses - direct foreign investments mainly in the oil and gas sector, the large share of the state in investments, weak dynamics of private entrepreneurship;

Opportunities - encouraging private investment by creating favorable conditions for the participation of both local and foreign entrepreneurs in the privatization of low-profit businesses;

Threats - attraction of investments in infrastructure projects, rather than in manufacturing.

3. Literature review

The role of investment in economic growth and the causal link between economic growth and investment has been the focus of research in macroeconomic literature (Ferreira, 1999; Khan and Reınhart, 1990; Peterson, 2009; Hamberg, 1962; Stephens, 2006; Turnovsky and Chatterjee, 2005; Nelson and Phelps, 1966; Herrerias, 2010; Humbatova and Hajiyev, 2019; Suleymanov et al., 2019; Anwar and Sun, 2011; Mukhtarov et al., 2019).The main hypothesis about the impact of investment on overall economic growth is that investment expansion has a positive impact on economic growth and has many economic benefits and benefits. Many scholars have found a positive relationship between investment and economic growth across countries (Chatterjeea et al., 2000; Maki et al., 2005; Scott, 1991; Kyoji et al., 2009).

It is generally accepted that investment is the most important factor of economic growth in both developed and developing countries (Lim, 1987; Sadokhin, 2012; Karimov, 2011; Shimelis, 2014).

Investigation of the relationship between investment in infrastructure and GDP has also been gaining momentum (Kenneth, 1998; Josheski, 2008; Lavee et.al., 2011; Maria, 2010; Antonio and Grégoire, 2012).

In addition, many other economists have also explored the impact of investment on GDP and non-oil GDP.

Table 1. Summary of similar empirical studies in the literature

	Data Period	Reearched countries	Method(s)	Results
Nazml and Miguel (1997)	1950−1990	Mexico	Modified neoclassical production function, Dynamic Model	The impact of private and public investments on economic growth has been researched in Mexico. Public investment costs have a positive impact on gross output. The impact of public investment costs on economic growth is statistically identical to the impact of private equity.
Kwan and Zhang (1999)	1952−1993	China	The exogeneity concepts, Regression model, Zivot-Andrews Test	The relationship between capital investment and economic growth has been studied in China. Result: investment in fixed assets is a key factor in economic growth. There is a fixed or structural link between capital accumulation and revenue growth.
Greiner and Willi (2002)	1950−1994	Germany, Japan	Cobb-Douglas production function, the Ramsey type growth model with endogenous growth	The impact of investment and education on economic growth has been studied. Investment in physical capital forms the capital of knowledge. And finally this is reflected in the economic growth.
Chaudhri and Wilson (2000)	1861−1900: 1949−1990	Australia	VAR Cointegration Test, long-run Granger causality techniques	In Austria, the relationship among savings, investment, productivity and economic growth was studied during 1861-1990. It was not observed long-term relationship between savings and investment. However, it was found correlation between investment and labor productivity. Relationship among investment, productivity and GDP have been relatively complex.
Maria (2010)	1964−2004	China	VAR	Cause-and-effect relationships between investment in equipment and economic infrastructure in China has been studied. The result: investment in equipment and infrastructure has played a key role in China's long-term economic growth.
Judson(1998)	1960−1990	OECD LACAR EMENA ASIA AFRICA	Panel GLS	The link between investment in education and economic growth has been studied. The correlation between investment in human capital and GDP growth is insignificant in countries with low incidence of burnout compared to countries with high incidence.
Miguel and Nazmi (2003)	1983−1993	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Uruguay	Modified neoclassical production function, Panel Regression	Result: The impact of public and private investment (education, health) on economic growth has been proven.
Colecchia and Schreyer (2002)	1959−2000	Australia, Canada, Finland, France, Germany, Italy, Japan, United Kingdom, and United States	Cobb-Douglas production function, Regression	Influence of investment on information and communication technologies, investment in product growth and economic growth revealed
Hundie (2014)	1969−2010	Ethiopia	Cointegratlon Test: ARDL Bounds Testing Approach	In Ethiopia, there is an integrated ling between aggregate savings, aggregate investment and real gross product, GDP, labor force and human capital.
Fukao et al., (2009)	1980/−	Japan	Cobb−	Intangible investments are relatively independent in

	2005		Douglas production function	terms of their economic growth.
Kristensen and Zhang (2001)	1989–1997	China	Keynesian model	The paradox of unequal regional investment and the equality of regional economic growth has been researched in China and found that the inequality of regional economic growth is not the result of an uneven distribution of foreign direct investment.
Zhang et al., (2010)	1999Q1 − 2007 Q4	China	VAR Panel Granger test	The relationship between intangible investment and economic growth has been studied in China and it has been came to conclusion that while investment in real estate in regions where GDP per capita exceeds $ 2,000 has a significant impact on economic growth, the impact of economic growth on real estate investments in regions where per capita GDP is less than $ 1,000 is negligible.
Gylfason and Zoega2006	1965–1998	Whole world	Cobb-Douglas production function Regression	The effect of savings and investment on economic growth has been studied. Economic growth is directly dependent on savings and investment.
Fatima and Waheed (2011)	1975–2008	Pakistan	GARCH	The causes and result relationship between investment and economic growth has been studied. Investment in machinery and equipment has a direct impact on economic growth. Economic growth has been the result of investment in non-residential buildings and facilities. Thus, public policy aimed at increasing investment in machinery and equipment is an effective means of stimulating economic growth.
Yu(1998)	1980-1990	China	Engle-Granger's Cointegration Tests, OLS, ECM	Fixed capital investment and commodity exports are two key determinants of economic growth.
Madsen (2002)	1950−1999.	18 OECD countries	Cobb–Douglas production function Granger–Sims causality tests	The causes and result relationship between investment and economic growth has been studied. Investment in machinery and equipment has a direct impact on economic growth. Economic growth has been the result of investment in non-residential buildings and facilities. Thus, public policy aimed at increasing investment in machinery and equipment is an effective means of stimulating economic growth.
Zou (1991)	1952−1985	China.	Cobb–Douglas production function, regression	Investment policy leads to socio-economic development and economic growth.
Kai and Kuo (2010)	1986−2007	Central China	VAR, Integration and Co-integration Test, Granger causality test	Investing in logistical infrastructure contributes to regional economic growth.
Gong et al., (2012)	1978−2003		Model with an Arrow–Romer production function and a Grossman (1972)	Investing in health, the accumulation of physical capital leads to long-term economic growth. However, excessive investment in health has a negative impact on economic growth. It is obtained conflicting results.
Glass (2009)	1959−2003	USA	Cointegration test, Granger causality test	Public costs for protection of public safety in USA has a direct relationship with private investments and economic growth.
Hemrit and Benlagha (2019)	2005Q1 − 2017Q4	Saudi Arabia	This new asymmetric NARDL bound testing	The asymmetric effect of insurance premiums on non-oil GDP has been studied. Result: There is a non-linear relationship between insurance premiums and non-oil GDP. Insurance premiums will increase the tempo of the non-oil

				sector in the long term perspective with the positive and negative shocks. And the decline in shocks has a negative impact on non-oil GDP growth in the short term. The shocks of public expenditure are symmetrical in their impact on non-oil GDP.
Mensi et al., (2017)	1902Q1 – 2014Q4	Saudi Arabia	NARDL	Asymmetric effects of public and private investments on non-oil GDP are studied in Saudi Arabia. Previous shocks in non-oil GDP have a strong impact on current non-oil GDP in the short term.
Hemrit andBenlagha (2018)	1970−2015	Saudi Arabia	VAR	The impact of public expenditure on non-oil GDP in Saudi Arabia has been studied. Result: Public spending has a stimulating effect on the non-oil GDP (health and agrarian sector).
Masood (2009)	1970–2006	United Arab Emirates	Multiple Linear Regression Analysis. Least Square Method (LSM)	In the United Arab Emirates, a quantitative calculation of the impact of sectors of the economy on non-oil GDP was executed and focused on finding those sectors.
Hoque and Al-Mutairi (1996)	1972−1993	Kuwait	Regression equations	An econometric model of the non-oil sector has been built in Kuwait. Accelerated reforms can, to some extent, lead to a decline in non-oil GDP.
Islam and Nakibullah (2007)	1977−2004	Bahrain	Cointegration regressions Regression	The impact of public spending on non-oil sectors in Bahrain has been studied. At this time, the positive multiplier effect of public expenditures has been identified.
Harb (2008)	1973−2005	In the five major oil exporting countries	Cointegration Tests VAR	The relationship between oil exports, non-oil GDP and investments in the economy over the long-term and short-term has been studied.
Mohey-ud-din and Muhammad (2014)	1981−2010	South Asian countries (SSAC) including Bangladesh, India, Nepal, Pakistan and Sri Lanka	Panel Estimation using GM-FMOLS Approach	Private investment and GDP uncertainties are studied in South Asia. It has been established that there is a long-term relationship between private investment and GDP. Thus, the uncertainties of GDP have a negative impact on private investment.
Shi (2015)	1980−2013		ARMA, VAR NARCH, APARCH, EGARCH, ARCH, GARCH, ARCH−M, GARCH−M, TS−GARCH, GJR, TARCH, NARCH, APARCH, EGARCH	The effect of cumulative investment and public consumption expenditures on GDP in the short and long term is studied. It has been positively and significantly connected in the short term. In the long term, it was positive and less important.
Ahmet (2014)	1970−2010	11Developing countries; 13Developed countries	Panel FMOLS Model Panel DOLS Model.	The long-term effects of investment in human capital on GDP have been studied. Cointegration regression analysis. The impact of physical capital and education costs on GDP is higher in developed countries than in developing countries.
Zou (2006)	1958–1997	Japan, USA	GMM (Generalized Method of Moments) and OLS (Ordinary Least squares)	In Japan and the USA, the relationship between public (state) and private investment and GDP growth has been studied. Public investment in Japan and private investment in the United States have an impact on GDP growth.
Chikán, Attila and	1987−	Belgium,	Factor analysis	The effect of cadastral investments on OECD

Kovacs (2009)	2004	Canada, Finland, France, Italy, Japan, Netherland, Sweden, United Kingdom, United States	Regression models	countries on various expenditure components of GDP (public and private investment, investment in fixed assets, foreign trade, as well as annual GDP growth rate) has been studied. These effects are different among countries.
Ibrahim (2019)	1980−2016	United Arab Emirates	VAR	The relationship between public spending and non-oil GDP growth in the United Arab Emirates has been studied. Result: Increased current public expenditures will lead to non-oil economic growth. Public expenditures should be more focused on research and development. Production costs result in increased labor productivity, higher wages and sustained economic growth in the state institutions.

4. Data and Methods

4.1. Data Descriptions

The economic growth in the study (GDP and non-oil GDP) is based on the time-series data (August 2005-June 2019). The data is taken from the Azerbaijan State Statistical Committee. Azerbaijan, as an oil exporting country, should not rely on the oil sector. In this regard, we also consider non-oil GDP as an important indicator. The descriptive statistics of all these variables at their levels are reported in Table 2.

Table 2. Descriptive statistics of the variables.

	GDP	NGDP	I
Mean	4116.315	2110.894	1064.988
Median	4315.250	2095.250	1034.000
Maximum	7715.300	4663.300	4338.800
Minimum	994.1000	115.9000	277.4000
Std. Dev.	1546.700	1032.621	564.4401
Skewness	-0.065580	0.135906	2.091165
Kurtosis	2.422056	2.065710	11.16717
Jarque-Bera	2.282941	6.154068	547.2647
Probability	0.319349	0.046096	0.000000
Sum	642145.2	329299.4	166138.1
Sum Sq. Dev.	3.71E+08	1.65E+08	49381855
Observations	156	156	156

4.2. Methodology

The methodology used in this study is based on econometric methods of the time series. Here are two important stages of econometric methodology. The first step is to create an integrated sequence of variables included in the model, the Augmented Dickey Fuller test (ADF), the Phillips-Perron test (PP), and the Kwiatkowski − Phillips− Schmidt − Shin (KPSS) stationary test. The second step envisages the application of joint integration methods. More specifically, Pesaran and Sheen (1999). Next, we test the ARDL models and boundaries for the cointegration approach to test the long-term relationship between the variables studied.

4.2.1. ARDL Bounds Testing Cointegration

Our research is based on ARDL models and boundary tests for the cointegration approach developed by Pesaran and Shin (1999) and Pesaran et al (2001). These models have recently been used to test the existence of long-term relationships between various macroeconomic variables. The main advantage of this approach is that there is no need to integrate all the variables in the same order.

The implementation of the ARDL method consists of three stages. In the first step, we test for the integration of different studied variables using ADF single root tests (Dickey and Fuller 1979), PP (Phillips and Perron 1988), and KPSS (Kwiatkowski, Phillips, Peter & Schmidt1991). We use three tests to check the validity of the results. In the second step, we evaluate the following unlimited error correction models given by equations (1) and (2):

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta I_{t-j} + \theta_0 \Delta LGDP_{t-1} + \theta_1 \Delta LI_{t-1} + \varepsilon_t \qquad (1)$$

$$\Delta LNGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LNGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta LI_{t-j} + \theta_0 \Delta LNGDP_{t-1} + \theta_1 \Delta LI_{t-1} + \varepsilon_t \qquad (2)$$

GDP	Gross Domestic Product
$NGDP$	Non-Oil Gross Domestic Product
I	Investment
β_0	Constant
$\varphi_i, \rho_i,$	Parameters

Bounds test	
Null hypothesis:	$H_0: \theta_0 = \theta_1 = 0$, No cointegration.
Alternative hypothesis:	$H_0: \theta_0 \neq \theta_1 \neq 0$, Cointegration.

p, g	Lags, are chosen based on the Akaike information criterion (AIC)
	All of the tests of stability, normality, autocorrelation, and heteroskedasticityshould be used to check the models estimated.

The decision-making procedure is based on the F-test developed by Wald. Critical values for the F test are given by Pesaran et al (2001). Complemented by Narayana (2005) for small and recent examples. There are two critical values: one is lower and the other is higher. The lower level is determined by taking into account that all the rows are stationary and that the upper level is first of all the variables integrated. Their values depend on the sample size, the number of independent variables and the probability levels. When the value of F-statistics exceeds the critical value, the null hypothesis is rejected. In this case, the variables are coordinated. However, when the F-statistic value is below the critical value, we accept the null hypothesis and ensure that the variables are not coordinated. Finally, when F-statistics are between two critical values, we cannot conclude.

4.2.2. Long Run Granger Causality Test

When the results indicate that the variables are coordinated, we estimate the UECM by equations (3) and (4) to determine the long-term relationship equations, as well as the short-term dynamics and velocity regulation.

We check for the presence of a long-term causal relationship between the dependent variables and the explanatory variables in each UECM. The negative sign and the significance of the coefficient (π) of the error correction term confirm the presence of long run causality from the independent variables to the dependent variable.

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta LI_{t-j} + \pi ECT_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta LNGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LNGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta LI_{t-j} + \pi ECT_{t-1} + \varepsilon_t \quad (4)$$

4.2.3. Diagnostic Test

This article will use *Breusch Godfrey LM test* (null hypothesis: "no serial correlation") in order to check subsequent correlation problem and use both *Breusch−Pagan−Godfrey* (null hypothesis: *"no heteroskedasticity problem"*) and *Autoregressive Conditional Hederoscedasticity test* (ARCH) for obtaining more reliable outcomes for heteroskedasticity problem. During ARCH test, null hypothesis "no heteroskedasticity problem" theory is checked. Nonetheless, *Ramsey RESET* Test and *Normality Test Jarque-Bera*(JB) was checked. Null hypothesis rejection is acceptable for every five cases.

5. Empirical Results and Discussion

5.1. Results of Unit Root Tests

As mentioned earlier, we will start by testing the integration sequence of various variables using ADF, PP and KPSS tests. The results of the ADF, PP and KPSS test are given in Tables 1, 2, 3 in the Appendix. Almost all three tests show the same results, which confirm the validity of our results. We can conclude that none of the variables is integrated of order two.

Thus, according to ADF test, in *With Intercept only* case, LGDP are stationary *I(0)*. Out of the variables LNGDP and LI are stationary *I(1)*. In *With Intercept & Trend* case LGDP and LNGDP *I(0)*,LI *I(1)* are stationary. In *No Intercept& No Trend case,* LGDP. LNGDP and LI *I(1)* is stationary again.

In PP Unit Root Test, in *With Interceptonly case,* LGDP.LNGDP and LI *I(0)* are stationary. In*With Intercept & Trend* case, LGDP. LNGDP and LI *I(0)* are stationary. In *No Intercept & No Trend* case only LGDP. LNGDP and LI *I(1)*is stationary.

According to Kwiatkowski−Phillips−Schmidt−Shin test statistics LGDP. LNGDP and LI *I(0)*.

5.2. Results of ARDL Models

Since all variables are *I(0)* or *I(1),* we cannot use the Johansen multifactor coupling method, but we can use ARDL boundary checking for the cointegration method.

5.3. VAR Lag Order Selection Criteria

In order to determine optimal lag for ARDL model, VAR Lag Order Selection Criteria was employed and we got the below-mentioned results. The models selection criterion used is AIC. The results of models selection criteria are reported inTable 3.

Table 3. VAR Lag Order Selection Criteria

	Lag	LogL	LR	FPE	AIC	SC	HQ
LGDP	0	-127.3441	NA	0.017444	1.626970	1.665573	1.642646
LI	1	-0.607796	248.6902	0.003725	0.083117	0.198925	0.130145
	2	23.95469	47.58017	0.002876	-0.175531	0.017482*	-0.097150
	3	33.63457	18.50743	0.002678	-0.246976	0.023242	-0.137243
	4	41.05918	14.00870*	0.002566*	-0.290053*	0.057371	-0.148968*
	5	42.93758	3.496899	0.002636	-0.263366	0.161262	-0.090929
	6	46.49456	6.532313	0.002651	-0.257793	0.244040	-0.054004
	7	49.13977	4.791323	0.002698	-0.240752	0.338287	-0.005610
	8	51.51666	4.245519	0.002755	-0.220335	0.435908	0.046158
LNGDP	0	-167.9956	NA	0.029088	2.138309	2.176912	2.153985
LI	1	-83.87709	165.0627	0.010618	1.130529	1.246337	1.177558
	2	-65.56719	35.46823	0.008869	0.950531	1.143544*	1.028911
	3	-56.75213	16.85395	0.008348	0.889964	1.160182	0.999697
	4	-46.76349	18.84648	0.007744	0.814635	1.162058	0.955720*
	5	-41.57327	9.662304*	0.007630*	0.799664*	1.224292	0.972101
	6	-38.35687	5.906850	0.007708	0.809520	1.311354	1.013310
	7	-36.24836	3.819179	0.007897	0.833313	1.412351	1.068454
	8	-35.42946	1.462700	0.008223	0.873327	1.529570	1.139820

Note:	
*	Indicates lag order selected by the criterion
LR:	Sequential modified LR test statistic (each test at 5% level)
FPE:	Final Prediction Error
AIC:	Akaike Information Criterion
SC:	Schwarz Information Criterion
HQ:	Hannan-Quinn Information Criterion

Table 4. Results from bound tests

				Significance								
				I(0) Bound				I(1) Bound				
Dependant variable	AIC lags	F–statistic	Decision	10%	5%	2.5%	1%	10%	5%	2.5%	1%	
LGDP		4.424186	1	4.04	4.94	5.77	6.84	4.78	5.73	6.68	7.84	Cointegration
LNGDP		3.157694	1	4.04	4.94	5.77	6.84	4.78	5.73	6.68	7.84	No Cointegration

Table5. ARDL Model Coefficients

	Model 1	Model 2
Variable	$\Delta LGDP$	$\Delta LNGDP$
$\Delta LGDP_{(t-1)}$	−0.306964***	
$LGDP_{(t-1)}$	0.155586**	
$\Delta LNGDP_{(t-1)}$		−0.290489***
$LNGDP_{(t-1)}$		0.441131***
$\Delta I_{(t-1)}$	0.195781***	0.484604***
$I_{(t-1)}$	−0.140179**	0.470154***
Constant	−0.305209	−0.081440

Table 4 shows whether there is a cointegration relationship between the variables. Thus, there is a correlation between Gross Domestic Product (GDP) and İnvestment (I). In other words, there is a long-term relationship. According to Narayan (2005), F-statistics ratios exceed the minimum by 5%. However, there is no correlation between Non-Oil Gross Domestic Product (NGDP) and Investment (I).

Table 6. Long Run Coefficients

	Variable	Coefficient	Std. Error	t–Statistic	Prob.
LGDP	LI	1.910755	0.169669	11.261671	0.0000
	C	-0.435758	0.638222	-0.682769	0.4959
LNGDP	LI	1.322331	0.215221	6.144053	0.0000
	C	-1.377195	1.483955	-0.928057	0.3550

$$Cointeq = LGDP - \alpha * LI + c$$
$$Cointeq = LNGDP - \alpha * LI + c$$

Table 5 presents the long-term relationship coefficients. Thus, a 1% increase in investment will lead to a 1.9% increase in GDP and a 1.3% increase in non-oil GDP. Both of these coefficients are 99.99% statistic. * p <0.05 ** p <0.01 *** p <0.001

5.4. Error Correction (short run) Model

Table 7. Error Correction (short run) Model Coefficients

	Coefficient	
	Model 1	Model 2
Variable	ΔLGDF	ΔLNGDF
$\Delta LGDP_{(t-1)}$	-0.266236***	
$\Delta LNGDP_{(t-1)}$		-0.183801**
$\Delta LI_{(t-1)}$	0.211714***	0.475613***
$ect_{(t-1)}$	-0.238608***	-0.455995***
Constant	0.017126	0.009195

The table 7 reveals the results of short-term and ECM model. The results are in the following: There is a positive relationship between investment and GDP as well as investment and non-oil GDP. GDP is statistically significant at the level of 0.1% (model 1). The NGDP is statistically significant at the 1% level (model 2). The ECT ratio is also statistically significant at the 0.1% level.

Their negativity substantiates the existence of cointegration relations proposed by Paseran et al. (2001). Having positive relation in these models shows the role of investment in the increase of GDP for new economic growth. (GDP and NGDP).

Table 8. Diagnostic Test Results (LM Version)

	Ramsey RESET Test (t–statistic)	Normality Test (Jarque-Bera) JB	Heteroskedasticity Test: ARCH χ^2	Heteroskedasticity Test: Breusch−Pagan−Godfrey	Breusch–Godfrey Serial Correlation LM Test: χ^2	R2	D_W
ARDL(9, 4)	0.407328	100.5034	0.310259	17.11356	0.091076	0.894661	2.012769
LGDP	0.6844	0.000000	0.5775	0.2502	0.9555		
ARDL(9, 4)	1.607116	5346.612	0.043720	16.53137	15.14336	0.855285	2.030931
LNGDP	0.1103	0.000000	0.8344	0.4165	0.2337		

Table 8a. Diagnostic Test Results (F Version)

	Ramsey RESET Test (F–Statistic)	Normality Test (Jarque–Bera)JB	HeteroskedasticityTest: ARCH	Heteroskedasticity Test: Breusch−Pagan−Godfrey	Breusch–Godfrey Serial Correlation LM Test
ARDL(9, 4)	F(1,155) .	N/A	F(1, 142)	F(14,143)	F(2,141)
LGDP	0.306914		0.165916	0.2525	0.040662
	0.5804	N/A	0.6844	1.240735	0.9602
ARDL(9, 4)	F(1, 139)	N/A	F(1,154)	F(16,140)	F(12,128)
LNGDP	2.582823		0.043172	1.029764	1.138679
	0.1103	N/A	0.8357	0.4295	0.3350

Legend: N/A-Not Applicable

ARDL models (model 1 and model 2) are 5% 1% and 0.1% significant. Regression equations are adequate. It also passes all the diagnostic tests against serial correlation (Durbin-Watson test and Breusch-Godfrey test), heteroscedasticity (White Heteroskedasticity Test), and normality of errors (Jarque-Bera test). The Ramsey RESET test also suggests that the model is well specified. All the results of these tests are shown in Table 8 and Table 8a. The stability of the long-run coefficient is tested by the short-run dynamics. Once the ECM model given by equations (Table 6) has been estimated, the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests are applied to assess the parameter stability (Pesaran and Pesaran 1997).A.Figure1 plot the results for CUSUM and CUSUMSQ tests. The results indicate instability of the coefficients because the plot of the CUSUM and CUSUMSQ statistic not fall inside the critical bands of the 5% confidence interval of parameter stability. (Non-stability model 1 and model 2 was observed (A. Figure1).

Conclusions

Since independence, the development of the oil sector through domestic and foreign investment has allowed the sector to significantly increase its share in the country's economy and its GDP, and to some extent, to other sectors of the economy. However, raw materials, for ex., oil-oriented development of the national economy cannot be considered acceptable in the context of integration into the world economy. At the present stage, the government is tasked with prioritizing diversification of the economy, eliminating its oil dependence, developing the non-oil sector, and identifying areas for increasing non-oil GDP.

Economic priorities should be the priority of investment in ensuring non-oil GDP growth in terms of globalization, global economic growth rates, risks in the changing environment, competitiveness of the country's economy, and sustainable economic growth.

In order to achieve high socio-economic development, improved living standards and quality of the country's population, structural changes in the economy, in particular the non-oil sector development trends, must be aligned with global economic development trends;

Increase in non-oil GDP should be achieved through maintaining macroeconomic stability in the country, stimulating investments and ensuring efficiency, reducing dependence on oil revenues and promoting non-oil sector development;

In order to accelerate the socio-economic development of the country, the main priorities of the investment policy should be the areas leading to the growth of non-oil GDP and the stimulation of investment resources to the development of the non-oil sector.

Appendix

A. Table 1. ADF Unit Root Test.

Model	Variable	ADF−Stat	Levels of Critical Values			LAG	*p*−Value	Stationarity	Integrir I(0,1,2)
			1%	5%	10%				
With Intercept only				At Level Form					
	LGDP	−2.684599*	−3.470427	−2.879045	−2.576182	2	0.0789	S	I(0)
	LNGDP	−1.628331	−3.470679	−2.879155	−2.576241	3	0.4658	N/S	I(1)
	LI	−1.928345	−3.473096	−2.880211	−2.576805	12	0.3186	N/S	I(1)
				At First differencing					
	D(LGDP)	−15.06261***	−3.470427	−2.879045	−2.576182	1	0.0000	S	I(0)
	D(LNGDP)	−10.96494***	−3.470934	−2.879267	−2.576301	3	0.0000	S	I(0)
	D(LI)	−3.688480***	−3.473672	−2.880463	−2.576939	13	0.0052	S	I(0)
With Intercept & Trend				At Level Form					
	LGDP	−3.754555**	−4.014986	−3.437458	−3.142936	2	0.0215	S	I(0)
	LNGDP	−9.873399***	−4.014288	−3.437122	−3.142739	0	0.0000	S	I(0)
	LI	−0.564500	−4.018748	−3.439267	−3.143999	12	0.9794	N/S	I(1)
				At First differencing					
	D(LGDP)	−15.11970***	−4.014986	−3.437458	−3.142936	1	0.0000	S	I(0)
	D(LNGDP)	−10.93526***	−4.015700	−3.437801	−3.143138	3	0.0000	S	I(0)
	D(LI)	−7.127587***	−4.018748	−3.439267	−3.143999	11	0.0000	S	I(0)
No Intercept & No Trend				At Level Form					
	LGDP	1.531775	−2.579139	−1.942781	−1.615416	2	0.9690	N/S	I(1)
	LNGDP	1.025169	−2.579315	−1.942805	−1.615400	4	0.9195	N/S	I(1)
	LI	2.052935	−2.580065	−1.942910	−1.615334	12	0.9905	N/S	I(1)
				At First differencing					
	D(LGDP)	−14.88337***	−2.579139	−1.942781	−1.615416	1	0.0000	S	I(0)
	D(LNGDP)	−12.52280***	−2.579226	−1.942793	−1.615408	2	0.0000	S	I(0)
	D(LI)	−3.393902***	−2.580264	−1.942938	−1.615316	13	0.0008	S	I(0)

Note: ADF denotes the Augmented Dickey–Fuller single root system respectively. The maximum lag order is 3. The optimum lag order is selected based on the Schwarz criterion automatically; ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 2006M01–2018M12.
Legend: S–Stationarity; N/S–No Stationarity

A. Table 2. PP Unit Root Test

Model	Variable	Phillips−Perron test statistic	Levels of Critical Values			Bandwidth	*p*−Value	Stationarity	Integrir I(0,1,2)
			1%	5%	10%				
				At Level Form					
With Intercept only	LGDP	−3.129209**	−3.469933	−2.878829	−2.576067	8	0.0263	S	**I(0)**
	LNGDP	−3.248045**	−3.469933	−2.878829	−2.576067	4	0.0190	S	**I(0)**
	LI	−8.405391***	−3.469933	−2.878829	−2.576067	9	0.0000	S	**I(0)**
				At First differencing					
	D(LGDP)	−30.58392***	−3.470179	−2.878937	−2.576124	21	0.0001	S	**I(0)**
	D(LNGDP)	−113.2714***	−3.470179	−2.878937	−2.576124	150	0.0001	S	**I(0)**
	D(LI)	−67.88853***	−3.470179	−2.878937	−2.576124	38	0.0001	S	**I(0)**
				At Level Form					
With Intercept & Trend	LGDP	−6.441575***	−4.014288	−3.437122	−3.142739	6	0.0000	S	**I(0)**
	LNGDP	−10.63930***	−4.014288	−3.437122	−3.142739	7	0.0000	S	**I(0)**
	LI	−12.32139***	−4.014288	−3.437122	−3.142739	8	0.0000	S	**I(0)**
				At First differencing					
	D(LGDP)	−34.67541***	−4.014635	−3.437289	−3.142837	24	0.0001	S	**I(0)**
	D(LNGDP)	−113.0401***	−4.014635	−3.437289	−3.142837	150	0.0001	S	**I(0)**
	D(LI)	−71.07886***	−4.014635	−3.437289	−3.142837	39	0.0001	S	**I(0)**
				At Level Form					
No Intercept &	LGDP	2.027832**	−2.578967	−1.942757	−1.615431	61	0.0199	N/S	**I(1)**
	LNGDP	1.044807	−2.578967	−1.942757	−1.615431	165	0.9222	N/S	**I(1)**
	LI	0.144919	−2.578967	−1.942757	−1.615431	25	0.7268	N/S	**I(1)**

No Trend			At First differencing						
	D(LGDP)	−25.61437***	−2.579052	−1.942768	−1.615423	16	0.0000	S	**I(0)**
	D(LNGDP)	−38.08631***	−2.579052	−1.942768	−1.615423	92	0.0000	S	**I(0)**
	D(LI)	−63.55831***	−2.579052	−1.942768	−1.615423	37	0.0001	S	**I(0)**

*Note:*PP Phillips–Perron is single root system. The optimum lag order in PP test is selected based on the Newey–West criterion automatically; ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 1995–2017.

Legend: S–Stationarity; N/S–No Stationarity

A. Table 3. KPSS Unit Root Test

Model	Variable	Kwiatkowski−Phillips−Schmidt−Shin test statistic	Levels of Critical Values			Bandwidth	Stationarity	Integrir I(0,1,2)
			1%	5%	10%			
With Intercept only	LGDP	1.403641***	0.739000	0.463000	0.347000	10	S	I(0)
	LNGDP	1.498770***	0.739000	0.463000	0.347000	10	S	I(0)
	LI	1.322274	0.739000	0.463000	0.347000	10	S	I(0)
	D(LGDP)	0.322709	0.739000	0.463000	0.347000	65	N/S	I(1)
	D(LNGDP)	0.372830*	0.739000	0.463000	0.347000	120	S	I(0)
	D(LI)	0.115541	0.739000	0.463000	0.347000	29	N/S	I(1)
With Intercept & Trend	LGDP	0.312673***	0.216000	0.146000	0.119000	9	S	I(0
	LNGDP	0.347859***	0.216000	0.146000	0.119000	8	S	I(0
	LI	0.329688***	0.216000	0.146000	0.119000	8	S	I(0
	D(LGDP)	0.218657***	0.216000	0.146000	0.119000	95	S	I(0)
	D(LNGDP)	0.358905***	0.216000	0.146000	0.119000	121	S	I(0)
	D(LI)	0.110111	0.216000	0.146000	0.119000	29	N/S	I(1)

A. Table 4. ADF unit root test.

Model	Variable	ADF−Stat	Levels of Critical Values			LAG	*p*−Value	Stationarity	Integrir I(0,1,2)
			1%	5%	10%				
With Intercept only	Model 1$_{ECT}$		At Level Form						
		−2.937153**	−3.472813	−2.880088	−2.576739	11	0.0434	S	I(0)
	Model 2$_{ECT}$	−1.677734	−3.471192	−2.879380	−2.576361	5	0.4406	N/S	I(1)
With Intercept & Trend	Model 1$_{ECT}$		At Level Form						
		−3.049389	−4.018349	−3.439075	−3.143887	11	0.1225	N/S	I(1)
	Model 2$_{ECT}$	−12.77642***	−4.014288	−3.437122	−3.142739	0	0.0000	S	I(0)
No Intercept & No Trend	Model 1$_{ECT}$		At Level Form						
		−2.595660***	−2.579967	−1.942896	−1.615342	11	0.0096	S	I(0)
	Model 2$_{ECT}$	−1.697271*	−2.579404	−1.942818	−1.615392	5	0.0848	S	I(0)

Note: ADF denotes the Augmented Dickey–Fuller single root system respectively. The maximum lag order is 3. The optimum lag order is selected based on the Shwarz criterion automatically; ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 1996–2017.

Legend: S–Stationarity; N/S–No Stationarity
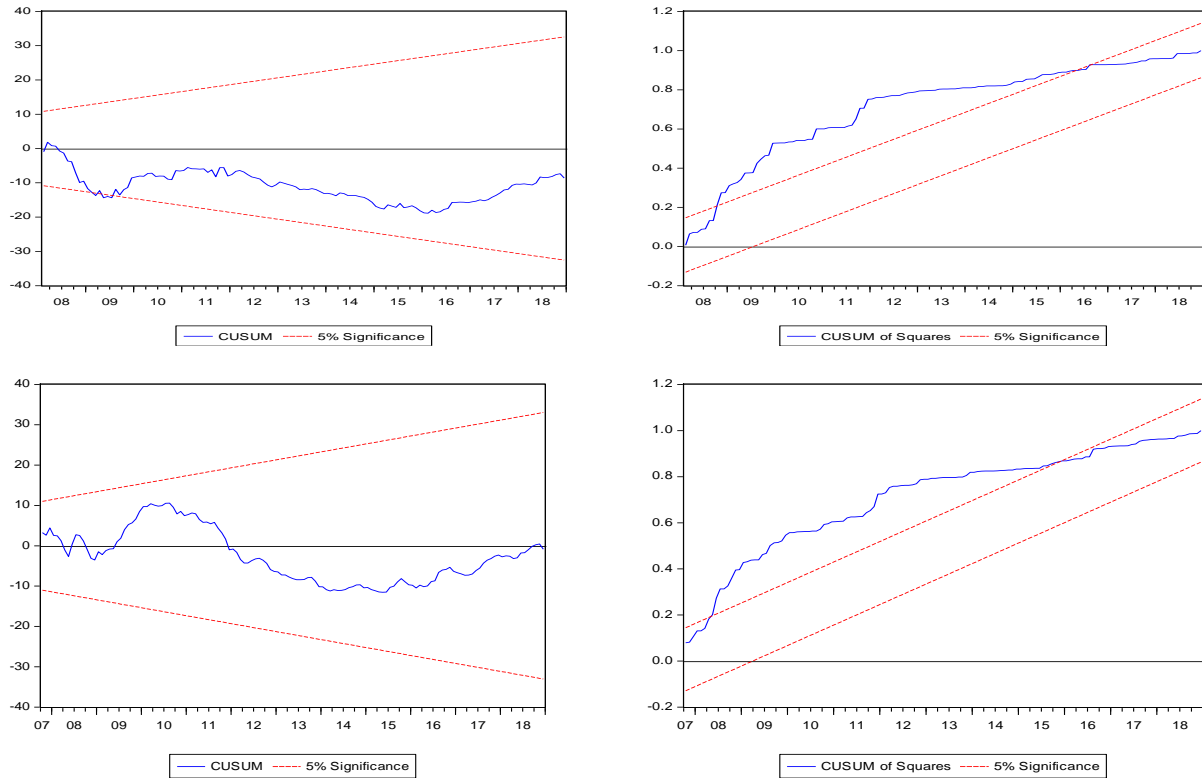
A. Figure 1. Plot of Cumulative Sum of Recursive Residuals
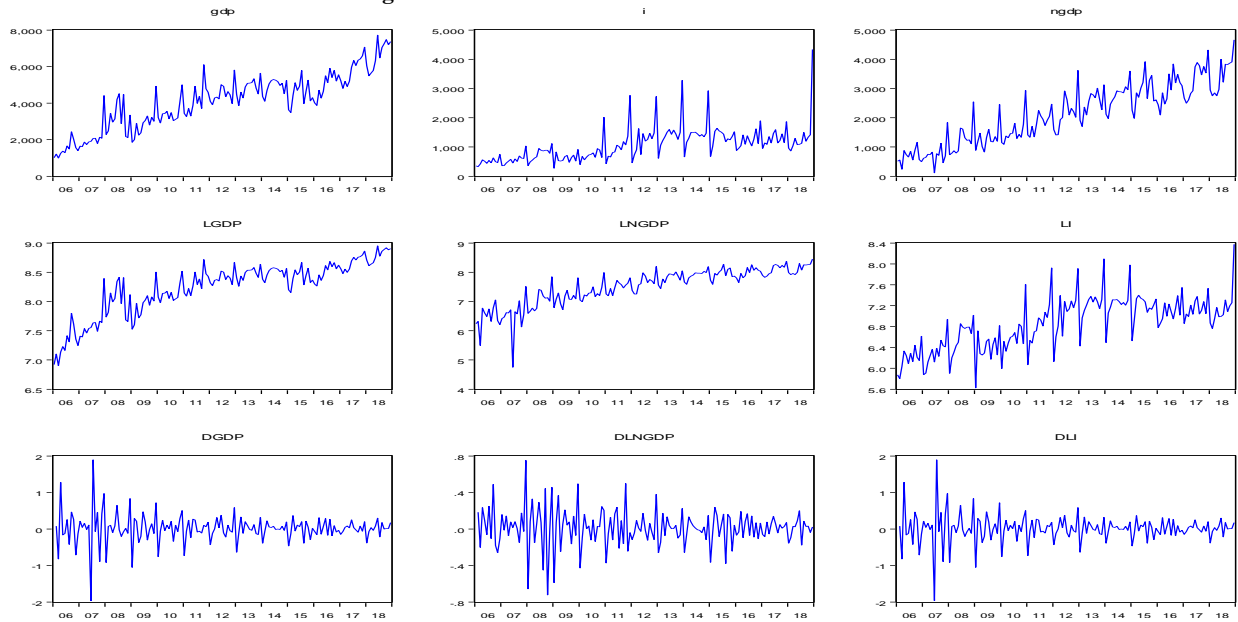
A.   Figure2. Dynamic

A.   Abbreviations

GDP	Gross Domestic Product	million manat
NGDP	Non-Oil Gross Domestic Product	million manat
I	Investment	million manat

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LINKS BETWEEN CORRUPTION AND QUALITY OF LIFE IN EUROPEAN UNION[*]

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Abstract. Studies looking at the links between corruption and quality of life have begun to take place recently, as until now the quality of life has not traditionally been associated with political decisions. Corruption may be defined as the abuse of entrusted power for private gain, which in one way or another affects the quality of life and satisfaction of others. The aim is to bridge the gap between the nexus of corruption and the quality of life in the EU. EU countries were divided into groups of countries according to the year of accession and cover the years 2004-2017 period. The EU has been selected as a geographical region with the aim of uneven economic development of the countries and the lack of research in the region. The aim of the article is to determine the interdependencies between corruption and quality of life indicators in EU countries. Multivariate regression models revealed that the prevalence of corruption among individual groups of six countries had the highest impact on mortality rates, unambiguously showing how well countries are managing their health care systems, population density, birth rate and population aging, GDP per capita, economic situation, life expectancy, serving as an indicator of quality of life and the number of people with primary education. The results of empirical research allow to form insights that in order to reduce corruption it is necessary to focus on the following spheres reflecting the quality of life: education, health care system and general economic situation of the country. The article used the following methods: comparative and systematic literature analysis, multiple regression analysis.

Keywords: corruption; European Union; life quality; well-being

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1. Introduction

The concept of quality of life is very broad and multifaceted, with no single definition due to its multidimensional nature. The concept of quality of life encompasses various aspects of human life (health, social well-being, psychology, standard of living). Quality of life becomes a key objective of national governance and strategic planning and an indicator of policy effectiveness. Corruption is one of the factors of the quality of life in the external environment. Studies and foreign experience show that countries with democratic traditions, human rights and freedoms are more open to high quality of life than countries with totalitarian regimes, unstable political situations, prosperous corruption and abuses of public service for private purposes. The less corruption at the state or local level, the more reason to implement the principles of efficiency and transparency in the redistribution of social funds, which positively influences the satisfaction of the population with government policies and at the same time reflects their attitudes and behaviors. According to Shumach (2018), low-income countries, countries with closed economies, low media freedom and relatively low levels of education are considered to be more prevalent in corruption. Corruption inhibits economic growth and affects business operations, employment and investment. Corruption also reduces the revenue from taxes and the effectiveness of various financial assistance programs. For the general public, high levels of corruption reduce confidence in the law, the legal system and consequently in the quality of life (health care, access to infrastructure, education). An analysis of the scientific literature (Wu, Zhu, 2016; Cárcaba, et al., 2017; Anderson, 2016) has revealed a lack of research revealing interdependencies between corruption and quality of life.

The main purpose of the article is to establish the interdependencies between corruption and quality of life indicators in EU countries. The following tasks are pursued: 1. To study the theoretical aspects of the correlation between quality of life and corruption. 2. Justify the appropriateness of the chosen methodology; 3. Empirically evaluate the interdependencies between corruption and quality of life in EU countries.
Research methods: comparative and systematic literature analysis, multiple regression analysis.

2. Literature review: existing links between corruption and quality of life

Famous ancient Greek philosophers like Aristotle and Plato wrote in their works about human happiness and the fullness of life. These philosophers sought guidance on the meaning of life, believing that they could help to attain a higher level of existence. A.C. Pigou was the first to use the concept of quality of life in his book on economics and well-being, but this concept was ignored and ignored until about the end of World War II. According to Rakauskienė & Servetkienė (2011), the notion of quality of life did not arouse greater interest in the scientific community and was commonly used as a concept requiring no explanation. According to Gruževskis & Orlova (2012), the concept of quality of life circa 1960. was established as a term of public political discourse and was used in political rhetoric to say that it matters not "how much, but how well." More broadly speaking, socio-economic research as a component of quality of life and individual development in the world began only in the 20th century (Schuessler, Fisher, 1985). Since then, various scientific disciplines have begun to analyze the quality of life and its determinants. Various models of quality of life and their measurement tools have been developed since the middle of the last century (McCall, 2005).

According to Janušauskaitė (2008), the perception of quality of life as the availability and distribution of material goods or resources has been a key component of quality of life for many years, and the definition of quality of life to satisfy. According to Easterlin (2001), Frey, Stutzer (2002), in economic theory, the concept of quality of life is often associated with the term welfare, which refers to the objective well-being that is most often measured in monetary terms. According to scientific literature, quality of life is determined by the external and internal environment (Hagerty et al., 2001; Veenhoven, 2000, 2005, 2009).

According to Wu, Zhu (2016) research linking corruption to life satisfaction is limited because life satisfaction has not traditionally been considered a political outcome or a politically relevant event. Only recently have researchers begun to examine the influence of political factors such as regime type, government welfare policy, and political representation on happiness (Bok 2010; Alvarez-Diaz et al. 2010; Di Tella & MacCulloch, 2005; Haller & Hadler, 2006; Pacek & Radcliff, 2008; Radcliff 2001, 2005; Lincényi, Čársky, 2020).

Charron et al. (2013) argued that until the mid-1990s, issues of corruption and mismanagement in the social sciences were largely ignored. The main reason behind the rise in the government's quality and good governance agenda has since been the introduction of various types of measures, especially the 1996 one "The Corruption Perceptions Index" (further CPI) published by Transparency International and only later by the World Bank. With the introduction of these and more tools, numerous studies have shown that government institutions that are reasonably devoid of corruption and real practices have a significant positive impact on many outcomes related to the quality of human life. According to Charron, Lapuente (2018), over the last two decades, more and more research has supported the notion that "government quality" - understood as an impartial, efficient and corruption-free government - is a key factor in explaining socio-economic differences through political communities. Quality of life is a broader concept than economic production and living standards. It includes the full range of factors that influence what we value in living, reaching beyond its material side (Eurostat, 2017).

The classification of quality of life indicators provided by Eurostat is presented in Figure 1.

Figure 1. Quality of life indocators.
Source: Eurostat

According to Eurostat, 8 of the quality of life indicators provided relate to the ability of people to pursue their own well-being according to their own values and priorities. According to research, middle-income countries with high levels of corruption account for one third of all countries in the world. Infant mortality rates in these countries are three times higher and literacy rates 25% lower. There is no country in the world where corruption is completely eliminated, but it is argued that emerging countries have a higher risk of corruption.

Researchers who have investigated the relationship between corruption and quality of life give mixed results. According to Cárcaba, et. al. (2017) did not confirm any relationship between transparency and quality of life when investigating municipal financial reporting in Spain. Although no link has been found, the study has shown that involving citizens; views and decision-making in the distribution of finances to municipalities has actually improved the quality of life in Spanish regions. Meanwhile, Wu, Zhu (2016) confirmed by research that the negative impact of corruption on happiness in China. Moreover, it demonstrates that the level of corruption in the

general environment or the quality of government governance has a particular impact on people's life satisfaction. The research was conducted through surveys with the dependent variable named life satisfaction; and independent variables - experience of corruption, corruption environment. Other research (Enste, Heldman, 2017) found that the main spheres of corruption are size and structure of government, democracy and the political system, determinants and percentage of women in the labor force. The effective functioning / inefficiency of these realms has the greatest impact on people's quality of life. It is concluded that, separately, the quality of life and the phenomenon of corruption are investigated in many ways, i.e. however, there is a lack of correlation between quality of life and corruption. The authors of the article were able to discover only a few studies carried out in Spain, China and the USA.

3. Research methodology

Researchers looking at quality of life face the challenge of choosing from a wide range of indicators that influence the quality of life, the most important and significant for quality of life. The article collected the official 15 selected indicators of quality of life in the European Union countries 1990-2018 period statistics. The data in question cover the various economic variables of the various countries which joined the European Union in 1958, 1973, 1981-1986, 1995, 2004 and 2007 respectively. Belgium, Italy, Luxembourg, Netherlands, France, Germany joined the EU in 1958; 1973 - Ireland, Denmark, United Kingdom (withdrew from EU 2020-01-31 but was still a member of the EU at the time of the calculation); 1981-1986 y. - Greece, Spain, Portugal; 1995 - Austria, Sweden and Finland; 2004 - Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Poland, Malta, Slovakia, Slovenia, Hungary; 2007-2013 y. - Bulgaria, Romania, Croatia.

The aim of the empirical study is to develop a model that assesses the extent to which quality of life indicators affect corruption across groups of countries. Quality of life indicators are presented in Table 1.

Table 1. Quality of life indicators

X	Indicator	Description and Source
X1	Income index	Income Index of a country based on the Gross National Income at Purchasing Power Parity per Capital. Income Index is the index of a country's GNI, where GNI (Gross National Income) is the income claimed by the residents of the country, product taxes etc. https://www.easycalculation.com/finance/income-index-calculator.php
X2	Main GDP aggregates per capita	Main GDP aggregates per capita: main components from the output, expenditure and income side, expenditure breakdowns by durability and exports and imports by origin https://ec.europa.eu/eurostat/cache/metadata/en/nama10_esms.htm
X3	Employment (as % of the population aged 20 to 64)	The employment rate is calculated by dividing the number of persons aged 20 to 64 in employment by the total population of the same age group. The indicator is based on the EU Labour Force Survey. The survey covers the entire population living in private households and excludes those in collective households such as boarding houses, halls of residence and hospitals. Employed population consists of those persons who during the reference week did any work for pay or profit for at least one hour, or were not working but had jobs from which they were temporarily absent. https://ec.europa.eu/eurostat/web/products-datasets/-/t2020_10
X4	Unemployment rates by sex, age and educational attainment level (%)	The unemployment rate is the number of unemployed persons as a percentage of the labour force (the total number of people employed and unemployed) based on International Labour Office (ILO) definition. Unemployed persons comprise persons aged 15 to 74 who fulfil all the three following conditions. https://ec.europa.eu/eurostat/web/products-datasets/-/tipsun10
X5	Life expectancy Index	The life expectancy index measures the relative achievement of a country in terms of life expectancy at birth. https://www.eustat.eus/document/datos/pi_metod/idh_idh_i.asp
X6	Life expectancy at birth, total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. https://datacatalog.worldbank.org/life-expectancy-birth-total-years-0
X7	Current health expenditure (%	Level of current health expenditure expressed as a percentage of GDP. Estimates of

	of GDP)	current health expenditures include healthcare goods and services consumed during each year. This indicator does not include capital health expenditures such as buildings, machinery, IT and stocks of vaccines for emergency or outbreaks. https://datacatalog.worldbank.org/current-health-expenditure-gdp
X8	Human development index	The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions. http://hdr.undp.org/en/content/human-development-index-hdi
X9	Education Index	Index, which is calculated using Mean Years of Schooling and Expected Years of Schooling. http://hdr.undp.org/en/content/education-index
X10	Gender employment gap	The indicator measures the difference between the employment rates of men and women aged 20 to 64. The employment rate is calculated by dividing the number of persons aged 20 to 64 in employment by the total population of the same age group. The indicator is based on the EU Labour Force Survey. https://ec.europa.eu/eurostat/web/products-datasets/product?code=sdg_05_30
X11	House price index - annual data (2015 = 100)	The House price index captures price changes of all residential properties purchased by households (flats, detached houses, terraced houses, etc.), both new and existing, independently of their final use and their previous owners. Only market prices are considered, self-build dwellings are therefore excluded. The land component is included. The data are expressed as annual average index 2015=100, as 3 years % change and annual average rate of change. https://ec.europa.eu/eurostat/web/products-datasets/product?code=tipsho20
X12	Population density (people per sq. km of land area)	Population density is midyear population divided by land area in square kilometers. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. Land area is a country's total area, excluding area under inland water bodies, national claims to continental shelf, and exclusive economic zones. In most cases the definition of inland water bodies includes major rivers and lakes. https://datacatalog.worldbank.org/population-density-people-sq-km-land-area-2
X13	Urban population growth (annual %)	Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects. https://datacatalog.worldbank.org/urban-population-growth-annual-5
X14	Air pollution effects (Mortality, per 1 mln inhabitants)	Fine particulate matter (PM2.5) can be inhaled and cause serious health problems including both respiratory and cardiovascular disease, having its most severe effects on children and elderly people. Exposure to PM2.5 has been shown to considerably increase the risk of heart disease and stroke in particular. Cost estimates represent only the cost of premature mortalities. They are calculated using estimates of the "Value of a Statistical Life" (VSL) and the number of premature deaths attributable to ambient particulate matter. https://data.oecd.org/air/air-pollution-effects.htm#indicator-chart
X15	Population by educational attainment level, sex and age (%) - main indicators. From 15-64 years. Less than primary, primary and lower secondary education (levels 0-2)	Presents data on the highest level of education successfully completed by the individuals of a given population. https://ec.europa.eu/eurostat/cache/metadata/en/edat1_esms.htm

Source: compiled by the authors

We will construct multivariate regression models by examining the effect of the independent variables included in them on the dependent variable. Python was used for all calculations, modeling and analysis. See Annex 1 for how the data were selected. A study of the effect of independent variables on dependent variable Y found the importance of variables X to Y: x8, x2, x14, x4, x6, x9, x7, x12, x15. Univariate linear regression tests were used for this purpose. Multiple regression models will include the following model fit criteria, R Square, Adjusted R2, Akaike's information criterion (AIC), F-statistics, Durbin-Watson statistics and Jarque-Bera test.

R Square (Coefficient of Determination) explains the percentage of variance explained by covariates in the model. It tells us the proportion of variation in the dependent (response) variable that has been explained by the model. It ranges between 0 and 1. Usually, higher values are desirable but it rests on the data quality and domain. We don't necessarily discard a model based on a low R-Squared value. Its a better practice to look at the AIC and prediction accuracy on validation sample when deciding on the efficacy of a model. *AIC* is measure of the goodness of fit of an estimated statistical model and can also be used for model selection. *Adjusted R²* penalizes total value for the number of predictors in the model. It doesn't increase, stays same or decrease unless the newly added variable is truly useful. Therefore, when comparing nested models, it is a good practice to look at Adjusted R² value over R-squared. The "*F-statistic*" and "*Prob (F-statistic)*" statistics test the overall significance of the regression model. Specifically, they test the null hypothesis that all of the regression coefficients are equal to zero. This tests the full model against a model with no variables and with the estimate of the dependent variable being the mean of the values of the dependent variable. The F-statistic value is the ratio of the mean regression sum of squares divided by the mean error sum of squares. Its value will range from zero to an arbitrarily large number. The low a value of "Prob (F-statistic)" would imply that at least some of the regression parameters are nonzero and that the regression equation does have some validity in fitting the data. The Durbin Watson statistic is a number that tests for autocorrelation in the residuals from a statistical regression analysis. The Durbin-Watson statistic is always between 0 and 4. A value of 2 means that there is no autocorrelation in the sample. Values from 0 to less than 2 indicate positive autocorrelation and values from more than 2 to 4 indicate negative autocorrelation. The Jarque-Bera Test, is a test for normality. Normality is one of the assumptions for many statistical tests, like the t test or F test; the Jarque-Bera test is usually run before one of these tests to confirm normality. Prob(JB) > 0.05 - Normal Distribution, Prob (JB) < 0.0 - Non-Normal Distribution.

4. Empirical research results

Multiple regression models were developed for individual groups of countries (see Table 2).

Table 2. Multiple regression models for corruption in individual groups of EU countries

Modelis	x2 (GDP)	x4 (Unemployment)	x6 (Life expectancy)	x7 (Health expenditure)	x8 (HDI)	x9 (Education index)	x12 (Population desity)	x14 (Air polution effect)	x15 (Population by education)	R	MAE	MSE	RMSE
1958	0.001	0.619	-6.250				-0.031	-0.074	-0.486	0.969	1.91	5.91	2.43
1973	0.001					99.560	-0.061	0.115		0.911	1.95	5.70	2.39
1981				-6.109				-0.066	0.406	0.912	2.31	9.58	3.10
1995	-0.002						-0.139			0.876	1.92	6.65	2.58
2004	0.003		-1.139	-1.832			-0.014	-0.045	0.467	0.744	3.23	17.03	4.12
2007	0.005		3.587		-680.221	232.792				0.782	2.08	6.34	2.52

Source: compiled by the authors

The models of both R-squared and Adj. R-squared ratios values are close to 1, Prob (F-Statistic) value <0.05 indicates that significant variables are included in the model, Prob (JB)> 0.05 indicates residual normality, and Durbin-Watson values are close to one, this indicates a positive autocorrelation of residues.

The growth / decline in the corruption perception index of the 1958 group of accession countries is affected by GDP per capita, unemployment, life expectancy, population density, air pollution and educated population (see equation 1):

1958 year $Y = 0.0006X2 + 0.6193X4 - 6.2498X6 - 0.0307X12 - 0.0738X14 - 0.4855X15 + 558.2605$ (1)

During the period under review, GDP per capita increased by 1 million. The CPI tends to increase by 0.001 points and vice versa. This supports the theoretical assumptions that corruption is lower in rich and developed countries. The rise of the CPI shows increasing transparency in the country. The CPI scores are on a 100-point scale where 100 points for a very transparent state and 0 for a very corrupt state. With a 1% rise in unemployment, the CPI has a tendency to increase by 0.619 points and vice versa. In the scientific literature, corruption in terms of bribery, nepotism, favoritism, commercial bribery, and unlawful favors is positively correlated with unemployment (Dwivendi, 1967). Other studies (Bouzid, 2016) have found that widespread corruption practices force most of the workforce to leave the formal economy, reducing income from taxable labor taxes. The decline in tax revenues weakens the government's capacity to create new jobs, increasing unemployment and the incentives for corrupt officials to take bribes. However, higher unemployment rates may increase corruption, while public officials may be hesitant to bribe in times of high unemployment for fear of losing their jobs. Given the relatively high average wages in this group of countries, bribing is not an attractive option.

With a one-year increase in population life expectancy, the CPI tends to decline by 6.24 points. Lower level of corruption or better control of corruption in a country can lead to longer life expectancy, lower infant mortality rate and lower under-five mortality rate for citizens (Lio, Lee, 2016). Corruption reduction itself is an effective method to promote health, but other researchers have not found significant links between corruption and individual illness. In the 1958 group of countries, life expectancy has been increasing, but CPI has been declining. By one person sq. meter, the CPI tends to drop by 0.031 points. According to Chowdhury (2007), countries with a higher density population are more likely to be categorized under higher corruption indices. This follows as a result of the population's place on increasing strain on governance, thus increasing corruption. With an increase in per capita mortality, the CPI tends to decrease by 0.074 points. Increased human mortality results in worsening health conditions, increased consumption of alcohol or tobacco products, and reduced quality of life, reflecting widespread corruption in countries. With a 1% increase in the proportion of those with lower than primary or secondary education, CPI tends to fall by 0.486 points, and vice versa. Those with lower levels of education are less conscious of not engaging in corrupt activities.

Studies have shown that citizens with the lowest levels of education are unresponsive to the effects of corruption; for all other citizens, the corrosive effects of corruption on political trust increase with education (Hakhverdian, Mayne, 2012). Life expectancy, unemployment rates and low educational attainment have had the greatest impact on the variation in CPI in Belgium, Italy, Luxembourg, the Netherlands, France and Germany, meaning that attention to quality of life variables included in the multivariate regression model needs to be addressed effectively.

Multivariate regression model for 1973 intervening countries:

1973 year $Y = 0.0009X2 + 99.5598 X9 + 0.1148X14 - 0.0614X12 - 56.4855$ (2)
In this model, in contrast to (1), the new variable, Education index, appears. As the Education index rises 1, the CPI tends to increase by 99.55.
1981 year $Y = -6.1087X7 - 0.0664X14 + 0.4062X15 + 117.2153$ (3)
1995 year $Y = -0,0016X2 - 0.1388X12 + 126.8781$ (4)
2004 year $Y = 0.0029X2 - 1.1392X6 - 1.8323X7 - 0.0140X12 - 0.0447X14 + 0.4667X15 + 134.7901$ (5)
2007 year $Y = 0.0051X2 + 3.5871X6 - 680.2210X8 + 232.7916X9 + 87.0062$ (6)

In conclusion, the extent of corruption within individual groups of countries was unequivocally influenced by the economic situation of countries, as measured by GDP per capita in this study (except for the countries that joined the EU in 1981). The improving economic situation of groups of countries had a positive effect on the values of the CPI, which indicated an improving situation in the fight against corruption. With the exception of in the 1995 accession countries, the value of GDP showed opposite tendencies in correlation with CPI. Finland, Austria and

Sweden are among the most transparent countries, although their CPIs have been on a declining trend to 75 points in 2017, Finland from 97 in 2004 to 85 points in 2017, Sweden from 92 in 2004 to 84 points in 2017. The impact of the unemployment rate on the values of the CPI only occurred in the group of countries that joined in 1958. The Life Expectancy Index, which reflects healthy lifestyles and long life expectancy, has a positive effect on CPI values in the group of countries that joined in 2007, signaling that public authorities should focus more on promoting healthy lifestyles and education in Bulgaria, Romania and Croatia. The extent of corruption was further influenced by charges on health care, particularly in 1981 and 2004. for groups of countries.

During the period under review, health and care taxation may have been ineffective in terms of quality ratio, leading to the assumption of increased mistrust in healthcare institutions and increased bribing of health care professionals. The impact of HDI on the value of CPI was only significant for a 2007 group of countries.

Conclusions

The mathematical statistical calculations revealed that the prevalence of corruption among groups of countries had the greatest impact on the mortality rate, which clearly shows how countries manage their health care system (4 out of 6 countries had a significant impact on corruption), population density, aging issues (4 out of 6 country groups), GDP per capita reflecting the economic situation of the country (5 out of 6 countries), life expectancy serving as an indicator of quality of life (3 out of 3 country groups) and primary education number (3 groups of 3 countries).

The study revealed that in order to reduce corruption, it is necessary to focus on the following areas reflecting the quality of life: education, health care system and general economic situation in the country. Education in the context of this study was defined by the lack of mentality of those with low levels of education, without realizing the negative consequences of corruption in the long term, the education index and HDI. The health care system was defined by mortality, life expectancy, health care expenditure, population density (which determines population size). It is concluded that by improving at least one of the models' quality of life indicators, the corruption index tends to improve. Further research suggests a more detailed study of the impact of identified quality of life indicators on corruption at national level.

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ANNEX 1

Sampling of data
The original dataset consists of the number of countries that joined the EU in different years and information on different economic variables over a period of time. It is likely that between the information collected, i.e. the 15 economic indicators will certainly be correlated, interdependent. Therefore, a correlation matrix between all available data and the values of economic indicators is presented first:
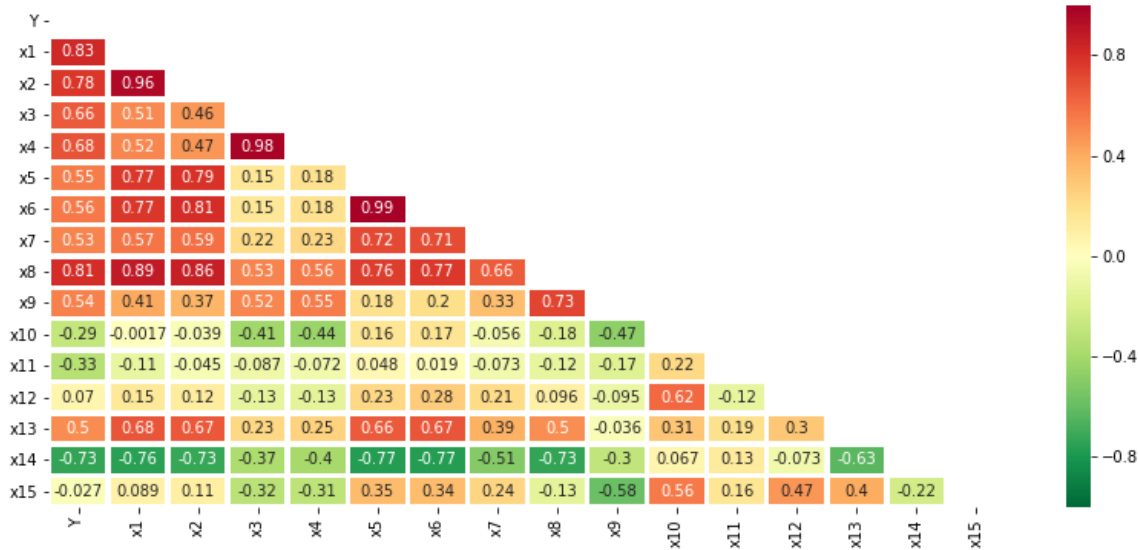
It is easy to see that there is a strong correlation between the whole mass of indicators, i.e. dependent on each other are x1 (Income index) and x2 (Main GDP aggregates per capita), x3 (Employment (as a percentage of the population aged 20 to 64)) and x4 (Unemployment rates by sex, age and educational attainment level, respectively) %)), x5 (Life expectancy Index), and x6 (Life expectancy at birth, total (years)). We look at the correlations of these variables differently, by year, for the groups that joined the EU:
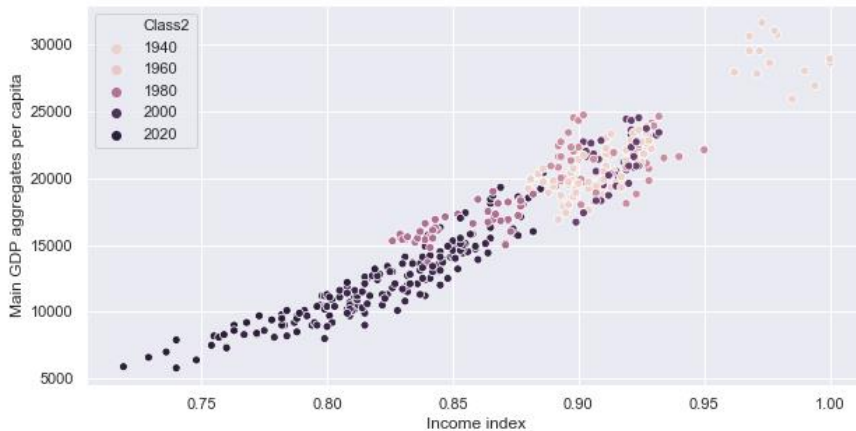
The linear dependence of the presented indicators on all blocks of countries is obvious; The following indicators x3 and x4 and x5 and x6 respectively are given below. The differences between the groups of countries are less pronounced, but the correlation is strong for all groups of countries.
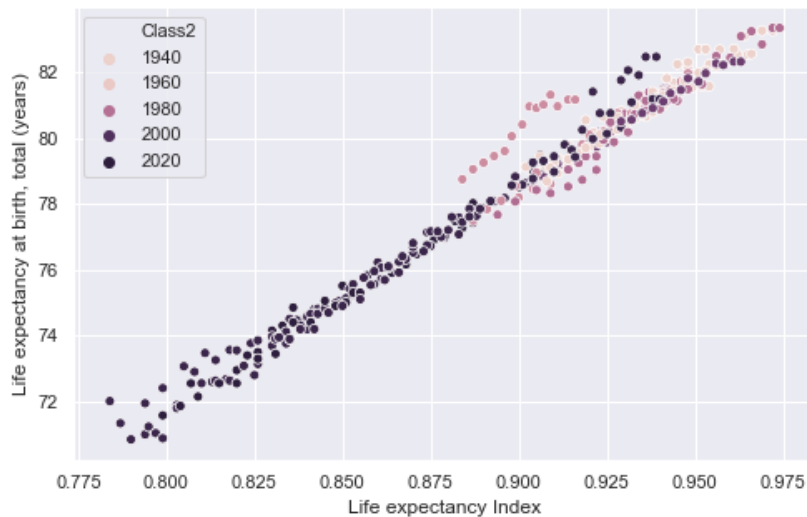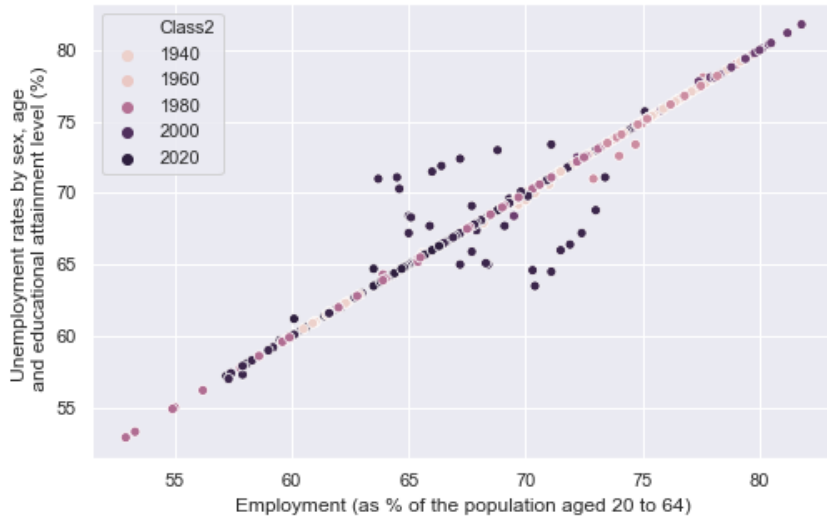
Given the importance of the economic variables mentioned above for dependent variable Y, the attributes x1, x3 and x5, respectively, are further removed from the data analysis. The x10 and x13 attributes have negative values, which are also removed from the original dataset. The x11 indicator has omitted values, and deleting entries with them significantly reduces the data set for the 2007 Accession Countries, eliminating the whole attribute. Missed values also have the x14 attribute, but we believe it is important for analysis, so the entries are removed, not the attribute itself. Distribution of data records, number of meanings by groups of countries joining the EU.

ANALYSIS OF DETERMINANTS OF INDONESIAN AGRICULTURAL EXPORTS[*]

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Abstract. This paper analyses determinants of agricultural exports and imports from Indonesia, including a set of demand and supply factors capturing effects of income, market size, prices, tariffs, exchange rates and variables related to logistics, competitiveness, trade policy, and innovation. A specific focus is on trade creation and diversion effects possibly arising as Indonesia experienced a deep liberalization of markets through the implementation of multiple Free Trade Agreements (FTAs). A gravity model helps to analyze the determinants of trade and the impacts of the various trade agreements, applied to two categories of agricultural exports: raw goods and food. The dataset comprises 50 countries with data on exports and imports from 2007 until 2017. The results find trade creation effects for both categories, with larger effects in exports within agricultural raw goods, and higher trade creation effects through imports in food. Indonesia also experienced trade expansion with non-free trade partners, suggesting that demand variables (e.g., income, market size, sophistication) are a more critical driver of growth rather than agreements. Price factors affect agricultural goods, with food products experiencing elastic price demand, while raw goods are affected by prices and exchange rate. Gains in competitiveness, logistics performance, and innovation is supporting agricultural exports (imports as well), although Indonesia is behind most of its trade partners. The current implementation of the FTA should be critically evaluated concerning food products as imports have expanded more rapidly than exports, and domestic goods may have experienced pressure from liberalization.

Keywords: Agricultural Trade; Gravity Model; Trade creation and trade diversion effects; GMM

Additional disciplines (besides field of economics reflected in JEL classifications): economics; agriculture; internationsl trade

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1. Introduction

This study analyses the determinants of agricultural exports from Indonesia, distinguishing two categories: agricultural raw materials (Agro raw hereafter) and food processing. Data covers the years 2007 to 2017, capturing exports and imports of Indonesia with 50 partner countries, of which 23 have a Free Trade Agreement (FTA) in place, and the rest (27) do not have active FTA. The period is of importance, considering five reasons. 1) The rapid rise in agricultural exports as new markers emerge (e.g., China, India, Sheperd, 2019). 2) A change in consumer behavior in both emerging countries (as income increased rapidly) and in advanced ones (Sun & Li, 2018). 3) Major technological changes that allows more extensive trade in processed food (Athukorala & Jayasuriya, 2003). 4) Large shocks in prices, global demand, and exchange rate during the period of study (Hegerty, 2016). 5) Indonesia experienced a broad liberalization in trade, moving from 10 FTA agreements in place in 2007 to 23 by the end of 2017.

Developing countries have emerged as new markets for agricultural goods and as new competitors in the global food supply, shaking the structure of markets (Jongwanich, 2009; Villoria, 2019). Indonesia alone reported an increase from US$23 billion in agricultural exports in 2007 to nearly US$50 billion in 2017, turning agricultural exports into a new source of growth for the country. Indonesia's agricultural raw exports expanded at 3.3% compound average growth (CAGR), more than double the CAGR for global exports of agricultural raw goods at 1.2%. Exports of food from Indonesia were notably faster as they grew 8.8% CAGR from 2007 to 2017, twice the global growth rate of 4.4% CARG.

In addition to Indonesia being among those active emerging markets taking larger shares in the global food supply (Jongwanich, 2009; Villoria, 2019), the country also shifted its pattern of agricultural exports by increasing both the share of food exports to total exports by 10%, and increasing the value of food exports faster than that of raw materials. A decade before, agricultural exports were mainly agricultural raw materials.

On the other hand, a volatile exchange rate, significant fluctuation of prices, and global demand seems to affect exports of agricultural commodities (raw or minimally unprocessed) in a more significant way than for food (which often has lower price elasticity), particularly for emerging countries (Baiardi, Bianchi, & Lorenzini, 2015). Main agricultural goods and raw exports of Indonesia experienced negative effects due to high volatility in exchange rate (Sugiharti, Esquivias, & Setyorani, 2020). Agricultural goods also face lower income elasticity, making them more sensitive to global shocks. As an example, the price of crude palm oil (CPO), the largest agricultural export product from Indonesia, recorded a price Index equal to 112.5 in 2006. Two years after, in 2008, the index increased to 227 and reached its peak in 2011 at 257. By 2015, the index price of CPO collapsed to 145 (Serrano & Pinilla, 2010). In contrast, imports dominated by sugar and cereals experience significant volatility, particularly sugar products, suggesting that agricultural trade is sensitive to price volatility.

While trade liberalization has penetrated a large number of sectors under manufacturing, agriculture is a sensitive and often an excluded sector (Anderson, Rausser & Swinnen, 2014), protected by tariffs and non-tariff barriers, and frequently subsidized by governments (Serrano & Pinilla, 2010). Nevertheless, in recent years, Indonesia has entered into a broader trade integration (beginning in the late 2000s) by removing a number of barriers and lowering tariffs that could allow the country greater access to new markets and to play a more important role in global exports (Villoria, 2019). Liberalization also imposes more considerable competition from foreign goods at home (Dai, Yotov, & Zylkin, 2014).

In the line of the literature of exports demand and the recent development of the market for agricultural products, this paper looks at the role played by supply and demand factors in shaping the demand for agricultural exports and imports from Indonesia. While demand function for exports (imports) is mainly related to incomes (at higher level) and to a lower degree to prices (Serrano & Pinilla, 2010), this study also includes factors related to distance,

indexes capturing logistic performance (LPI), human development (HDI), competitiveness (GCI), innovation (GII), and governance (GI), plus factors related to prices including the consumer price index (CPI), tariffs, and exchange rates. Also, facilitation in trade and removal of barriers to trade (liberalization of markets), often reflected in the existence of Free Trade Agreements (FTAs), are included in the model to measure the possible trade creation, expansion, or diversion effects arising from trade liberalization. The set of factors allows the capturing of multi-resistance terms, an essential challenge in gravity models.

The study includes Agricultural Materials categorized under SITC under codes (0+1+2 – 27 -28 + 4), and further categorized into two groups 1) Agricultural Raw Materials and 2) Food products. The distinction is proposed as literature suggests that income and price elasticity differ between raw goods and processed goods (food), and other factors are also expected to be different depending on the nature of the goods (Hayakawa, Ito, & Kimura, 2016). Distance, logistics, competitiveness, innovation, and governance indexes may reflect important differences in the role they play to promote deeper integration into the global agricultural chain.

2. Literature Review

This section offers evidence on studies addressing export/import demand employing gravity models, as well as offering evidence of variables employed in empirical models, likely to influence the pattern of agricultural trade from Indonesia. The main intention is to provide support for the model proposed in this paper, as well as to highlight empirical gaps in the literature, related to the object of this study.

In the literature on trade creation and diversion employing gravity models, the logic implies that trade is driven by demand-side factors as income, prices, exporter production capability, and trade costs often associated with distance (Urata & Okabe, 2010). Trade creation and trade diversion effects complement free trade agreements, a concept introduced by Viner (1950). Trade creation describes how having a free trade deal could lead to a substitution of goods previously imported from non-member countries, by products from within new country members. The switch to cheaper goods from inside country members could lead to a more efficient allocation of resources and possible welfare gains. By contrast, trade diversion is the effect where goods from outside the bloc substitute intra-bloc goods (FTA members).

Nevertheless, while trade agreements are likely to help expand trade (Lee & Oh, 2019), not all agreements offer evidence of trade creation (Ghosh & Yamarik, 2004), and some deals are instead mixed in dimension (Anderson & Yotov, 2016; Kohl, Brakman, & Garretsen, 2016; Urata & Okabe, 2014), suggesting the need to look at specific country-time-industry-agreement effects. While trade agreements could lead to large trade effects, the welfare repercussions may be less substantial (Shepherd, 2019). In addition, FTAs could lead to stronger trade creation for imports than for exports, while diversion effects could be stronger (and increasing) for domestic trade (Dai et al., 2014).

Different sorts of factors can play a role in intensifying or lessening the demand for goods. Factors like lower tariffs and fewer barriers to trade promoted through FTA agreements could support lower trading costs and tentatively, promote more substantial trade. Nevertheless, the literature suggests the presence of heterogeneity effects across agreements, across countries and across sectors. Specifically, Baier, Yotov and Zylkin (2019) offer evidence of four sources of heterogeneous effects on FTA agreements. Firstly, countries with high barriers previous to the signature of the FTA deal have larger potential gains. Secondly, countries with relatively lower market power grant relatively smaller allowances when signing FTA deals. Thirdly, countries with prior trade agreements in place may tend to have lower effects in successive deals. Fourthly, FTA deals tend to be weaker for further away partners (harder coordination or cultural affinity). In addition to mixed results found within the agreements and across partners (Baier et al., 2019), Anderson and Yotov (2016) note the presence of *phasing-in* trade effects as agreements may take time before they affect supply and demand. The different factors suggesting

heterogeneous results open a gap for empirical research when dealing with a specific country -Indonesia-, different agreements in place, and specific sectors and product groups within agriculture, where so far there is no conclusive evidence on trade effects.

As an example, Urata and Okabe (2010) found more frequent trade diversion effects among developing countries, highlighting that the tariffs imposed on non-members could be a driver of diversion effects. Other studies at the commodity level (dairy products), as that of Schaak (2015), find larger trade creation in imports than in exports, advising a more critical evaluation of policies for countries playing essential roles in global supply that can lead to volatility in global prices. Other studies suggest that latecomers to FTAs (as in the case of Indonesia) may have lower potential benefits from trade agreements (Anderson & Yotov, 2016). The large concentration of Indonesia in few strategic goods (at a global level), as in the case of rubber goods, Crude Palm Oil (CPO), paper products, cork & wood, shrimps, and coffee, among others, opens a gap for empirical analysis.

Nevertheless, studies within the Association of Southeast Asian Nations (ASEAN) find evidence of net trade creation within agricultural trade as a result of the integration of markets (Shepherd, 2019; Korinek & Melatos, 2009). Other studies with the largest partners of Indonesia in Asia (Japan and China) also suggest gains, at least at the regional level. As an example, Szalanczi and Trinh (2017) find trade creation and higher levels of intra-regional trade as a result of the ASEAN-Japan Comprehensive Economic Partnership (AJCEP). Yang and Martinez-Zarzoso (2014) also find that FTAs in nearby countries (China) contributed to trade expansion both for members and non-members and partners.

Besides estimating trade creation and diversion effects, empirical literature covers multilateral-resistance factors (MR) that can explain the degree of gains/losses, both captured by non-time and time-varying aspects, often introduced as treatments. In gravity models, trade cost is associated with distance and coordination costs (Bergstrand, Larch, & Yotov, 2015). A number of empirical studies suggest a negative impact between distance and trade (e.g., Magerman, Studnicka & Van Hove, 2016). Other studies suggest a negative relationship between distance and trade as it could be associated with sensitivity to trade policy, higher coordination costs or weaker cultural affinity (Baier et al., 2019).

In the literature of determinants of agricultural trade, income often appears as the primary driver of trade (Baiardi et al., 2015; Serrano & Pinilla, 2010). Together with income, market size (population) is often associated with purchasing power or a proxy for demand. In Sasaki (2015), a high population growth rate is associated with larger trading flows driven by consumption growth, especially under free trade agreements that offer large scope in liberalization. A larger GDP and a greater similarity between countries, is associated with a larger probability of trade creation (Baier & Bergstrand, 2004; Baier et al., 2019).

In this study, the effect of demand is expected to be large, firstly because the GDP of the main export destinations of Indonesian goods is large (particularly that of the US, Japan, Singapore and Korea) and, secondly, as income is growing quickly among new partners in the developing world (India and China). Nevertheless, the GDP factor is expected to be lower for agricultural raw goods than in manufacturing goods, as noted in Urata and Okabe (2014).

Together with income, prices are also important determinants of exports. Lower prices, a favorable exchange rate and stable prices could be a driver of more significant exports. Serrano and Pinilla (2010) find larger agricultural exports in periods of less volatility, although this is a rather small positive factor. On the other hand, while exchange rate depreciation could lead to lower prices of exports and increasing export flows (Baek, 2014; Bahmani-Oskooee and Aftab, 2017), it could also be associated with higher transaction costs and for instance, with lower trade. Volatility in the exchange rate could also affect exports (Asteriou, Masatci, & Pılbeam, 2016; Sugiharti, et al. 2020). Prices affect goods within agriculture in a different way, as price elasticity within processed food is often lower than for commodities (raw), as found in Baiardi et al., (2015). The role of price

elasticity, tariffs and exchange rates seems to affect commodities more sharply than food, while non-price factors tend to have a more significant effect on the trade of food products. Processed food faces lower price elasticity in demand for exports and higher income elasticity, while the opposite is proposed for commodities (Baiardi et al., 2015); however, at the disaggregated product level and for more prolonged periods, elasticity may tend to be similar. In previous years, price distortions and multiple government interventions to reduce negative impacts due to high volatility (Pieters & Swinnen, 2016) suggest the importance of price stability for both domestic and international trade of food.

Tariffs are also employed as a standard control variable in gravity models, with evidence of significant adverse effects on trade flows (Ando & Urata, 2007). Nevertheless, Urata and Okabe (2014) find that tariffs could still lead to trade diversion effects, more for manufacturing than for agricultural goods (often excluded from RTAs). As noted in Fugazza and Maur (2008), tariffs are essential components of trade agreements, but other factors may also play a role in trade effects (e.g., trade facilitation and non-trade barriers), especially when tariffs reach low levels. Nevertheless, tariffs and trade relations may require time before bringing benefits (Lin, 2018) and effects may experience diminishing benefits as the trade relation matures (Baier et al., 2019; Ghosh & Yamarik, 2004).

Empirical studies observing effects on trade due to transportation costs conclude that improvements in the logistics index could lower transportation costs, driving positive effects in trade expansion (Hoekman & Nicita, 2010; Saslavsky & Shepherd, 2014). Available high-quality logistics services are likely to influence the volume of trade, both in exporting and in importing countries (Gani, 2017). In the ASEAN region, Korinek and Melatos (2009) suggest potential gains in agricultural trade as a result of improvements within logistic performance in the region. Although, Hummels (2007) and Disdier and Head (2008) argue that transportation costs have not fallen as much as expected, meaning that even higher logistic performance may not necessarily mean massive cuts in transportation costs. The mixed evidence opens a gap for empirical findings.

The type of trade agreements also offers evidence of heterogeneous effects (Urata & Okabe, 2014). In countries like Indonesia, where most of the trade agreements are under the umbrella of regional deals (mainly under ASEAN), trade may face both creation and diversion effects. While standard trade provisions could be drivers of trade, more current provisions are not always favorable (Kohl et al., 2016). Although more recently bilateral Trade Agreements have flourished in Indonesia as they require fewer coordination efforts versus multilateral deals (Urata & Okabe, 2010), new agreements are more sophisticated and more profound, going beyond tariff reduction-removal (Fugazza & Maur, 2008). So far the largest trade growth of Indonesia is under the ASEAN Plus Six Trade agreements (Padilla, Handoyo, Sugiharti, & Muryani, 2019).

A final note on control variables covers global competitiveness, innovation, human development and governance. Studies such as that of Llatja (2015), find a positive relationship between foreign investment inflows and trade, often related to innovation, higher competitiveness and transparency. Erkan (2015) also notes a positive relationship between trade and innovation, concluding that increases in the innovation index lead to larger trade flows. In a gravity model conducted for Central and Eastern Europe (CEECs), it was shown that human development (HDI) is also possibly associated with trade flows (Cieślik, Michalek & Mycielski, 2016). However, while human development can support growth, other studies suggest unidirectional effect from trade liberalization to human development, but not necessarily the other way around (Mustafa, Rizov & Kernohan, 2017), opening an empirical question for this study. Another country-specific effect is derived from the role of institutions, with negative impacts on trade under unstable economic and political environments (Kuncic, 2013), and positive ones when institutions are well in place (Campi & Dueñas, 2019). Although Indonesia reports considerable improvements over the past years in the above indicators, the country runs behind in competitiveness-related indicators versus main trading partners, as in the Global Competitiveness Index (GCI), Logistic Performance Index (LPI) and Global Innovation Index (GII) (see Table 2).

A large number of agreements are in place in Indonesia. However, it is still an empirical question if the agreements have benefited or affected the trade pattern and the trade balance. While some studies present evidence of less than a third of total FTAs signaling positive effects to trade (Kohl, 2014), other sources are more optimistic, presenting nearly 38.5% of deals as being positive to trade (Baier et al., 2019). Serrano and Pinilla (2010) attributed the significant expansion of agricultural trade mainly to income growth, while prices and exchange rates played a smaller role, and trade cost and liberalization may not have been the main drivers of trade. The implementation of trade agreements and the proliferation of multiple RTAs supported the expansion of regional agricultural trade in cases like Europe (Serrano & Pinilla, 2010), but does the research does not offer evidence on the impacts on the Indonesian case.

3. Methodology

This paper applies a gravity model employing a data panel incorporating country- and time-specific effects (Urata & Okabe, 2014), and country-pair fixed effects (Baier & Bergstrand, 2007). The attention focuses on agricultural trade, disaggregating goods into two main groups: agricultural raw goods and food products. This research follows the structural gravity model proposed by Anderson and Van Wincoop (2003) in which trade flows are represented as a function of income, prices and relative trade cost among country partners, often reflected as multilateral resistance terms (MR). The MR captures some of the changing conditions of the exporter and importer partners at a country-specific and time-specific level (Feenstra, 2015).

This study follows the proposed methodology of Martinez-Zarzoso, Felicitas and Horsewood (2009), where individual bilateral fixed effects and country-and-time effects are introduced in panel data structures to address the endogeneity issue. As noted in Carrere (2006), panel data estimations are more reliable than OLS, as the latter tend to over(under) estimate effects. In addition, MR-terms at country-specific (Fixed effects) suggests the need to employ panel datasets rather than time series.

Considering the presence of endogeneity problems in the data, a Generalized Method of Moment (GMM) is selected as a suitable approach (Martinez-Zarzoso et al., 2009; Schaak, 2015). Trade data at commodity level is employed to avoid mis-estimation of effects arising from aggregation. A significant challenge in gravity models is how to account for unobserved multilateral resistance and how to account for unobservable endogeneity. For instance, the model proposes a set of variables to capture MR effects. For the demand side, the real GDP and the market size (population) allows the capturing of effects related to the importer's capability. An additional set of variables considers an interaction between demand and supply (relative role), mainly through index variables proxying efficient logistics (Logistic Performance - LPI), Human Development (HDI), distance, Global Competitiveness (GCI), Global Innovation (GII), and public policy - Government (GI). The interaction arises as the performance of both exporter and importer together determine trade flows. The GDP of the exporter country gives information on domestic demand, production capability and income, likely affecting trade flows positively. Three variables capture the effects of prices; these are applied tariffs, Consumer Price Index (CPI) and Exchange Rates. A dummy variable captures whether country pairs have an FTA in place (one) or not (zero). The FTA dummy variable captures the effects on trade creation and diversion, as a way of addressing having (or not having) a trade deal affects / benefits trade flows, both for exports and imports.

Data

The study includes a total of 50 countries, from which 23 have FTA agreements with Indonesia, and 27 did not have FTA in place with Indonesia before the end of 2017. The 23 countries under FTA are: ASEAN (Brunei, Cambodia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam); East Asia (China, Japan, Korea, Rep,); South Asia (Bangladesh, India, Pakistan); Others (Australia, Egypt, Iceland, New Zealand,

Nigeria, Norway, Switzerland and Turkey). The study covers the period from the year 2007 to 2017. Agricultural exports are further aggregated within two main groups: agricultural raw materials and food.

The variables in the model include: The Human Development Index (HDI) whose value ranges from 0 to 1 (highest). The Logistics Performance Index (LPI) ranges from 1 to 5 (highest). The Global Innovation Index (GII) ranges from 0 to 100 (highest). The Global Competitiveness Index (GCI) ranges from 1 to 7 (highest). The Governance Index (GI) goes from -2.5 to 2.5, with higher values representing better performance. The Relative Consumer Price Index (CPI) among countries is adjusted by the exchange rate. Real Exchange Rate (ER) between partners. LPI, HDI, GCI, GII, Tariff, and GI are computed as an average bilateral index among partners.
Model Specification

This section describes the model adapted from the general gravity equation. Within the gravity model, trade flows between countries are expected to be positively related to income and size of the importing country, and negatively related to a set of factors reflecting the costs. A considerable cost may be linked to production, transportation, coordination and other sets of the cost associated with distance, trade performance, competitiveness and innovation, among others.

The model is estimated, including a time dimension. Xijt is the exports (imports) from the country of origin i to country destination j at time t expressed in current USD \$. Data for each of the different groups (r) is run independently, namely: Total Agricultural trade, Agricultural Raw goods, and Food. The model is linearized by taking natural logs (Ln), except for the indexes and tariff variables.

$$lnExp^r_{ijt} = \beta_1 lnExp^r_{ijt\text{-}1} + \beta_2 lnGDP_{ijt} + \beta_3 lnPop_{ijt} + \beta_4 LPI_{ijt} + \beta_5 HDI_{ijt} + \beta_6 lnDist_{ijt} + \beta_7 GCI_{ijt} + \beta_8 GII_{ijt} + \beta_9 Tariff^r_{ijt} + \beta_{10} GI_{ijt} + \beta_{11} CPI_{ijt} + \beta_{12} ER_{ijt} + \beta_{13} FTA_{ij} + \varepsilon_{ij} \qquad (1)$$

$$lnImp^r_{ijt} = \beta_1 lnImp^r_{ijt\text{-}1} + \beta_2 lnGDP_{ijt} + \beta_3 lnPop_{ijt} + \beta_4 LPI_{ijt} + \beta_5 HDI_{ijt} + \beta_6 lnDist_{ijt} + \beta_7 GCI_{ijt} + \beta_8 GII_{ijt} + \beta_9 Tariff^r_{ijt} + \beta_{10} GI_{ijt} + \beta_{11} CPI_{ijt} + \beta_{12} ER_{ijt} + \beta_{13} FTA_{ij} + \varepsilon_{ij} \qquad (2)$$

Where *ln* denotes variables in natural logs, Exp_{ijt} denotes bilateral exports from *i (Indonesia)* to country *j* in period *t* in current thousand US\$. Imp_{ijt} denotes bilateral imports from country *j* to country *i (Indonesia)* in period *t* in current thousand US\$. The subscript *j* includes 23 trade partner countries in the free trade agreement with Indonesia and 27 of Indonesia's most significant trading counterparts. *t* captures time from the year 2007 to 2017. $lnGDP_{ijt}$ indicates Real GDP of country *i* and *j* years in year *t* (USD), in natural logarithms (*ln*). $lnPop_{ijt}$ denotes total population of country *i* and *j* in year *t*. LPI_{ijt} indicates the Logistic Value Performance Index, HDI_{ijt} signifies the value of the Human Development Index, $LnDist_{ij}$ captures the distance between countries *i* and *j*, GCI_{ij} records the Global Value of Competitivity Index of partners (*i* and *j*) in year *t*. GII_{ij} represents the value of the Global Innovation Index of countries *i* and *j* in year *t*, $Tariff_{ij}$ *signifies the average tariff rate in the country i* from *j* in year *t* for a specific sector *r*. GI_{ij} is the Institution Value Index between country *i* and *j* in year t. CPI captures the Consumer Price Index adjusted by exchange rate among partners *i* and *j*. EX represents the bilateral exchange among partners *i* and *j*. FTA_{ijt} is a dummy variable that takes the value of 1 if Indonesia and the partner are on a trade agreement, and it takes the value of 0 (zero) if the opposite is true. The effect of trade creation occurs if the coefficient of this variable is positive and significant, while there is trade diversion if the coefficient of this variable is negative and significant.

The $\beta_1 – \beta_{13}$ represents the *slope*, while ε is the *error* term.

This model assumes a dynamic relationship in the dependent variable, meaning the presence of a lag on exports and imports where the regression models are influenced by both the current period and the previous one (*t-1*),

known as distributed lag models (Gujarati & Porter, 2009). Furthermore, dynamic adjustment analysis is better using panel data. According to Baltagi (2008) *Dynamic panel data model* is shown as follows:

$$y_{it} = \delta_{i,t-1} + x_{1it}\beta + u_{it} \; ; = 1,..., N \; ; \; t=1,2,...,T \tag{3}$$

in which δ is a scalar and x_{1it} is a matrix measuring 1 x *K*, and β is a *K* x sized matrix 1. It is assumed that the u_{it} follows the one-way component model as follows:

$$u_{it} = \mu_i + v_{it} \tag{4}$$

μ_i is the individual effect assumed $\mu_i{\sim}N\,(0,\,\sigma\,2\,/\,\mu)$ and v_{it} is the error term assumed to be $v_{it}{\sim}N\,(0,\,\sigma\,2\,/\,\mu)$, where μ_i and v_{it} are mutually independent.

The panel data model that includes the lag of the dependent variable as a regressor within the regression as trade is likely to be related to previous flows. The lag causes endogeneity problems but the Generalized Method of Moments (GMM) overcomes this problem (Baltagi, 2008). Also, it is possible to address the endogeneity of the explanatory variable by introducing instrumental variables or by a differential fixed effect model as FTA terms tend to be correlated with the error term (Baier & Bergstrand, 2004). To avoid serial correlation on error terms, a fixed effect model is more efficient than instrumental variables (Baier & Bergstrand, 2007; Powers, 2007).

GMM System (SYS-GMM)

The GMM system is applied to deal with unobserved heterogeneity by applying a set of treatment variables. This paper follows the specifications in Blundell and Bond (1998), as well as those in research papers such as that of De Benedictis, De Santis & Vicarelli (2005) and Martinez-Zarzoso et al., (2009). The core of the GMM method is estimating a system of equations at first difference level by employing a different instrument for each equation. The instrument used at the level is the first difference lag. The GMM System employs a combination of instruments in the form of levels in the first difference equation and the instrument in the form of first difference in level equations. Misspecification in the estimators is lower employing the GMM System.

4. Results

Exports of Agricultural goods increased from US\$23.8 billion in 2007 to US\$49.3 billion in 2017, a 107% growth. The most significant expansion of exports was registered to FTA partners (363.8% growth). During the period of analysis, five large countries were incorporated as trade partners: Japan in 2008, India in 2010, and Pakistan, Bangladesh and Egypt in 2011. Agricultural raw materials and food experienced a large expansion of trade with strategic trade partners and a shift of markets formerly from non-FTA to FTA partners.
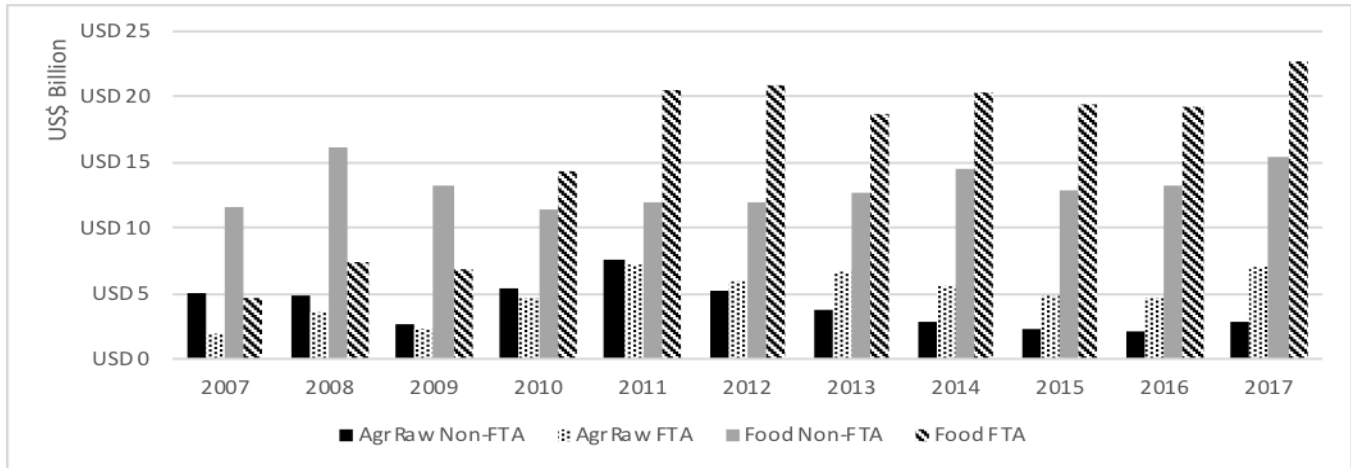
Fig 1. Exports to FTA and non-FTA Countries (2007 – 2017) (US$ Billion).
Source: Annual Data retrived from International Trade Centre (Trade Map), processed by author.

Table 1. Exports and Imports from Indonesia (Billion US$) Selected Years

	Exports						**Imports**					
	2007	2011	2017	Growth 07-17	CARG	% Share	2007	2011	2017	Growth 07-17	CARG	% Share
Total Agricultural Raw	**7,1**	**15,3**	**10**	**42,6%**	**3,3%**	**20,6%**	**2,6**	**5,7**	**5,1**	**95%**	**6%**	**21%**
Cork and wood	0,6	0,8	1,1	89%	6%	11%	0,1	0,1	0,3	133%	8%	6%
Anim/vegetable matter	0,2	0,3	0,5	130%	8%	4%	0,1	0,1	0,2	193%	10%	4%
Rubber	4,9	11,8	5,6	13%	1%	55%	0,3	1,0	0,8	197%	10%	15%
Hide/skin/fur, raw	0,0	0,0	0,0	-71%	-11%	0%	0,0	0,0	0,0	106%	7%	0%
Pulp and waste paper	1,1	1,6	2,4	127%	8%	24%	1,0	1,8	1,8	72%	5%	35%
Textile fibres	0,4	0,8	0,6	69%	5%	6%	1,1	2,6	2,0	80%	6%	40%
Total Food	*17*	*33*	*39*	*134%*	*8,1%*	*79,4%*	*7,9*	*16,7*	*18,6*	*137%*	*8%*	*79%*
Animal feed	0,3	0,5	0,6	87,6%	5,9%	1,5%	1,1	2,2	2,9	156%	9%	16%
Animal oil/fat	0,0	0,0	0,0	50,3%	3,8%	0,0%	0,0	0,0	0,0	62%	5%	0%
Animal/veg oils	0,9	1,6	3,4	290,6%	13,2%	8,7%	0,0	0,1	0,1	233%	12%	1%
Beverages	0,0	0,1	0,1	470,3%	17,1%	0,3%	0,1	0,1	0,1	81%	6%	1%
Cereals	0,2	0,4	0,7	359,4%	14,9%	1,9%	2,0	5,1	4,1	102%	7%	22%
Coffee/tea/cocoa/spices	2,0	3,3	3,6	77,1%	5,3%	9,1%	0,2	0,7	1,0	314%	14%	5%
Dairy products & eggs	0,1	0,1	0,1	-19,7%	-2,0%	0,2%	0,9	1,2	1,0	11%	1%	5%
Fish/shellfish/etc.	2,1	3,2	4,2	100,4%	6,5%	10,7%	0,1	0,3	0,3	455%	17%	2%
Fixed veg oils/fats	9,4	20,3	21,6	128,4%	7,8%	55,1%	0,0	0,1	0,1	173%	10%	0%
Live animals except fish	0,0	0,1	0,1	56,7%	4,2%	0,2%	0,2	0,3	0,5	128%	8%	3%
Meat & preparations	0,0	0,0	0,0	-25,2%	-2,6%	0,0%	0,2	0,3	0,6	238%	12%	3%
Misc food products	0,5	1,6	2,0	261,7%	12,4%	5,1%	0,3	0,7	0,8	193%	10%	4%
Oil seeds/oil fruits	0,0	0,1	0,0	23,9%	2,0%	0,1%	0,6	1,5	1,6	192%	10%	9%
Sugar/sugar prep/honey	0,1	0,2	0,2	146,1%	8,5%	0,6%	1,1	1,9	2,6	137%	8%	14%
Tobacco/manufactures	0,4	0,7	1,1	168,3%	9,4%	2,9%	0,3	0,6	0,6	143%	8%	3%
Vegetables and fruit	0,5	0,8	1,4	176,8%	9,7%	3,5%	0,7	1,5	2,2	195%	10%	12%
Growth	**23,8**	**48,1**	**49,3**	**107%**	**7%**	**126%**	**10,5**	**22,4**	**23,7**	**127%**	**8%**	**61%**

Source: Annual Data retrived from International Trade Centre (Trade Map), processed by author.

Among agricultural exports, food products experienced the most substantial growth with 133% expansion and accounting for more than 80% of total agricultural exports. In the years 2011 and 2012, agricultural exports

reached a historical high, although exports fell in the following years amid low prices, particularly within agricultural raw materials (in line with Esquivias, 2017).

Agricultural Raw materials (Agro raw hereafter) experienced significant fluctuation in exports, reaching its peak in 2011 (US$15.2 billion), its lowest point in 2016 (US$6.9 billion), and recovered to US$10.15 billion in 2017. By the end of 2017, Agro raw material exports accounted for 20.6% share of total agricultural exports from Indonesia, down from the 30% it accounted for in 2007. Within agricultural raw, 90% of the exports were represented by rubber materials (US$5.6 billion), pulp and paper (US$2,4 billion), and cork & wood (US$ 1 billion). Rubber and paper experienced an average CAGR growth rate of 7.9% and 7.7%, respectively, from 2007 to 2017 (see Table 1). Other goods, such as hides and skin materials, by contrast, collapsed at CARG -10% a year. Agricultural raw goods experienced a sharp impact due to global commodity prices and sluggish global demand. Food exports, by contrast, experienced constant growth, although there was a slowdown from 2012 to 2015. As noted in Baiardi et al., (2015) agricultural raw goods tend to experience higher competition and higher exposure to prices as it faces higher price elasticity compared to processed food (lower price elasticity of exports). Also, agricultural goods face higher income elasticity, making it more sensitive to global shocks, as opposed to food.

In both agricultural materials and food, Indonesia has a net surplus. Nevertheless, imports have been rising faster than exports. In agricultural raw materials, imports are concentrated in textile fibers, pulp, and rubber, while in food products there is significant concentration in cereals, feeds, sugar, vegetables and fruit (see *Table 1*). Four food import categories had expanded more than 200% during the period (double-digit CAGR); animal and vegetable oils (233%), coffee/tea/cocoa/spices (314%), fish (455%), and meat (238%).
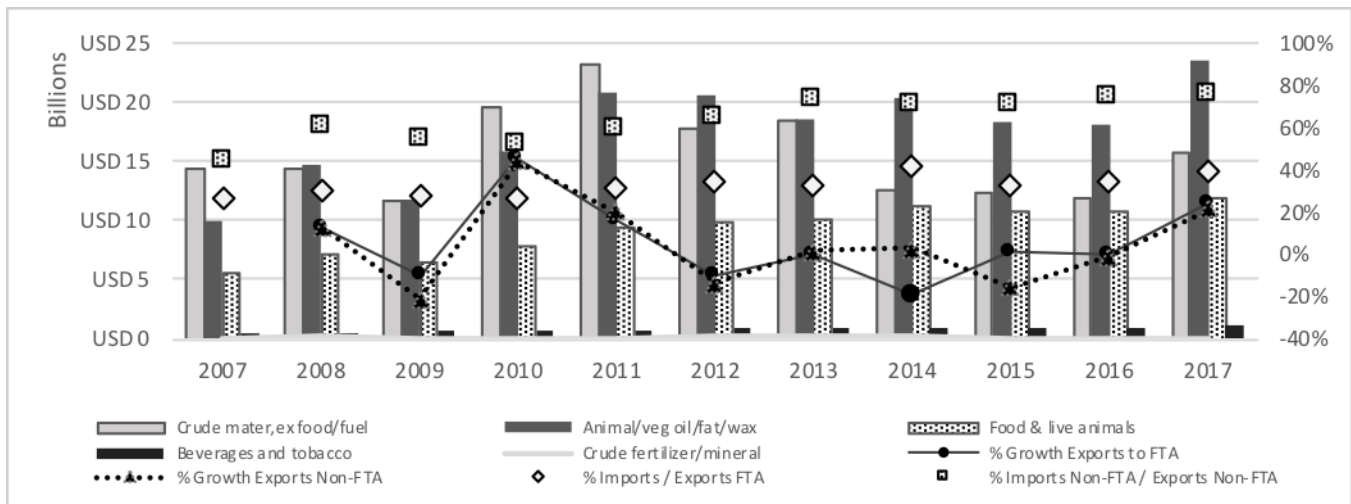
Fig 2. Total Exports per sub-category, rates of growth, and share of imports to exports
Source: Annual Data retrived from International Trade Centre (Trade Map), processed by author.

Note. 1) Exports of Crude materials, Animal/Vegetable oils/fats/wax, Food & live animals, and Beverages and tobacco indicated in USD $ billion (left axis). 2) % Growth Exports to FTA partners, % Growth Exports to non-FTA partners, Percentage of Imports from FTA partners to Exports to FTA, and % of Imports from Non-FTA to Exports to non-FTA are indicated in percentage terms in the right axis.

Table 2 illustrates, firstly, the position of Indonesia relative to the main nine trading partners. The colored cells denoted that Indonesia underperformed versus its trade partners (worsened its position). As an example, in 2017, the GDP of Indonesia was 11% that of China's GDP, and the population was 19% relative to China's total population. In GDP growth, China expanded more than Indonesia (colored cell), while in terms of population, Indonesia expanded more rapidly, although in both indicators China is far larger than Indonesia (89% larger GDP, and 81% larger population).

Table 2. Indonesia relative to Top Trade Partners. Percentage 2017, Indonesia as reference point

	China	**India**	**Japan**	**Korea**	**Malaysia**	**Netherlands**	**Pakistan**	**Singapore**	**United States**	**Indonesia**
GDP	11%	41%	18%	81%	299%	119%	453%	352%	6%	100%
Population	19%	20%	208%	513%	835%	1541%	134%	4704%	81%	100%
LPI	82%	87%	75%	80%	87%	71%	102%	72%	75%	100%
HDI	92%	108%	76%	77%	87%	75%	123%	74%	75%	100%
GCI	92%	100%	84%	91%	89%	81%	125%	81%	79%	100%
Tariff	84%	82%	190%	41%	87%	282%	54%	3012%	231%	100%
GII	57%	85%	55%	52%	70%	48%	86%	51%	49%	100%
GI	10%	44%	3%	4%	5%	5%	-7%	2%	3%	100%
Price Index	119%	89%	137%	126%	119%	128%	91%	126%	126%	100%

Source. GDP, Population, Logistic Performance Index, Human Development Index, Tariff, and Governance Index (retrieved from World Bank, World Development Indicator). Distance retrieved from indonesia.distanceworld.com. Global Competitiveness Index retrived from World Economic Forum. Global Innovation Index retrived from globalinnovationindex.org.
Note. The relative size of Indonesia versus main trade partners. The colored cells denote that Indonesia underperformed versus its main trade partners during the 2007-2017 period (worsened its position).

In terms of GDP, Population, LPI, HDI, and GCI, Indonesia improved significantly versus most of its top partners. Nevertheless, it has lower LPI, HDI, and GCI indexes versus most of the trade partners, meaning that it has lower competitiveness in transportation, human development and global competitiveness (except for Pakistan). It is noticeable that in GII and GI all top trade partners did better than Indonesia, similar to prices where Indonesia's price Index increased faster (deteriorated) than its partners (except versus India and Pakistan). Currencies studied showed the following results: Indonesia (-32% depreciation versus 2007 level), China (-39%), Japan (-35%), Korea (-17%), Malaysia (-15%), Netherlands (-17%), and Singapore (-37%) weakened versus the US Dollar, while only India (8%) and Pakistan (19%) strengthened versus USD 2007 level.
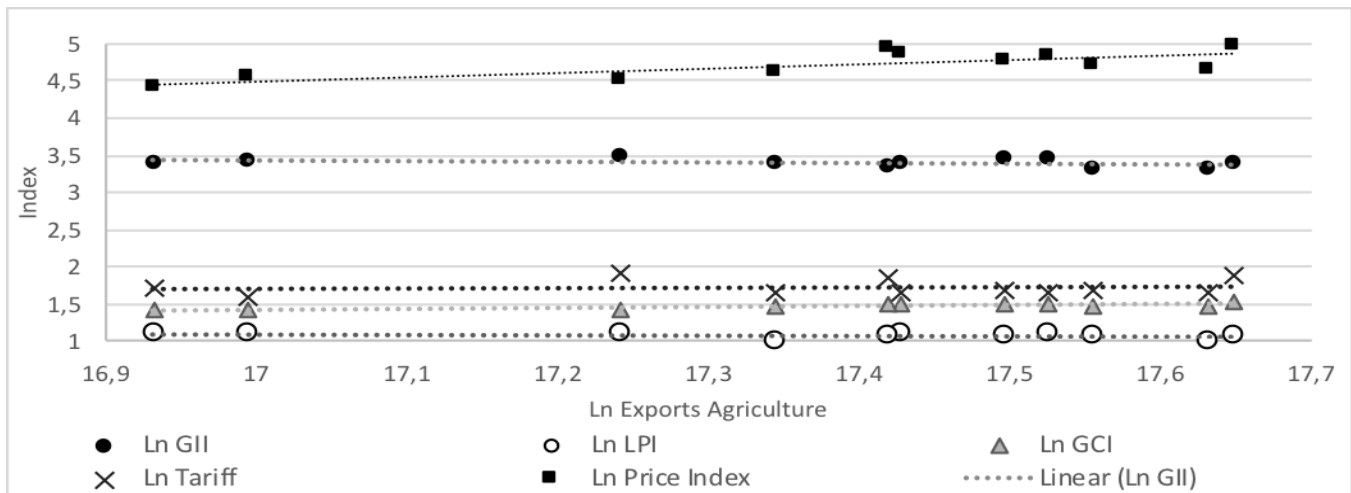
Fig. 3. Selected Indicators (Index) versus Ln Exports of Agriculture

Note. Indicators for Indonesia. Global Innovation Index (GII), Logistic Performance Index (LPI), Global Competitiveness Index (GCI), Average Tariffs, Exports of Agriculture (Ln)
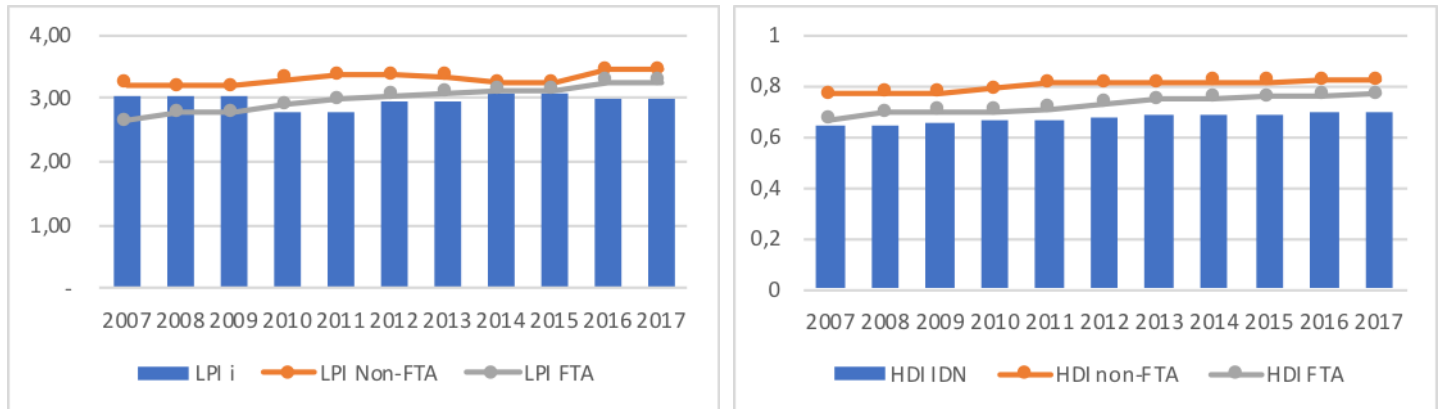
Fig. 4. Logistic Performance Index (LPI) and Human Development Index (HDI) of Indonesia versus Non-FTA partners and FTA-Partners.
Source: Annual Data retrived from International Trade Centre (Trade Map), processed by author.

Determinants of Agricultural Trade

The results of the model are significant for most of the variables, both for the different determinants, as well as for trade creation/ diversion effects (FTA dummy variables) for exports and imports. The results in *Table 2* display aggregated agricultural exports, and results based on disaggregated data in two groups: raw products and food. A first point to note is that estimators based on aggregate or disaggregate data give a different result, suggesting more precise estimations at a more disaggregated level.

Determinants for Exports

For agricultural exports, several indicators that could proxy the role of demand signal a positive effect on agricultural exports. The lagging exports variable, the GDP_j of the importing country, and the population are all positive and significant, suggesting an active role of demand in agricultural exports from Indonesia. The lagging exports variable and the GDP_j of the importer are relatively similar for agricultural raw and food exports, while the population variable signals a larger marginal effect for exports of agricultural raw goods, reflecting the role large countries play. Four large nations import nearly 65% of Indonesia's raw goods (China, India, Japan and the United States).

In 2007, the accumulated GDP of Indonesia's FTA partners accounted for only 10% of global GDP (US$5.66 Trillion). By 2017, the share increased to 38%, meaning that new agreements help to increase the market size (US$25 Trillion). In 2007, the population of FTA partners accounted for 32% of the global population. By 2017, the share increased to 71%, meaning that new agreements helped to increase the market size from 1.64 billion people to more than 4 billion.

The lagging variable for exports (*Lag Export*) signals that shipments from previous years (historical trade and relations) play an essential role in explaining current exports. Food has the most robust coefficient (0.690), followed by Agricultural Raw materials (0.616). A high lagging variable can denote particular concentration of markets, strong links with partners, and growing demand. A large lagging export variable also indicates a relatively low change in the pattern of exports as regards export destinations. The top main partners of 2007 are the same as in 2017. A few changes include the lower share of the North American market (from absorbing 20% of total raw goods to only 11%) and Singapore (from 5% to 1%). India and China significantly expanded their trade with Indonesia.

Another interesting finding is that the variables capturing the logistics (LPI), human development Index, and the Global Competitiveness Index are all positive, suggesting that the larger the average Index, the larger the flow. All three indicators (LPI, HDI, and GCI) have a strong role in explaining trade flows. Both Indonesia and its main partners significantly improved in the three indexes. Nevertheless, in most indexes, Indonesia underperforms versus its trade partners.

The coefficient of distance has a negative relationship with trade, meaning that the greater the distance, the lower the exports, in line with trade theory and close to those findings in Baier et al. (2019). The coefficient of distance for food is larger than that of agricultural raw goods, explaining the nature of food goods where freshness is essential, proximity is key, logistics are more complicated (costly), and access to raw materials is crucial. ASEAN plus six strategic regional partners (India, China, Japan, South Korea, Australia and New Zealand) account for 52% of food exports.

As for supply variables (besides possible effects captured in LPI and HDI Indexes), the variables related to global competitiveness GCI for Indonesia are positive and significant, suggesting that the more competitive the country becomes, the larger the export flows. Within food products, logistics tend to be more complex, offering more substantial potential with transportation and infrastructure (logistics) improvements. The GCI for the importer has a reinforced effect with the partner country for agricultural raw goods but has an opposite direction in the case of food. While exports of raw goods are more directed to developing countries, food has the largest markets among more advanced countries (nearly 40%).

In 2007, the Logistics Performance Index (LPI) of Indonesia was 3.01, and by 2017 it had reached 2.98. The ratio of Indonesia's LPI to that of its partners fell from 1.14 in 2007 to 0.97, meaning that the FTA partners became more competitive than Indonesia. In 2007, the HDI index of Indonesia was 0.642, increasing to 0.694 by 2017. On the other hand, the average HDI in the World increased from 0.642 to 0.764. The ratio of Indonesia's HDI to that of its FTA partners fell from 0.96 in 2007 to 0.91, meaning that FTA partners increased their HDI more than Indonesia.

The coefficient of GDP_i for Indonesia capturing local purchasing power or production capability is negative, indicating that the larger the Indonesian GDP, the lower the exports, perhaps signaling the increase in local demand (volume and perhaps prices) with the domestic market competing for exports.

Tariffs have a positive effect, opposite to the theory. In reality, tariffs with some partners experienced periods of increasing rather than decreasing over time. A possible explanation is that although tariffs increased, export flows did not decrease. Also, in products with low price elasticity, increases in tariffs are often passed to consumers. Tariffs were mechanisms imposed by some trade partners to lower increasing imports from Indonesia (i.e., CPO in India, Pakistan, among others).

Prices captured by the CPI index are harmful for both groups, suggesting that agricultural exports are price elastic as the change in volume is affected on a larger scale by the change in price. Agricultural raw goods have a significant adverse effect of -1.027, suggesting that a 1% change in price could lead to a decrease in exports by 1%. Food, by contrast, has a coefficient of -1.527, signaling a much larger effect (1.5 times) on volumes over a change in prices. Nevertheless, agricultural raw goods are more exposed to changes in prices, not always captured by the CPI indicators as commodities are not always represented in the reference baskets of goods. As indicated in the variable of exchange rate for agricultural goods, the coefficient is negative for raw goods and positive for food (opposite somehow to CPI effects). A possible explanation is that raw goods are mainly commodities in nature and for instance have larger price elasticity reflected in more significant fluctuations in volume as a result of a change in prices and variations in exchange rates (Baiardi et al., 2015; Serrano & Pinilla, 2010). In commodities, competition tends to be more in prices and less in differentiation. Food, on the other hand, has lower price

elasticity (generally) suggesting that higher exchange rates (appreciation of the currency) lead to larger flows of goods (price transfer to buyers not to producers.)

In line with the findings of (Wang & Reed, 2014) Indonesian food products (shrimp) are price elastic, a situation that causes pressure as main competitors face lower price elasticity as products are more differentiated and offer higher quality.

The variables capturing trade creation indicate a positive and significant value, meaning that having an agreement has positively supported exports to FTA partners, rather than lowering the rates of growth by being substituted by other partners. Trade creation impacts through exports are nearly four times larger in agricultural raw goods than in food, meaning that having FTA deals supports the exports of raw goods more than for food. Nevertheless, the dummy variable capturing non-FTA partners (*FTA2*) increased to a larger extent than those for FTA partners (*FTA1*), indicating both trade creation with partners and trade expansion with non-FTA trade partners. From 2007 to 2017, agricultural exports shifted from 71% share of exports initially to non-FTA partners, to only 34%. Exports to non-FTA (as a group) fell by 2.1% (CAGR) while exports to FTA partners increased 363.8% (CARG). In value terms, exports increased with both.

Table 2. GMM System Estimation Results (Exports)

Variabel	Exports			Imports		
	Agricultural	Agr_Raw	Food	Agricultural	Agr_Raw	Food
Lag Export	0,549***	0,616***	0,690***	0,519***	0,869***	0,177***
GDP_i	-0,4766***	-0,865***	-0,213***	-0,585***	-2,269***	-2,052***
GDP_j	0,166***	0,122***	0,101***	0,072**	0,055***	0,111**
$Population_{ij}$	0,747***	1,204***	0,480***	0,847***	0,211***	2,094***
LPI_{ij}	1,751***	2,047***	1,166***	2,701***	0,476***	4,448***
HDI_{ij}	1,032***	5,199***	1,054***	2,891***	0,719	5,617***
$Distance_{ij}$	-0,399***	-0,219***	-0,394***	0,003	-0,079***	0,315*
GCI_{ii}	0,192***	6,452***	4,830***	0,442***	6,603***	9,456***
GCI_{ij}	-0,457**	0,309**	-0,407*	-0,016	1,832***	1,451*
$Tariff_{ij}$	0,347***	0,127**	0,534***	0,415***	0,327***	-0,319**
GII_{ij}	-0,456***	-1,396***	-0,316**	0,228	-0,328*	0,803*
GI_{ij}	-0,038***	0,149***	-0,028***	0,088***	-0,162***	0,072***
CPI_{ij}	-0,385***	-1,027***	-1,527***	-0,396***	-0,342***	-0,579
Exchange Rate$_{ij}$	0,829*	-0,025**	0,032***	-0,030**	-0,023*	-0,240***
FTA1	1,109***	1,713***	0,480**	0,452***	0,242***	1,046***
FTA2	0,393***	2,013***	0,765***	0,299***	0,229***	0,334**
Constant					44,573***	
AR (1)	0,235	0,039	0,194	0,034	0,008	0,019
AR (2)	0,503	0,129	0,352	0,899	0,852	0,118
Sargan Test	0,002	0,000	0,005	0,688	0,129	0,941
Hansen Test	0,284	0,563	0,644	0,746	0,653	0,981
Hansen Test (GMM)	0,071	0,178	0,165	0,387	0,196	0,896
Hansen Test (Diff GMM)	0,999	0,997	0,996	0,950	0,989	0,954
Hansen (IV)	0,038	0,207	0,347	0,767	0,305	0,938
Hansen (Diff IV)	0,990	0,988	0,937	0,495	0,980	0,917
Prob > F	0,000	0,000	0,000	0,862	0,000	0,000

Notes. Regression estimation indicates ***, **, * significant level at 1%, 5%, 10%.

Imports

The coefficients for imports reflect key aspects of Indonesian trade. Firstly, both demand and supply factors tend to support the expansion of imports, meaning that the more significant and the more sophisticated the Indonesian

market, the larger the imports. The higher the capacity of exporters, the larger the imports in Indonesia as well. As noted, imports increase at a faster speed than exports most likely because both domestic demand increased as a result of higher incomes and as a result of a relocation of factors in the agricultural sector, shifting to different crops.

The coefficient for lagging imports in raw agro goods is four times larger than that of food products, meaning dependency from previous partners is important. The variable of GDP_i of the exporter is negative, possibly signaling a shift of imports to Indonesia formerly from developed countries to lower income nations, or signaling the large GDP growth of exporter countries where domestic goods compete with exports. The market of Indonesia captured by GDP_j and $Population_j$ reflects that the larger and stronger the purchasing power of Indonesians, the larger the importing of goods, particularly from food. Improvements in logistics (LPI), human capital (HDI), and competitiveness in Indonesia (GCI) also supports a greater amount of imports, particularly in food products. More sophisticated logistics in Indonesia supports not only larger exports from Indonesia to the World, but also larger exports from the World to Indonesia. Nevertheless, the coefficients indicate that the role of CPI, LPI and HDI on the exporters is more important than that on the importer, suggesting that improvements in logistics, competitiveness or human development in Indonesia help to promote exports in a larger proportion than imports.

Distance has a negative effect on raw materials but a positive effect on food. As noted earlier, food logistics required more advanced systems and lower transport times. The highest amount of imports of food come from advanced countries, located farther away, possibly explaining why the estimate for distance is positive within food products.

Tariffs have a positive effect on raw materials and a negative effect on food. Raw materials may have lower elasticity, also reflected in CPI and exchange rate variables, when dependency from specific sources limits the possibility of substitution. Food, by contrast, has larger adverse effects regarding tariffs, prices (CPI) and exchange rate, as increases may lead to higher prices and for instance, to lower demand for imports. Nevertheless, the effects of the variables, although negative, are inelastic as the coefficient is less than one. Tariffs or a weaker Rupia may discourage imports to some degree, but the effects of the tariffs or currency may be transferred to consumers at home (as demand for imports may likely continue).

The effects of the dummy variables to capture the outcomes of the agreements indicate a trade creation effect in imports, both from partners and non-partners. This implies that while imports from FTA partners have increased, perhaps it has not resulted in substitutions of goods from other regions (non-FTA), and for instance, Indonesia may not have achieved lower import prices. Trade from Non-FTA partners continues to increase even though no FTA deal was in place.

The magnitude of effects in FTA dummy variables shows that the effects of trade creation on agricultural raw goods exports are more extensive than trade creation through imports. On the other hand, the effect of trade creation is larger through imports in food (*FTA1* larger in imports than *FTA1* in exports) than that of exports. As exports and imports in Indonesia are larger within the food sector, rather raw goods, it is possible that the liberalization of the last two decades may have resulted in lower benefits for Indonesia. Imports have expanded at a faster speed than exports, trade is highly concentrated in specific commodities, and little substitution of cheaper goods from within the FTA partners seems to have occurred during the last decade.

Conclusions

This study estimates trade creation/diversion/ expansion within agricultural exports from Indonesia, covering the period of 2007 to 2017, where several Free Trade Agreements were implemented. The study includes variables

from the demand and supply side to help to capture determinants of exports and imports by implementing a Generalized Method of Movements System (GMM-SYS). Demand variables explain a significant share of the growth of exports; larger incomes (GDP), larger markets (population), and more sophistication (HDI, LPI, GCI) is positively associated with more exports. The results suggest that the large expansion of agricultural trade for Indonesia is supported by income and population growth, in line with Serrano and Pinilla (2010), as well as by demand of trade partners. Distance plays a negative role, in line with the theory suggesting stronger possibilities to expand trade with regional partners than with those from other regions.

Prices and exchange rates play a role, nevertheless, at different degrees for each group of products. Both raw goods and food are price elastic, suggesting that periods of price volatility, a collapse in agricultural prices, or exchange rate could affect exports of agricultural goods; this would affect food to a larger extent through prices, and raw goods through exchange rates and prices.

Supply factors are essential to escalating exports, as LPI, HDI and GCI are positively related to larger exports, suggesting the importance of infrastructure development, human capital and a more competitive sector for larger exports. Trade cost has adverse effects (distance). However, higher sophistication in transportation and logistics seems to counterbalance the negative effects, suggesting a continued effort to improve logistics performance. Better transportation also leads to more significant exports of food, putting pressure on both domestic players and the balance of trade. However, improvements in LPI, HDI and competitiveness is also associated with more massive imports (at a lower extent than exports).

Liberalization of markets through FTA agreements supported trade creation with FTA partners, at a higher degree in raw materials than in food. Trade creation in imports is larger than that of exports within the food sector, meaning that liberalization has played a role in increasing exports but has also brought more considerable competition, while not necessarily lower import prices. The coefficient for non-FTA partners suggests export expansion to non-FTA partners, even at a higher degree than with FTA members, meaning that the role played by demand may be larger than the effects of having FTA agreements in place.

In line with the findings of Baiardi et al., (2015), industrial and trade policy to support further processing in agricultural goods may allow Indonesia to lower substitutability in global markets, to be less exposed to price fluctuations (less price elastic demand), to increase market power and to raise exports. Further processing, a shift towards a price setter rather than a price taker, requires increasing quality standards and more market orientation to successfully adapt goods to global markets and further specialize (differentiation).

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TECHNOLOGIES OF IMPROVING THE UNIVERSITY EFFICIENCY BY USING ARTIFICIAL INTELLIGENCE: MOTIVATIONAL ASPECT

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Abstract. The aim of this study was to identify the most appropriate technologies to improve the university efficiency by using the motivational artificial intelligence (AI). Methods of the study were as follows: the questionnaire survey by using the Google Chrome electronic service, content analysis, methods of statistical analysis, and a focus group. The authors' version of the questionnaire was made by using the Likert methodology taking into account indicators of the QS World University Rankings rating system. The data obtained during the three stages were generalized and analyzed by using the descriptive statistics. The regression analysis was used to study the relationship between the motives of the academic staff (AS) and the nature of the stimulating effect of the university authorities on the staff of the university. Results: The discrepancy between the AS motivation structure and the range of stimulation methods applied by the university authorities, a continuous increase in the burden from introduced innovations, and the formal style for employees to fulfill new tasks have been revealed. The analysis of the results on using the techniques and methods by the university authorities to motivate and stimulate the staff has shown the need in new combinatorics, an innovative system that harmoniously combines the advantages of natural and artificial intelligence to motivate the AS in training HR for the digital economy of the 21st century. The new system should be universal and flexibly respond to constant changes in the socio-economic environment. It is important to timely eliminate the contradictions in needs and teachers' opinion on the ideal assessment system of their activities and offered forms of stimulation by universities authorities. The vectors of their activities must be constantly coordinated, based on the AI capabilities. The introduction of AI in the activities of universities improves the competitiveness of promising, innovative teachers and has positive impact on the image, efficiency, academic reputation, and citation index of universities. The authors for the first time ever have studied the problems of using the AI in the motivational system of the university's AS and offered technologies to improve the efficiency of universities by using the motivational AI. The practical importance of solving the problem is related to the real possibility of applying the offered technologies by the university authorities that strive to improve their efficiency and competitiveness in the educational market. The main advantage of the work is related to the advanced solutions of the emerging problems on using the AI in motivating the university staff identified during the three-stage study. The interdisciplinary nature of the study and the offered technologies can serve as the basis for the further study and an additional element that expands the views, approaches, and the framework of categories and concepts of the world science. Conclusion: The most suitable technologies for the university that strives to be efficient include the elimination of the imbalance in the system of staff motives – incentives of the university (employer) authorities, the harmonious use of the AI in educational activities and the system of motivation and stimulation of staff where the natural intelligence prevails, and the improvement of the staff's publication and grant activities by using the AI with a synergistic effect due to efficient team building.

Keywords: technologies; motivation and stimulation; artificial intelligence; efficiency; higher education

1. Introduction

In the modern world, the competitiveness of organizations is determined by their opportunities and abilities to constantly create innovative products and introduce them into various areas of the human life. The competitive advantage of companies is achieved through highly qualified HR, their creative and innovative potential, advanced management, and competent personnel and investment policy. Efficiency and competitiveness are strived for in all areas of the economy. There is as intense competition in training and higher education. The best universities are defined according to certain methods by using rating systems. The rating of a university, its importance, value, performance, and efficiency are determined by specified indicators. Indicators may differ depending on a rating system (Girdzijauskaite et al., 2019). In this article the leading QS World University Rankings rating system was taken as a basis. Its main indicators with weighted values are academic reputation (40 %), reputation among employers (10 %), ratio of teachers to students (20 %), citation index (20 %), share of foreign students (5 %), and share of foreign teachers (5 %).

The Russian system of education is being reformed. It had been decided to bring it into compliance with the requirements and terms of the world community's efficiency. The main work started in 2013 – 2014, when Russian universities were assessed for efficiency. Some universities were defined as inefficient, and they were disbanded. Other universities were rated as partially inefficient, and they were given an opportunity to become efficient. However, the overall picture was not good. According to QS World University Rankings, in 2014 – 2015 even leading universities of the country were not included in the list of the 100 best universities in the world. The Lomonosov Moscow State University took position 114. American and English universities were leaders of the ranking. It was necessary to take urgent measures to correct the situation, taking into account the enormous potential of the Russian higher education. It was important to reform all systems, including the most important of them – the staff motivation and stimulation system.

Rather many university principals started acting by using the following principle: "You need to fight for a good student. I can buy any professor (teacher)". They chose the material, monetary motivation out of the basic motivation forms. This was controversial. On the one hand, the AS wanted to improve their financial situation and began to work according to the rules offered by the university authorities. On the other hand, in universities there was a certain type of people with a wider range of needs expressed in the motives of recognition, respect, development, and confidence in the future. The created system of motivation and stimulation did not work fully and ignored the most important motives of the university teacher's work. At the same time, strategic goals required to include teachers' initiative, creativity, innovation and team spirit in training the HR under new conditions of the digital economy. The lack of appropriate incentives did not destroy these motives among teachers, but it did not motivate to more active actions in this direction. All this considerably reduced the efficiency of universities. The AI had great potential, covered more and more areas of the human life, and gradually spread its effect to the higher education. However, its role in the systems of motivating the university staff was close to zero. The current situation required to search for technologies to improve the efficiency of universities by using the AI. One of the ways to solve this problem was to improve the motivation of the AS based on the AI. It could really improve the academic reputation and citation index of universities that jointly made up 40 % of the rating value.

2. Literature review

Theoreticians and practitioners have always been interested in issues on improving the efficiency of organizations. This is especially relevant in the context of the economy stagnation or economic crisis, and the need to fight against shadow income (Kaurova et al., 2013). Nowadays, more and more solutions to improve the

efficiency of organizations are sought in the area of personnel management (Buley et al., 2016), as well as skillful implementation of the AI in business processes related to the competent use of the human potential (Ossmy et al., 2019; Pomato, 2019; TextRecruit, 2019; Unilever, 2019). Various technologies based on using the AI in the HR are offered (Zimenkova et al., 2018). The issues on the AI impact on the labor market, reduction of labor force (Shi, 2019), increased competition among employees of organizations, and revealing of their best and worst qualities (Burrell, 2019) are considered.

Studies are carried out in relation to the problems of the interaction between the natural and artificial intelligence (Belciug & Gorunescu, 2019; Kumar & Kumar, 2019; Das et al., 2019). The AI impact on the human psyche and behavior is studied (Abubakar et al, 2019; Kalmady et al, 2019).

The AI is being actively introduced to the educational process. In Spain, teachers create virtual environments based on the virtual reality to improve students' motivation to better understand complex topics in real time (Vergara et al, 2019).

In the UK, the issues on forming efficient teams that have the necessary motivation, trust and belonging for the competent use of AI (robots) to study and conduct surgical operations (Randell et al, 2019) are focused on. The motivation of employees to work efficiently more and more dominates in solving problems related to the improvement of the competitiveness of organizations in the public sector and business (Liu & Perry, 2016; Belle & Cantarelli, 2015). The relationships between motivation and stimulation are revealed (Astakhova et al., 2019; Karácsony et al, 2018; Avanesova et al, 2016; Bernardi, 2019).

Algorithms for a complex integrated development of the personnel motivation system under the impact of such factors as cultural, social, personal and psychological are worked out. It is offered to classify motivation into motives of three levels: national, regional and personal (Predeus et al., 2019).

In this case, sometimes controversial motivational models are created. They are based on a temporary delay in paying the fair compensation. They are based on the logic of a long-term improvement in professional competence, career growth depending on the work experience (Fujimura, 2019). As a whole, this contradicts the principle of timely deserved certain reward, rather than indirect, time lagging, unclear prospects. The lack of results from investments may affect the staff motivation (Veretekhina et al, 2018; Belousova et al, 2016).

Motivation is important in the system of managing educational organizations (Vinichenko et al, 2018). Attempts are being made to create innovative models to assess the role of organizational culture, the organizational climate in the exchange of knowledge in the academic environment, in higher education, and the impact of the management style on the trust of teachers in the area of knowledge (Al-Kurdi et al., 2019). The issues related to the impact of leaders of the academic environment, advanced scientists on the correct exchange of knowledge, the promotion of advanced technologies, and interaction among scientists at different levels are brought up.

The creation of models for the professional development and management based on the efficient motivation of university teachers is studied. Based on the comparative analysis of training and organizing classes for the AS, Dunbar D. (2019) offers ways to optimize the motivation of sportsmen and business representatives. The gamification of educational activities is actively being introduced into the motivational system (Shakhovska, et al, 2019; Marti-Parreno et al., 2016; Lumsden et al, 2016).

The reasons for the decline in the quality of education in higher education are identified. The decline in working conditions is the most important one. In Nigeria, these include low teacher motivation, poor funding, and lack of training and equipment for classrooms (Laseinde et al, 2019). In a number of other countries, they include a high academic load, poor transport accessibility, management style of authorities, problems on introducing the AI into

training and practice (Rogach et al, 2016; Koch & Brockmann, 2019). Issues on the priorities in the AS work: what is more important for the professor: to improve personal publication activity or teaching, HR training? – are set (Ouardighi et al., 2013; Prichina et al., 2017).

Teachers carry out the work to motivate students to consciously choose training courses in accordance with the cost-benefit system (Scott et al., 2019). Researchers at the Southern Illinois University Edwardsville School of Pharmacy determined a dependence of the motivation of pedagogical graduates and teachers on the experience of the university AS, and their self-assessment of competencies (Poirier et al, 2019). This is relevant for the Russian teachers, whose status considerably declined during the educational reform (Ilina et al, 2018). The most suitable ways to use social networks are actively being searched for to exchange knowledge of a different nature and content, and to systematize the studies (Ahmed, et al 2019). The improvement of trainees' motivation was also determined among service personnel of universities in the UK during advanced training (Coomber, 2019).

Thus, the issues on motivating the AS of universities attract the attention of many researchers. Recently, more and more works have been devoted to using the AI, and applying it to improve the motivation of the AS. However, no integral work has been created to describe the mechanisms for improving the efficiency of the AS by using the motivation-based AI. The high need in defining technologies to improve the efficiency of universities by using the motivational AI and the lack of scientific works on this theme has become the basis for writing this article.

3. Methods

The aim of this study was to identify the most appropriate technologies to improve the university efficiency by using the motivational AI. Due to this, the following **scientific problems** were solved:

1. To define the technology for eliminating the imbalance in the system of staff motives-incentives of the university authorities (employer).

2. To develop the most appropriate technology (methods) of applying the AI in educational activities and the HR motivation and stimulation system.

3. To identify the technology to improve the publication and grant activities of the staff.

Methods. The study was carried out by using a set of sociological methods that included a questionnaire survey, content analysis, statistical analysis methods, etc. The survey was carried out online by using the *Google Chrome* electronic service, email and online contacts with respondents. The authors' version of the questionnaire included 19 points at the second stage, 23 points at the third stage, and was formed by using the Likert methodology taking into account indicators of the *QS World University Rankings* rating system. The obtained empirical data, secondary data of other authors' statistical studies were studied, generalized and analyzed.

The focus group included foreign experts who specialized in improving the efficiency of organizations and motivation.

The study included **three stages**: **Stage I** – the formation of a new system of motivation and stimulation in the context of the university reform, **Stage II** – the identification of weak elements, additional system resources, and **Phase III** – the optimization of the created system based on the comparative analysis of the data obtained during the survey of the AS from Russian universities.

Stage I. The Russian State Social University (the RSSU) was chosen as an experimental site. After another inspection carried out by the Ministry of Education and Science it happened to be on the verge of being

recognized as an inefficient university and disbanded. The new rector formed a special working group to make the university efficient. The expert reforming group included crisis management specialists, as well as the expert group where foreigners participated, whose task was to assess the implemented reforms based on this study.

The primary task of the working group was to develop a concept and program for increasing the values of performance indicators and achieving top positions in the rating of universities. The work on improving the efficiency of the university was organized in three areas: bringing into compliance (optimization) the system *staff motives – incentives of the university authorities (employer)*; searching for an appropriate technology, ways to use the AI in educational activities and the system of motivation and stimulation of staff; and identification of ways to improve the publication and grant activities of the staff.

At **Stage I**, **the main methods** included the comparative analysis, the content analysis of the current legal documentation, and the method of mathematical statistics.

At **Stage II**, weak elements and additional resources of the system were identified on the basis of the sociological survey where 237 respondents had taken part. The total number of respondents was 748 people, and the sample number was 237 people, where there was a 4.5 % sampling error, and the confidence level of 95 %.

At **Stage III**, the created system was optimized on the basis of the results obtained from the sociological survey. The study group included representatives of 23 Russian universities (n = 456). The total number was 245,100 people, and the sample number was 456 people, where there was a 4.75 % sampling error, and the confidence level of 95 %. Using quota sampling, representatives of universities were selected. The quota features included gender, age, academic degree, and academic rank.

The division by gender showed the majority of men – 64 %, the share of women turned out to be 36 %. The age division was in favor of the older age groups (41 – 50 years old and 51 – 60 years old) – 32 % each. There was a relatively fewer number of respondents aged 31 – 40 years old (18 %) and 20 – 30 years (14 %), over 60 years old – 4 %. The shares of the respondents who took part in the survey were the following: 15 % – doctors of sciences, 70 % – candidates of sciences, 15 % – persons without a degree, 6 % – professors, 67 % – associate professors, and 27 % – respondents without any academic title.

4. Results

3.1. Technology for bringing into compliance, eliminating imbalances in the *teacher's motive – university's incentive* system

At **Stage I** in the course of grading the university and introducing a new system of motivation and stimulation, the most acceptable forms were searched for. The **technology** was used to bring into compliance, eliminate imbalances in the *teacher's motive – incentive of the university authorities* system.

The grading technology used as the initial step at **Stage I** gave a positive effect. The organizational and staffing structure was optimized, and the number of administrative staff was considerably reduced (Kirillov et al, 2015). Taking into account the limited number of reform supporters seeking to improve the university efficiency, and the grading time, counter-reforms started more and more considerably restraining the development of the university. The expert reforming group started searching for additional resources to improve the staff motivation.

At **Stage II**, a sociological study was conducted at the RSSU to identify the reserves of this system according to the method of V.I. Gerchikov (2005). In accordance with his methodology, there are five types of motivation: instrumental, professional, patriotic, economic, and lumpenized.

The identification of priority motivational profiles of the university staff made it possible to focus the authorities' and the HR department's attention on targeted stimulation of those motives that were basic for the employees. As a result, it was possible to define that the overwhelming majority (87 %) of the AS had a professionally-instrumental motivational profile. The patriotic type of motivation was the third. Reserves in the motivation system that do not require considerable financial costs were identified for this configuration of the motivational profile. The following incentives were recognized as the most effective: congratulations on the employees' birthday on the university website, gratitude, diploma, honorary sign of the university for the semester, year, providing the head of the structural unit with an opportunity to independently allocate a part of the income earned by performing entrepreneurial activities at the RSSU to his/her team, convenient working time, flexible schedule, a bonus that was equivalent to the employee's personal efficiency per semester (or quarter), widespread use of symbols and active promotion of the RSSU brand, and advanced training and retraining. These events improved the job satisfaction and loyalty of most of the AS, including leading world-class scientists.

Based on the study, two systems were introduced: the teacher assessment system – incentive payments for the intensity, high results, and quality of the works performed according to the *Personal Contribution System*, and incentive payments for performance indicators and criteria in the *Efficient Contract System*. The assessment was carried out according to the method of 360 degrees based on the electronic medium. One of the key performance indicators was the academic reputation, employer reputation, and citation index, which were taken from the *QS World University Rankings* assessment methodology.

The system of assessing personal efficiency of employees named *Personal Contribution System* included the assessment of personal efficiency of employees by five indicators, which were also consistent with the indicators of *QS World University Rankings*: personal performance, innovations (optimization) of the working educational process, improvement of professional knowledge, customer focus; and teamwork (Table 1).

Table 1. Employee Assessment Algorithm for *Personal Contribution*

Index	Employee assessment	Employee's comment	Authority assessment	Authority's comment	Final assessment	Agreed assessment	Your comment
Personal performance	XXX		XXX		XXX	To be chosen	
Innovation (optimization) of the educational process	XXX		XXX		XXX	To be chosen	
Improving of professional knowledge	XXX		XXX		XXX	To be chosen	
Customer (client) focus	XXX		XXX		XXX	To be chosen	
Teamwork	XXX		XXX		XXX	To be chosen	

The following incentives were defined as important, although they were not put into effect: preferential loans subject to continuous work at the RSSU for 10 years or more, contest "Best in Profession', a challenge prize for the best structural unit, and state, departmental awards. Favorable working and rest conditions to maintain health and recreate have not been fully created. Innovative teams in promising areas with leading companies and awards, prizes for special achievements (profitable contracts, important events, establishing promising relationships, etc.) have been partially created.

The issue on establishing labor relations between the university and the teacher was of special importance. In order to improve the AS's feeling of confidence in work and in the future for scientific and pedagogical workers, it was offered (however, not implemented) to prolong the labor contract subject to the continuous work at the RSSU for five – three years, seven – four years, ten and more years – five years (in fact, the labor contract is concluded only for a year).

At **Stage III**, the sociological study was carried out to identify common motivational problems that were characteristic of the AS at universities of the country. During the study, it was defined that most of the respondents were satisfied with the system of motivation and stimulation of the university (73 %) (Figure 1).
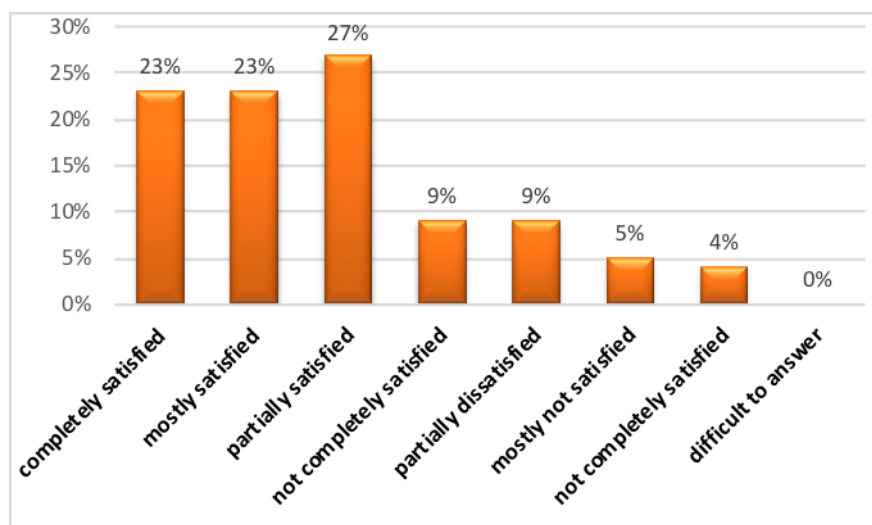
Fig. 1. Satisfaction with the University Motivation and Stimulation System

Moreover, only 23 % of the respondents are fully satisfied with this system. The payment structure is fully suitable for 44 % of the respondents. 50 % of the respondents believe that the payment structure requires further development. These results indicate that the problem of creating the optimal system of motivation and stimulation of the AS is typical for all universities in the country. This has a restraining effect on improving the efficiency and competitiveness of universities, raising their positions in the world ranking of universities.

3.2. Technology of Using the AI in the motivation and stimulation system

At **Stage I** the AI was used in the system of motivation and stimulation through transferring part of the educational functions to the electronic environment. The AS were stimulated to create electronic content on the subjects they taught and to publish them on the university portal in the distance education system. As an incentive, there was a thesis on reducing the number of class hours, using more modern teaching forms, using educational videos, and remote tutor-student communication forms. Such way to improve motivation and stimulate the AS to the efficient work had both positive and negative features. In the context of constant changes, it took many efforts to develop electronic content, and the AS failed to create unique courses in a short time. The expectation that students will more actively use the time allotted for independent study of subjects by using the electronic environment and the AI has not been justified. The psychology of students still substantially depends on the direct impact of teachers and administrators on them. Students strive to minimize their efforts to obtain the desired grade, dishonestly carry out the assigned educational tasks, often use other people's works from the Internet, and show them as their own, and involve other people and consulting companies to carry out educational

tasks for money. There are 5 – 65 % of the conscientious students in various training areas and forms. The least conscientious students take distance courses. A number of students find it difficult to work in the electronic environment. Some of them poorly carry out their tasks, and sometimes attach the material that is not related to the subject at all. Teachers had to make students improve their works, and then check the completed student works again. As a result, this overloaded teachers, and the volume of the academic load increased much as compared to the pre-introduction of e-learning, which reduced the quality of education.

At **Phase II**, **another** negative aspect was the priority of the AI in admitting students to tests and exams. A special expert program calculated the points scored by a student during the academic semester, and determined whether to allow him/her to take the final control test. In some cases, the AI that intended to help hindered the teachers' work. The developed program did not enable teachers to define the trainees' level of preparation, and willingness to fulfill professional functions. Sometimes students did not get the earned points due to failures of the expert program. There were cases when teachers could not set additional points because they could not access additional services. As a result, overcoming the problems created by the AI, teachers started using the system of "manual control" again.

At **Phase III**, there was a task to define the way how to apply the AI in the educational system to motivate and stimulate the AS. As a result, it was determined that only 14 % of the respondents were fully and mainly satisfied by using the AI in the motivation and stimulation system of the university. It was characteristic that almost half of the teachers (41 %) found it difficult to answer this question (Figure 2). This suggests that the teaching environment has not yet fully realized that the AI is increasingly involved in the training process, and there is still no clear assessment of the nature and efficiency of using the AI in teaching students.
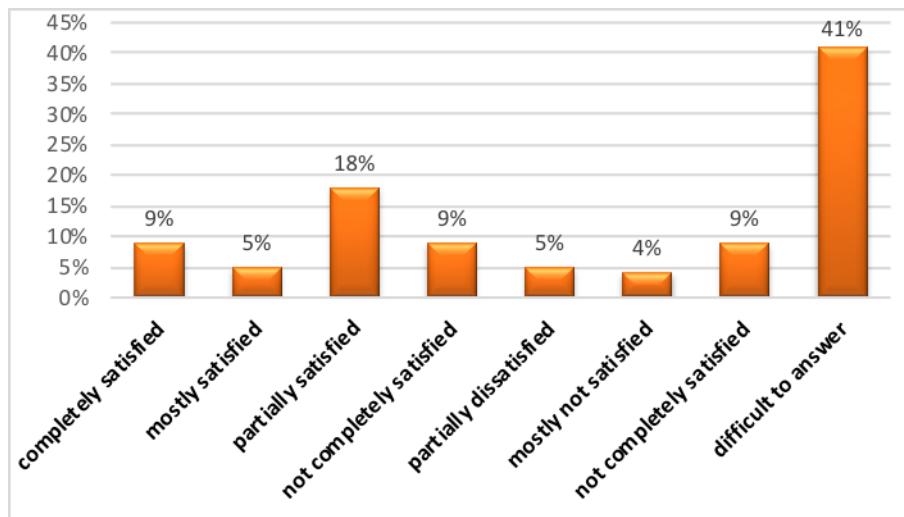
Fig. 2. Satisfaction with the AI Use in the University Motivation and Stimulation System

More than half of the teachers believe that it is possible to create an AI-based system of motivation and stimulation (Figure 3). To a degree, 73 % of the respondents trust it.
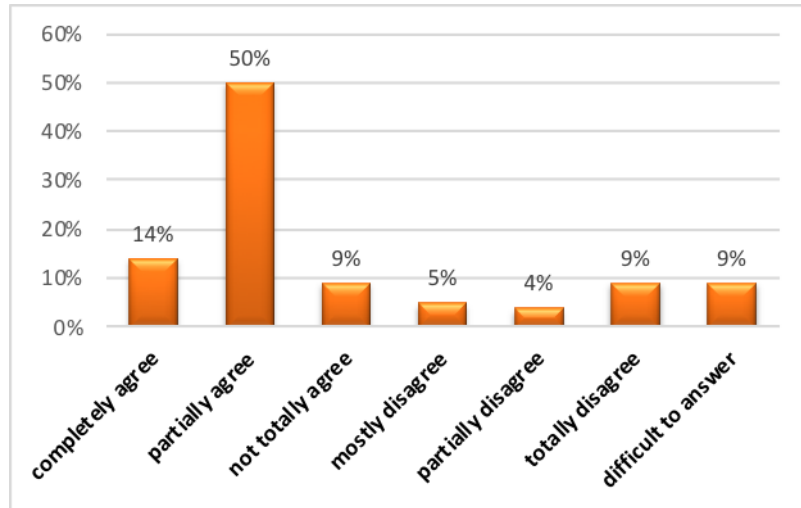
Fig. 3. Possibility to Create the AI-based Motivation and Stimulation System

These results indicate that the AS are not completely satisfied with the assessment of their activities by the university authorities, and would like to entrust the assessment procedure to objective evaluator, the AI-based expert programs. However, it is necessary to take into account that now the AI must still be controlled by people. As experience shows, modern programs are not perfect. In addition to this, there are failures in the electronic environment, which can also cause an opposite (negative) effect from replacing the natural intelligence in assessing the teachers' activities by the AI.

Most of the teachers surveyed believe that AI motivates them to work better (Figure 4).
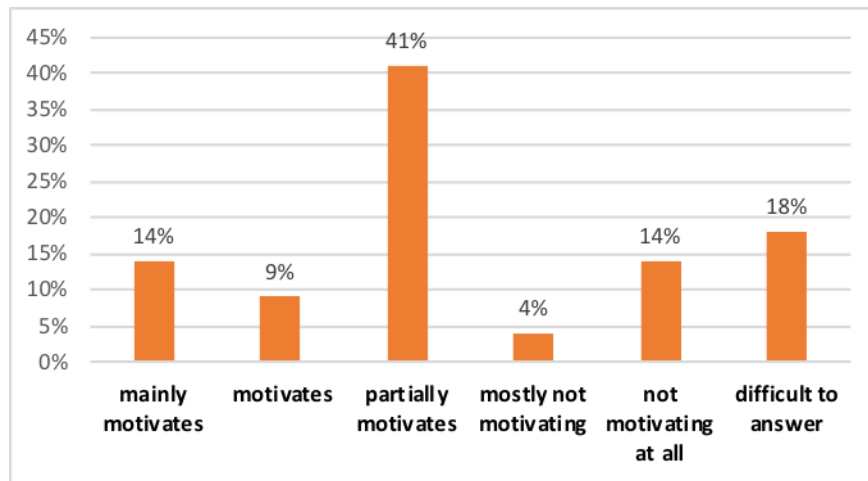
Fig. 4. Answers to the question: "Does the AI Introduced to the Educational Activity Motivate You to Work Better?"

At the same time, it is necessary to note that only 14 % of the respondents are mainly motivated by the AI to work better. It is quite reasonable. This is the number of teachers who stakes in the AI-based training of students. This is related not only to training IT specialists, but other specialties, too. It is positive that rather many teachers are balanced about the implementation of the AI in the educational process. These are the teachers who are partially motivated (41 %) by the introduction of the AI in educational activities.

Moreover, the AI has considerable impact on the AS competitiveness (Figure 5).
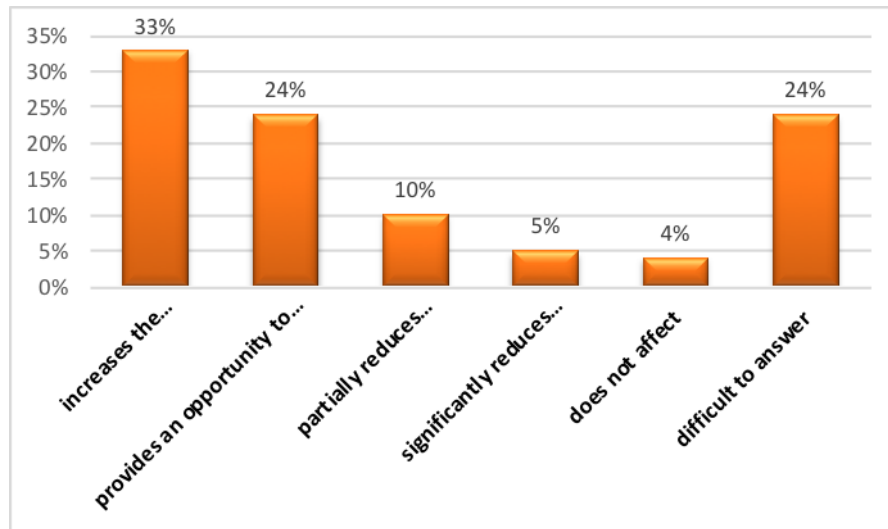
Fig. 5. Answers to the Question: "Does the AI Have Impact on the University Teachers' Competitiveness?"

Many teachers (33 %) believe that the AI enhances their competitiveness. Twenty-four percent of the respondents expressed the opinion that the AI offered them the opportunity to become better than their colleagues. Five percent of the respondents noted that AI reduced their competitiveness and ten percent said it partially decreased competitiveness. Twenty-four percent found it difficult to answer the question. Thus, more than half of the teachers realized the importance of using the AI in educational activities, improving their competitiveness in the labor market and the educational market.

The data on the priority areas of using the AI at the university are of great interest (Figure 6). The top-priority areas included learning (77 %) and scientific activities (62 %). It was offered to use the AI least of all in educational work (16 %).
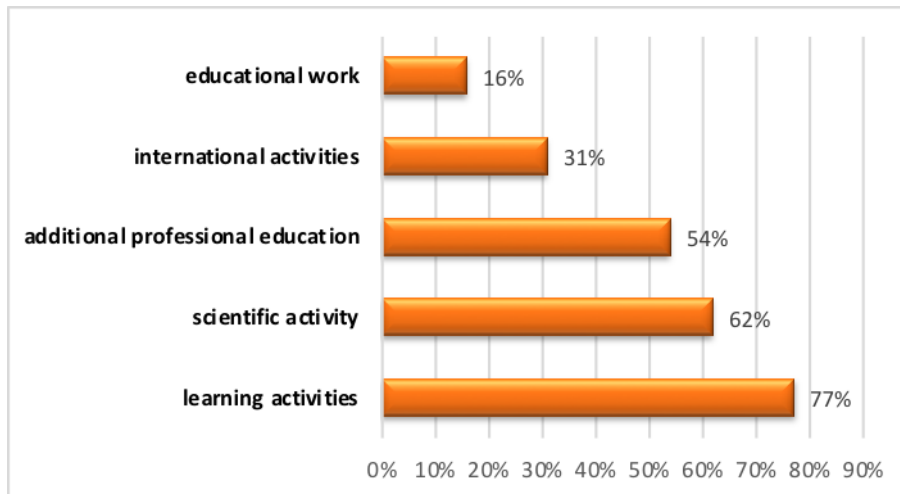
Fig. 6. Answers to the Question: "What Can Be Trusted to the AI to Motivate the University AS?"

These results are controversial. On the one hand, the teacher is the most important element in educational activities. Their main task is not only to provide educational and professional information, but also to bring up a mature member of the society who has an adequate psyche. Here, the most important aspect is the students'

commitment to the corporate culture of the university as a prototype of the future corporate culture of the organization where he/she will continue developing and fulfilling labor functions. On the other hand, the modern generation more and more often obtains information from the electronic environment, social networks, and is increasingly dependent on electronic devices, the AI that is actively involved in all areas of the human life. Now it is necessary to influence young people, students of various ages by using the AI capabilities. However, in this matter it is necessary to maintain harmony and balance of the teacher's (natural intelligence) and the AI's impact on students.

3.3. Technology to Improve the AS' publication and grant activities

At **Stage I** the system of motivation and stimulation of the AS that is flexible and promising in terms of the publication activity and created by the working group made it possible to considerably increase the number of publications made both by individual teachers and the university, as a whole. According to this indicator, the university strengthened its position, became efficient, and rose in national and international ratings. Moreover, it targeted the number of publications rather than their quality. This was logical, because the indicators of the university did not take into account the quality. However, in the future, the growth in the number of publications sharply decreased and stopped, but in general the university remained efficient (Table 2).

Table 2. Number of Teachers According to Levels of Personal Contribution to the Efficiency of the University

Levels of AS contribution to the University KPI	Publication levels	Grant levels	AS for the given indicators		
			2015	2017	2019
1	WoS -3 Q 1	Grant Level 1 (external, for the amount of above RUB 3 mln)	0 %	1 %	1 %
2	WoS -2 Q 2	Grant Level 1 (external, for the amount of above RUB 2 mln)	0 %	2 %	1 – 2 %
3			1 – 2 %	3 %	2 – 3 %
4	WoS Q 4	Grant Level 4 (external, for the amount of less than RUB 1 mln)	2 – 3 %	4 – 5 %	3 – 5 %
5	Q, Higher Attestation Commission	Grant Level 5 (internal, for the amount of RUB 500,000 – 1 mln)	10 – 15 %	20 – 25 %	25 – 30 %
6	Higher Attestation Commission, Russian Science Citation Index	Grant Level 6 (internal, for the amount of less than RUB 500,000)	50 – 70 %	50 – 70 %	50 – 60 %
7	Russian Science Citation Index	-	10 – 15 %	25 – 30 %	25 – 30 %
	With a foreign co-author		5 %	10 – 15 %	10 – 15 %

The division of the AS by the contribution to the university KPI shows that the vast majority of the AS covered the lower level of the university performance indicators. This is natural, because in such a short time it was possible to develop and publish scientific articles only in the bulletins that took low positions of the elite databases rating. It was faster, easier, and cheaper.

The most talented and organized teachers, about 15 % of the total number of the AS, were able to realize their potential in a short time and publish the required number of articles in the bulletins indexed in the *Web of Science and Scopus* databases according to the motivation and stimulation system. Since the leading researchers have hit the ceiling of stimulation according the created system, their activity started declining. This was manifested at **Stage II** of the study when introducing a new system of motivation and stimulation of the staff. This affected the total number of publications in 2018. It decreased by 14 %.

Other teachers published the results of their research under administrative pressure in the bulletins that took low positions of the elite database ratings, and their number did not increase.

At the same time, there was another problem related to improving the quality of publications. The growth of levels one – three was minimal, which made the university authorities and HR Department amend the staff motivation and stimulation system.

First of all, publication surcharges changed. They were directly related to the level of the bulletin indexed in the *Web of Science and Scopus* databases, where a scientific article was published. The leaders by the number of scientific developments were indirectly stimulated by inviting them to elite internal and external grants. Teachers who developed scientific communication with foreign researchers were psychologically encouraged. However, this required additional costs and was prolonged in time.

At **Stage III** of the study, it was possible to define that 46 % of the respondents were completely and mostly satisfied with the working conditions at the university, including the opportunities for developing the publication activity (Figure 7). Fifty percent of the respondents found it necessary to change the working conditions.
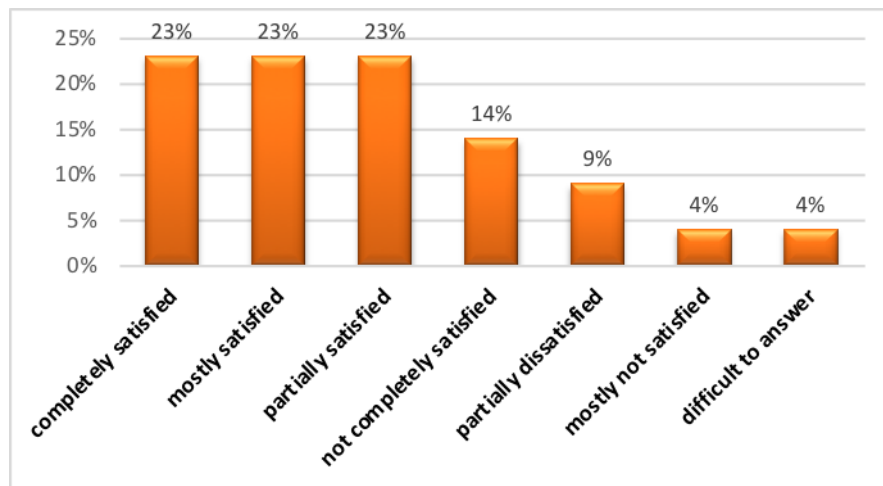
Fig. 7. Answers to the Question: "Are you Satisfied with the Working Conditions at the University?"

Besides, at **Stage III**, the risks associated with insufficiently flexible work with talented employees increased. The university lost 10 – 25 % of the talented employees, leading world-class researchers due to socio-psychological and ethical reasons. A number of employees were not satisfied with the administrative methods of influence, the management style (Figure 8), and some of them were not satisfied with the nature of implementing their ideas. Forty-six percent of the respondents were fully and mostly satisfied with the management style at the university. Fifty percent of the respondents found it necessary to change the management style.
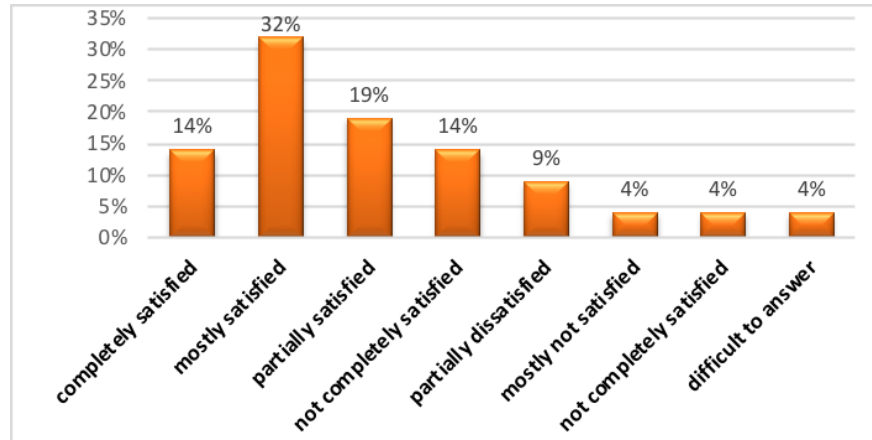
Fig. 8. Answers to the question: "Are you Satisfied with the Management Style of Your Authorities?"

This indicates that the activities of the university authorities are assessed ambiguously. Not only opponents of reforms, but also some supporters are not satisfied with the management style.

The university authorities had to part with some talented employees due to expanding the spectrum and nature of the introduction of innovations that went beyond what was permitted, the slowness of introducing the AI into the educational environment, violation of the conduct rules, including the corruption component.

This forced the authorities to pay more attention to keeping their own and attracting leading world-class researchers from other universities. According to the analysis of the data in Figure 9, only 36 % of the teachers are mostly satisfied and satisfied with the system of additional payments for the scientific activity. Fifty-four percent want to see a better system of additional payments for their scientific activities. A low assessment of the system of additional payments for the scientific activity by teachers creates the prerequisites for the participation of leading world-class researchers in scientific projects outside the university they work at. In its turn, this creates the prerequisites for the further transition of the leading world-class researchers to an establishment that offers more favorable working conditions and better assesses the scientific activity.
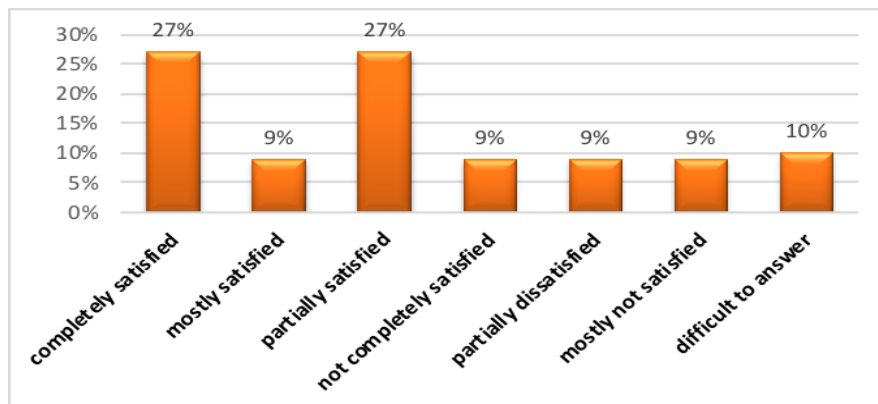
Fig. 9. Answers to the Question: "Are you Satisfied with the System of Additional Payments for Scientific Activity?"

At **Phase III**, **the technology of forming efficient teams was also improved. The talented** employees and the AS were consolidated by creating informal teams: scientific, multifunctional, and administrative. Creative, developing employees, primarily teachers, joined their efforts around the researchers who had achieved high indicators and had great scientific and communication potential. The basic motives included the development and

belonging to the team. Scientific teams worked at improving the publication grant activities. Multifunctional teams were formed according to the principle of using each team member's strengths in science, communication, management, and the AI. Administrative teams were formed by employees from the management team who helped one another by using administrative resources and their subordinates.

5. Discussion

The study of the formation and development of a new system of motivation and stimulation in the context of the university reform made it possible to identify the problem areas related to the **compliance of the *teacher's motives – university authorities' incentives* system** to improve the efficiency of the educational organization. They are similar to such problems in business (Karácsony et al, 2018). In **the focus group**, elements of the motivation and stimulation system used at the Lomonosov Moscow State University – TRUE – were offered as a positive experience. First of all, this was related to the **duration of the contract**. Professional universities have been using one-year **labor contracts** for a long period of time. This is due to the authorities' fear not to accept the required number of students, and to more efficiently influence the AS. At the Lomonosov Moscow State University, the duration of the contract depends on the teacher's rating. If he/she holds a position on the lowest 25 % of the rating, the contract is concluded for one year, while in case of the position in the highest 25 % of the rating, the contract is concluded for five years. The interval between these positions makes it possible to conclude the contract for three years. This improved such teachers' motives as respect, development, confidence in the future, and one incentive – the duration of the employment relationship – applied technologically and fairly. As for military universities, the peculiarity of teachers working there was the conclusion of an unlimited contract with them, regardless of the rating. As the experience shows, when taking a decision, it is reasonable to give priority to the authorities based on the AI capabilities (Belciug & Gorunescu, 2019).

Another issue is related to the fact that **the innovations introduced continuously increase the load** that sometimes exceeds the AS capabilities to fulfill all their functions at a high level and with the required quality. This caused the emasculation of the motive of conscientious, high quality performance of their duties. **The formal style** of teachers performing constantly new tasks that affects the quality of students' training, the image and attractiveness of the university becomes more and more popular. The outflow of students from various courses to other universities increased.

The study showed that the universities authorities could not create a universal motivational system that flexibly responded to constant changes in the socio-economic environment. There are contradictions in the teachers' needs and vision of an ideal assessment system of their activities and the offered forms of incentives by university authorities. The vectors of their activities are not agreed on a number of indicators and contradict one another. This causes the decrease in staff loyalty, especially among leading world-class researchers and talented employees. Sears (2003), Schweyer (2004), Smilansky, 2005, Effron & Orth, 2014, talent management theorists and practitioners, advise on more serious treatment of talented employees. The most important issues are related to keeping talented people in the organization, including cybersecurity issues (International Conference, 2019), improvement of their loyalty in various areas of activity (Chulanova et al 2018).

The study showed that the implementation of the AI in training was a real, objective and irreversible process. However, a lot of AS have not yet realized the importance of its application and form of use. However, in some cases, teachers have more confidence in evaluating their activities by the AI rather than by authorities. This is generally correlated with the search for the efficient leader's behavior (Bryman, 2007).

According to the analysis of the study results, first of all, it is necessary to use the AI in the learning and scientific activities of the university. In fact, it improves the competitiveness of teachers, and most of the AS agree with this, against the opinion about the motivation for a better job. Nevertheless, it must be technologically integrated

into the existing training system without losing the benefits of training specialists by using the natural intelligence, as noted in the study carried out by Zimenkova, Paramonova & Lobacheva (2018). It is necessary to develop **new combinatorics, an innovative system that harmoniously combines the advantages of the natural and artificial intelligence to motivate the AS in training personnel for the digital economy of the 21ˢᵗ century.** It is necessary **to use** the AI in educational activities and the HR motivation and stimulation system **harmoniously subject to the priority of the natural intelligence**. The use of the AI in the educational work is controversial.

The fragmented priority of the AI over the natural intelligence **has been identified**. This creates risks in the real leadership in the AS educational activities. They are accordant with the risks of machine learning (O'Sullivan et al 2019). In addition, the mentality of the student environment is a problem. The AI becomes an assistant for negligent students who strive to get a high mark at the exam rather than knowledge.

The publication and grant activities were improved in an unstable manner: from a sharp increase in the number of publications to subsequent stagnation. This naturally caused the improvement of the motivation and stimulation system with an emphasis on material stimulation. The resources of nonmaterial motivation, especially the ones of the image nature, respect, recognition of merits were not fully used. The achievement of the required quantity of publications in the *Scopus* and *WoS* databases logically caused the solution of the following problem – improving the quality of publications. At the same time, there was a problem of struggling for talented employees, especially leading world-class researchers. One of the promising ways to solve this problem was the technology of forming efficient teams and securing talented employees in them. It is useful to use the AI capabilities to predict the conduct of team members (Abubakar, et al 2019). The desire of the university authorities to improve the efficiency of the university through **the commercialization** of the AS work faced a limited number of teachers with an instrumental type of motivation focused on money rewards. The team technology helped to solve this problem. The team includes commercially targeted teachers who helped the team to directly connect scientific achievements with their implementation and decent money rewards.

Thus, the technology to improve the staff's publication and grant activities by using the AI with a synergistic effect due to the efficient team building **has been formed**.

Conclusions

In the modern world, the terms and conditions for the activity of educational organizations are rapidly changing. In order to maintain high competitiveness, the university management must use advanced management and staff motivation technologies. During the study, in order to achieve the goal and solve scientific problems, the most suitable technologies for the university that strives to become efficient have been identified. These are the following technologies: the elimination of the imbalance in the system of staff motives – incentives of the university (employer) authorities, **the harmonious use of AI** in educational activities and the system of motivation and stimulation of personnel **where the natural intelligence prevails**, and the improvement of the staff's publication and grant activities by using the AI with the synergistic effect due to efficient team building. The analysis of the results on using the staff motivation and stimulation techniques and methods by the university has shown the need in new combinatorics, an innovative system that harmoniously combines the advantages of natural and AI to motivate the AS in training HR for the digital economy of the 21ˢᵗ century. The new system should be universal and flexibly respond to constant changes in the socio-economic environment. It is important to timely eliminate the contradictions in needs and teachers' opinion on the ideal assessment system of their activities and offered forms of stimulation by universities authorities. The vectors of their activities must be constantly coordinated, based on the AI capabilities. The introduction of the AI in the activities of universities improves the competitiveness of promising, innovative teachers and has positive impact on the image, efficiency, academic reputation, and citation index of universities.

The commercialization of the AS activities is improved through efficient team building. The loyalty of leading world-class researchers and the reduction of costs for the system of motivation and stimulation is improved within the prolongation of labor relations with the management of the university. The university authorities, the HR service must take into account possible problem areas when working with talented, key employees. It is important to take into account these risks at the stage of selection, monitoring and improving working conditions, to form and develop a reserve. At the same time, it is necessary to skillfully use the synergetic potential of various teams, developing a system of motivation and stimulation, taking into account the encouragement of the formation and action of teams.

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IMPACT OF SELECTED FACTORS ON STOCK PRICE: A CASE STUDY OF VIETCOMBANK IN VIETNAM

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Abstract. Fluctuation of stock price in commercial banks in developing countries such as Vietnam will reflect the business health of bank system and the whole economy. Good business management requires us to consider the impacts of multi macro factors on stock price, and it contributes to promoting business plan, financial risk management and economic policies for economic growth and stabilizing macroeconomic factors. The article analyzed and evaluated the impacts of seven (7) macroeconomic factors on stock price of a joint stock commercial bank Vietcombank (VCB) in Vietnam in the period of 2014-2019, both positive and negative sides. The results of quantitative research, in a seven factor model, show that the increase in GDP growth and lending rate and risk free rate has a significant effect on increasing VCB stock price with the highest impact coefficient, the second is decreasing the exchange rate, finally is a slight decrease in S&P500. This research finding and recommended policy also can be used as reference in policy for commercial bank system in many developing countries.

Keywords: bank stock price; GDP growth; inflationary; S&P500; risk free rate; market interest rate

1. Introduction

Commercial bank system in Vietnam in recent years plays a key role in helping the whole economy. In the context that GDP growth in Vietnam was increasing during 2014-2019 (see Exibit 1 at the end of the paper) and Vietnam stock market has been growing significantly, it is necessary to evaluate impacts of selected macro economic factors on bank performance, especially bank stock price. From these analytical results, we could

suggest bank and government policies to encourage and stabilize the growth of bank system and stock market in such developing countries such as Vietnam.

Looking at the Chart 1 below, we find out that Vietcombank (VCB) stock price moves in the same trend with VN Index, S&P 500 and GDP growth, although it fluctuates in a smaller range.
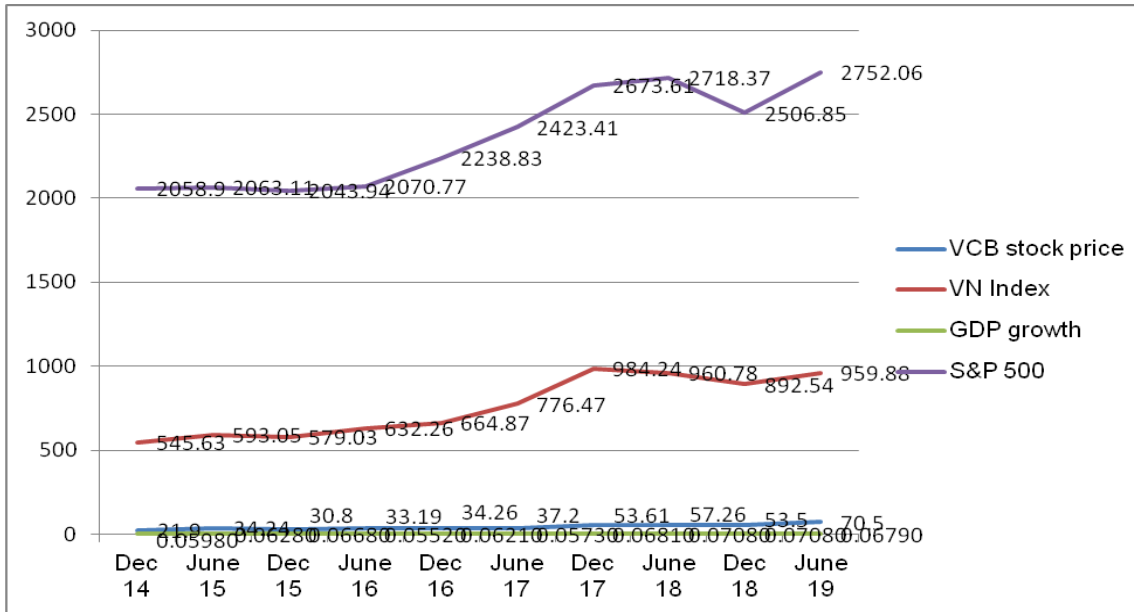
Chart 1. Vietcombank (VCB) stock price, VN Index, GDP and S&P500 (2014-2019)
Source: VN Stock exchange and Bureau statistics

This study will calculate and figure out the impacts of seven (7) macro economic factors such as inflation, GDP growth, market interest rate, risk free rate, VNIndex, S&P500 and exchange rate on Vietcombank stock price (VCB).

The paper is organized as follows: after the introduction it is the research issues, literature review and methodology. Next, section 3 will cover methodology and data and section 4 presents main research findings/results. Section 5 gives us some discussion and conclusion and policy suggestion will be in the section 6.

2. Literature review

Lina (2012) indicated that both the change of inflation rate and the growth rate of money supply (M2) are positive but insignificant to the banking industry stock return, the exchange rate is positive and significant to banking industry stock return and interest rate is negative and significant to banking industry stock return. Next, Sadia and Noreen (2012) found out exchange rate, and Short term Interest Rate have significant impact on Banking index. Macroeconomic variables like Money Supply, Exchange Rate, Industrial Production, and Short Term Interest Rate affects the banking index negatively where as Oil prices has a positive impact on Banking index. Other scientists point to such factors as change of oil prices and terrorism activities, which impact stock prices (Masood et al., 2019; Masood et al., 2020).

Manisha and Shikha (2014) stated that Exchange rate, Inflation, GDP growth rate affect banking index positively whereas Gold prices have negative impact on BSE Bankex but none of them have significant impact on Bankex. Then, Winhua and Meiling (2014) confirmed that macroeconomic do have a substantial influence to the earning power of commercial banks.

Krishna (2015) investigated the nature of the causal relationships between stock prices and the key macro economic variables in BRIC countries. The empirical evidence shows that long-run and short-run relationship exists between macro economic variables and stock prices, but this relationship was not consistent for all of the BRIC countries. And Kulathunga (2015) suggested that all macroeconomic factors influence the stock market development. More precisely, volatile inflation rate and exchange rate together with higher deposit rate have curtailed the stock market development in Sri Lanka. Moreover, positive optimism created by the economic growth and the stock market performance during the previous periods tend to enhance stock market performance. Moreover, Duy (2015) mentioned through the evolution of interest rates and the VNI could see that the relationship between these two variables in the period 2005-2014 is the opposite. This relationship is shown in specific periods of the year the stock market proved quite sensitive to interest rates. When interest rates are low or high but the bearish stock market rally, and vice versa when the high interest rates the stock market decline.

Last but not least, Quy and Loi (2016) found that 3 economic factors (inflation rate, GDP growth rate, and exchange rate) impact significantly on real estate stock prices; but the relationship between 10-year Government bond yield and trading volume, and real estate stock prices was not found. Ahmad and Ramzan (2016) stated the macroeconomic factors have important concerns with stocks traded in the stock market and these factors make investors to choose the stock because investors are interested to know about the factors affecting the working of stock to manage their portfolios. Abrupt variations and unusual movements of macroeconomic variables cause the stock returns to fluctuate due to uncertainty of future gains.

Until now, many researches have been done in this public debt field, however, they just stop at analyzing internal macroeconomic factors on stock price.
Within the scope of this paper, we measure impacts of both internal and external macro factors on Vietcombank stock price and suggest policies for bank system, Vietnam government, Ministry of Finance, State Bank and relevant government bodies. We also analyze data through out time series from 2014-2019.

Research issues
The scope of this study will cover:
Issue 1: What are the relationships among many economic factors: VCB stock price, interest rate, exchange rate, inflation, VNIndex, S&P 500 and GDP growth?

Issue 2: What are the impacts of above 7 macro economic factors on Vietcombank stock price?

Issue 3: Based on above discussion, we recommend some solutions regarding to commercial bank management in incoming period.

This paper also tests two (2) below hypotheses:

Hypothesis 1: An increase in lending rate will make VCB stock price declines.
Hypothesis 2: An increase in inflation can increase pressure in VCB stock price.

3. Methodology and data

This research paper establishes correlation among macro economic factors by using an econometric model to analyze impacts of seven (7) macro economic factors in Vietnam such as: GDP growth, inflation, interest rate, exchange rate, S&P 500 on Vietcombank (VCB) stock price.

In this research, analytical method is used with data from the economy such as inflation in Vietnam and market interest rate, GDP growth rate, exchange rate (USD/VND). Data are included from 2014 -2019 with semi-annual data (10 observations in total). Data is estimated based on exchange rate and lending interest rates of commercial banks such as: Vietcombank, BIDV, Agribank, Vietinbank… (average calculation). S&P 500 index data is from USA Stock exchange, data source (inflation, GDP) is from Bureau of Statistics. Beside, econometric method is used with the software Eview. It will give us results to suggest policies for businesses and authorities.

We build a regression model with Eview software to measure impacts of factors. Vietcombank stock price is a function with 5 variables as follows:

Y (VCB stock price) = f (x1, x2, x3, x4, x5, x6, x7) = ax1 + bx2 + cx3+dx4+ ex5 + fx6 + gx7 + k

Where:
x1: GDP growth rate (g), x2: inflation, x3: VNIndex, x4: lending rate, x5: risk free rate (Rf), x6: USD/VND rate, x7: S&P 500.

Besides, this paper also uses analytical and general data analysis method to measure and generate comments on the results, then suggest policies based on these analyses.

4. Main results

4.1. General data analysis
First of all, the chart 2 presented below shows us that Y has a positive correlation with GDP growth:
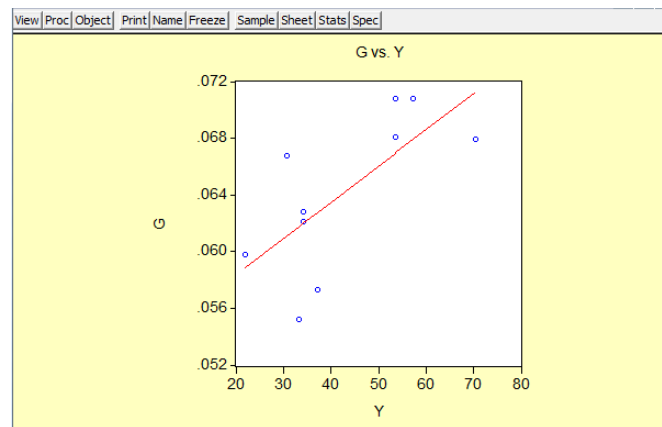
Chart 2. VCB stock price (Y) vs. GDP growth in Vietnam (G)

Next we find out that, based on the below scatter chart 3, Y (VCB stock price) has slightly positive correlation with inflation (CPI).
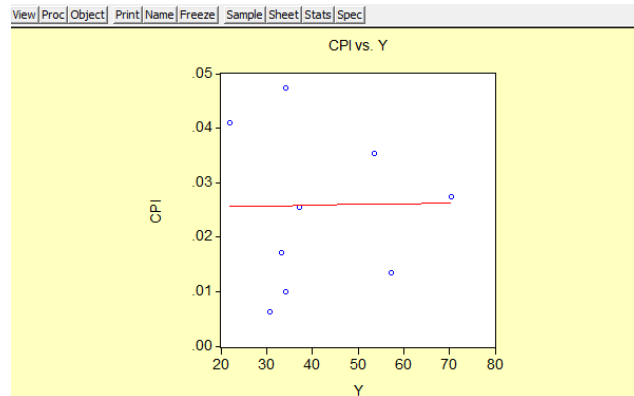
Chart 3. VCB stock price (Y) vs. Inflation (CPI)

Looking at the below chart 4, we also recognize that VCB stock price (Y) and VNIndex have positive correlationship.
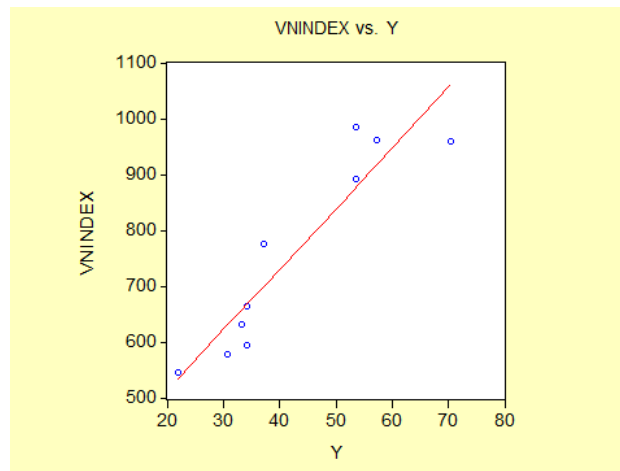
Chart 4. Y vs. VN Index

We see that, VCB stock price (Y) and lending rate have negative correlation (Chart 5):
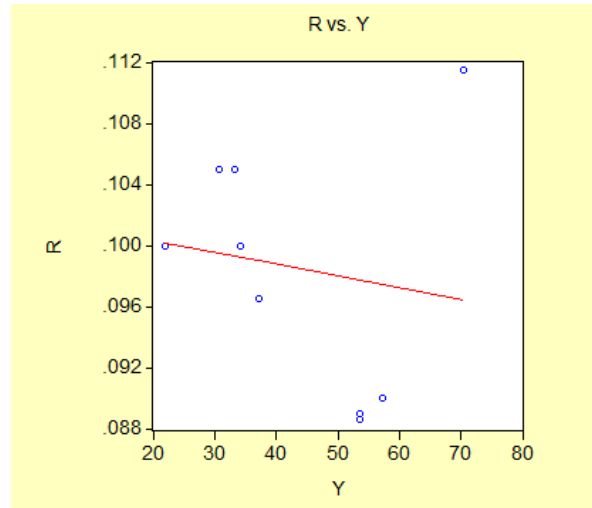
Chart 5. Y vs. Lending rate (r)

In addition to, the below scatter graph shows us that VCB stock price (Y) and risk free rate (Rf) also have negative correlation (Chart 6).
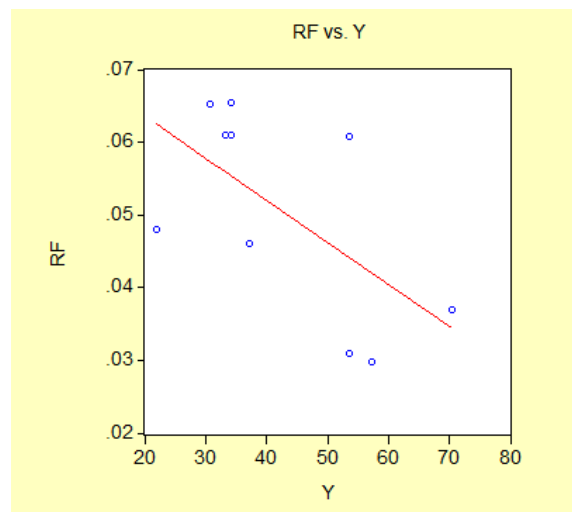
Chart 6. Y vs. Risk free rate (Rf)

Last but least, chart 6 shows us public debt increase (Y) and export/import ratio have negative correlation.

The below chart 7 shows us that Y and USD/VND rate have a positive correlation.

2720
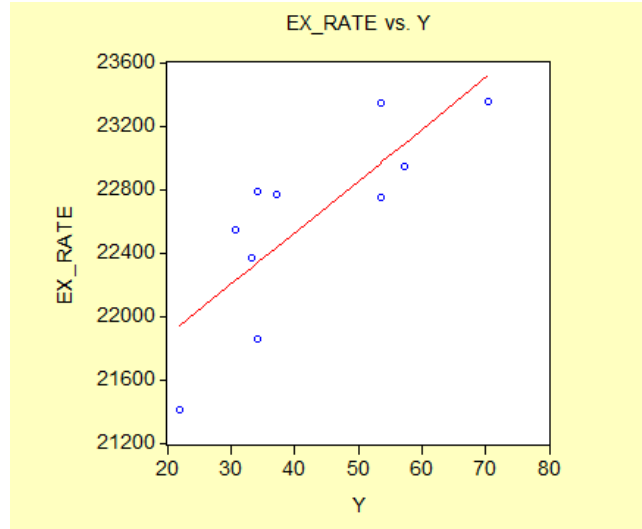
Chart 7. Y vs. Exchange rate (Ex_rate)
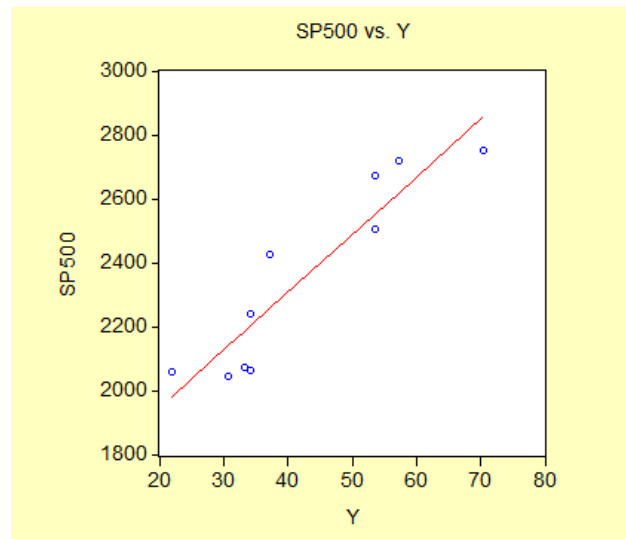
Chart 8. Y vs. S&P 500

In the above chart 8, we also see that VCB stock price (Y) has a positive correlation with S&P500.
On the other hand, we could see statistical results with Eview in the below Table 1 with 5 variables:

Table 1. Statistics for macro economic factors

Unit: %

	VCB stock price	GDP growth	Inflation (CPI)	VN Index	Lending rate	Risk free rate	USD/VND rate	S&P 500
Mean	42.646	0.06416	0.02588	758.875	0.09856	0.050485	22611.7	2354.985
Median	35.73	0.0648	0.0264	720.67	0.1	0.05435	22757.5	2331.12
Maximum	70.5	0.0708	0.0474	984.24	0.1115	0.06535	23350	2752.06
Minimum	21.9	0.0552	0.0063	545.63	0.0886	0.0297	21405	2043.94
Standard dev.	15.12253	0.005549	0.013884	176.4835	0.007636	0.014066	610.2313	294.9314

Looking at the above table, we recognize that standard deviation of exchange rate, S&P 500 and VNIndex are the highest values. Whereas standard deviation of GDP growth and lending rate are the lowest values.
If we want to see correlation matrix of these 8 macro variables, Eview generate the below result in table 2:

Table 2. Correlation matrix for eight (8) macro-economic variables (GDP growth, inflation in VN, market interest rate, Risk free rate, S&P 500, exchange rate and VCB stock price)

Correlation Matrix								
	Y	VNINDEX	SP500	RF	R	G	EX_RATE	CPI
Y	1.000000	0.928783	0.923796	-0.621026	-0.151701	0.697094	0.805234	0.013802
VNINDEX	0.928783	1.000000	0.983824	-0.634696	-0.440372	0.653067	0.777514	0.146050
SP500	0.923796	0.983824	1.000000	-0.677534	-0.374293	0.634468	0.755250	0.183559
RF	-0.621026	-0.634696	-0.677534	1.000000	0.302601	-0.474076	-0.521420	-0.158705
R	-0.151701	-0.440372	-0.374293	0.302601	1.000000	-0.390583	-0.154750	-0.220576
G	0.697094	0.653067	0.634468	-0.474076	-0.390583	1.000000	0.564582	-0.050535
EX_RATE	0.805234	0.777514	0.755250	-0.521420	-0.154750	0.564582	1.000000	0.082310
CPI	0.013802	0.146050	0.183559	-0.158705	-0.220576	-0.050535	0.082310	1.000000

The above table 2 shows us that correlation among 8 macro variables. An increase in exchange rate and decrease in lending rate might lead to an increase in VCB stock price. It also indicates that correlation between VCB stock price (Y) in Viet Nam and VNIndex in Viet Nam and S&P 500 in the US (0.928 and 0.923) is higher than that between Y and lending rate (-0.15) or between Y and CPI (0.01).

The below Table 3 shows us that covariance matrix among eight (8) macro economic variables. VCB stock price (Y) has a negative correlation with risk free rate and lending rate but has a positive correlation with exchange rate (EX_Rate), CPI and GDP growth.

Hence, an increase in GDP may lead to an increase in VCB stock price.

Table 3. Covariance matrix for 8 macro economic variables

Covariance Matrix								
	Y	VNINDEX	SP500	RF	R	G	EX_RATE	CPI
Y	205.8218	2230.926	3708.207	-0.118892	-0.015765	0.052645	6687.802	0.002608
VNINDEX	2230.926	28031.78	46087.69	-1.418033	-0.534085	0.575578	75361.46	0.322068
SP500	3708.207	46087.69	78286.05	-2.529699	-0.758612	0.934488	122334.5	0.676458
RF	-0.118892	-1.418033	-2.529699	0.000178	2.93E-05	-3.33E-05	-4.028085	-2.79E-05
R	-0.015765	-0.534085	-0.758612	2.93E-05	5.25E-05	-1.49E-05	-0.648952	-2.10E-05
G	0.052645	0.575578	0.934488	-3.33E-05	-1.49E-05	2.77E-05	1.720538	-3.50E-06
EX_RATE	6687.802	75361.46	122334.5	-4.028085	-0.648952	1.720538	335144.0	0.627614
CPI	0.002608	0.322068	0.676458	-2.79E-05	-2.10E-05	-3.50E-06	0.627614	0.000173

4.2 Regression model and main findings

In this section, we will find out the relationship between eight macro economic factors and public debt.

4.2.1 Scenario 1: Regression model with single variable: analyzing impact of GDP growth (G) on VCB stock price (Y)
Note: C: constant
Using Eview gives us the below results:

```
View Proc Object  Print Name Freeze  Estimate Forecast Stats Resids

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:15
Sample: 1 10
Included observations: 10
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	1899.833	690.8540	2.749978	0.0251
C	-79.24730	44.47413	-1.781874	0.1126

R-squared	0.485940	Mean dependent var		42.64600
Adjusted R-squared	0.421682	S.D. dependent var		15.12253
S.E. of regression	11.50026	Akaike info criterion		7.899473
Sum squared resid	1058.048	Schwarz criterion		7.959990
Log likelihood	-37.49736	F-statistic		7.562379
Durbin-Watson stat	1.505540	Prob(F-statistic)		0.025060

Hence, $Y = 1899 * g - 79.2(8.1)$, $R^2 = 0.48$, $SER = 11.5$

Within the range of 10 observations (2014-2018) as described in the above scatter chart 1, coefficient 1899, when GDP growth increases, VCB stock price will increase.

4.2.2 Scenario 2 - Regression model with 2 variables: analyzing impact of GDP growth (G) and Inflation (CPI) on VCB stock price (Y):

Running Eview gives us below results:

```
View Proc Object  Print Name Freeze  Estimate Forecast Stats Resids

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:16
Sample: 1 10
Included observations: 10
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	1906.603	737.7633	2.584302	0.0362
CPI	53.54223	294.8606	0.181585	0.8611
C	-81.06734	48.48068	-1.672158	0.1384

R-squared	0.488350	Mean dependent var		42.64600
Adjusted R-squared	0.342164	S.D. dependent var		15.12253
S.E. of regression	12.26544	Akaike info criterion		8.094774
Sum squared resid	1053.087	Schwarz criterion		8.185549
Log likelihood	-37.47387	F-statistic		3.340612
Durbin-Watson stat	1.610906	Prob(F-statistic)		0.095809

Therefore, $Y = 1906 * g + 53.5*CPI - 81.06$, $R^2 = 0.48$, $SER = 12.2$

Hence, this equation shows us VCB stock price has a positive correlation with GDP growth and inflation in Vietnam. Esp., it is highly positively affected by GDP growth rate.

4.2.3. Scenario 3 - Regression model with 3 variables: adding lending rate (r) into the above model

Eviews generates below statistical results:

| View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids |

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:17
Sample: 1 10
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	2090.650	855.5390	2.443665	0.0502
CPI	97.54438	322.7201	0.302257	0.7727
R	332.0784	636.6066	0.521638	0.6206
C	-126.7442	101.4428	-1.249415	0.2580

R-squared	0.510547	Mean dependent var	42.64600
Adjusted R-squared	0.265821	S.D. dependent var	15.12253
S.E. of regression	12.95763	Akaike info criterion	8.250421
Sum squared resid	1007.401	Schwarz criterion	8.371455
Log likelihood	-37.25210	F-statistic	2.086195
Durbin-Watson stat	1.694810	Prob(F-statistic)	0.203512

Hence, $Y = 2090.6 * G + 97.5 * CPI + 332*R – 126.7$, $R^2 = 0.51$, $SER = 12.9$

The above regression equation shows us that VCB stock price (Y) has a positive correlation with GDP growth (G) and inflation (I) and lending rate (R). And the coefficient (with GDP) is the highest, the 2nd highest is with lending rate. Lending interest rate increases together with GDP growth increases will increase savings of public and lead to an increase in VCB stock price.

4.2.4. Scenario 4 - regression model with 4 macro variables:
Eviews presents the below results:

| View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids |

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:18
Sample: 1 10
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	568.4568	272.9590	2.082572	0.0918
CPI	-42.91707	83.85602	-0.511795	0.6306
R	669.8638	166.7110	4.018114	0.0101
VNINDEX	0.081169	0.008711	9.318429	0.0002
C	-120.3347	25.93881	-4.639174	0.0056

R-squared	0.973351	Mean dependent var	42.64600
Adjusted R-squared	0.952032	S.D. dependent var	15.12253
S.E. of regression	3.312085	Akaike info criterion	5.539886
Sum squared resid	54.84953	Schwarz criterion	5.691178
Log likelihood	-22.69943	F-statistic	45.65600
Durbin-Watson stat	2.698581	Prob(F-statistic)	0.000398

Therefore, $Y = 568.4*G – 42.9*CPI + 669.8*R + 0.08* VNINDEX – 120.3$, $R^2 = 0.97$, $SER = 3.31$

We find out impacts of 4 macro variables, with the new factor: VNINDEX, shown in the above equation, VCB stock price (Y) has negative correlation with inflation, whereas it has positive correlation with GDP growth, lending rate (R), VNINDEX and interest rate (R). When inflation goes down, VNINDEX and interest rate

increase, this will increase public savings and investment in stock market, as a result, VCB stock price will increase.

4.2.5. Scenario 5 - regression model with 5 macro variables:
Running Eviews gives us results:

| View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids |

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:20
Sample: 1 10
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	550.9841	298.6726	1.844776	0.1388
CPI	-47.71077	91.62142	-0.520738	0.6300
R	669.4207	181.0975	3.696466	0.0209
VNINDEX	0.078826	0.010615	7.425598	0.0018
RF	-54.34554	111.5725	-0.487087	0.6517
C	-114.5236	30.59845	-3.742792	0.0201

R-squared	0.974843	Mean dependent var	42.64600
Adjusted R-squared	0.943397	S.D. dependent var	15.12253
S.E. of regression	3.597860	Akaike info criterion	5.682265
Sum squared resid	51.77838	Schwarz criterion	5.863816
Log likelihood	-22.41132	F-statistic	31.00042
Durbin-Watson stat	2.960460	Prob(F-statistic)	0.002699

Hence, $Y = 550.9*G – 47.7*CPI + 669.4*R + 0.07* VNINDEX – 54.3* Rf – 114.5$, $R^2 = 0.97$, SER = 3.59

Here we see impacts of 5 macro factors, with the new variable: risk free rate (Rf), the above equation shows that VCB stock price (Y) has negative correlation with inflation and risk free rate, whereas it has positive correlation with GDP growth, lending rate and VNINDEX. We also recognize that GDP growth and lending rate have the highest impact on VCB stock price. When risk free rate declines, it will increase investment in stock market, then it will lead to an increase in VCB stock price.

4.2.6. Scenario 6 - regression model with 6 macro variables:
Running Eviews gives us results:

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:21
Sample: 1 10
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	544.5089	350.1376	1.555128	0.2178
CPI	-48.21379	105.7299	-0.456009	0.6794
R	661.2468	223.7272	2.955594	0.0598
VNINDEX	0.077779	0.015999	4.861442	0.0166
RF	-53.68074	128.7782	-0.416846	0.7048
EX_RATE	0.000396	0.003895	0.101578	0.9255
C	-121.4743	76.98268	-1.577943	0.2127

R-squared	0.974929	Mean dependent var	42.64600
Adjusted R-squared	0.924788	S.D. dependent var	15.12253
S.E. of regression	4.147324	Akaike info criterion	5.878831
Sum squared resid	51.60090	Schwarz criterion	6.090641
Log likelihood	-22.39416	F-statistic	19.44362
Durbin-Watson stat	2.975998	Prob(F-statistic)	0.016849

$Y = 544.5*G – 48.2*CPI + 661.2*R + 0.07* VNINDEX – 53.6* Rf + 0.0004*EX\_RATE -121.4,$
$$R^2 = 0.97, SER = 4.14$$

Therefore, we see impacts of 6 macro factors, with the new variable: exchange rate USD/VND (EX_RATE), the above equation shows that VCB stock price (Y) has negative correlation with inflation and risk free rate, whereas it has positive correlation with GDP growth, lending rate, VNINDEX and exchange rate. We also recognize that GDP growth and lending rate, then risk free rate have the highest impact on VCB stock price, while exchange rate just has a slightly impact on stock price.

4.2.7. Scenario 7 - regression model with 7 macro variables:
Running Eviews gives us results:

```
View Proc Object  Print Name Freeze  Estimate Forecast Stats Resids

Dependent Variable: Y
Method: Least Squares
Date: 09/15/19   Time: 10:22
Sample: 1 10
Included observations: 10
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
G	566.4365	392.8950	1.441699	0.2861
CPI	-21.33970	125.5649	-0.169950	0.8807
R	761.8717	296.2645	2.571593	0.1238
VNINDEX	0.119401	0.068101	1.753285	0.2216
RF	-99.56139	161.1397	-0.617858	0.5996
EX_RATE	-0.000547	0.004601	-0.118823	0.9163
SP500	-0.024482	0.038651	-0.633413	0.5912
C	-83.80216	104.6013	-0.801158	0.5071

R-squared	0.979118	Mean dependent var	42.64600
Adjusted R-squared	0.906032	S.D. dependent var	15.12253
S.E. of regression	4.635679	Akaike info criterion	5.896004
Sum squared resid	42.97904	Schwarz criterion	6.138073
Log likelihood	-21.48002	F-statistic	13.39682
Durbin-Watson stat	2.975491	Prob(F-statistic)	0.071198

$Y = 566.4*G – 21.3*CPI + 761.8*R + 0.11*VNINDEX – 99.5*Rf – 0.0005*EX\_RATE – 0.02*SP500$,

$$R^2 = 0.97, SER = 4.63$$

Here we see impacts of 7 macro factors, with the new variable: S&P500 (SP500), the above equation shows that VCB stock price (Y) has negative correlation with inflation, exchange rate, S&P500 and risk free rate, whereas it has positive correlation with GDP growth, lending rate and VNINDEX. We also recognize that GDP growth and lending rate and risk free rate still have the highest impact on VCB stock price. S&P 500 has a slight impact on VCB stock price.

5. Discussion and further researches

Through the regression equation with above 7 macroeconomic variables, this research paper used updated data from 2014-2019 to analyze the regression equation via Eview in order to show that an increase in GDP growth has a significant impact on increasing VCB stock price (Y) with the highest coefficient of impact, followed by an increase in lending rate and decrease in risk free rate, then an increase in VNINDEX, a reduction in inflation and increase in VNINDEX and finally a slight decrease in S&P500, as well as a little reduction in exchange rate.

Data are from observations in the past 10 years, it is partly based on the market economic rules, and the research results are also affected by socio-economic characteristics in Vietnam such as: efficiency of public investment, waste of public investment, enterprise bankruptcy, and investment in areas that increase GDP such as production, electricity, etc. or investing in healthcare, environment and education sectors. We have not yet considered the impact of these factors.

Beside, we can analyze impact of another macro factor, for example, deposit rate when we add this variable into our regression model of public debt. Furthermore, we can add unemployment rate or public debt increase into our econometric model to measure the impact of these extra factors on VCB stock price.

6. Conclusion and policy suggestion

Based on the above data analysis from our regression model, although low inflation during 2015-2016 is a good signal for VCB stock price, we would suggest the government, Ministry of Finance and State Bank of Vietnam consider to control inflation more rationally, i.e not increasing much and suitable with each economic development stage. Governmental bodies and bank system also need to apply macro policies to stimulate economic growth, however not reducing lending rate too much, together with credit, operational and market risk management, corporate governance and controlling bad debt.

Next, it is necessary to coordinate synchronously between the management and administration of commercial bank policies with fiscal policies, monetary policies (used as effective tools to stimulate bank stock price) and other economic development policies to limit the negative effects of lending rate, risk free rate and exchange rate, i.e not increasing much. Lending policy of bank system need to be selective and increase interest rates for acceptable high risk high return projects.

Generally speaking, managing VCB stock price depends on many factors, so the government need to use fiscal policy combined with monetary policies and socio-economic policies to reduce unemployment and stimulate economic growth, toward a good stock price management.

Finally, this research paper also helps to direct further future researches, for instance, we could add deposit rate and unemployment rate into our above econometric model to measure impacts of them on commercial bank stock price.

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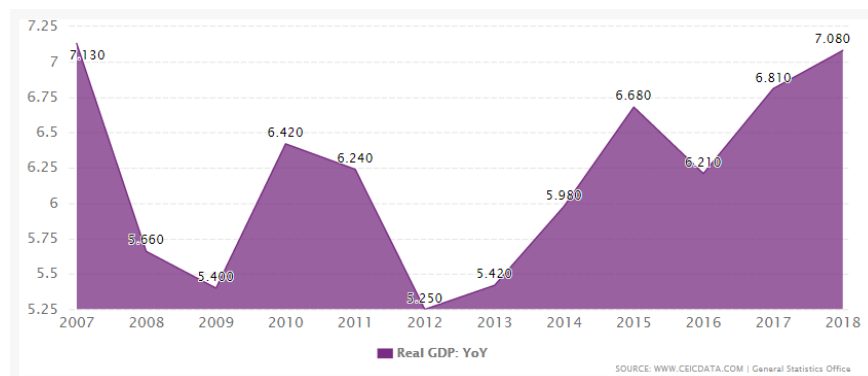
Exhibit

Exhibit 1. GDP growth rate past 10 years (2007-2018) in Vietnam

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PRECONDITIONS OF SEEDS' PRODUCTION ENHANCEMENT: A CASE STUDY

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Abstract. The article reveals the current state of selection and seed production of grain crops in the Russian Federation. There were considered the barriers of the development of the subsector in the conditions when one of the priorities is the creation of export-oriented grain production, which is not possible without well-developed plant breeding and seed production. There were revealed the features of selection and seed production of grain crops in modern conditions: underfunding of organizations engaged in selection, lack of breeding laboratories in the field of genetic technologies, imperfection of legislation in the country, low level of material and technical support of seed production, illegal seed trafficking, lack of financial opportunities of agricultural producers to conduct timely the variety exchange and variety renewal. There were proposed the measures to improve the system of state regulation in the field of selection and seed production of grain crops to solve these problems.

Keywords: grains; selection; seed growing; barriers of development; biotechnology; state regulation, Russian Federation

1. Introduction

The solution of the problem of ensuring food independence of Russia directly depends on the level of development of selection and seed production of grain crops. In accordance with the Decree of the President of the Russian Federation on August 6, 2014 No. 650 "On the application of certain special economic measures to ensure the security of the Russian Federation", there was introduced the law which bans the supply of certain types of agricultural products and food to Russia from countries that have announced sanctions against Russian legal entities and individuals. The current situation has determined the task of import substitution in the agro-industrial complex of the country, which is reflected as a priority in the "Long-term strategy of the development of the grain complex of the Russian Federation until 2035" (Long-term strategy 2019). Of course, it concerns the

sphere of plant breeding and seed production of grain crops (On complex of immediate measures directed to the provision of accelerated development of domestic selection and seed production. 2019).

Behind the apparent prosperity of the country's self-sufficiency in grain seeds and leguminous crops (at the level of 86.8% for the 2018 harvest), the share of imported seeds for such an important grain crop as corn reaches 49%. According to a number of experts, domestic selection with the exception of crops, cereals, is in a state of deep crisis and is not able to compete with world leaders (Mayorov, 2019).

One of the main barriers in the development of grain selection in Russia is the prohibition of sowing of genetically modified seeds and agricultural crop hybrids in production (Federal law from 3th of July 2016).

For this reason, the development of domestic varieties and hybrids takes a longer period of time and does not always ensure their resistance to adverse environmental factors due to the underdevelopment of genetic innovations. It causes an increasing lag of crop production in Russia from the world's main agricultural leaders. However, in the long term, it may be beneficial to our country, because of the demand for non-genetically modified products (hereinafter, GMOs) in the coming years, according to researches of the Institute of Statistical Researches and Economic Science (ISRES) of the Higher School of Economics (hereinafter, HSE) will actively grow (Kolyanina, 2019).

According to A. M. Medvedev, the Deputy Minister of the Ministry of Education and Science of Russia, leading research institutions of grain crop selection in the country are the following: FSBRI "National Grain Center named after P. P. Lukyanenko" (Krasnodar Territory), FSBRI "Agricultural Research Center "Donskoy" (Rostov region), FSBRI "Research Institute of Agriculture of the South-East" (Saratov region), FSBRI "Omsk Agricultural Research Center" and others. Thus, researches in the field of plant breeding and seed crops are conducted by 615 researchers, including 76 Doctors of Sciences, 286 PhD, 50 graduate students in subordinate institutions of the Ministry of Education and Science of the Russian Federation (Medvedev, 2019).

The relevance of the study determines the need to identify barriers of development in order to improve the selection and seed production of grain crops in the Russian Federation. During the study of the subject, the authors used the following research methods: foresight (expert assessment of existing barriers of development and areas of improvement of selection and seed crops), comparative analysis (in the study of areas of state support), monographic (to assess the system of state regulation of the studied subsector of crop production).

2. Results

The sequence and intensity of selection process is primarily determined by the biology of grain crops and coefficient of its reproduction. Based on these prerequisites, a specific program of selection of a particular grain crop should be developed in the breeding center, ensuring the withdrawal of the appropriate variety or hybrid in a certain period with specified economic and valuable characteristics. One of the main challenges for selection and seed production of grain crops is to ensure the growth of quantitative indicators with a rapid increase in the quality parameters of produced seeds.

The employees of related science branches are taken part in the creation of new varieties and hybrids of grain crops: phytopathologists, agronomists, biophysicists, genetic engineers and other specialists (Dolferus et al. 2011).

The efficiency of selection process is a complex category that reflects the effectiveness of the selection center to create new varieties and hybrids, taking into account the use of production means, live labor and return of total investments. In general, the scheme of selection work with self-pollinating crops is presented in Figure 1.
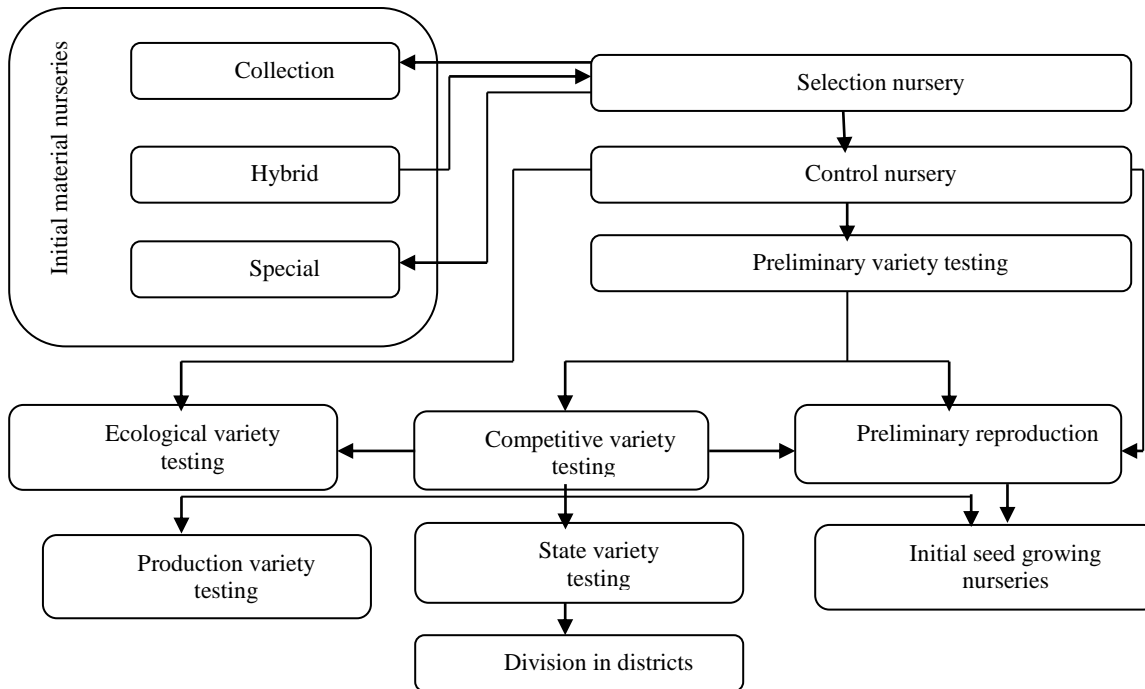
Fig. 1. Scheme of selection work with self-pollinating grain crops
Source: compiled by the authors based on (Nechaev, 2000)

The objective of selection of self-pollinating crops consists of selection of homozygous highly productive plants, assessment of their progeny and production on their basis of a new variety. In contrast to self-pollinating crops, the selection process of cross-pollinated plants, and in particular corn, is based on the use of the heterosis effect, that is, it is all connected with the creation of hybrid combinations and hybrids for industrial purposes. Figure 2 shows a diagram of the breeding process for cross-pollinating crops.
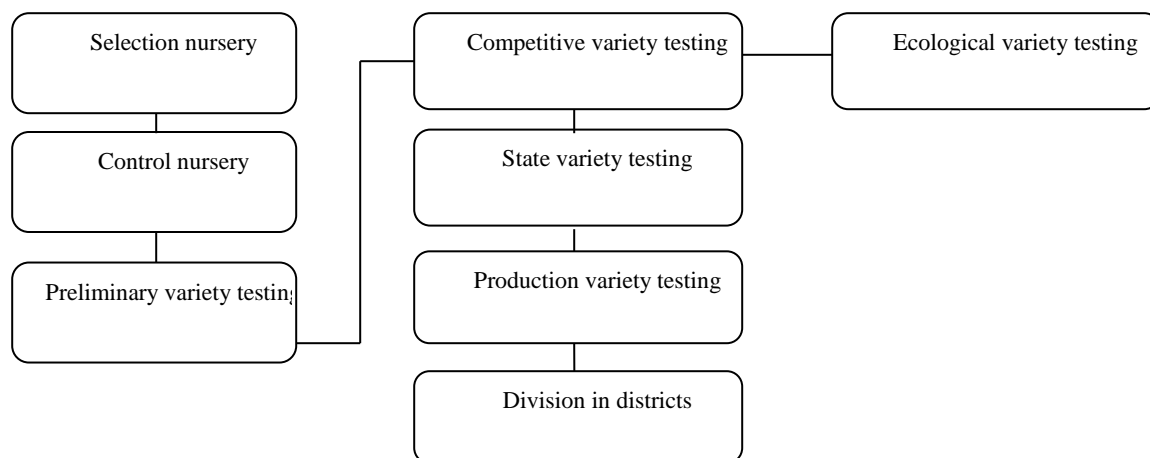
Fig. 2. Scheme of selection process with cross-pollinating cultures
Source: made by the authors on the basis (Nechaev, 2000)

It should be noted that one of the promising directions abroad is the production of hybrids and self-pollinating crops on the basis of heterosis. Thus, according to Akel W. and other scientists (Akel et al. 2019) there were selected the hybrids of durum wheat with high yield potential and good grain quality. However, hybrid breeding is not widely used in the real sector of the economy due to the difficulties in hybrid seed production.

It is evident that selection of grain crops is difficult and labor-consuming process demanding considerable financial and intellectual expenses from the given figures. Therefore, it is no accident that the HSE Technology Transfer Centre launched a research project "Selection 2.0". This project is aimed at studying all aspects of the functioning of breeding and seed industry in Russia, it is planned to analyze the state of competition in the Russian Agro-Industrial Complex during its implementation, to work out possible options of mechanisms of public and private cooperation in crop selection and work with genetic resources.

As a result, experts should work out the structure of the chain of selection products value, identify growth points, barriers and ways of development of selection and seed growing industry. At the same time, it is planned to update the level and depth of Russia's technological dependence, identify priorities for state efforts to support the technological development of the subsector. Unfortunately, the initiators of the project did not specify why this project was designated 2.0. We realize that the innovative development of agricultural industries today takes place during the fourth industrial revolution "Industry 4.0". These are not new technologies, but new approaches to production and consumption, which are based on the collection of big data (Espolov, 2019). Therefore, why this research project designated as "Selection 2.0" is not entirely clear.

The working group is headed by Roman Kulikov, Deputy Director of the Digital Agrolaboratory "Skoltech". It also included the Executive Director of the Association of Seed Potato Producers - Gennady Rezviy, Sergey Goncharov, professor of the department of selection and seed production of Voronezh State Agrarian University, Doctor of Agriculture, Sergey Platonov, political coordinator of the Federal Union of Plant Breeders of Germany in the Russian Federation, expert of the National Union of Plant Breeders and seed growers (Kulikov, 2019).

Modern biotechnology is just a new tool in the development of grain crop selection - the most effective variant of traditional selection (Conway, 2000; Ortiz et al., 2008). Therefore, it is no accident that the area under biotechnological (genetically modified) crops in the world has increased 110 times for 22 years. Thus, if in 1996 the area under these crops did not exceed 1.7 million hectares, in 2017 these figures increased to 189.8 million hectares (ISAAA Briefs 53-2017). This growth indicates that methods of biotechnology ensure the sustainability of agricultural production on the basis of specialized selection (Lammerts van Bueren et al. 2018).

It should be noted that plant breeders of Russia have created dozens of grain crop varieties with genetic potential of more than 10 tons per 1 hectare by classical methods. But these varieties do not realize their potential due to extreme environmental factors: lack of water in soil and air, severe clogging, soil salinity, epiphytotic diseases and pests. These varieties and hybrids of cereals can be given the properties of tolerance to above stress factors by means of genetic engineering methods, which require the joint work of plant breeders and genetic engineers.

The corresponding member of RAS A. A. Tishkov (Tishkov, 2019) states that in the world of genetics, already now, new genetically modified (GM) crops work not only to protect, for example, corn from pests, but also to change the strategy of photosynthesis, water regime and other areas, adapting new gene modifications to modern environmental conditions. Thus, according to Conway G. (Conway, 2000) biotechnology will become an important partner for farmers if crop yield limits increase significantly without excessive dependence on pesticides, will be resistant to drought, salinization and can use other nutrients more efficient. Anton Paul Wasson, R.A. Richards, R. Chatrath, S.C. Misra and other researchers pointed to it (Wasson et al., 2012).

In addition to traditional methods of genetics and selection to improve the efficiency of selection and seed production in recent decades, modern methods of marker selection are widely used for many varieties of agricultural plants, the use of which contributes to the acceleration of the selection process. With the help of marker-oriented selection methods, it is possible to solve the problems of crop resistance to various pathogens and stress factors more effectively (Richards et al., 2010).

Due to A. V. Alabushev, academician of the RAS, (Alabushev, 2019) in spite of specific success of domestic selection, high-yield wheat varieties, barley, rice, corn hybrids and other grain crops are not genetically protected from such diseases as ear physariosis, dusty and sound smut, blistered smut, leaf diseases, root rots and others. There is an increase in the number of insect pests, their activation and migration in the Northern direction. Everywhere there is an increase in populations and harmfulness of aphids, cicadas, thrips, cereal flies, bread beetles. The harmfulness of the bug-turtle, which has 4 morphological types, does not decrease and the expansion of the distribution area in Northern and Eastern regions of the country is revealed. The use of varieties genetically similar to the genes of resistance and susceptible to diseases and pests can lead to yield losses in the production.

The increase in risks in agricultural production leads to an increase in the number of late-ripening varieties, the share of which is more than 30 percent. Modern varieties and hybrids of grain crops do not always have sufficient quality of output products, mainly due to shortcomings in the preparation of seeds and technologies of their cultivation.

Table 1. Category of spring grain seeds and leguminous crops in the entities of the Russian Federation in 2019

Region	Total sown, th/tons	Category of seeds, th/tons		Percent of original, elite and reproduction seeds to sown seeds
		Original and elite	Reproductive (1-4)	
RUSSIAN FEDERATION	**5503,2**	**629,2**	**3480,8**	**74,68**
Costroma region	8,8	1,5	3,0	51,14
Smolensk region	22,9	2,4	10,7	57,21
Tula region	66,5	4,1	42,9	70,68
Vologda region	28,7	3,6	21,1	86,06
Kaliningrad region	6,7	0,5	4,4	73,13
Republic of Mari El	26,0	2,5	11,8	55,00
Udmurtia Republic	70,0	12,7	41,2	77,00
Kirov region	72,7	8,6	56,3	89,27
Orenburg region	278,9	25,6	145,2	61,24
Sverdlovsk region	91,4	9,0	55,7	70,79
Altai Republic	9,5	0,8	3,7	47,37
Khakass Republic	18,9	1,0	13,1	74,60
Kemerovo region	121,8	8,6	49,1	47,37
Buryat Republic	15,5	1,5	10,9	80,00
Sakha Republic (Yakutia)	4,5	0,3	3,5	84,44
Trans-Baikal Territory	25,0	0,5	4,8	21,20

Source: compiled by the authors based on (Nekrasov, 2019)

It follows that the percentage of original elite and reproductive seeds of grain and leguminous crops to their total number in the whole of the Russian Federation amounted to 74.7 percent from the data of Table 1. This indicates that the remaining 25.3% of the acreage is sown with seeds of mass reproductions or unknown origin. In the regions of Russia, this figure varied from 89.3% in Kirov region to 21.2% in Trans-Baikal Territory.

These problems should be solved by conducting selection to increase the potential of productivity and quality of output products, as well as winter hardiness, precocity, resistance of plants to dangerous pathogens and pests, drought resistance, resistance to other adverse factors. In addition, adaptive selection should be used to create fundamentally new varieties, increase the efficiency of crop production in the regions of the country, as well as the application of the principles of agro-economic zoning of varieties and hybrids. For this purpose, it is of particular importance to conduct fundamental and priority applied researches in the field of botany, genetics, physiology, biochemistry, immunity, biotechnology to obtain new results and create modern methods of effective assessment of the gene pool, modification and development of new methods of comprehensive study of grain crops in order to identify and use optimally the potential of hereditary variability of important economic characteristics in selection, breeding and creation of genetic sources and donors of original effective alleles of genes of resistance to stressors, productivity, quality and other economically valuable signs and also formation of collections of the identified gene pool for development of fundamental researches, traditional and new directions of selection, isolation and synthesis of fundamentally new donors and genetic sources with increased resistance to bio - and abiotic factors, high productivity, product quality and other economically useful features.

The development of the domestic grain market along with the selection of grain crops is directly related to the improvement of legislation regulating the field of seed production.

The legislation of the Russian Federation in the field of seed production of agricultural crops is extremely imperfect in comparison with the legislation of countries with significantly developed crop production, including Russia's neighbors - the countries of the former Soviet Union, which import a large volume of falsified seeds on the domestic market, seeds that do not correspond to varietal and sowing qualities, seeds without documents.

Legislation in the field of seed production should be focused on compliance by the legal entities, individual entrepreneurs and individuals with mandatory requirements at the production, certification, sale, storage and transportation of seeds of agricultural plants intended for the production of agricultural products, which is the basis of food security of the State.

In any country with a developed system of seed production, there is a law regulating activities in the field of seed production.

The state regulation of this sphere of activity is carried out in the EEU member states, according to their national legislation: the Law of the Republic of Armenia from 16.06.2005 No. ZO-106 "On seeds", the Law of the Republic of Belarus from 2.05.2013 No. 20-3 "On seed production". Law of the Republic of Kazakhstan No. 385-11 from 8 February 2003 "On seed production". Law of the Kyrgyz Republic No. 38 from 19.06.1997 "On seeds".

In other countries:
•USA. Code of Federal regulations published in the Federal register by agencies of the Federal government. Section 7 "Agriculture" (Electronic Code of Federal Acts. 2019);
•Canada. RSC, 1985, s. S-8 "Law on seeds" (Law on seeds (R. S. C., 1985, p. S-8));
•PRC. "Law on seeds" People's Republic of China 2004 (The law "On seed production" of People's Republic of China 2004);
• The European Union has adopted 12 directives regulating the requirements for sale and quality of seeds and planting material of agricultural plants (Legislation of the EU on marketing of seed and plant material).
All of the above countries, according to the International Federation of Seed Trade (IFST) have the highest volume of seed exports in the amount of 100 to 1500 million us dollars annually. At the same time Russian organizations purchase seeds annually worth more than 400 million US dollars (Dankwert, S.A. 2019).

Currently, the mechanism of protection of intellectual property in the field of selection and seed production in Russia is regulated by Chapter 73 of the fourth part of the Civil Code of the Russian Federation, including the protection of selection achievements.

In accordance with paragraph 36 of the Plan of measures to improve supervisory and licensing functions and optimizing the provision of public services by Federal executive authorities in the sphere of agriculture, approved by the Decree of the Government of the Russian Federation of March 9, 2010 № 299-r of the Ministry of Agriculture of Russia jointly with concerned agencies developed the draft of the Federal law "On amendments to the Federal law "On seed production and some other legislative Acts of the Russian Federation" (hereinafter - the Law).

This draft of the law is aimed at improving the legislation of the Russian Federation in the field of seed production, including the creation of conditions for the development of effective seed market, informing domestic producers and consumers of seeds about varietal resources, the availability and quality of seeds produced in the Russian Federation.

The draft of the Federal law "On amendments to the Federal law "On seed production and some other legislative Acts of the Russian Federation" is currently finalized on the comments of the Ministry of Justice of Russia and the Institute of legislation and comparative law under the Government of the Russian Federation contained in the relevant findings and is being prepared for submission to the government of the Russian Federation.

The state program of the development of agriculture and regulation of markets of agricultural products, raw materials and food approved by the resolution of the Government of the Russian Federation of July 14, 2012 No. 717 (further - the State program) provides measures of state support, including on development of seed production.

In order to stimulate the use of agricultural producers as a priority competitive domestic seed and planting material, technological equipment and materials since 2015 the reimbursement of direct costs incurred for the creation and (or) modernization of selection and seed centers in crop production has been provided. This measure of state support contributes to improving the competitiveness of domestic agricultural products in domestic and foreign markets as well as increasing the growth rate of agricultural products.

Since 2017, the subsidy has been provided for the provision of unrelated support for the reimbursement of costs to carry out a complex of agrotechnological works per 1 hectare of acreage for the production of corn seeds.

The possibility of obtaining preferential short-term loans to purchase seeds and also preferential investment loans for the period from 2 to 8 years on building, reconstruction and modernization of selection and seed production centers were provided by the order of the Ministry of Agriculture of Russia from January 24, 2017 No. 24 "On approval of lists of directions of target use of short-term preferential loans and preferential investment loans".

Support of elite seed production carried out within the framework of the "integrated" subsidy (Annex No. 9 to the State program) helps to increase the area occupied by varietal crops as well as to improve the quality of seed material produced.

The establishment of additional measures of state support for agricultural producers as well as organizations and individual entrepreneurs, scientific organizations, professional educational organizations, educational organizations of higher education engaged in the production of domestic agricultural products, its primary and (or) subsequent (industrial) processing can contribute to the development of domestic selection and seed production of agricultural plants.

Also due to the Decree of the President of the Russian Federation of July 21, 2016 No. 350 "On measures on realization of state scientific and technical policy in development of agriculture" there was developed the Federal scientific-technical program of development of agriculture in 2017-2025, approved by the Decree of the Government of the Russian Federation of 25 August 2017. No. 996 (hereinafter, FSTP), which is aimed at the production of original and elite seeds of agricultural plants in the direction of domestic crop production, which currently has a high degree of dependence on seeds of foreign production.

Employees of the Federal State Budgetary Scientific Institution of the Federal scientific center "All-Russian Research Institute of Agricultural Economics" proposed the principles of interaction between the participants of the FSTP (government, business, scientific institutions and universities) (Polunin, 2019):
● selection of participants implementing priority directions (from science, education, business);
● concentration of human, land and financial resources in priority areas;
● organization of transfer of selection achievements from science, education into production and control of their movement;
● business participation in the financing of science and education in priority areas of development and on a parity basis;
● Project financing of implementation of priority directions including with participation of support funds of scientific, scientific-technical, innovation activity and other institutes of development, such as the JSC "Rosagrolizing" and the JSC "Rosselkhozbank".

The next significant barrier in the considered FSTP is restraining factors of the implementation of public-private partnership:
-weak material and technical base of scientific organizations participating in state complex plans of scientific researches (further-CPSR) and complex scientific and technical programs (further-CSTP) which is economically unfavorable to develop for business, because any investments of the latter don't become its property, but only the gift which is burdensome for scientific and educational organizations;
- place of a consumer of scientific products of state research institutions and higher schools will be specify;
- insufficient volume of state support of researches and working outs of participants in CPSR and CSTP;
- whole range of possible ways of achieving the main goal in the field of selection and seed growing of agricultural crops.

We consider it expedient to propose changes to the CSTP:
- to endow the head executor of the CSTP with the status of a customer of scientific developments created by state scientific institutions;
- customer of scientific development makes a technical specification for the production of scientific products;
- customer finances the development of scientific products at the expense of received state subsidies and own funds in the proportion of 50-50;
- exclusive rights to the results of intellectual activity created within the framework of the CSTP are distributed between a customer and a contractor in equal shares. At the same time, the Ministry of Agriculture reserves the right to obtain a non-exclusive license, provided that the project participants do not use the results of intellectual activity protected by the patent in practice.

Academician A.V. Alabushev (Alabushev, 2019) notes that today in Russia there is an organizational scheme of seed crops, providing for the implementation of varietal renewal once every 4-5 years, which corresponds to the production of at least elite seeds in the amount of 5% of the total need in seeds. However, most producers do not have necessary financial possibilities to provide high-quality seed material, even their own production. Therefore, seeds of low sowing conditions do not create insurance and changing seed funds.

Seeds of low sowing conditions and mass reproductions even in the presence of a high level of agricultural technology, favorable climatic and soil conditions reduce yields. Studies have shown that the contribution of the quality of seeds used in sowing to gross grain production is 11-19%. Up to 15-20% of the crop yield is lost annually when using low-quality seeds in sowing due to the lack of changing funds.

Dynamics of sowing of conditioned seeds of cereal crops in the Russian Federation in 2007 -2019 is presented in Figure 3.
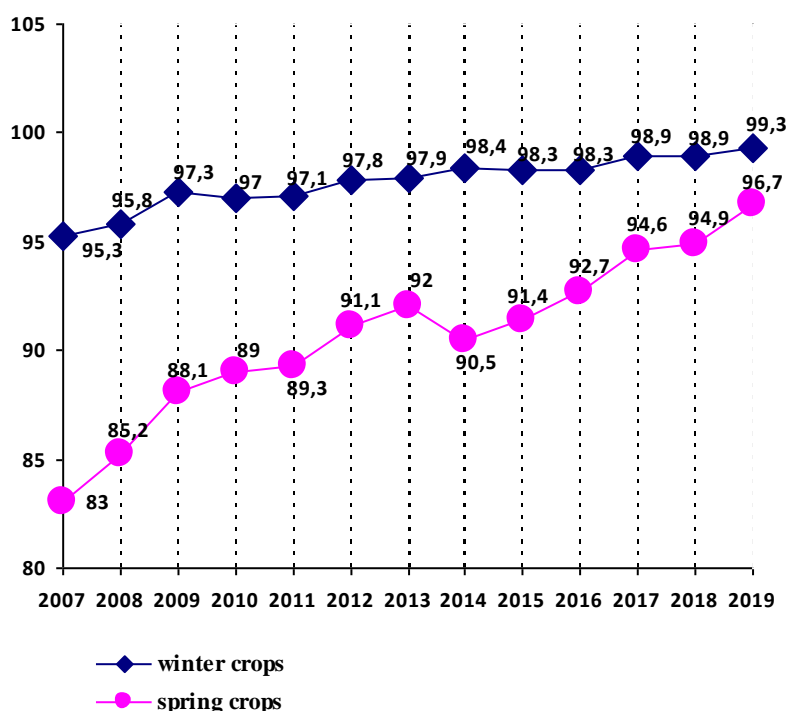
Fig. 3. Dynamics of sowing of conditioned seeds of cereal crops in the Russian Federation since 2007 to 2019, %
Source: compiled by the authors based on (Nekrasov, 2019)

From the data of Figure 3, it can be seen that the number of conditioned seeds of cereal crops increased for the period from 2007 to 2019. So if, this rate changed from 95,3 to 99,3% at winter grain crops, and from 83,0 to 96,7% at spring crops respectively.

In the complex of measures for the rise of grain production, an important place should be occupied by the variety exchange, as the cheapest and most affordable factor of intensification of grain production. At the same time, despite the high genetic potential of modern varieties, it is not always possible to obtain sufficiently high yield of grain crops. Therefore, due to the accelerated introduction of new varieties, there are real opportunities for sustainable growth of grain yields.

The main internal barrier in seed production is the problems accumulated in recent years: low level of material and technical support of primary seed production; lack of specialized small-sized equipment and modern complexes of post-harvest refinement of original and elite seeds; violation of agrotechnological requirements on seed crops; existence of illegal trafficking of seeds; low marketability of seeds of most crops, due to the lack of

necessary funds from agricultural producers for the purchase of high-quality seed material. They are forced to move to on-farm seed production at growing seeds in farms that do not have the necessary material and technical base and qualified personnel. We can observe the slow introduction of new varieties into production due to poor controllability of processes of variety exchange and variety renewal. In this regard, it is advisable to improve the zonal technologies of primary and industrial seed production, ensuring the production and high yield of high-quality seeds, accelerated introduction of new varieties and hybrids into production.

The lack of a well-established mechanism of implementation of scientific developments in production leads to the fact that the level of use of scientific achievements according to some estimates does not exceed 10% in agriculture. Seed producers ignore scientifically based recommendations on the placement of varieties. Contrary to the current legislation, varieties that are not included in the State Register of selection achievements of the regions of admission zones are widely used, the work on seed production have developed not in all entities.

For developing and implementing a program for selection of varieties (hybrids) of grain crops on the basis of scientific and academic organizations, it is necessary to provide for:
- sources of financing as state as private;
- formation and introduction of information-analytic system of efficient monitoring and assessment of condition of scientific-technological provision of researches in the field of selection technologies including technologies of genetic modification as well as risks of uncontrolled spreading and use of these technologies;
- development of special laboratories and centers implementing researches in the field of genetic technologies and their technological provision as well as training of personnel in this field (Nechaev, Gaponenko, 2013);
- laboratory and sorted control of grain crops as a basis of grain business creation in Russia (Lyubimova, Eremin, 2018);
- using the experience of Brazil (De Urzedo et al., 2019) to provide for measures of state support directed to preservation and active use of Russian genetic resources in plant selection and to decrease the dependence of domestic agricultural production from import of seed and planting material.

In addition, one of the promising directions in selection and seed production of grain crops is digitalization. The elements of the process of agro-digitization include: zoning of the region for the purpose of ecological testing of varieties and hybrids of grain crops, simulation of the reaction of source material to natural and climatic conditions of the region and most importantly - will track the path of seeds from an originator of the variety to a final user.

The next barrier in the implementation of digitalization of selection and seed production of grain crops is a limited ability of the country's selection centers to purchase modern machinery with special equipment. So, if in the USA the share of such equipment is as follows: tractors - 25,9%, combine harvesters -17,9%, these rates do not exceed 2,0 and 1,6 % in the Russian Federation respectively (Nekrasov, 2019).

We have high hopes for improving the mechanism of grain seed market management with the Federal State Information System in the field of seed production of agricultural crops (hereinafter, FSIS Seed Production). As a change in its structure, we proposed a scheme, which is presented in Figure 4.
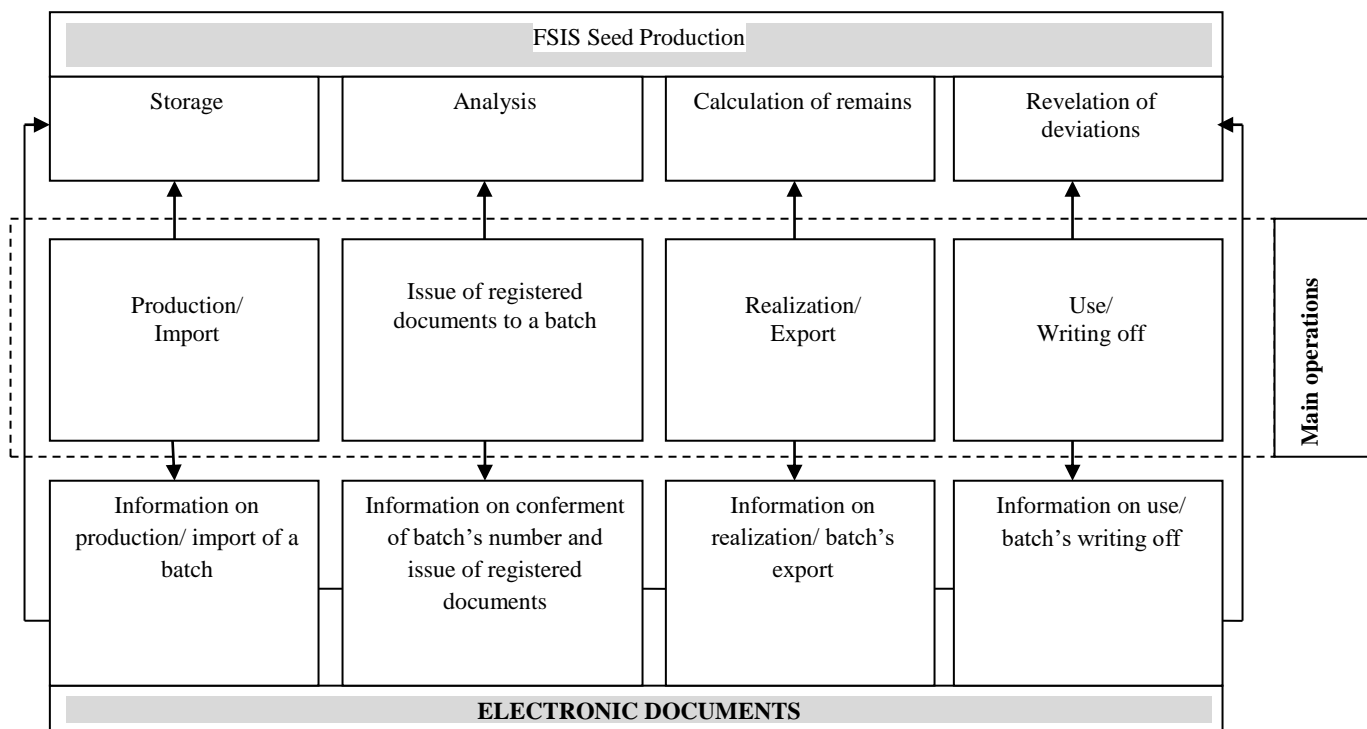
Fig. 4. Proposals for the formation of the Federal State Information System in the field of seed production of agricultural plants
Source: compiled by the authors based on (Nekrasov, 2019)

We have proposed a new organizational mechanism of the federal state information system, which includes an algorithm of management actions in the production, storage and sale of agricultural seeds with a set of relevant documents based on agro-digitization. This approach allows us to take into account the zoning of regions, the classification of agricultural organizations by the level of production and, most importantly, to determine the origin of a particular batch of seeds of any agricultural crop.

Conclusions

To solve the above problems, it is necessary to take the following measures to improve the selection and seed complex of grain production in the Russian Federation:
- creation of fundamentally new varieties and hybrids, increasing the efficiency of crop production in the regions of the country, as well as the application of the principles of agro-economic zoning of varieties and hybrids;
- increase of efficiency of use of domestic selection achievements, including modern biotechnological designs;
- development of scientifically grounded schemes of seed production, modern technologies of production of original, elite and reproduction seeds in practice;
- reduction of import volumes due to production of domestic high-quality varietal seeds;
- technological modernization of the crop industry, improvement of the material and technical base of breeding and seed production. It is necessary to purchase modern equipment for researches, high-quality agricultural machinery for the needs of selection and seed production;
- training of plant breeders and seed growers with mandatory socio-economic conditions for scientific staff, including housing, sufficient wages to attract young talented specialists to work in this sub-sector of agriculture. To do this, it is necessary to work with target universities, to form basic departments together with agricultural

research centers for further passage of practical training of students on the basis of these centers, to train specialists through postgraduate school. It is necessary to train highly qualified specialists for researches in the field of marker selection, protection and physiology of plants and other agricultural areas;
- cooperation with leading foreign scientific centers, as it allows to use unique scientific installations and instrument-methodical base, to master advanced technologies;
- to recognize agricultural research centers as agricultural producers, according to Federal law No. 424-FL from 28.12.2017 (Federal law 2017).

The proposed measures to improve the system of state regulation of selection and seed production of grain crops in the country will contribute to the increase in exports of grain and products of its processing, technical and technological modernization of the sub-sector of crop production.

They will complement the priorities set out in the "Long-term strategy for the development of the grain complex of the Russian Federation until 2035" (Long-term strategy 2019) and the Federal scientific and technical program for the development of agriculture for 2017-2025.

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MULTIPLE SYSTEM OF INNOVATION-INVESTMENT DECISIONS ADOPTION WITH SYNERGETIC APPROACH USAGE

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Abstract. The purpose of the article was to comprehensively study and systematize knowledge about the essence, sources of origin and evaluation of synergistic effect in integration processes of national economy in order to build a conceptual scheme of its receipt in the implementation of integration interaction. The conducted research has shown that, a multi-level system of making innovative investment decisions using a synergistic approach is necessary to identify and build up a positive synergistic effect from the combination and interaction of assets and sources of financing, evaluation of the end results of such interaction, cooperation of labor, integration of industries, production integration. For example, the financing of the banking system of the agrarian sector of the Ukrainian economy was considered. The practical significance of the research is that the scientific developments will enable the formation of an effectively functioning agro-industrial complex in Ukraine with optimal financing based on the use of a multi-level system of making innovative investment decisions using a synergistic approach. Further studies are in the field of studying the system-forming factors and patterns of behavior of economic systems in terms of restoring the synergy potential.

Keywords: synergy; synergistic effect; lending, agriculture; innovation; investment

1. Introduction

The main feature of modern economy development trends is its innovative orientation. As a result of scientific and technological progress, the world has received a strong impetus, which stimulates the replacement of technology and scientific developments in material production. As an example, let's consider agriculture as a

strategically important sector of the country's economy. Among the main factors of economic growth of agricultural production are banking system financing. The necessity and special role of credit, without which the producer cannot exist, are determined by the specifics of its reproduction process. Most agricultural enterprises - potential borrowers - are not attractive creditors because of their low creditworthiness. Such creditworthiness is caused by unsatisfactory financial condition, lack of liquidity and high risks of lending to the enterprises of the industry.

Due to the lack of funds needed for the agro-industrial complex development, insignificant participation in the lending of agricultural commodity producers of universal banks, the priority of development of the agrarian sector should be the formation of an effective lending mechanism that can meet the high demand in the agricultural credit market and overcome the tendency of low credit supply from commercial banks and lack of sources of self-financing for agricultural enterprises. Changes in the economic situation exacerbate the old and cause new problems that need to be solved in a timely search for new ones and improve the traditional credit mechanisms of agriculture.

The main constraints on the credit market development in the agricultural sector today are: long-term decline in bank lending activity, orientation of bank lending activity in non-productive industries, high cost of loans, limitation of long-term credit for 3-5 years, low level of creditworthiness of agricultural holdings due to the high level of operation and moral obsolescence of fixed assets of agricultural enterprises, the limited infrastructure of the credit market.

So, Gai and Kapadia (2019) investigate the solvency and liquidity crises of the financial system. Kanbur (2019) writes that inequality is a matter of the moment. In many rich countries, including the United States, there is a clear upward trend in income inequality. A study by Deloof et al (2019) provides new data on the implications of developing advanced banking systems in the country to fund new businesses. Grishnova, Cherkasov and Brintseva (2019) explored one of the pressing issues of the national economy: how, by what principles, by what system, how workers should be compensated, and how income should be organized in the new economy, in the new job market. Amoro et al (2019) consider two types of entrepreneurship: entrepreneurship based on opportunities linked to innovation; need-based entrepreneurship is starting a business through pressure as a way to compensate for the absence of other sources of employment. Jarkinbayev and Kosherbayeva (2018) argue that in the face of global economic instability, there is a growing need for accurate forecasts of macroeconomic indicators to make informed decisions on the implementation of the socio-economic policies of the state.

Wang & Lee (2011) argue that investors often need to evaluate investment strategies according to their own subjective preferences based on different criteria. Serrano-Cinca & Gutiérrez-Nieto (2013) propose a decision-making model that assesses various aspects related to investment decisions. Winkler (1997) explores how cohabitants make economic decisions. Pauraa and Arhipovaa (2016) examined dairy production, which is of great importance for the European Union and is one of the important sectors of the agricultural economy. Lindholm-Dahlstrand,et al (2018) note that new knowledge is a major source of economic growth. Xiao, (2015) argue that in recent decades, the economic slowdown of major advanced economies in Europe has driven both academic and political concern for entrepreneurship. Collewaert and Fassin (2013) developed proposals for the impact of perceived unethical behavior on the conflict process between investors, venture capitalists and entrepreneurs. Frishammar et al (2019) identify new innovation audit activities and practices; Hallberg and Brattström (2019) have developed a model that outlines the impact of knowledge that shows the value of innovation, the price of products, the comparative value of innovation, and the corresponding moderators of these effects. Cobeña et al (2017) reveal the concepts of partner heterogeneity, the diversity of alliance portfolios, and the complementarity of network resources to gain a deeper understanding of alliance portfolio configuration and how it affects performance. Calvo-Mora et al (2016) study the impact of process methodology and partner management, as well as the relationship between this variable and key business outcomes. Brix-Asala et al (2016) highlight the

opportunities and disadvantages of informal valorisation in return logistical activities, both socially and environmentally. Chulkova et al (2017) study the issues of increasing the investment attractiveness of agriculture, where economic security comes first and actually becomes a topic of food security.

It is advisable to investigate the improvement of the credit system of the borrowers of the agricultural sector of the economy through the prism of neutralization or reduction of the effect of the mentioned number of factors. Today, the practice of conducting domestic agrarian business with the attraction of credit for seasonal needs, modernization and construction of new production facilities has been formed. Most representatives of the agricultural sector of the economy use short and long-term loans and in the current conditions, a significant decrease in lending activity of banks lacks them.

Therefore, the domestic banking system plays an important role in the agriculture regarding the continuity of the reproduction process and the development of entrepreneurial activity; the study and justification of the need for a multi-level system of making innovative investment decisions using a synergistic approach has theoretical and practical importance.

Purpose of article
The research of economic systems' development problems on the basis of synergetic approach substantiated the relevance of the tasks, which are fulfilled in this article:

1. Generalization of the synergistic concept components and identification of the economic systems development features on the basis of the systematic approach and the general theory of systems.

2. Analysis of the current state of the agro-industrial complex financing by banking institutions, submission of proposals for the further effective financing of the agricultural enterprises in the Ukrainian economy based on synergistic effect.

3. Consideration of the innovation-investment process as a source of synergy formation, which creates preconditions for the potential of self-organization and reproduction of the real sector cycles of the economy.

The purpose of the article is to comprehensively study and systematize knowledge about the essence, sources of origin and evaluation of synergistic effect in integration processes to build a conceptual scheme of its receipt during the integration interaction.

2. Theoretical Basis

Aleskerova et al. (2018) argue that the agricultural business needs significant support for the process of resource recovery. The objective necessity of applying a loan for the reproduction of fixed assets is conditioned by the specific nature of the seasonal nature of the agricultural production process. Vasylieva (2018) writes that Ukraine's agriculture occupies a dominant global position in growing cereals and oilseeds. National exporters belong to the TOP-10 markets for wheat, barley, corn, sunflower and soybeans. Loukianova et al. (2017) write that synergies can be obtained from different sources. They identify the main types of synergy - operational and financial. Operating synergy involves improving the operating activities of companies. However, the synergy does not automatically arise after the M&A is concluded. Businesses need to make some efforts (and some costs) to gain synergy. Xu et al. (2012) note that in a knowledge economy, organizational learning is an effective way for an enterprise to acquire, assimilate, assimilate, and apply and produce knowledge. The paper of these scholars presents a multi-level view of the organization of training, which suggests that training in organizations occurs at the individual, team, organizational and inter-organizational levels. Rajchlova et al. (2018) investigate the possible synergistic effect of the essence of accounting problems. Having identified the synergistic effect and the positive synergistic effect, the researchers focused on monitoring the positive synergistic effect of achieving positive changes in financial performance, the so-called "positive financial synergy". Zhylinska et al. (2017) propose an authors' approach to structuring synergistic effects; identify the features of synergistic interaction and identify methodological tools for evaluating the activities of diversified companies as complex integrated open-

type structures, taking into account modern marketing management concepts. Halynska (2017) writes that given the trends of globalization and the growing competition between enterprises, the transformation processes that are currently taking place in the Ukrainian economy lead to the need for cooperation and the creation of various forms of vertical integration structures. Collaborating with one another, firms are increasingly forming alliances that open up huge opportunities for businesses.

The synergy effect is often replaced by the notion of an economic effect, which is a predictable result, and a systematically organized integration process, as opposed to a synergy effect, is predicted. Pokrason (2017) argues that the Ukrainian banking sector is faced with extremely difficult conditions, which are reflected in the national economy, a decrease in capital reserves, and a decline in the quality of lending throughout the market. The analysis of Holovach, Petrovskyi, Adamchuk (2018) showed that most European states support the policy of regulating the financial system as a holistic, indivisible phenomenon, gradually deviating from its perception as a collection of individual segments. The European Union has made a significant impact on this issue, which has introduced the integration of key functions in the regulation of the EU financial system and assigned these functions to a separate group of special bodies.

Zavadska (2018) determines that a special task for the development of the modern economy of Ukraine is to increase the role of banks in shaping the necessary resources for the implementation of innovation policy. Dzhafarova et al. (2018) write that European integration for Ukraine, on the one hand, is a way of modernizing the economy, attracting foreign investment and technology, improving the competitiveness of domestic producers, access to world markets, including the financial services market. On the other hand, it is access to world markets.

The formation of an open economy also means that the economy and financial system of the state must be internally stable, able to withstand the risks that accompany the processes of globalization and European integration. Ivanov et al. (2018) argue that it is impossible to ensure the active development of the economy, to strengthen the democratic foundations of Ukraine and to raise the standard of living of the population without the effective functioning of the credit and financial mechanism, which is a component of the banking system. Rogach et al. (2019) write that the current system of financial support for agriculture in Ukraine is on a vector of formation and adaptation to the conditions of the European Union. The EU's financial support policy for agriculture in the European Union ensures high results in agricultural production, economic and social processes and the promotion of agriculture. Rostetska, Naumkina (2019) develop the theory and practice of cooperation of Central European countries in the context of modern European integration processes, which is important for the development and implementation of foreign and domestic policy strategies in European countries and Ukraine.

Aleskerova et al. (2018) considered features of securing a loan for reproduction of fixed assets in agriculture are to take into account the sectoral specificity and structure of fixed assets and determine the types of loans that can be attracted by agricultural enterprises for the formation of resources. The conducted research shows that lending relations for reproduction of fixed assets are at the initial stage of their development. Pokrason (2017) defined the credit rating criteria for Ukrainian banks: 1) sovereign risk; 2) capital position and asset quality; 3) financing and liquidity; 4) exchange rate. Holovach (2018) have determined that government regulation of the financial system of many European countries is based on the consolidation of coordination and supervisory functions.

One or more clearly-defined bodies carry out national regulation of financial relations in such European countries as Germany, Poland, Sweden, Spain, etc. Zavadska (2018) has identified effective areas of customer interaction with banks, developing fundamentally new banking tools for investing in innovative businesses, which will help to enhance the role of banks in the innovative development of Ukraine. Rogach et al. (2019) point out that the defining feature of European financial support for agriculture is to regard it as one of the factors in the development of the European Union's financial system. In Ukraine, support for the agricultural sector formally and marginally affects the development of the agricultural sector.

Therefore, the expediency of spreading topical forms of bank credit for agrarian structures is conditioned by destabilizing determinants in the domestic economy against the backdrop of world financial events, since it is the agro-industrial complex that addresses the issue of food security. The agro-industrial sector of the economy, considering the seasonality factor and climatic conditions, is considered especially risky from the standpoint of conservative lenders, and especially the financing of its innovation process.

At the same time, the existence of agribusiness in the gap with innovations and advanced transformations in science and technology is impossible and requires close integration into the industry. Such convergence certainly requires proper access to financial resources, which is not always self-financing and requires external borrowing.

Outlined problems of financing the innovation process in agribusiness, riskiness in particular, low investment attractiveness, specific features of the industry require the study of key trends and prerequisites for the implementation of bank lending in the system of financial support of the innovative agribusiness process in order to expand sources of access to financial resources.

3. Methods

During the study, the following methods were used: dialectical (Wang & Lee (2011)), observation (Serrano-Cinca & Gutiérrez-Nieto (2013)), critical thinking and generalization (Grishnova et al (2019); Frishammar et al (2019)) – to determine the role of the banking system in financing the development of agriculture; analysis, synthesis (Pauraa and Arhipovaa (2016)) – to evaluate the potential of the banking system to finance the development of agriculture; economic and statistical method (Lindholm-Dahlstrand, Andersson & Carlsson (2018)) – to study the impact of macroeconomic indicators of the banking system on agriculture value added; formal and logical, systematic approach (Collewaert and Fassin (2013)) – to improve conceptual provisions and develop a conceptual model of agricultural development management using bank financing. The methods of scientific generalization, data averaging and retrospective analysis methods of financing sources of agribusiness innovations of Ukraine were also used in the article.

The theoretical and methodological basis of the research is the scientific works of representatives of different schools and areas of economic theory, modern scientific developments of domestic and foreign scientists, devoted to the issues of synergy, synergetic effect and their manifestation and measurement in integration processes.

The methodological basis of the study was the systematic and integrated approaches to the study of the synergistic effect in integration processes (see Figure 1).

Agricultural development as an indicator of global economic development

Formation of methodological bases of economic development strategy of Ukrainian agriculture

Criteria, causes and stages of economic development strategy formation of agriculture in the system of national economy

Global indicators of agricultural development

National indicators of agricultural development

The concept of economic development of agriculture as a development dominant of the national economy

State regulation of the formation and implementation of the agricultural development strategy as a component of the socially oriented national economy

The modern paradigm of agricultural development

Strategy for economic development of agriculture

Multilevel system of making innovative investment decisions using a synergistic approach

Motives:
- competitiveness
- innovative processes

Landmarks:
- Global
- Industrial
- Regional
- Local

Institutional determinants of agricultural economic development strategy formation

Financing of agricultural development

Economic development of agricultural enterprises

Fig. 1. The logic of the study

Together with the interdisciplinary nature of the synergistic approach, its transdisciplinarity is important. It reveals itself in such synergistic features as operation "through", disciplinary boundaries in the study of the subject, as going "beyond" specific disciplines. The transdisciplinary features of the synergistic approach are manifested in the ability to transfer cognitive schemas from one subject area to another with the emergence of shared spaces of existence. The transdisciplinary nature of synergetics creates an anthropic space for the dialogical communication of subjects. From this point of view, synergetics reveals the researcher's territory of subjectivity.

The key provisions of the synergistic methodology are as follows:

- complex systems cannot impose development paths, but need to promote their own development trends (Anning-Dorson, Nyamekye & Odoom 2017);
- chaos can be a constructive source, from which a new organization of the system may be born (Holovach, Petrovskyi and Adamchuk 2018);
- at certain moments of instability, small perturbations can have macro-consequences and develop into macrostructures, in particular, the actions of one particular personality can affect macro-social processes (Vasylieva 2018.; Paptsov, Nechaev and Mikhailushkin 2019);
- for complex systems there are several alternative ways of development, but at certain stages of evolution a certain pre-determination of the deployment of processes manifests itself, and the present state of the system is determined not only by its past but also by its future (Loukianova, Nikulin and Vedernikov (2017));
- a complexly organized system involves not only simpler structures and is not an ordinary sum of parts, but generates structures of all ages in a single world (Halynska (2017));
- taking into account the regularities and conditions of the rapid, avalanche-like processes and processes of nonlinear self-development of systems, it is possible to initiate these processes through human administrative actions (Laila and Widihadnanto 2017).

4. Results

According to the analysis of the Global Innovation Index (GII), which takes into account about 80 criteria and allows annual monitoring of innovative activity of countries, the rating of innovative activity of Ukraine in the world is also gradually increasing (Fig. 2).
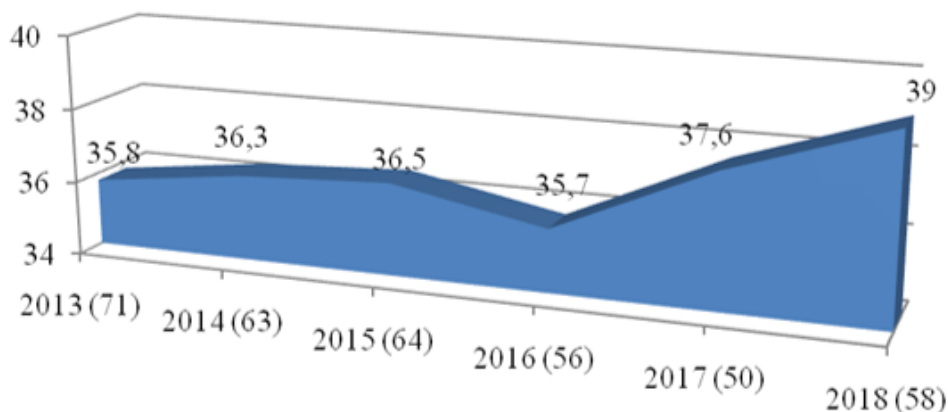
Year (place in the ranking)	2013 (71)	2014 (63)	2015 (64)	2016 (56)	2017 (50)	2018 (58)
Overall index	35,8	36,3	36,5	35,7	37,6	39,0

Fig. 2. Dynamics of the Global Innovation Index and Ukraine place in the World Ranking for the period 2013-2018
Source: compiled by authors based on World Bank, World Economic Forum data

For a more detailed explanation of the topic of the study, it was considered the dynamics of banking lending to the agrosphere. Financing of the innovation process of the agro-industrial complex of Ukraine is carried out exclusively at the expense of the own financial resources of the enterprises (Table 1).

Table 1. Dynamics and structure of financing sources of agribusiness innovations, 2010-2018.

Years		Total	Including the expense of funds		
			own funds	state budget funds	credits
2010	thousand UAH	64 917,8	64 407,8	-	510
	in a percentage of the total	100	99,2	-	0,8
2011	thousand UAH	85 140,2	85 140, 2	-	-
	in a percentage of the total	100	100	-	-
2012	thousand UAH	75 878,4	70 726,3	2828,1	2324
	in a percentage of the total	100	93,2	3,7	3,1
2013	thousand UAH	72 241,9	72 017,9	-	224
	in a percentage of the total	100	99,7	-	0,3
2014	thousand UAH	67 225,9	67 225,9	-	-
	in a percentage of the total	100	100	-	-
2015	thousand UAH	85 533,9	85 533,9	-	-
	in a percentage of the total	100	100	-	-
2016	thousand UAH	92 742,6	92 742,6	-	-
	in a percentage of the total	100	100	-	-
2017	thousand UAH	103 712,5	103 712,5	-	-
	in a percentage of the total	100	100	-	-
2018	thousand UAH	112 776,5	112 776,5	-	-
	in a percentage of the total	100	100	-	-

Source: based on data from the Ministry of Agrarian Policy and Food of Ukraine

The state budget is (3.7% in 2012) and lending is (0.8% - in 2010, 3.1% - in 2012, 0.3% - in 2013). Such a structure of financial support hinders the innovative activity of the industry, since its own funds are directed mainly to the modernization of existing equipment, not to the creation of new ones.

It was considered the potential of the banking system to finance the development of agriculture. The study of innovative economic processes and the identification of reserves for the effective use of financial instruments, the increase in production of goods, works and services occur after the implementation of the cycle of financial resources. They provide an opportunity to improve the work in the future, but do not affect the mistakes, miscalculations and all kinds of illegal actions that took place in the analyzed period. While exercising the control function is not so much about detecting deviations from a given state of an object, it is about preventing them from occurring.

Assessing the feasibility of using a financial instrument at the stage of innovation in agriculture prevents those processes that are contrary to the requirements of regulatory documents or do not agree with the purpose of innovation. Accordingly, control is a means of preventively regulating innovation in agriculture, which causes positive or unwanted changes in management. However, these management functions, with the skillful use of their interpenetration, reveal a real picture of the managed system. It follows that, knowing the content of managing the bank financing of the national economy, it is possible to effectively manage the development of innovative agriculture. In fig. 3 it is developed a conceptual model for making innovative investment decisions in different sectors of the national economy using a synergistic approach.

Fig. 3. Conceptual model of making innovative investment decisions in different sectors of the national economy using a synergistic approach
Source: developed by authors

In Table 2 the financial sustainability indicators of the Ukrainian banking system are analyzed.

Table 2. Indicators of financial stability of the banking system of Ukraine, mln. UAH

Indicator	2013	2014	2015	2016	2017	2018	The ratio of 2018 to 2013
The ratio of regulatory capital to risk-weighted assets	18,26	15,60	12,31	12,69	16,10	16,18	88,61
The ratio of non-performing loans to total gross loans	12,89	18,98	28,03	30,47	54,54	52,85	410,01
Share in total gross loans: Residents	98,72	96,05	94,54	95,92	94,21	93,47	94,68
Share in total gross loans: Non-residents	1,28	3,95	5,46	4,08	5,79	6,53	510,16
The rate of return on assets	0,26	-4,24	-5,54	-12,47	-1,76	1,60	615,38
The rate of return on capital	1,72	-31,95	-65,5	-122,1	-15,34	14,61	849,42
The ratio of interest margin to gross income	58,56	48,46	39,00	45,94	50,20	52,02	88,83
The ratio of liquid assets to total assets	20,63	26,40	33,00	48,53	53,94	51,14	247,89

Source: compiled by the National Bank of Ukraine

In Fig. 4 the dynamics of agriculture, value added (% of GDP) and employment in agriculture (% of total employment) are analyzed.
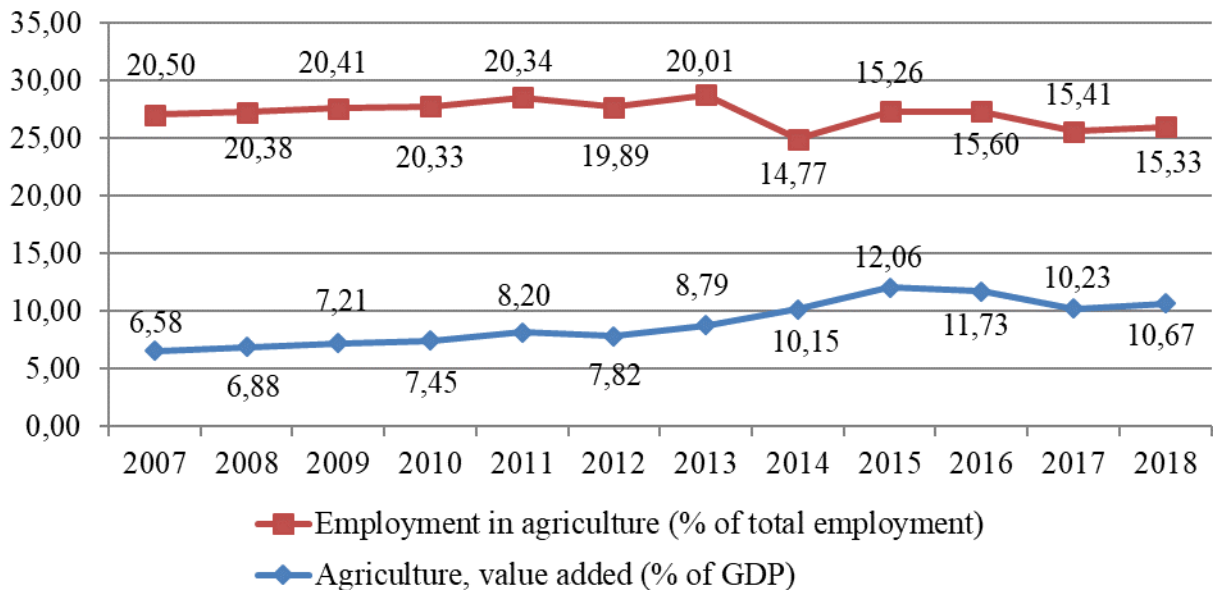
Fig. 4. Dynamics of agriculture, value added (% of GDP) and employment in agriculture (% of total employment)
Source: compiled by the National Bank of Ukraine

For more detailed disclosure of the research topic, the multiple regression model was applied. Most economic factors are often influenced by more than one factor. Thus, agriculture value added (% of GDP) is determined not only by the volume of credit support of the agro-industrial complex of Ukraine by the banking system, but also by the number of operating structural units of banks, employment in agriculture and many other factors. The data for the analysis are taken for 2013-2018. For research it was applied the multiple regression method.

$$\hat{y} = f(x_1, x_2, ..., x_p) \qquad (1)$$

Multiple regression is widely used in macroeconomic calculations. The main goal of multiple regression is to create a model with a large number of factors, as well as to determine the influence of each factor separately and their combined effect on the modeled indicator. It was used the linear model of multiple regression for research:

$$y = \alpha' + \beta_1' x_1 + \beta_2' x_2 + ... + \beta_p' x_p + \varepsilon \qquad (2)$$

After the calculations, the function *y* agriculture value added (% of GDP) is characterized by equation:

$$y = 38 + 0,09 x_1 + 0,11 x_2 + 0,06 x_3 + \varepsilon$$

where the factors are:
x1 - the volume of credit support of the agro-industrial complex of Ukraine by the banking system (million UAH.),
x2 - number of operating structural units of banks (thousand units),
x3 - employment in agriculture (%).

It is understandable that with the constant number of operating structural units of banks and employment in agriculture, the growth of the volume of credit support of the agro-industrial complex of Ukraine by the banking system by 1 million UAH entails an increase in agricultural value added by an average of 0.09%. The increase in the number of operating structural units of banks with constant volumes of credit support of the agro-industrial complex of Ukraine and employment in agriculture, leads to an increase in agricultural value added on average by

0.11%. With unchanged volumes of credit support of the agro-industrial complex of Ukraine and the number of operating structural units of banks, the growth of employment in agriculture leads to an increase in agricultural value added by an average of 0.06%. However, this does not mean that the agricultural value added is more influenced by the first factor than the second and the third. Using the regression equation on a standardized scale, it is possible to make the following comparison. The standardized regression equation looks like this:

$$\hat{t}_y = 0{,}8t_{x_1} + 0{,}3t_{x_2} + 0{,}5t_{x3}$$

This means that with the growth of the first factor by one unit, with a constant number of operating structural branches of banks, employment in agriculture and agricultural value added increase by an average of 0.8%. Since $\beta_1 > \beta_2 > \beta_3$ (0,8>0,3>0,5), it can be concluded that the first factor has a greater influence on the agricultural value added rather than the second factor, as it seems from the full-scale regression equation.

In Fig. 5 the sources and effects of synergy in a multilevel system of making innovative investment decisions using a synergistic approach are considered.
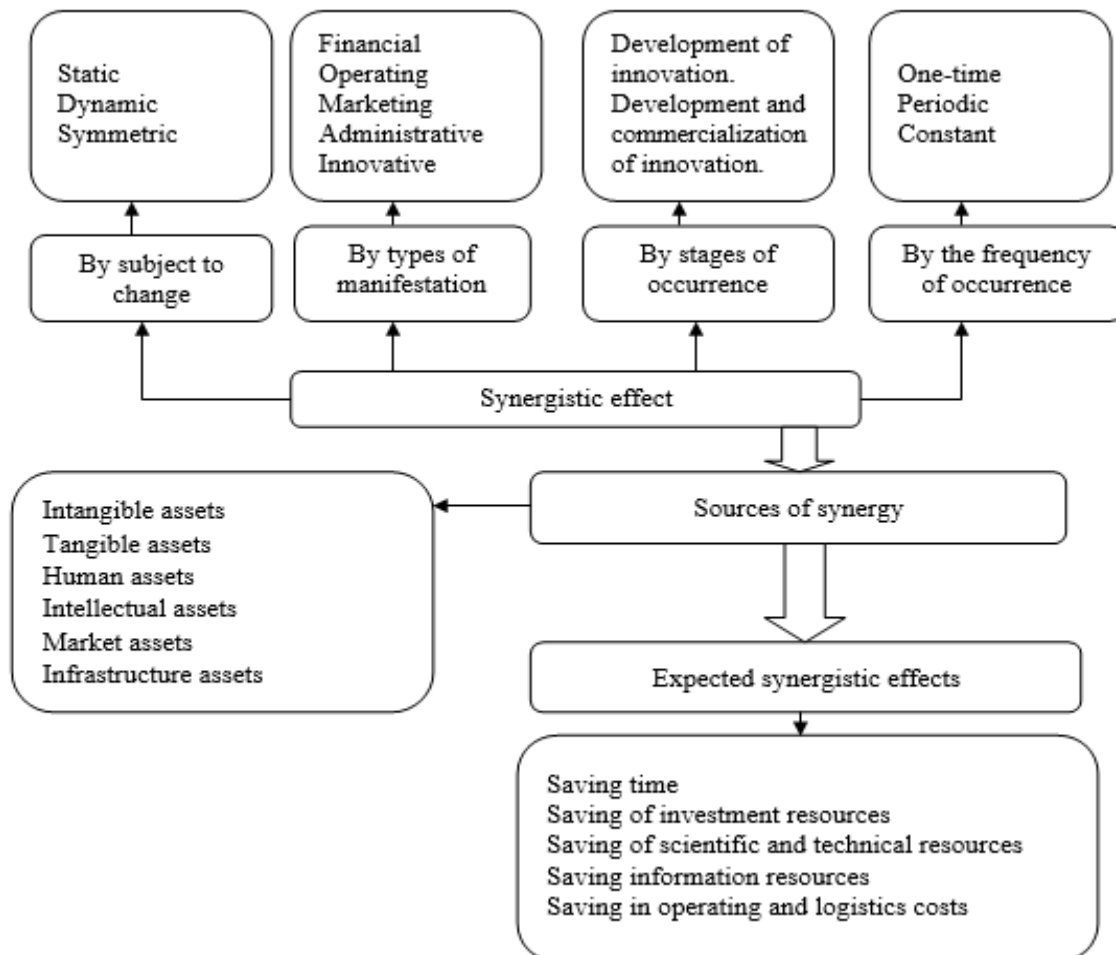
Fig. 5. Sources and effects of synergy in a multilevel innovative investment decision making system using a synergistic approach
Source: own development

Direct proportional dependence causes consideration of the basic processes and their changes on the basis of systems of differential linear equations, the solution of which is based on the use of mathematical analysis apparatus and is obtained depending on the initial conditions in real and complex values.

A multilevel system of making innovative investment decisions using a synergistic approach is used to identify the forms of dependencies that cause this or that trend, since the decisions can be many.

The existence of multi-directional links over time can lead to the aggregation into new forms (cooperation, integration, coalition) and the formation of links with more potential.

From the point of view of the synergistic approach, economic systems are represented as a set of many subsystems, characterized by incompleteness of information and the following features: nonlinearity (loss of the property of additivity in the process of development); instability (loss of equilibrium states in the process of evolution); openness (exchange of resources from the outside); subordination (functioning and development are determined by processes in subsystems).

The following synergistic effects are distinguished: the effect of introducing (accessing) new products and markets and the effect of further compatible strategic steps of the partners.

In Fig. 6 the advantages and contradictions of making innovative investment decisions using a synergistic approach are considered.
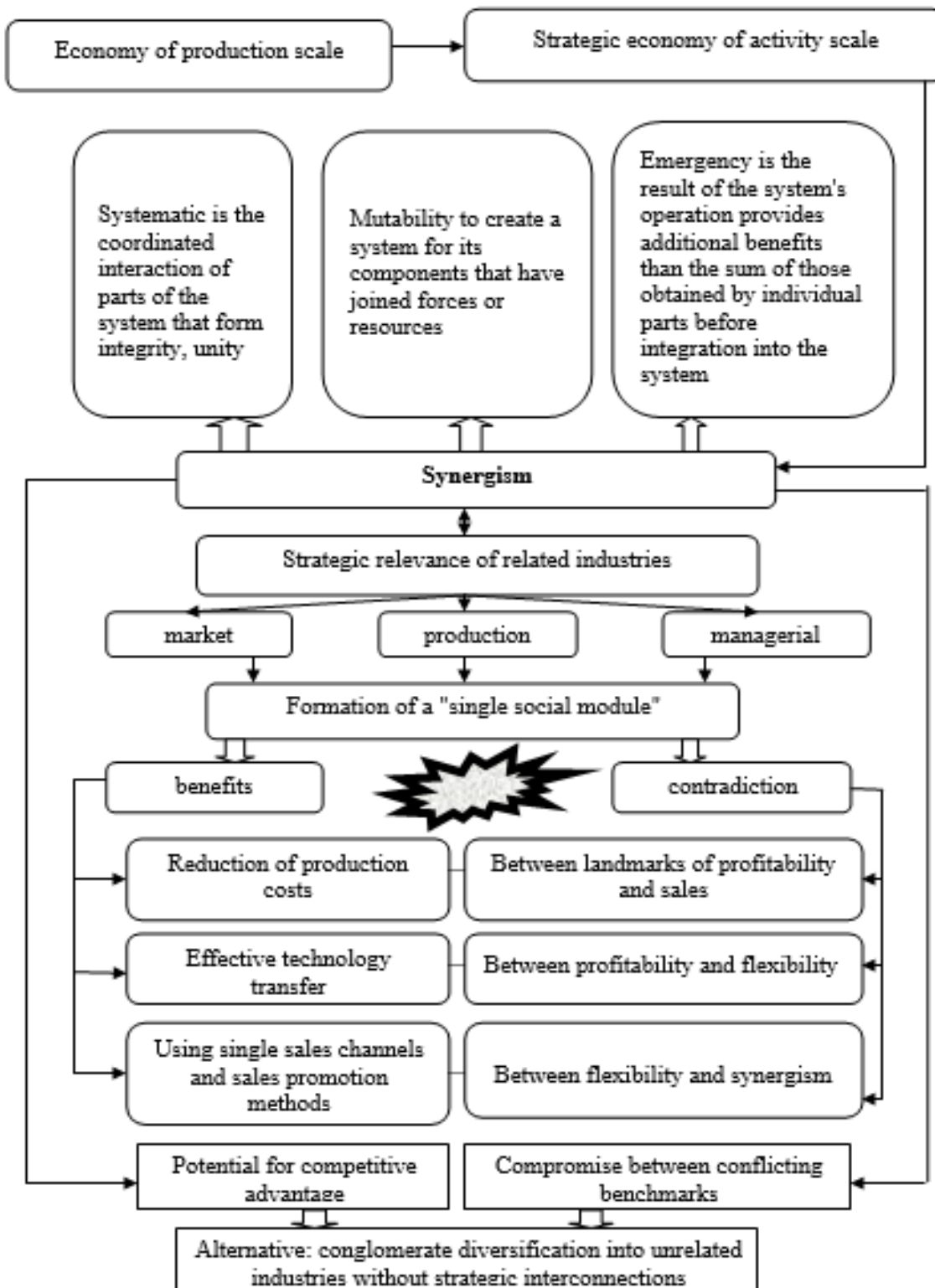
Fig. 6. Advantages and contradictions of making innovative investment decisions using a synergistic approach
Source: own design

Thus, the potential for the development of economic systems lies in the possibility of their self-organization, the realization of which occurs in cases of inertia of motion. The use of a multi-level system of making innovative investment decisions using a synergistic approach generates a synergistic potential, capable of finding many possible solutions for the trajectory of sustainable development (see Table 3).

Table 3. An explanatory table illustrating the achievement of the study goals

Goal	Previous researches	The obtained results	Future researches
Generalization of synergetic concept components and revealing of peculiarities of economic systems development on the basis of system approach and general systems theory.	Kanbur (2019); Gai and Kapadia (2019) argue that the most real world crises are located between extreme indicators of pure illiquidity and net insolvency, and instruments of the solvency and liquidity crisis need to be carefully weighed in the development of anti-crisis policy.	The synergistic concept contributes to the knowledge of such complex, non-linear, open systems as the global economy, society, people and their activities. When applying the ideas of synergetics in agricultural financing, one limitation should be taken into account: the theory of financing is not a theory of development, because the main question remains - the sources of financing.	What are the different roles of the synergistic concept in transformational change?
Analysis of the current state of financing of the agro-industrial complex by the banking institutions, submission of proposals for further effective financing of enterprises of the agricultural sector of the Ukrainian economy based on synergistic effect.	Jarkinbayev and Kosherbayeva (2018) write that the accuracy and consistency of macroeconomic projections are of particular importance to developing countries, which are significantly influenced by external factors and macroeconomic shocks.	According to the theory of synergetics, no open system can impose a mode of behavior or development, but one can choose and stimulate one of the conditions laid down in specific conditions, counting not so much on a managerial, but on a synergetic, self-managed process.	Assessment of other factors is a topic for future research.
Consideration of the innovation-investment process as a source of synergy formation, which creates preconditions for the potential of self-organization and reproduction of cycles of the real sector of the economy.	Amoro et al (2019) argue that if developing countries do not make the promotion of productive entrepreneurship a major concern in their political agendas, they will only diminish efforts without achieving higher results.	Innovation and investment processes are based on the laws and patterns of self-organization and self-development of economic systems. They give an opportunity to take a new approach to the development of problems of agricultural development, considering them primarily from the point of view of openness, co-creation and orientation to development.	How is the innovation and investment process changing in different technological sectors over a long period of time?
Comprehensive research and systematization of knowledge about the essence, sources of origin and evaluation of synergistic effect in integration processes to build a conceptual scheme of its receipt in the implementation of integration interaction.	Deloof, La Rocca and Vanacker (2019) have considered the idea that factors at the country or local level can influence the discretion of entrepreneurs. Researchers have illustrated that developing a local banking business can both facilitate and limit the ability of entrepreneurs to raise finance for their businesses.	Synergetics theory focuses on disequilibrium, instability as a natural state of open nonlinear systems, on the multiplicity and uncertainty of the paths of their development, depending on the factors and conditions that affect it.	Is the role of synergies different in different sectors and at different times?

5. Discussion

We are expanding the research of scholars such as Gai and Kapadia (2019) who find that liquidity crises affect solvency prospects; and the expected recovery ratios of the creditors, in turn, will affect the short-term prospect of a liquidity decision. We, for more detailed disclosure of the research topic, study the dynamics of development of banking lending to the agrosphere and financing the innovation process of the agro-industrial complex of Ukraine. This allows us to capture the interaction between the specific features of the country and the possibilities of financing agriculture. So, Kanbur (2019) notes that the analysis of unevenness in the country is important for establishing the basic facts of unevenness in a world where countries are increasingly linked by trade and investment and where, the global economy requires an assessment of global inequality rather than national inequality in isolation. We contribute to our existing research activities by analyzing the Global Innovation Index (GII), which takes into account about 80 criteria and allows us to track the innovative activity of countries and the rating of innovative activity of Ukraine in particular on a yearly basis.

Deloof, La Rocca and Vanacker (2019) provide new theoretical and empirical insights into how heterogeneity in the local banking market affects funding. And in our study, we continue and expand on this topic by considering the potential of the banking system to finance the development of agribusiness.

In their work, Grishnova, Cherkasov and Brintseva (2019) have obtained empirical results that confirm theoretical hypotheses about the dynamic changes in the social sphere and employment and society in general; and the world at large, the public administration of each individual country and every real or potential employee, in particular, must prepare thoroughly for this. And as we deepen the proposed topic, we study the impact on agriculture of value added (% of GDP) of the volume of credit support of the agro-industrial complex of Ukraine by the banking system, the number of operating structural units of banks, employment in agriculture. Amoro, Ciravegna, Mandakovic, and Stenholm (2019) argue that developing countries should rationally organize their functions, improve governance and eliminate barriers that impede productive business activity rather than focus only on reducing unemployment. Our research shows that with constant volumes of credit support of the agro-industrial complex of Ukraine and the number of operating structural units of banks, growth in employment in agriculture leads to an increase in agricultural value added by an average of 0.06%.

Jarkinbayev and Kosherbayeva (2018) argue that monetary forecasting errors during the review have increased and a possible reason for this is the lack of coordination between the Ministry of National Economy, Ministry of Finance and the National Bank in the preparation of macroeconomic forecasts. And in our study, in turn, the conceptual model of making innovation-investment decisions in different branches of the national economy using a synergistic approach is proposed.

The analysis and research of the tendencies characterizing the state of credit of the agro-industrial complex in Ukraine made it possible to conclude that bank loans are not able to fully meet the needs of agricultural enterprises for credit resources; regulation of credit provision for agricultural enterprises is ineffective and government support is inadequate; unsatisfactory volumes of credit inflows into the agricultural sector due to harsh conditions and high interest rates.

The study also found that globalization and concentration of production are now taking place in all sectors of the economy. They qualitatively and quantitatively affect both the individual enterprise and the economy of the state as a whole. The solution to these problems is complicated by the fact that the functioning of the Ukrainian economy is characterized by a number of fundamental contradictions.

Methodological and methodological limitations of the study are that when assessing economic cyclicality, its synergistic nature is taken into account, which has a significant impact on the features of cyclical dynamics in real

economic systems. The nonlinearity and complexity that characterize the economic system, as well as the presence of a large number of feedbacks, determine the synergistic nature of many economic phenomena and lead to numerous synergistic effects that change the qualitative side of the functioning of the national economy. Understanding the nature and features of the manifestation of synergistic effects allows you to organize the management of the economy at a new level, based on the ideas of discretion and stability of trajectories of economic development. The presence of synergistic effects in the economy requires new approaches to forecasting, planning, and regulation at different levels - from the economy of an individual firm to the economy of the whole country.

Prospects for further research are to study non-linear processes of formation and development of institutional systems, to find ways to form and actualize their market potential.

Conclusion

The conducted research has shown that, a multi-level system of making innovative investment decisions using a synergistic approach is necessary to identify and build up a positive synergistic effect from the combination and interaction of assets and sources of financing, evaluation of the end results of such interaction, cooperation of labor, integration of industries, production integration.

For example, the banking system financing of the agrarian sector of the economy in Ukraine was considered. The research showed that with the constant number of operating structural branches of banks and employment in agriculture, the growth of the credit support volume of the agro-industrial complex of Ukraine by the banking system by 1 million UAH entails an increase in agricultural value added by an average of 0.09%. The increase in the number of operating structural branches of banks with constant volumes of credit support of the agro-industrial complex of Ukraine and employment in agriculture, leads to an increase in agricultural value added on average by 0.11%. With unchanged volumes of credit support of the agro-industrial complex of Ukraine and the number of operating structural branches of banks, the growth of employment in agriculture leads to an increase in agricultural value added by an average of 0.06%. It is proved that the factor of the volume of credit provision of the agro-industrial complex in Ukraine has the largest influence on agricultural value added by banking system among other investigated factors.

The practical significance of the conducted research is that the scientific developments will allow forming in Ukraine an effectively functioning agro-industrial complex with optimal financing on the basis of the use of a multi-level system of making innovative investment decisions using a synergistic approach.

Further researches are in the field of studying of system-forming factors and regularities of behavior of economic systems in the conditions of synergy potential restoration.

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THE IMPORTANCE OF INNOVATIVE TOOLS APPLICATION IN THE DEVELOPMENT OF STATE TAX AUDIT

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Abstract. The aim of the study is to develop theoretical and methodological approaches, implementation mechanism and scientific and practical recommendations for improving the state tax audit and tax administration in the conditions of innovative development. The main results are obtained and accurately reasoned using the methods of theoretical research, comparative analysis, statistical and econometric methods, methods of induction and deduction, tabular and graphical methods. The authors identify the interaction model between tax and innovation systems at the international level. In addition, during the study the evaluation methodology of the governmental tax audit effectiveness were developed and tested, using the example of the Republic of Kazakhstan. The main directions of innovation development of the state tax audit and analysis of the scenario of the consequences of implementation are determined. The scientific novelty of this study is to develop assessment methodology of the state tax audit efficiency and identify approaches to improvement based on innovative tools. The study results are valuable from the point of view of subsequent developments in the space of state financial control.

Keywords: state tax audit; efficiency; integral coefficient; scenario analysis; innovative development

1. Introduction

Information technology and improvement of material and technical equipment and tax official qualification are important in innovative development of the economy.

A key factor in improvement of the tax administration efficiency is high degree of informational interaction between the taxpayer and tax services under modern conditions. This interaction is required to carry out in electronic form with application of modern telecommunication. Increasing of the tax system efficiency by the implementation of new informational technologies, equipping of technological processes with modern systems

and operational management tools will lead to an improvement in the entire taxpayer accounting system in countries with developing economies.

The study aim is formulation theoretical and methodological approaches, implementation mechanism and scientific and practical recommendations for the state tax audit and tax administration improvement in the condition of innovative development. In accordance with the goal, the following tasks are defined:

- research of modern scientific approaches of innovations in the tax administration system;
- identification the link between the tax burden and innovation development across countries;
- determination of the state tax audit efficiency applying a comprehensive assessment method in Kazakhstan context;
- analyze and substantiate the prospects of innovation in state tax audit system.

The main results are obtained and accurately reasoned using the methods of theoretical research, comparative analysis, statistical and econometric methods, induction and deduction, tabular and graphical methods.

The impact of innovative development on the tax burden at the international level is studied at the first stage of the research. The evaluation of the state tax audit effectiveness based on the integral coefficients method for the example of Kazakhstan is realized on the second stage. The main prospects of the state tax audit in the context of innovative development are presented in the third part of the study.

2. Methodology and/or theoretical framework

At the first stage of the study, the link between the level of innovation and the tax burden,using the graphical method of correlation analysis is investigated.

In order to use the graphical method of correlation analysis it is necessary to convert the results and display them on the percentage scale.In this method, a two-factor analysis was performed, in which the results of one factor are reflected on the abscissa scale, and the other on the ordinate scale.

After performing horizontal and vertical analysis along the selected levels, the matrix of graphical correlation analysis was obtained. The quadrants along the diagonal represented in this matrix at on the right above and on the left below, refer to a high level of direct correlation. The other two quadrants are diagonally related to the low level of correlation.The tax burden data of the studied countries are selected according to the World Bank database. Summary data for the analysis are presented in Appendix A (Table A1).

The data of the Global Innovation Index for 2017 is used for research. The correlation plot is designed depending on the resulting variable Y (the level of tax burden, % to GDP) from the argumentative X (Global innovation index). Then the median indicators of X and Y are determined which allow to identify the quadrants of the correlation plot characterizing the structure of the functional dependence.

At the next research phase the methodology for evaluation of the state tax audit efficiency was developed with integral indicator. Tax audit is considered as an effective mechanism to achieve certain goals. Achievement this goal requires elements of effective tax audit. In accordance to it, the model of tax audit efficiency consisting of the following stages is proposed:

1. Evaluation of the tax revenues planning and forecasting effectiveness;
2. Analysis of the tax revenues accounting and control;
3. Assessment of compliance tax regulation with tax legislation;
4. Monitoring the implementation of audit recommendations.

The proposed parameters represent only a part of the indicators characterizing the effectiveness of the state tax audit, and there is a possibility to supplement other statistical information for extended analysis.

The actual indicators of the governmental tax audit efficiency are calculated with the statistical data of the State Treasury of the Ministry of Finance and Accounts Committee for control over execution of the republican budget of the Republic of Kazakhstan for 2015-2017. Normative values of indicators are determined in accordance with the data of the Committee of statistics of the Republic of Kazakhstan and the decision of professional auditors. Therefore, the actual values to the normative indicators are determined by the following formula:

$$I_{tj} = \frac{x^f_{tj}}{x^n_{tj}} \tag{1}$$

where I_{tj} – the index of the level of compliance with normative indicators, in shares;

x^f_{tj} – actual value of specific coefficients of the corresponding period;

x^n_{tj} – normative of specific coefficients of the corresponding period.

The total integral indicator consists of the sum of the values of each indicator in points. In order to calculate the integral indicator of the efficiency of the state tax audit the following type of additive function was applied:

$$Y_t = \sum_{j=1}^n b_{tj} \tag{2}$$

where Y_t –integral indicator of the corresponding period;

b_{tj} – the value of the specific coefficients of the corresponding year in points.

At the final stage of scenario analysis, the amount of tax revenues is calculated upon the occurrence of each of the scenarios of the state tax audit according to the formula:

$$T^i_t = T_{t-1} * \left((1+g) * p^i_u + 1 * p^i_s + (1-g) * p^i_d \right), \tag{3}$$

where T – amount of tax revenue, billion tenge;
i – appropriate scenario of tax audit development;
t – corresponding forecast period;
g- the rate of short-term increase in tax revenues, %;
p^i_u – probability of economic recovery with the occurrence of the corresponding scenario, %;
p^i_s – probability of economic stagnation in the appropriate scenario, %;
p^i_d – probability of economic growth in the occasion of a corresponding scenario, %.

3. Literature review

The improvement of the tax system occurs in the context of the acceptance of the state audit institute into the financial control system that imposes requirements to optimize the activities of public authorities, developing state standards and the formation of the effective functioning within the innovative development framework. Moreover, the governmental tax system is responsible for provide completeness and timeliness of tax revenues in the business activity growth and economic liberty condition.
State tax audit is one of the key directions of improvement of the state audit and tax control quality. Furthermore state tax audit is aimed to determine the tax administration efficiency and subsequent monitoring of the audit recommendations implementation.

In addition, the main directions of innovative activity in the sphere of state control and management are revealed in the analysis of scientific research.

In many countries, attempts to modernize public administration are focused on higher efficiency of internal public operations, interaction with citizens by providing information and public services available in electronic form (Bekkers, 2017; Foley and Alfonso, 2018).

According to the studied research, transformation in the public sector is the complex process, characterized by changes in political and legislative sphere rather than market shifts (Rusaw, 2017).

Dutton and Eynon (2016) argued that innovations perform an important part in the governmental modernization and transformation, requiring the launch of information services and new types of interaction between public sector entities and taxpayers.

The analysis carried out by Feller, Finnegan and Nilsson (2018) identified four types of innovations for the government transformation: aggregation, syndication, consumption, and partnership. Moreover, that the studied innovations have the impact on the regional budgets revenues by increasing revenues as a result of regional co-branding and expanding the small and medium business sector.

Damanpour and Schneider (2018) consider that innovation contribute to increase of public services quality and public organizations capacity in order to solve social problems by formation of regulated governance system. Such reforms are accompanied by the implementation and development of new government, e-government, and more recently discussions about the transition from government to the 'Big Society'.

According to Potts and Kastelle (2010), the public sector is required the economic principles of efficiency, that directed to the reduced costs and budget revenues growth. Furthermore, the application of innovation in the public sector contributes to the efficiency of public and market systems. In addition, the following conditions may lead to the necessity for innovation: economic growth, inefficient management structure, lack of competition in the public sector, the occurrence of dysfunctional governmental regulators in respect of the private innovation sector, changing forms of public-private partnership.

Dunleavy, Patrick and Margetts (2010) emphasize that the new technologies emergence is accompanied by the entry into the new Digital Era Governance (DEG). DEG is characterized by the social relationships reorganization, the priority of that in the interests of citizens. The change of the digital age is bound to affect to the government. Advanced industrial societies are being led towards online civilization by the formation of social networks, cloud technology and application development. Therefore, DEG operates as the channel of interaction between citizens and governments.

According Pollitt Ch. (2009), the public sector could be improved by importing business concepts and methods with the focus on effectiveness of results, replacement of hierarchical links by contractual and widespread implementations of market mechanisms.

Fishenden and Thompson (2012) identifies three areas of innovation in the public sector: reintegration, holism and digitization. Backward integration, as opposed to integrated management, includes outsourcing and simplified service of delivery chains. The next direction of holism is the reorganization of services, includes the "unified" services system, supported by data storage, simplification and integration of processes, and the audit of citizens and services evaluation based on social networks. For its part, digitization includes the strategy of " 100% online channels", in that services are provided by automatic processes, open information data, public "cloud web services", open book (the maximum possible openness in providing information about the formation of state revenues and expenditures), exchange of services.
As part of the analysis, the review of the Eurasian economic Union countries researches in the area of the public sector innovation was conducted.

In according to Islamutdinov V.F. (2018), Lobanov V.V. (2017), Mishustin M.B. (2014) viewpoints, the certain algorithm of modernization of the public administration system exists in international practice, while in the post-socialist countries at the first stage, the focus is on regulatory legal acts and legislation. Subsequently, there is a transition to the creation of stable functioning institutions and organizations in the public administration system. Consequently, the following activity is aimed to the efficiency improvement of the whole system based on the analysis of current problems and development of "ideal" model of public service. Furthermore, apply of modern information technologies contributes to the tax service transition to a qualitatively new level of tax administration. The key effects are high resistance to economic shocks, and maintaining stable incomes of all budget levels as well as increasing transparency through remote interaction of taxpayers and tax authorities.

Thus, the analysis of various approaches to the state tax audit innovative tools development showed that there are significant differences between advanced and emerging markets. Moreover, most scientists in developed countries assume that the stability of the innovation system depends on market instruments due to the business sphere that initiates the development and implementation of innovations. On the other hand, the approach of economists in developing countries is R&D support and funding stimulates the innovation environment by government in order to develop of entire economic system. This distinction is due to the specification of public administration and political structure of these countries.

3.1 Innovations as the factor of the state tax audit development: international scope

As part of the analysis, the dependence of tax revenue collection on the level of innovation activity in Kazakhstan, OECD (The Organization for Economic Co-operation and Development) countries and neighboring countries is considered. According to the «Global innovation index» report, Switzerland, Sweden and the Netherlands are the leading innovation countries in 2017. Kazakhstan is on the 78th place in the ranking. (Figure 1).

Developed European countries and developed OECD countries represent the first quadrant: Canada, Israel and New Zealand. In this area of the correlation is the direct link that the high degree of innovation corresponds to the high degree of tax burden. This circumstance is explained by the high participation of the state in the creation of conditions for innovative activity in order to expand the tax base. The state accumulates tax revenues in order to direct them to innovative industries launches, thereby increasing the level of the national gross domestic product. Consequently, the innovative activities of these countries are supported through public tax administration, redistributing high tax revenues in support of high-tech business initiatives.

The second quadrant is represented by countries with developed innovation economies, such as Switzerland, USA, Germany, Ireland, South Korea, Singapore, Japan, Hong Kong, China and Australia. In this sector, the inverse dependence is revealed by the high level of innovation with the low tax burden. The state, reducing tax rates, increases the net profit of companies, thereby stimulating innovative activity in conditions of high market competition. The distinctive feature of this system is decentralized structure of innovation regulation. The government creates favorable conditions for economic activity, and business, in its turn, generates innovative projects. For instance, experience of China in the area of tax incentives for innovative development is remarkable in due to the state provides tax breaks for companies that use its own financial resources to invest in innovative technologies, and offers preferential tax status for high-tech mini-and micro-enterprises.

The third block includes countries with developing markets, such as Latvia, Lithuania, Turkey, Chile, Armenia, Mexico, India, Kazakhstan, Azerbaijan, Kyrgyzstan. This quadrant is characterized by a direct relationship: the low level of innovation and, as a result is the low tax burden. The market potential of these economies impedes to the innovational development in order to expand the tax base. High dependence on natural resources and weak

innovation support lead to low levels of tax collection. According to the report «The global innovation index», these countries are able to achieve significant tax effect with the active support of innovation or the creation of competitive business environment. It is important to note, that Kazakhstan and the Eurasian Economic Union (EAEU) member countries are represented in this group. As the results, this reflects to the common economic and innovative development within the framework of the integration processes of the Union.
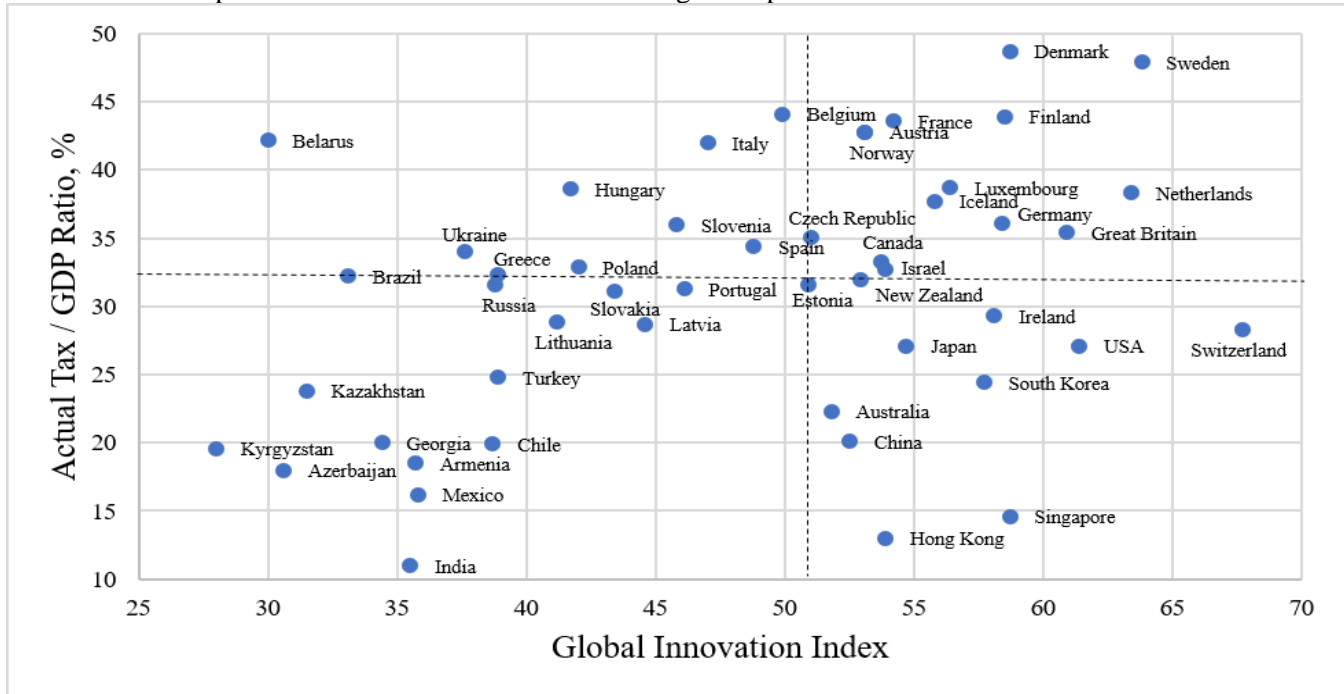
Figure 1. Correlation of tax burden from innovation activity by country in 2017
Source: compiled by authors

The fourth quadrant is represented by Eastern European countries (Slovenia, Hungary, Slovakia, Poland), OECD countries (Greece, Portugal, Italy), Commonwealth of independent States (CIS) countries (Russia, Belarus, Ukraine) and Brazil. This block is characterized by the high level of tax burden with insufficient innovative development. Consequently, governments with the high level of tax revenues does not contribute to the funding and implementation of innovative projects. On the other hand, encouragement policy high-tech and knowledge-intensive industries would contribute to the transition to the higher quality level in the analogy of the countries of the first group.

According to the game theory of Nobel Prize winner John Forbes Nash (1951), no one participant can increase the gain by changing their strategy if other participants do not change their strategies. If this theory to the innovative development of regions were applied, the tax potential of the republic would achieve with steady pace of high technologies implementation in each separate sphere. Moreover, according to Deloitte research, stable tax system functioning requires the creation of the transparent structure, which on the basis of aggregation, confirmation and analysis of data will allow to identify deviations and avoid possible risks at the present stage. According to reports, the average tax burden is 34% in OECD countries. The comparative analysis of the situation in the OECD countries and Kazakhstan shows that the OECD has higher tax rates, less blurring of the tax base due to privileges and technological tax administration.

Comprehensive measures are essential by the competent authorities of the Ministry of national economy (MNE RK) and the Ministry of Finance (MF RK) in order to achieve the average level of tax collection in accordance with the OECD. The issue of MNE RK is gradual increase in tax rates to the OECD average that would increase

the tax burden by 9%. As regards to the Ministry of Finance of the Republic of Kazakhstan, the elimination of tax breaks differing from international standards and increase of tax administration efficiency would provide the tax burden rise to 1.5% and 13.6% respectively (Figure 2).
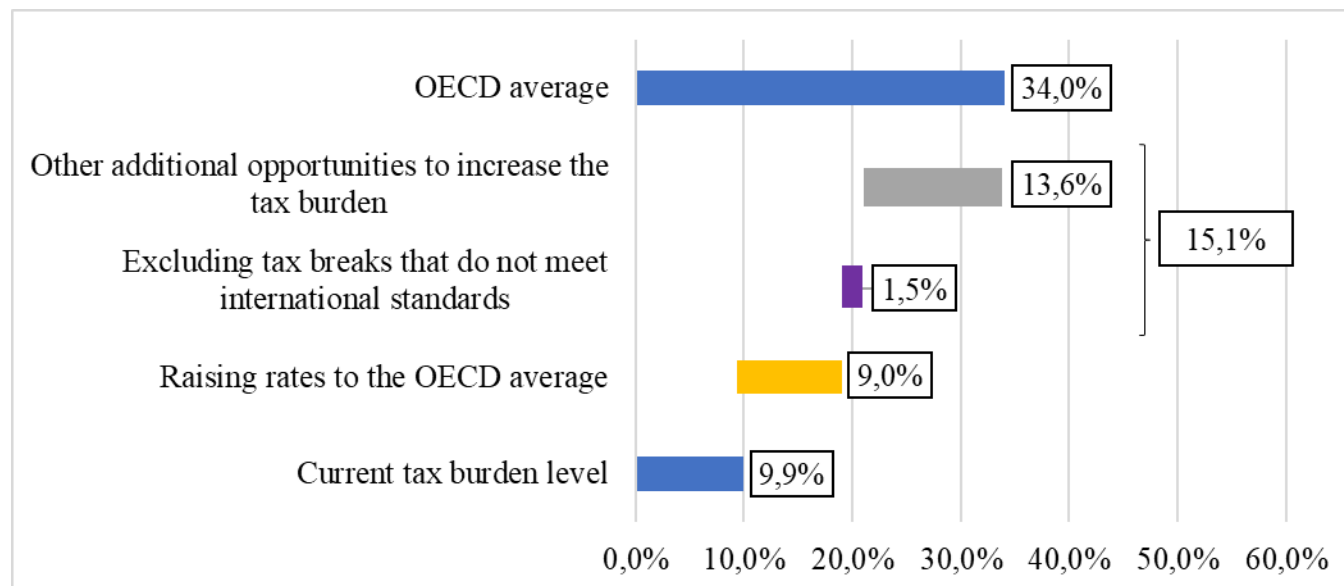
Figure 2. Prospects for achievement of the tax burden level (excluding transfers) of the Republic of Kazakhstan to OECD average level, (percentage to GDP)
Source: compiled by authors

According to the figure 2, in order to increase the tax burden of the Republic of Kazakhstan to the average level of OECD countries, it is necessary to launch innovation development mechanisms as additional opportunities to increase tax revenues.

Therefore, that the basis for the successful development of the state tax administration and audit system is the systematic implementation of innovative technologies into the overall structure of the tax system. Based on the above findings, it is necessary to consider the effectiveness of the state tax audit system as the priority for further improvement through the application of innovative tools.

3.2 Assessment of the integrated index of efficiency of the state tax audit on the example of Kazakhstan

The tax system improvement is hold in the context of the introduction of the state audit in the Republic of Kazakhstan that imposes requirements for the optimization of the activities of state authorities, development of state standards and formation of effective function within the framework of innovative development of the economy. The state tax system is responsible for completeness and timeliness of tax revenues execution in the context of increased business activity and economic freedom.

The state tax audit introduction is one of the key areas for the state audit quality and tax control improvement. The state tax audit is aimed to determine the level of performance and efficiency of tax administration and subsequent monitoring of the audit recommendations implementation.

According to the report of the Government of the Republic of Kazakhstan on the execution of the Republican budget for 2017, the criteria for assessment of the budget revenues execution and efficiency of tax administration relates to the tax revenue plan realization, tax potential and tax gap value, effectiveness of cameral control.

However, these criteria do not reflect the level of effectiveness of the tax audit, i.e. the form of subsequent tax control. The issues of determination of the tax audit effectiveness are rather complicated and insufficiently developed at present. The characteristics of the tax audit efficiency model are presented in Table 1.

Table 1. Characteristics of the tax audit efficiency

Parameter	Description
Definition	Compliance of the tax audit system and its results with the requirements and objectivity of the effectiveness assessment of the tax authorities
Purpose	Evaluation completeness and timeliness of tax revenues and monitoring of audit recommendations
Principle	Efficiency, economy, productivity, materiality
The main stages of the tax audit efficiency	Efficiency of planning, forecasting, accounting and control, regulation, subsequent monitoring of recommendations

Source: compiled by authors

The methodology for estimation of the tax audit efficiency is required to base on four consecutive stages that characterized by the group of indicators. In the current study, the efficiency of tax audit is determined by calculation of the integral indicator. This method consists of the combination of particular indicators and systematization into integrated assessment.

The first stage is based on the analysis of the efficiency of tax revenues planning and forecasting. This stage is characterized by the determination of tax planning indicators, grouped into the group "P -Indicators of planning and forecasting efficiency" (Table 2).

Table 2. Indicators of planning and forecasting efficiency

No.	Indicator	Equation	Standard
P1	Execution of tax revenues, in shares	Actual tax revenues / Tax revenues according to the budget plan	Full execution of the plan, i.e. 100% or 1
P2	The share of arrears to the tax revenue	The amount of the tax revenues arrears / the sum of the actual tax revenues	Lack of arrears, i.e. 0
P3	The ratio of the tax gap and tax revenues	Tax gap* / Actual tax revenue	The share of the tax gap is permissible at a statistically acceptable margin of error, i.e. 5% or 0.05
P4	The ratio of the tax gap and amount of transfers	Tax gap* / The amount of actual transfers	The share of tax gap is acceptable at the level of 1% of transfers, i.e. 0.01

Source: compiled by authors according to the Accounts Committee of the Republic of Kazakhstan

At the second stage, the methodology for evaluation of tax audit effectiveness includes indicators related to group C – "Indicators of the tax control quality", characterizing the quality accounting of taxpayers and tax revenues control. This group of indicators should directly reflect of the tax authority effectiveness.

Table 3. Indicators of the tax control quality

No.	Indicator	Equation	Standard
C1	Share of inspections carried out by visits	The number of inspections conducted by the visit / The total number of inspections	It should be half of the total number of checks, i.e. 0.5
C2	Share of unplanned inspections	Number of unplanned inspections / Total number of inspections	According to the Tax Code of the Republic of Kazakhstan, the number of grounds for conducting unscheduled inspections was reduced by 62%, i.e. standard value should be equal to 38% or 0.38
C3	The share of inspections of private business entities with high risk	Number of inspections of high-risk private enterprise entities / Total number of inspections of private enterprise entities	It should be half of the total number of checks, i.e. 0.5
C4	Share of administrative fine imposed on the result of unplanned inspections	The amount of the administrative fine imposed on the results of unplanned inspections / The total amount of the administrative fine imposed on the results of inspections	Share of unplanned inspections of the relevant year
C5	Tax control efficiency	The amount of funds directed from the all budget levels for the conduct of inspections / The total amount of the administrative fine imposed by the inspections	The minimum share of the inspection cost, i.e. 5% or 0.05
C6	The share of private businesses inspections	Number of inspections of private businesses / Total number of inspections	The share of private entrepreneurship of entrepreneurs total number, according to the Statistics Committee of the MNE RK
C7	Share of inspections of large business entities	Number of inspections of large business entities / Total number of inspections of private business entities	The share of large businesses in the total number of private businesses, according to the Statistics Committee of the MNE RK
C8	The share of state enterprises inspections	The number of inspections of state enterprises / The total number of subjects that are not subjects of private entrepreneurship	The share of state-owned enterprises in the total volume of entities that are not private entrepreneurs, according to the Statistics Committee of the MNE RK

Source: compiled by authors

At the third stage of the proposed methodology for evaluation of the tax audit efficiency, effectiveness degree of regulation of compliance with tax legislation is determined. Thus, in order to assess the regulation effectiveness, the indicators of group R - "Indicators of compliance regulation with tax legislation" is proposed (Table 4).

Table 4. Regulatory Compliance Indicators

No.	Indicator	Equation	Standard
R1	Percentage of inspections that are denied registration	Number of inspections that are denied registration / Total number of inspections	The lack of inspections that registration is denied, i.e. 0
R2	Proportion of complaints filed for infringement of the inspection procedure and their results	Number of complaints filed for infringement of the inspection procedure and their results / Total number of inspections	The proportion of complaints is permissible to 1% of the total number of inspections, i.e. 0.01
R3	Proportion of inspection for that infringement were revealed	Number of inspections for which for that infringement were found / total number of inspections	It should be half of the total number of inspections, i.e. 0.5

Source: compiled by authors

The initial data for the model structure are presented in table 5.

Table 5. System of actual and normative values of particular indicators

No.	Actual Values			Standard Values		
	2015	2016	2017	2015	2016	2017
P1	1,08	1,10	0,95	1,00	1,00	1,00
P2	0,02	0,02	0,03	0,01	0,01	0,01
P3	0,22	0,18	0,15	0,05	0,05	0,05
P4	0,26	0,12	0,10	0,01	0,01	0,01
C1	1,00	0,97	0,51	0,50	0,50	0,50
C2	1,00	0,99	0,98	0,38	0,38	0,38
C3	0,01	0,01	0,06	0,50	0,50	0,50
C4	1,00	0,93	0,57	1,00	0,99	0,98
C5	0,06	0,11	0,02	0,05	0,05	0,05
C6	0,97	0,97	0,95	0,88	0,88	0,88
C7	0,06	0,09	0,09	0,01	0,01	0,01
C8	0,42	0,47	0,23	0,57	0,57	0,57
R1	0,00	0,00	0,00	0,00	0,00	0,00
R2	0,01	0,01	0,10	0,01	0,01	0,01
R3	0,13	0,13	0,17	0,50	0,50	0,50

Source: compiled by authors

The final stage of evaluation of the tax audit efficiency in the framework of the proposed methodology is the calculation of the integral indicator. Each calculated indicator is assigned the certain number of points on the following score scale (Table 6).

Table 6. The rating scale of indicators of efficiency of tax audits

Values									
0-0,04	0,05-0,14	0,15-0,24	0,25-0,39	0,4-0,49	0,5-0,59	0,6-0,69	0,7-0.79	0,8-0,89	0,9-1
Score									
10	9	8	7	6	5	4	3	2	1

Source: compiled by authors

In addition, in order to determine the final integral indicator, actual and normative values are compared and the state tax audit efficiency expressed in points is determined (Table 7).

Table 7. The analysis result of the integral indicators of the state tax audit efficiency for 2015-2017

№	Actual value (in shares)			Normative value		
	2015	2016	2017	2015	2016	2017
P1	1,08	1,10	0,95	1	1	1
P2	0,53	0,42	0,32	5	6	7
P3	0,23	0,28	0,33	8	7	7
P4	0,04	0,08	0,10	10	9	9
C1	0,50	0,52	0,98	5	5	1
C2	0,38	0,37	0,37	7	7	7
C3	x	0,02	0,12	10	10	9
C4	1,00	0,94	0,58	1	1	5
C5	0,80	0,44	2,66	2	6	1
C6	0,91	0,91	0,93	1	1	1
C7	0,17	0,12	0,10	8	9	9
C8	0,73	0,81	0,40	3	2	6
R1	1,00	1,00	1,00	1	1	1
R2	1,18	0,73	0,10	1	3	9
R3	0,26	0,27	0,35	7	7	7
Total:				70	75	80
Average:				4,67	5,00	5,33

Source: compiled by authors

Analysis of the indicators of the "P" block shows that compared to the previous period, the indicators of P1 and P2 decreased by 0.15 and 0.1 sub-points respectively in 2017. Moreover, this indicates the decrease of the tax revenues execution plan and increase of overdue debts on tax revenues proportion of the state budget. Indicators P3 and P4 increased in 2017 by 0.05 and 0.02 respectively compared to 2016. These changes are explained by the tax gap decrease and increase in tax revenues in the reporting period. As the result analysis indicates the improvement methods necessity of planning and forecasting of the Republican budget revenues.

The assessment of the indicator group "C" reveals the sharp increase of indicator C5 and significant increase C1, C3, C6 by 2.22; 0.46; 0.1; 0.02 respectively sub-points compared to the previous period. In contrast, the values of indices C2, C4, C7 and C8 are being decreased during the study period. According to the analysis, those factors for efficiency improvement are the online monitoring development and tax inspection effectiveness; while the reasons for the decline in index values are the ineffective apply of the Risk Management System and the high proportion of unplanned inspections.

The study of the indicators of the "R" group revealed stability of the R1 indicator in 2017. There is sharp decrease of R2 index by 0.63 sub-points compared to 2016 and slight increase of R3 by 0.08 from the previous period. These changes are explained by significant decrease in complaints about tax inspection and improvement of their quality. In addition, the final values of the integral indicator is estimated on classification scale of efficiency level presented in Table 8.

Accordingly, the model on the results and integrated efficiency indicators and the following values for the analyzed period are demonstrated.

The integral indicator value was 70 points, which corresponds to the average level of efficiency audit on the scale of criteria in 2015.

Table 8. Calculated values scale of integral indicator

Table 8. Calculated values scale of integral indicator Intervals of calculated values, (in points)	Qualitative evaluation of tax audit efficiency
to 30	High efficiency
31 - 60	Average efficiency
61 - 90	Middle efficiency
91 -120	Low efficiency
more 120	Insufficient efficiency

Source: compiled by authors

On the other hand, there is a decrease of 5 points to the level of 75, which is also the average level of efficiency in 2016.

In addition, the figure is 80 points and by 5 below of the previous year level and 10 to the base period, which indicates satisfactory level of efficiency in 2017 (Figure 3).

As part of the study, there is a steady decline in the integral indicator of the tax audit efficiency within an acceptable value. The results of the analysis of the effectiveness indicate the necessity for targeted monitoring of recommendation implementation of previous periods as the main tool to improve of the state tax audit efficiency of authorities.
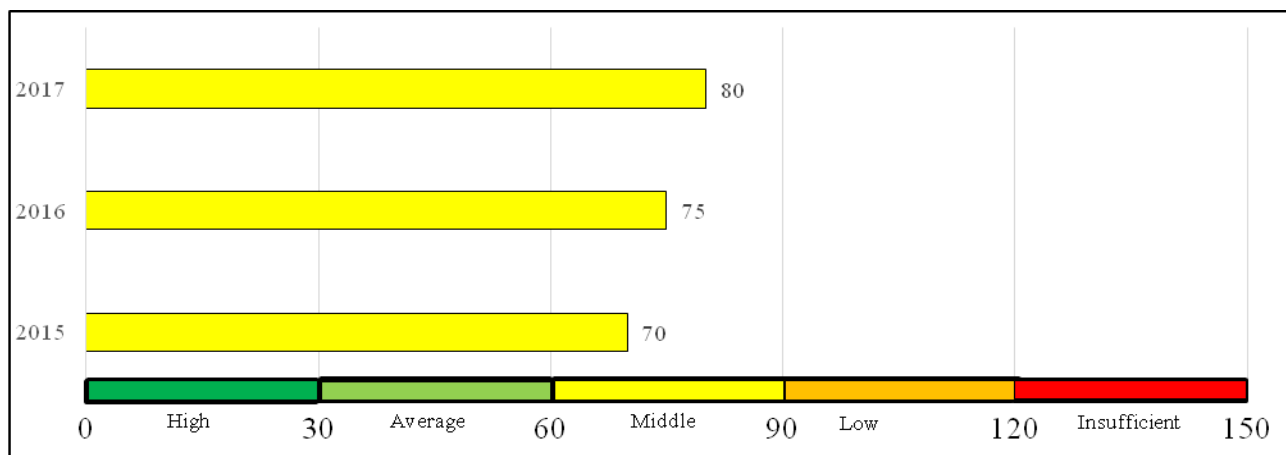
Figure 3. Dynamics of the level of efficiency of the state tax audit for 2015-2017
Source: compiled by authors

The proposed method is intended to determine of the tax audit effectiveness in the state audit system. It is necessary tool for the formation of improvement measures to tax authority activities in the context of modernization and innovative development.

3.3 Prospects of the state tax audit in the conditions of innovative development

Increasingly, new sources of information, such as social networks and other web-based communication platforms, provide public services with innovative ideas and new tools to connect with citizens and participate in social issues discussions. Thus, the use of extensive and diverse information contributes to opportunities for formation the innovative capacity of tax audits, including through providing of new knowledge, creativity and feedback.

In addition, the openness of tax audit results to external users of information is also related to new ways of information management. For instance, in foreign practice, citizens are given the opportunity to submit ideas or feedback to government agencies regularly. In addition, the intensive application of technologies such as crowdsourcing, BIG DATA and OPEN DATA provided to tax authorities contribute to high tax audit results. As part of the Strategic plan of the Ministry of Finance of the Republic of Kazakhstan, the technology of "BIG DATA" implementation in order to expand of modern digital solutions in the sphere of tax administration have been planned. Thus, the relevant system is aimed at required data formation for the transition to the Overall Declaration of Income.

In our opinion, the wide development of innovative technologies will allow to launch the mechanism of transformation of the state tax audit system through the introduction of advanced applied and technological tools.

Automatic methods of tax statements processing for audit purposes and sample selection based on the risk management system at the post-audit stage lead to timesaving, costs, and more accurate reflection of the tax report data. In spite of that the relevant types of information processing and risk management system reveal, but prevent of the facts of non-fulfillment of tax obligations by the taxpayer partially. For instance, in Singapore the Non-filing Service (NFS) is intended to eliminate the requirement to file personal tax declarations for taxpayers. NFS was tested in 2007 with 45,000 taxpayers and rose to 1.39 million in 2017. Taxpayers are able to view the assessment notification of tax obligations on the web portal using reliable data to automate the tax return process in order to reduce the risk of non-compliance with tax laws and contact to the tax authority.

The wide range of internal and external data sources is possible through the widespread use of BIG DATA and OPEN DATA technology. Moreover, information from public services partner with varied degrees of detalization provides the full range of input to the audit. In the practice of the Russian Federation, property taxes are assessed with information provided in the XML file format by the property registry, which contains descriptions of the properties and parameters of the tax base. Furthermore, the taxpayers receive tax information, regardless of their location through the personal secure account on the web portal of the tax administration.

The cloud technologies implementation in the system of state tax administration is able to provide the efficiency of collection, storage and management of information on tax liabilities. For example, cloud technologies under the tax system digitalization are integral part of large-scale IT projects in countries such as the United States, Mexico and the United Kingdom.

Thus, operational efficiency achievement of the tax authorities is one of the main goals set and published in the strategic documents of the government of the United States of America in 2010. One of the program points is aimed at the realization of Cloud First policy based on commercial cloud technologies for the implementation of state and local government policies. In addition, the Internal Revenue Service (IRS) applies the legal protection of the confidentiality of Federal tax information (FTI) through controls and guarantees.

However, practice shows that tax administration in most countries is traditionally conservative and distrustful of the external environment. Therefore, potential risks and problems should be sufficiently evaluated in the decision-making process in the cloud technologies direction.

The transformation of technical equipment and the corresponding legislative registration promotes system improvement of the state tax audit.

Thus, the effective transformation of tax audit into innovative development economic ensures the achievement of two main indicators: tax gap minimization with high level of the responsibility of taxpayers, which leads to the increase in the efficiency of the tax authorities. In our opinion, the strategic planning and legislative regulation of the state tax audit should use the relevant key guidelines.

Three scenarios for the further development of the state tax audit and its impact on the economic situation in order to predict the value of tax revenues in the short term are defined (Table 9).
1. Inertial - continuation of previous policy and maintenance achieved level of tax audit development without key priorities implementation.
2. Decisive modernization - rapid and sharp effect of innovation in the system of state tax audit.
3. Gradual development - systematic and comprehensive implementation of tax audit transformation tools.

According to expert survey, conducted by National research University Higher school of Economics, the probability of occurrence of each scenario over two forecast periods (2018-2020) is determined. The sum of probabilities for each period is 100%. The analysis shows that the most probable development scenario is gradual development (48%, 48.7% and 49.4% respectively), and the least possible is for "Decisive modernization" (6.7%, 7.3% and 8% respectively). Moreover, the probability of maintaining the current model of tax audit development is still high (45.3%, 44% and 42.7%, respectively).

Table 9. Scenario analysis of tax audit development and its consequences for the economy of the Republic of Kazakhstan for 2018-2020

№	The direction choice of tax audit development	Year	Option		
			Inertial	Decisive modernization	Gradual development
1	Probability, %	2018	45,3	6,7	48,0
		2019	44,0	7,3	48,7
		2020	42,7	8,0	49,4
2	Preferability, (points)	2018	14,7	40,1	45,2
		2019	9,5	41,0	49,5
		2020	6,1	41,9	54,2
	Consequences for the economy, probability in %				
3	Growth	2018	11,2	52,9	47,3
	Stagnation		53,6	22,7	37,0
	Recession		12,4	24,4	15,7
	Growth	2019	11,8	59,1	46,1
	Stagnation		51,2	20,8	33,8
	Recession		37,0	20,1	20,4
	Growth	2020	12,4	66,0	44,9
	Stagnation		48,9	17,5	28,6
	Recession		38,7	16,6	26,5
4	Amount of tax revenue, (bln. tg.)	2018	7068,1	7255,9	7267,0
		2019	6979,1	7397,4	7382,2
		2020	6889,7	7583,6	7821,9

Source: compiled by authors

During the analysis, preferability in the development of these scenarios is estimated by experts in percentage and in the amount of 100%. The results of the survey show that the most preferred option is gradual development (45.2%, 49.5% and 54.2%, respectively). Furthermore, the least preferred is inertial development (14.7%, 9.5% and 42.7%, respectively). The level of preferability for the model of decisive modernization is also quite high and represents 40.1%, 41% and 41.9% for each period.

Variants of each of the scenarios consequences for the economy in the probabilities form of recovery, stagnation and recession are calculated. It can be seen from the table, if the inertial path of development is maintained, the most possible option is economic stagnation (53.6%, 51.2% and 48.9% for each period). Implementation of drastic modernization is probably to lead to economic recovery (52.9%, 59.1% and 66%, respectively), but the probability of recession and stagnation remains high. Moreover, for the gradual development scenario, economic growth is more probable (47.3%, 46.1% and 44.9%, respectively), at the same time, the probability of economic stagnation is quite high due to the short period of forecasting (37%, 33.8% and 28.6%, respectively).

Thus, based on the analysis, it was found that the preferred option of tax audit development through decisive modernization is less probable due to the scale of the necessary measures and the lack of resources for their implementation. At the same time, the inertial path of development is potential due to the short-term planning period, but the corresponding scenario is less preferable, as it is able to lead to the preservation and subsequent increase of barriers of economic system development as a whole. In our opinion, the third scenario of gradual

development of tax audit is the most balanced and its implementation probability is the highest and most appropriate.

At the final stage of scenario analysis, the amount of tax revenues at the each scenarios is calculated according to the formula:

$$T_t^i = T_{t-1} * \left((1 + g) * p_u^i + 1 * p_s^i + (1 - g) * p_d^i \right),$$

T – the value of tax revenues, billion tenge;
i – appropriate scenario of development of tax audit;
t – relevant forecast period;
g - short-term growth rate of tax revenues, 5 (constant) %;

p_u^i – the probability of economic recovery under appropriate scenario, %;

p_s^i – the probability of economic stagnation under the appropriate scenario, %;

p_d^i – the probability of economic recession under the appropriate scenario, %.

According to the estimated values of tax revenues for the relevant forecast periods, it follows that unfavorable options arise in the inertial path of development. For instance, there is a decrease in the modelled indicator from 7068.1 billion tenge in 2018 to 6889.7 billion tenge in 2020 respectively.

If decisive modernization model is adopted, tax revenues will amount to 7255.9 billion tenge in 2018, 7397.4 billion tenge in 2019 and 7583.6 billion tenge in 2020 respectively. These figures show an acceptable level of tax revenue. However, according to the probability of examined scenario occurrence, the achievement of these indicators is improbable.

According to statistics, revenue amounted to 7153.9 billion tenge in 2017. If gradually development of tax audit is chosen, the tax revenues in the forecast periods will be 7267 billion tenge in 2018, 7382.2 billion tenge in 2019 and 7821.9 billion tenge in 2020 respectively. Since the probability of occurrence of the respective scenario is rather high, achievement of the revealed indicators is possible and acceptable. The development of this model of state tax audit has a cumulative effect and will serve as key factor in advanced level achievement with the designated strategic guidelines in the long term.

Thus, according to the analysis the following conclusions are formed:
    1. The place of Kazakhstan in the Global innovation development reflected to the dependence between the modernization level and amount of tax revenues. Thus, Kazakhstan belongs to the group of countries with low level of taxation and innovation activity. At the same time, it is proposed to accelerate of innovative technologies development and their implementation in all areas of state regulation, in particular, in the state tax audit.
    2. The transformation of the institute of state tax audit in innovative development framework requires the creation of an effective tax control system, which is directed to modern tools intensify to economy transparency improvement and accelerate the information data exchange.
    3. Proposed method implementation of state tax audit transformation through three forms, which are inertial, decisive modernization and gradual development. In our opinion, the choice of the strategy for the phased development of tax audit is the most rational due to criteria of economic effect (result maximization while cost minimization) and avoiding of negative consequences of its implementation.

Conclusions

The study is dedicated to the implementation of innovations as the basis for improvement of the state tax audit.
At the first stage, foreign and domestic scientists' research in innovative development of tax administration are studied. Significant differences in approaches to the assessment of the modernization beginning of the tax administration system are revealed. Thus, foreign researchers conclude that the main source of innovative development and further implementation in the tax system are market and business community and competitive environment contributes to the creation of advanced technologies. Furthermore, Russian scientists suggest that measures to tax system modernization and digitalized are possible only with the government participation. The state in this case is the main moderator of innovative development, having the required resources and powers. The next step in the study is analyze of tax burden dependence on innovative development degree of OECD countries and emerging markets. According to the results of the analysis, four types of interaction between innovation and tax systems are identified.

At the second stage of the study, the effectiveness of the state tax control by integrated methods for indicator determination on the example of Kazakhstan was evaluated. Due to the lack of research on this issue, evaluation method of effectiveness of the tax authority's activity is determined through three groups of indicators. According to calculation, that efficiency level of the state tax audit in the Republic of Kazakhstan is satisfactory and requires further improvement, in particular through the implementation of advanced innovative technologies. The proposed methodology has given objective results and can be used to assess of public audit efficiency in other countries.

At the final stage of the study, prospective areas for state tax audit in the context of innovative development were identified. In our opinion, in order to the successful tax system function requires operational activity monitoring, based on modern information technologies that match to high requirements of modern tax audits. Consequently, determined tools will allow generating required tax information and identifying reserves for tax revenues growth by comparing data from third parties. The digitization of the tax audit system and the timely implementation of innovative infrastructure will provide significant time and material costs reduction of monitoring, thereby freeing up reserves for further strategic purposes.

The scientific novelty of this study is development of efficiency evaluation methodology for state tax control and determination of improvement approach based on innovative tools. The results of the study are valuable from the point of view of subsequent developments in direction of state financial control and definition of approaches in order to solve existed issues of state audit.

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Appendix A
Table A1. Global Innovation Index and Tax Burden Indicators by Country for 2017

№	Country	Global Innovation Index	Actual Tax / GDP Ratio, %	Tax Gap, % of actual tax
1	Armenia	35,7	18,5	22,0
2	Australia	51,8	22,3	19,3
3	Austria	53,1	42,8	8,7
4	Azerbaijan	30,6	18,0	19,1
5	Belarus	30,0	42,2	-28,3
6	Belgium	49,9	44,1	40,7
7	Brazil	33,1	32,2	-16,4
8	Canada	53,7	33,3	12,5
9	Chile	38,7	19,9	44,9
10	China	52,5	20,1	53,6
11	Czech Republic	51,0	35,1	3,0
12	Denmark	58,7	48,7	41,9
13	Estonia	50,9	31,6	8,9
14	Finland	58,5	43,9	10,7
15	France	54,2	43,6	9,9
16	Georgia	34,4	20,0	62,0
17	Germany	58,4	36,1	15,4
18	Great Britain	60,9	35,4	12,0
19	Greece	38,9	32,3	38,3
20	Hong Kong	53,9	13,0	57,0
21	Hungary	41,7	38,6	21,0
22	Iceland	55,8	37,7	18,0
23	India	35,5	11,0	25,0
24	Ireland	58,1	29,3	-0,1
25	Israel	53,9	32,7	34,7
26	Italy	47,0	42,0	3,7
27	Japan	54,7	27,1	1,7

28	Kazakhstan	31,5	23,8	27,0
29	Kyrgyzstan	28,0	19,6	15,8
30	Latvia	44,6	28,7	2,0
31	Lithuania	41,2	28,9	0,8
32	Luxembourg	56,4	38,7	55,6
33	Mexico	35,8	16,2	33,3
34	Netherlands	63,4	38,3	29,1
35	New Zealand	52,9	32,0	5,0
36	Norway	53,1	42,8	39,7
37	Poland	42,0	32,9	54,3
38	Portugal	46,1	31,3	3,8
39	Russia	38,8	31,6	60,7
40	Singapore	58,7	14,6	-29,1
41	Slovakia	43,4	31,1	-14,0
42	Slovenia	45,8	36,0	-19,7
43	South Korea	57,7	24,4	2,7
44	Spain	48,8	34,4	23,0
45	Sweden	63,8	47,9	-3,5
46	Switzerland	67,7	28,3	-10,8
47	Turkey	38,9	24,8	5,4
48	Ukraine	37,6	34,0	8,1
49	USA	61,4	27,1	6,5
50	*Median*	*48,0*	*31,0*	*18,3*

Source: compiled by authors

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NON-PROFIT SECTOR IN KAZAKHSTAN: INFLUENCE ANALYSIS AND DEVELOPMENT OPPORTUNITIES[*]

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Abstract. The paper describes the analysis and assessment of non-profit sector development drivers in the Republic of Kazakhstan. The authors identify the most significant factors that influence the nonprofit sector on the basis of multifactor correlation and regression analysis. The scale of the non-profit sector is determined on the basis of two indicators: the number of non-profit sector institutions and Global Venture Alliance (GVA). The authors have estimated two analysis options. The first option assesses the effect of the economy on the number of institutions (inflation, government expenditures on the social sphere, actual final consumption) and the effect of the population (employment, income, number of socially vulnerable groups). The most significant factors were income indicators, their correlation with the minimum subsistence level and the number of socially vulnerable groups. The second option considered GVA as a resulting indicator and studied the dependence of the sector's economic results on its potential, and the sector's state support on the population's standard of living and the number of socially vulnerable groups. The influence of the state social contract does not have a positive effect on the sector's GVA volume, which indicates the problem in its priorities and distribution mechanisms. The authors proposed a transition to the consumer subsidy model and infrastructure support for social entrepreneurship development as one of the priority directions of non-profit sector transformation.

Keywords: non-profit sector; correlation and regression analysis; influence drivers; consumer subsidies; state social contract

1. Introduction

The non-profit sector in the modern economy has many functions. One of the most important ones is the service provision from public sector resources in the social sphere. It is also the basis for the social entrepreneurship development worldwide. Most of the social entrepreneurs identified in Kazakhstan operate through non-nprofit institutions and use their accumulated potential (Pritvorova, Ayaganova, 2017).

At the end of 2018, the number of legal entities registered in Kazakhstan increased by 5.1% - as of January 1, 2019, there are about 433.8 thousand of them in the republic. The largest growth is shown by small (up to 424.8 thousand) and large (up to 2488 units) business. The number of operating non-profit organizations amounted to 13184 units (Statistics committee Ministry of National Economy of the Republic of Kazakhstan). The entry of mankind into the era of the global information society, in which information, knowledge and intellectual activity is gradually becoming leading, has led to the emergence and development of the "third sector" of the modern world. Social entrepreneurship inherently plays an important role in society, as it solves certain urgent social problems. If business is purposefully working in order to make money, then social entrepreneurship does not focus on earning, but on solving a social problem, instead.

In the topic of social entrepreneurship, it is necessary, first of all, to realize that it does not concern material wealth, but primarily spiritual wealth. Non-governmental organizations (NGO) already today play a huge role in Kazakhstan in human rights activities, and in realizing the special interests of population groups, and in social stabilization of society.

Analyzing the experience of foreign countries, the author concluded that:
1) in the most countries, in particular, developing (e.g. the Middle East, Central Asia, Russia), the practice of social entrepreneurship is under development;
2) the difference from the focus of social initiatives is different in developed and developing countries;
3) many public sector organizations are still donor-dependent, so raising awareness about social partnerships (SPs) is needed;
4) culture and mentality may be one of the key factors affecting the social sector;
5) the larger the economy is resource-dependent - the higher is civic activity, and, respectively, economic development;
6) in the most countries, social entrepreneurship was created on the basis of existing NGOs;
7) political instability, change of power - more active civic position leads to the search for new solutions;
8) support of international organizations.
Therefore, experience working with various clients from non-profit organizations, including charitable organizations, housing associations, educational institutions and trade unions, has strengthened the understanding of the specific problems inherent in this sector.

The definition of social entrepreneurship in Kazakhstan has not yet been formulated; there is no law on social entrepreneurship. Alas, the focus on identifying and supporting social entrepreneurs has already been done by both public organizations, including international, and government agencies. In 2019, the Ministry of Information and Social Development (MISD) of the Republic of Kazakhstan, together with the Impact Hub Almaty corporate fund, held the first republican Ozgeris ustasy award. 15 of its winners received grants in the amount of 500 thousand tenge, and in addition, the Register of Social Entrepreneurs of Kazakhstan was formed, which included 152 social entrepreneurs of the country. Based on this registry, you can see that:
- the majority (a bit over 40%) of social entrepreneurs are concentrated in the "assistance / support for vulnerable groups" segment,
- the second largest segment is "education" (14.85%).

- 43.4% of social entrepreneurs have been operating for more than five years, and the most active regions in this matter are Turkestan region (there are 22% of those included in the register of social entrepreneurs), Nur-Sultan (19%) and only then - Almaty (7 %).

Over 27,000 non-profit organizations are registered in the Republic of Kazakhstan (according to various estimates), which makes up more than 6% of the total number of legal entities, according to other sources their number is 18,000. Different statistics are due to different reasons:

1) state statistical accounting in the structure of the third sector includes all organizations listed by the Law of the Republic of Kazakhstan "On Non-Profit Organizations" (Law 2001 "On Non-Profit Organizations"). Meanwhile, some independent research agencies exclude state institutions, bar associations, consumer cooperatives, notarial chambers, etc. from the third sector, which are taken into account by official statistics. Naturally, with this accounting, the number of organizations is reduced by 2 times.

2) most NGOs are inactive (that is, they exist only on paper), which complicates the calculation of really functioning organizations and leads to a distortion of statistics;

3) some cease their activities (more often actually than legally), as a result, new organizations are registered.

Thus, in Kazakhstan, there is an imperfection of statistical accounting of non-governmental organizations.

Public sector resources are considered by modern researchers as a source of non-profit sector's financial stability and potential growth, and permanent income generating activities are considered as a basis for its development based on the type of social entrepreneurship.

The exact size of the nonprofit sector in the world is difficult to assess, but it can be confidently stated that in the countries of Europe and the USA its work has a significant impact on the economy. So, in 2014 in the USA the number of officially registered non-profit organizations amounted to 141,000,000, in 2013 their contribution to the economy amounted to 5.4%. Despite the effects of the global economic crisis, private donations in the non-profit sector are increasing. Hence, in the USA since 2013, the volume of receipts from private donors has grown by 7.1%. According to the CAF, which studies charity trends in more than 140 countries, in 2010–2014 in both developed and developing economies, and in transition economies, charitable contributions increased slightly. The non-profit sector plays an important role in the social services provided to the population in modern economies, despite the fact that its activities remain more limited compared to those of the private and public sectors. The share of the non-profit sector in GVA of the developed world varies from 3 to 6% and tends to be positive (Rozhdestvenskaya, 2017). According to The Johns Hopkins Comparative Nonprofit Sector, the aggregate nonprofit sector is the seventh largest economy in the world, immediately following Great Britain and France and ahead of Italy, Brazil, Russia, Spain and Canada. The world average contribution of NPOs to GDP is 4.5%. The share of employees is much higher, for example, in Canada - 10.5%, in the USA - 9% (Salamon 2014). The domestic non-profit sector is somewhat diverse in terms of the types of activities they practice, since it has about 26 main activities of organizations, of which about 12 activities are primarily social (preschool education, social services, culture, sports and leisure activities, financing, public infrastructure, ecology, and much more).

2. Research background

The non-profit sector development and social entrepreneurship was significantly covered within the global community (Lombardo, 2013). The awareness of this phenomenon dates back to the 90s of the 20th century, when both practitioners and academic scholars started addressing new methods of solving social problems. Modern classic scholars include G. Dees (Dees, 2001), R. Martin and S. Osberg (Martin, Osberg, 2007), K. Alter (Alter, 2007), Haugh (Haugh, 2007), Bowlby S., Lloyd Evans S. (Bowlby & Lloyd Evans, 2011), J. Defornie and J. Nissens, (Defourny, Nyssens, 2010), J. Austin (Austin, 2010), L. Gramescu (Gramescu, 2016), R. Lance (Lance, 2017), L. Racheda (Racheda, 2018), Franco M. & Haase H. (Franco M. & Haase, 2017), F. Vigliarolo (Vigliarolo, F. 2020) and many others. In the post-Soviet area, active research is being conducted by A. Moskovskaya and V. Soboleva (Moskovskaya, Soboleva, 2011), Yu. Nesterenko and A. Plyukhina (Nesterenko, Plyukhina, 2017), D. Kachko (Kachko, 2017), A. V. Kuzmin, S. V. Yegerev (Kuzmin, Yegerev, 2009) and others.

In addition, empirical studies in this sector identify business models of entrepreneurship while maintaining the social mission priority (Gelashvili, Zhumanova, 2019).

The non-profit sector in Kazakhstan is developing with the goal of achieving social, charitable, cultural, educational, legal, health and environmental, sporting goals; to meet religious needs. For example, the annual foreign financing of NGOs is about five billion tenge (13.6 million dollars). Such funding receives about two hundred NGOs, 70% falls on the United States and international organizations. In Kazakhstan, according to the Ministry of Social Development, 53 international organizations, 30 foreign state organizations, 77 foreign non-governmental public organizations authorized and registered by the government conduct their activities. 13,6 million dollars (or about 5 billion tenge) are annually allocated by foreign investors to support domestic non-profit associations, where the key figures are international NGOs and the United States, whose share is 70% of all foreign financing (Statistics committee Ministry of National Economy of the Republic of Kazakhstan).

So, Bob Doherty, Helen Haugh and Fergus Lyon (2014) analyze on organizations with a social focus, defining organizations' commitment to financial sustainability and solving of social problems. Franco M. and Belo M. (2013) in their publications consider network collaboration as a mechanism for enhancing territorial competitiveness, with an emphasis on social entrepreneurship. Kowo, S. A., Adenuga, O. A. O., Sabitu, O.O. (2019) provide cases when small enterprises help to alleviate povety. Singgalen, Y.A., Sasongko, G., Wiloso, P.G. (2019) analyze partnership between coomunity and bussiness for achieving better results for society.

3. Materials and methods

There is a need to find adequate methods for measuring the social effectiveness of NGOs:
1) Calculation of statistical coefficients - involves a comparison of actual indicators with target indicators, where the final indicator may reflect a comparison of planned and actual social results of NGOs or social results and the costs of achieving them.
2) Dynamic methods - based on the determination of net cash flows that are capable of generating certain social consequences of NPO activities.
3) Methods of correlation and regression analysis - involve the determination of the tightness or type of connection between the social results of the activities of NPOs and their costs.
4) Optimization methods - based on the definition of the boundaries of production capabilities and the efficiency indicator as a measure of the remoteness of a particular NPO from it.
5) The method of "factorial survey" is one of the universal methods, using which a set of evaluation criteria for the analyzed NPOs is compiled, after which a random sample of combinations of values of the corresponding criteria is formed. The involved experts give each of the sets of target values included in the sample an aggregated quantitative assessment in a certain scale, after which the methods of regression analysis calculate the weights of individual criteria that best approximate the data by the assessment experts and use the found weights to compile an aggregated performance criterion.

A non-profit institution may perform one or several types of activities stipulated by the laws of the Republic of Kazakhstan and relevant to the goals of the non-profit institution as stipulated by its constituent documents.
Legislative acts of the Republic of Kazakhstan may impose restrictions on the types of activities that non-profit institutions of certain organizational and legal forms are entitled to conduct.
Non-profit institutions are regulated by the Law of the Republic of Kazakhstan On Non-profit Institutions and other regulatory legal acts in force in the territory of the Republic of Kazakhstan (Law 2001 "On Non-Profit Organizations").
Thus, in accordance with the requirements of the Law of the Republic of Kazakhstan On Non-profit Institutions, non-profit institutions are:
1. Institutions and private institutions.

2. Private associations
3. Fund
4. Consumer cooperative
5. Religious organization
6. Other legal form of non-profit organization
7. Association of legal entities in the forms of association (union).

The activity of non-profit institutions is an integral part of economic and social progress, which, on its part, contributes to the solution of such problems as population employment, material and spiritual well-being of the population, national projects implementation, rational use of free time and a certain level of quality of life.
Non-profit institutions can be established to achieve:
- social, cultural, scientific, educational, charitable and management goals;
- protection of the rights and legal interests of citizens and institutions;
- resolution of disputes and conflicts;
- satisfaction of spiritual and other needs of citizens;
- protection of citizens' health, environmental protection, development of physical culture and sports;
- provision of legal assistance, as well as for other purposes aimed at ensuring public goods and benefits of its members (participants) (Mersiyanova, 2017).

Non-profit institutions may be established in the form of an institution, public association, joint-stock company, consumer cooperative, fund, religious organization, association of legal entities as an association (union) and in any other form provided by laws.

Non-profit sector is the sector involved by the social state to implement its main function: social benefits generation in the public sector of the economy. The right to produce social benefits with an individual character of assigning a social effect and a significant secondary effect at the macro-level at the same time was granted to the non-profit sector for the purpose of optimizing state budget expenditures (Rubinstein, 2009).

In the second half of the 20th century, the growing attention of the world community to the issues of inclusive development of the society and the social equity implementation not only activated the discussion in theory and practice, but also caused the challenge to diversify the service providers in the conditions of demand individualization for public goods (Sen, 2016). The non-profit sector of the economy, with its ability to meet individual needs at a lower cost than the public sector, has become the main provider of public social services in some countries. The researchers note that in the United States, for example, in addition to hundreds of community institutions, it includes 90% of day care centers, 46% of primary and secondary schools, 50% of colleges and universities, 2/3 of social service centers, more than 60% of clinics and hospital complexes and other institutions of the "non-market services sector" (Schlichter, 2016).

Official data show that the contribution of the non-profit sector to the country's GDP in 2016 was 7.6% in the U.S., 2.7% in New Zealand, 3.8% in Australia, etc (Rozhdestvenskaya, 2017). In Kazakhstan, this number was 3.4% in 2017, which makes it possible to consider the sector of non-profit institutions to be quite comparable with other countries (National accounts of the Republic of Kazakhstan, 2019).

In recent years, most have been directed to the social sphere. In 2019, 4.8 trillion tenge, or 45% of the budget, was allocated for the social sector, including three trillion for social assistance, 1.1 trillion for health care, 583 billion for education, 78 billion tenge for culture and sports " . Within the framework of these funds it is planned:
- Strengthening social support for certain categories of citizens - 224.3 billion tenge;
- the construction of rental housing for low-income large families and the introduction of soft loans through Zhilstroy Sber Bank - 100 billion;

- development of regional infrastructure - 90 billion;
- implementation of the special project "Auyl - El Besigi" - 30 billion tenge.

According to the Ministry of the Republic of Kazakhstan, out of 224.3 billion tenge aimed at strengthening support for hotel categories of citizens, specifically, 49.6 billion tenge will be allocated for targeted social assistance in 2019, 115 billion in 2020, 108 in 2021 billion tenge. With an increase in disability benefits by 30% this year, 5 billion tenge will be allocated, in 2020 - 12.8 billion, in 2021 - 14.9 billion tenge. To increase the wages of low-paid budget workers this year - 169.7 billion tenge, for 2020 - 397 billion, for the 2021st - 410 billion tenge.Diversification of non-profit sector funding sources in many countries at the expense of not only public resources, but also private and corporate funds, foreign and international institutions ensured a stable financial base for the non-profit sector (Statistics committee Ministry of National Economy of the Republic of Kazakhstan). Ultimately, it is their own commercial revenues that allowed the nonprofit sector (hereinafter referred to as NPOs) to generate an independent financial platform (Salamon, Anheier, 2014). The current stage of the non-profit sector (hereinafter referred to as NPS) development differs in the fact that it includes the phenomenon of social entrepreneurship, which combines a social mission with various sources of income, which ensures the subject's financial stability (grants, subsidies) and provides an opportunity to receive permanent income associated with activities in the market (Thompson, Doherty, 2012; Gramescu, 2016).

Moreover, these revenues are distributed only in part or not distributed at all, but are directed to the social mission or organization's development as a business entity. Social entrepreneurship is described by many scholars as the fourth sector of the economy that combines the characteristics of all three sectors (public, private and nonprofit) (Newey, 2017; Rasheda, 2018).

This paper aims to analyze the factors of non-profit sector development and suggest ways to expand its development opportunities. The research method is a multifactor correlation-regression analysis, which enables us to assess the interrelation and influence of many factors on the result indicator (Yeliseeva, Yuzbashev, 2012).

4. Results and Discussion

Today, the non-profit sector is a serious "player" in the global economy. This is confirmed by the real achievements in the economy and social sphere that NGOs demonstrate. Describing the contribution of NPOs to the economy, we note:
1) Direct contribution of the non-profit sector to the economy:
- ensuring employment and self-employment of the population;
- providing socio-psychological support to the socially vulnerable part of the population involved in economic activity;
- purchase and production of goods necessary for the activities of NPOs,
- stimulation of aggregate demand (theory of demand for NPO products) and aggregate supply (theory of supply based on the form of managing);
- NPOs work in niches that, given the natural state of affairs in a free and competitive market, would not interest the commercial sector, since they give too small profit margins.
2) Indirect contribution of the non-profit sector to the economy:
- NPOs introduce elements of competition into the social sphere, increasing the efficiency of the functioning of the system of providing social services;
- the possibility of reducing the tax burden;
- the activities of NGOs help to improve the level of education and health of the nation, which increases the efficiency of the economy and ensures higher rates of economic growth;
- social and political stability, which are necessary conditions for economic growth.
According to a survey conducted within the framework of the project "I-SEED: Social Entrepreneurship and

Education", implemented by the British Council in conjunction with Chevron on the state of social entrepreneurship in Kazakhstan, it was found that the main problem of social entrepreneurship in Kazakhstan was the lack of information on this topic and low public awareness of the concept of social entrepreneurship.
We note some problems in the field of social protection of the population (Table 1).

Table 1. Problems in the field of social protection

№	Problem	Description / Recommendations
1	Inconsistency of established insurance tariffs and assignment of types of economic activity to occupational risk classes	Conduct a study to substantiate the correctness of the calculation of the establishment of insurance tariffs with the participation of NPP and initiate the introduction of appropriate amendments to the Law of the Republic of Kazakhstan dated February 7, 2005 No. 30 "On compulsory insurance of an employee against accidents in the performance of his labor (official) duties" (Law, 2005)
2	Combining social payments into one type of payment	The current mechanism for retaining and calculating data on social payments is very complicated and difficult to understand today. For each social payment instructions, instructions, rules. The object of taxation for all these types of social payments is the wage fund. Combining these social payments into one type of payment for calculation and payment, with their subsequent breakdown by the necessary funds, will simplify the current situation.
3	Remove the administrative barrier established by paragraph 7 of Art. 30 of the Law of the Republic of Kazakhstan dated May 4, 2010 No. 274-IV "On Protection of Consumer Rights" (Law, 2010)	So, upon termination of the contract, settlements with the consumer are made in the event of a price increase for the product based on its price at the time of termination of the contract, and in the case of a price reduction based on the price of the product at the time of purchase. In this connection, it is necessary to amend the current legislation.
4	Eliminate the impossibility of implementing the Law of the Republic of Kazakhstan "On the Protection of Children from Information Harmful to Their Health and Development"	On January 10, 2019, the Law of the Republic of Kazakhstan dated July 2, 2018 No. 169-VI "On the Protection of Children from Information Harmful to Their Health and Development" (Law, 2018) entered into force. According to this Law, information products at the time of distribution must contain age category. It is necessary to make amendments to Article 15 of the Law of the Republic of Kazakhstan dated July 2, 2018 No. 169-VI "On the Protection of Children from Information harmful to their Health and Development." Get a delay in fulfilling the requirements for the sign of the age category of information products.
5	Set criteria, standards or rules for determining the degree of guilt as a percentage of the employer and employee in the investigation of an accident	It is necessary to provide in the Labor Code the procedure for determining the degree of guilt of the employer and employee as a percentage in the investigation of an accident, or develop an additional regulatory legal act regulating the application of paragraph 3 of Art. 326 Labor Code (2016).

Source: compiled by authors

Based on the identified problems in the field of social protection for the further development of social entrepreneurship in Kazakhstan, the need for:
- to increase the general civic culture of society and instill social responsibility for schoolchildren and youth;
- to disseminate success stories of Kazakhstan's social entrepreneurs who have created sustainable business;
- more widely cover issues and problems of social entrepreneurship in the media, raising awareness;
- to develop educational courses and trainings on social entrepreneurship;
- to improve the relevant legislative framework on social entrepreneurship;
- job creation for vulnerable people;
- development of educational and health services.

We developed two options of correlation-regression analysis:
Option 1: the number of active NPO subjects acts as a dependent variable (a result indicator), the dependence of the sector's scale on the standard of living of the population and the number of socially vulnerable groups was studied.
Option 2: the GVA served as a dependent variable (effective indicator) in the sector of non-profit institutions serving households (NPISH) and the dependence of the sector economic results on its potential, government support, population's standard of living and the number of socially vulnerable groups has been studied.

Option 1.
The following parameters were selected for analysis:
–   Y (dependent variable) - number of active NPO subjects (except for parties, religious institutions, trade unions);
–   X0 - number of population, people;
–   X1 - number of pensioners, people;
–   X2 - number of state social age-based benefits recipients, people;
–   X3 - number of state social disability benefits recipients, people;
–   X3 - number of recipients of state social benefits;
–   X4 - number of recipients of state social benefits for loss of breadwinner, people;
–   X5 - number of GACP (Targeted State Social Assistance) recipients, persons;
–   X6 - household income used for consumption, on average per capita per month, KZT;
–   X7 - ratio of income used for consumption and minimum subsistence level, %;
–   X8 - share of population with incomes below the minimum subsistence level, %;
–   X9 - expenditures on actual final consumption of households (from SNA), KZT thous. per capita;
–   X10 - index of household final consumption expenditure, as a percentage of the previous year;
–   X11 - GDP per capita, USD per capita
–   X12 - share of government spending on SB (social benefits) and SA (social assistance), as percentage to GDP;
–   X13 - share of public expenditures on education, as percentage to GDP;
–   X14 - share of public expenditures on healthcare, as percentage to GDP;
–   X15 - consumer price index, %;
–   X16 - consumer price index for services, %;
–   X17 - unemployment rate, %;
–   X18 - number of self-employed people, thous. people.

Further, to build the final model, a package of Microsoft Office applications was used, which enabled us to obtain a correlation matrix, elements of dispersion analysis and balances.

Correlation matrix allows us to obtain a list of factors that directly influence Y, and to exclude those that cannot be used to build an econometric model of the analyzed set of parameters.

The analyzed Y is "the number of active subjects of NPOs (except for parties, religious institutions, trade unions)" are actually influenced by only six factors, correlation coefficient of the five of which (X0, X1, X3, X6, X9) exceeds 90%. Consequently, they will be included in the model. Also, in our opinion, it is advisable to include parameter X7, even though its correlation coefficient is less than 75%. We believe that it can influence the future econometric model, being an important macroeconomic indicator.

Correlation coefficients of the remaining indicators are negative, which indicates the lack of correlation between them and the key analysis value (Y).

The selected values with a significant correlation coefficient are presented in table 2.

Table 2. Selected values (based on the obtained correlation coefficients) for econometric model construction

Indicator	Correlation Coefficient
X0 - number of population, people	0.97
X1 - number of pensioners, people	0.99
X3 - number of state social disability benefits recipients, people	0.91
X6 - household income used for consumption, on average per capita per month, KZT;	0.95
X7 - ratio of income used for consumption and minimum subsistence level, %;	0.70
X9 - expenditures on actual final consumption of households (from SNA), KZT thous. per capita;	0.97
Note: Calculated by the authors.	

Source: compiled by authors

Of the aggregated indicators presented in table 1, the first three indicators (X0, X1, X3) represent the characteristics of the country's population, including its socially vulnerable groups. Indicators X6, X7, X9 are indicators of the country's population income, including the poverty indicator, calculated on the basis correlation between the average per capita income used for consumption and the minimum subsistence level.

Using the Data Analysis add-on, we calculated the indicators of the future regression model (table 3).

Table 3. Regression statistics

Parameter	Indicator
Regression statistics	
Multiple R	0.996589759
R-square (determination coefficient)	0.993191148
Standardized R-square (reduced determination factor)	0.979573443
Observations	10
Co-efficient	
Y-intersection	-20571.02
X1 (X0) variable: "population, people"	0.00083
X2 (X1) variable: "number of pension recipients, people"	0.011
X3 (X3) variable: "number of state social disability benefits recipients, people"	0.00082
X4 (X6) variable: "household income used for consumption, on average per capita per month, KZT";	0.045
X5 (X7) variable: "ratio of income used for consumption and minimum subsistence level, %";	-12.86
X6 (X9) variable: expenditures on actual final consumption of households (from SNA), KZT thous. per capita;	-2.86

Source: compiled by authors

Table 3 shows that the given coefficient of determination exceeds 99%, which indicates that the model is consistent with the data; such a model is considered valid.

The final model view is as follows:

$$y = -20571.02 + 0,00083\,x_1 + 0.011\,x_2 + 0.00082\,x_3 + 0.045\,x_4 - 12.86\,x_5 - 2.86\,x_6$$

An important step is to check the obtained model for autocorrelation. We used the Darbin-Watson criterion method which is considered as the best one.

Firstly, we show the calculated balances, and then, using formula, calculate the Darbin-Watson coefficient and the calculated balances (table 4):

$$DW = \frac{\sum (e_i - e_{i-1})}{\sum e_i^2},$$

where: $e_i = y - y(x)$

Table 4. Calculated Balances

Observation	Predicted Y	Balances	$(e_i - e_{i-1})$	e_i^2
1	7984.519775	-122.5197754	-	-
2	8241.843286	99.15671402	9832,053935	49140,46597
3	8379.860775	111.1392248	12351,92728	143,5805641
4	8894.799371	-45.79937109	2097,582392	24629,72287
5	9083.450998	131.5490022	17305,13997	31452,44549
6	9851.786128	48.21387183	2324,577437	6944,743947
7	10636.54616	-307.5461571	94584,63875	126565,1982
8	11191.71488	-102.7148812	10550,34681	41955,8516
9	11935.86819	66.13180801	4373,41603	28509,20445
10	13061.61044	122.389564	14979,20537	3164,935107
Total			168398.888	312506.1482

Source: compiled by authors

Thus, the Darbin-Watson coefficient in our case is 1.86:

$$DW = \frac{312506.1482}{168398.888} = 1.86$$

It is generally accepted that if the obtained coefficient is in the range of $1.5 < DW < 2.5$, the autocorrelation is not possible. Therefore, the constructed econometric model is effective and can be used in further research on social entrepreneurship development potential in Kazakhstan.

Results. To summarize the research using the correlation-regression model (1 option), we can draw the following conclusions:
The model tested 19 indicators that can potentially influence the scale of the NPISH sector, one of the characteristics of which is the number of NPOs in the country. Six indicators characterize the size and composition of the country's population in terms of socially vulnerable groups.

Six indicators characterize the standard of living of the population in the country on the basis of income measured at the micro- and macro-level (SNA) and the total welfare indicator as GDP per capita.
Three indicators characterize public policy in the form of public expenditure on education, health, social security and social assistance.
Two indicators characterize the real purchasing power of revenues based on the consumer price index for goods and services.
The two indicators characterize the population employment and highlight the part of the population that is self-employed and unemployed as a potentially vulnerable group.

As per the matrix of correlation coefficients, 6 indicators were selected, which have a significant impact on the NPC scale, measured by "number of non-profit institutions" factor.
There is a significant correlation between the number of NPOs and the population characteristics: the population number, the number of pension recipients, the number of disability benefits recipients.

A significant relationship exists between the indicators of the population' standard of living at the macro- and micro-level:
−   expenditures on actual final consumption of households in KZT thous. per capita (measured at the macro level in system of national accounts);
−   household revenues used for consumption, average per capita, KZT;
−   the ratio of household revenues used for consumption and the minimum subsistence level.

In accordance with the coefficients signs in the multiple regression equation, the increase of expenditures on final consumption at the macro-level and improvement of the ratio of revenues used for consumption and the minimum subsistence level slightly reduces the society's demand for non-profit institutions. All other factors influence the growth of such demand.

Whereas the minimum subsistence level over the period under consideration has been repeatedly criticized by the scientific community for being too low, the trend towards an increase in the ratio recorded by statistics can be considered an overestimate, not entirely realistic.

As for the expenditures on the actual final consumption of households at the macro-level, they include government expenditures on individual benefits, and the increase in this indicator slightly reduces the population's need for services of non-profit institutions.

Option 2
We used the following indicators for analysis:
− Y (dependent variable) – gross value added in NPISH sector, KZT mln;
− X1 – (active) NPOs number, units;
− X2 – state social contract, KZT mln;
− X3 - number of state social disability benefits recipients, people;
− X3 - number of recipients of state social benefits;
− X4 - number of recipients of state social benefits for loss of breadwinner, people;
− X5 - number of TSSA (Targeted State Social Assistance) recipients, persons;
− X6 - household income used for consumption, on average per capita per month, KZT;
− X7 - ratio of income used for consumption and minimum subsistence level, %;
− X8 - share of population with incomes below the minimum subsistence level, %;
− X9 - expenditures on actual final consumption of households (from SNA), KZT thous. per capita;
− X10 - index of household final consumption expenditure, as a percentage of the previous year;

- − X11 - GDP per capita, USD per capita;
- − X12 – expenditures on actual final consumption of households (from SNA), KZT thous. per capita;
- − X13 – index of household final consumption expenditure, as a percentage of the previous year;
- − X14 - GDP per capita, USD per capita
- − X15 - share of government spending on SB (social benefits) and SA (social assistance), as percentage to GDP;
- − X16 - share of public expenditures on education, as percentage to GDP;
- − X17 - share of public expenditures on healthcare, as percentage to GDP;
- − X18 - consumer price index, %;
- − X19 - consumer price index for services, %;
- − X20 - unemployment rate, %;
- − X21 - number of self-employed people, thous people.

Further, to build the final model, a package of Microsoft Office applications was used, which enabled us to obtain a correlation matrix, elements of dispersion analysis and balances.

Correlation matrix allows us to obtain a list of factors that directly influence Y, and to exclude those that cannot be used to build an econometric model of the analyzed set of parameters.

The analyzed Y is "gross value added, KZT mln" is actually influenced by only six factors, correlation coefficient of the six of which (X1, X3, X4, X6, X9, X12) exceeds 90% which meets the selection criteria. Consequently, they will be included in the model.

Correlation coefficients of the remaining indicators are negative, which indicates the lack of correlation between them and the key analysis value (Y).

Table 5 contains indicators with significant correlation coefficient.

Table 5. Selected values (based on the obtained correlation coefficients) for econometric model construction.

Indicator	Correlation co-efficient value, %
X1 - number of NPOs (active), units	0.91
X2 - state social contract, KZT million	0.8
X3 - population, people	0.97
X4 - number of pensioners, people	0.94
X6 - number of state social disability benefits recipients, people	0.94
X9 - household revenues used for consumption (average per capita per month), KZT	0.96
X10 - ratio of income used for consumption and minimum subsistence level, %	0.83
X12 - expenditures on actual final consumption of households (from SNA), KZT thous. per capita;	0.96

Source: compiled by authors

Using the "Data analysis" add-in, calculate the future regression model (table 6).

Table 6. Regression Statistics

Parameter	Indicator
Regression statistics	
Multiple R	0.999832608
R-square (determination coefficient)	0.999665245
Standardized R-square (reduced determination factor)	0.996987204
Observations	10
Co-efficient	
Y-intersection	-5415789.79
X1 variable – "number of NPOs (active), pcs." (X1)	-9.39
X2 variable – "state social contract, KZT mln" (X2)	0.95
X3 variable – "population, people" (X3)	0.33
X4 variable – "number of pensioners, people (X4)	0.99
X5 variable – "number of state social disability benefit recipients, people" (X6)	0.007
X6 variable – "household revenues used for consumption (average per capita per month), KZT" (X9)	0.26
X7 variable – "ratio of income used for consumption to the minimum subsistence level" % (X10)	-1100.56
X8 variable – "expenditures on actual final consumption of households (from CHC), KZT thous. per capita" (X12)	-352.02

Source: compiled by authors

Table 5 shows that the given coefficient of determination exceeds 99%, which indicates that the model is consistent with the data; such a model is considered valid.

The final model is as follows:

$$y = -5415789.79 - 9.39x_1 + 0.95x_2 + 0.33x_3 + 0.99x_4 + 0.007x_5 + 0.26x_6 - 1100.56x_7 - 352.02x_8$$

An important step is to check the obtained model for autocorrelation. We used the most optimal Darbin-Watson criterion.

Firstly, we show the balances that we received in calculation, and then calculate the Darbin-Watson factor and the balances obtained in calculations (table 7).

Table 7. Balances obtained in calculations

Observation	Predicted Y	Balances	$(e_i - e_{i-1})$	e_i^2
1	81440.89496	253.2050385	-	-
2	94150.23771	1032.962289	1067011,091	608021,3699
3	116993.0756	-1018.945604	1038250,144	4210326,002
4	148805.4376	-2821.937607	7963331,856	3250780,162
5	164611.7324	1618.367567	2619113,581	19716310,03
6	178582.6751	988.7248865	977576,9012	396449,9047
7	259904.9298	947.1702108	897131,4082	1726,791075
8	272974.5667	125.2332659	15683,37089	675580,3413
9	268911.4506	-1668.350575	2783393,641	3216942,994
10	269627.9295	543.5705282	295468,9191	4892594,966
		Total	17656960.91	36968732.56

Source: compiled by authors

Thus, the Darbin-Watson criterion in our case is 2.09:

$$DW = \frac{36968732.56}{17656960.91} = 2.09$$

It is generally accepted that if the obtained coefficient is in the range of $1.5 < DW < 2.5$, the autocorrelation is not possible. Therefore, the constructed econometric model is effective and can be used in further research on the potential of social entrepreneurship development in Kazakhstan.

Results. The results obtained using the correlation-regression model (Option2) can be estimated as follows.
The model tested 21 indicators, each of which can potentially contribute to the economic results of the NPISH sector, measured as Gross Value Added of NPISH sector. The group of indicators is similar to Option 1, and "Number of operating non-profit institutions, units" and "State social order, million tenge" added.

Significant factors in the model are:
- In terms of economy and the state: number of operating NPOs (0.91%), volume of the state social order in million tenge (0.8%);
- In terms of population: population (0.97%), number of recipients of pensions and state social disability benefits (0.94%);
- In terms of standard of living: household revenues used for consumption (average per capita per month) in tenge (96 per cent), the ratio of income used for consumption to the minimum subsistence level in per cent (83 per cent), expenditure on actual final consumption of households in the account of the expendable income of the SNA in thousand tenge per capita (96 per cent).
The final econometric model taking into account the signs in coefficients leads to a paradoxical conclusion that the increase in the number of non-profit institutions reduces the gross value added of the non-profit sector. Each newly established institution within the period under review reduces the GVA volume by 9.3 million tenge. In our opinion, this indicates that during the period under review there was a practice of opening non-profit institutions under a specific grant and these institutions did not carry out any activities other than spending grant money. As a result, the allocated funds were redistributed among a larger number of institutions, which, if no other activities were carried out, had a negative impact on the sector's GVA. As a result, the GVA per organization decreased. It

is possible that the new practice of NPO registration and the tracking of its history before the allocation of the state grant will have a positive impact on these processes. However, since the model uses data for a long past period, it is not feasible to track and assess the impact of the practice of NPO registration with a special state body at this stage of the study. In addition, we can conclude that the allocation of one additional million tenge to the state social order led to a decrease in NPO activity as a social entrepreneur, reduced incentives to run business in the open market, which in turn reduced the sector's GVA per organization.

The other indicators demonstrated an impact on GVA similar to the first model. In fact, the size of the population and its socially vulnerable groups, especially pensioners and disabled people, has a positive impact on the sector's GVA, which is an obvious fact. The improvement of the income used for consumption and the minimum subsistence level reduces the need of households for the services of non-profit institutions, as they increase their purchasing power and can purchase services in the open market. Therefore, the factor has a negative effect on the sector's GVA. The increase in expenditures on the actual final consumption of households in the account of the use of disposable income of the SNA reduces the Gross Domestic Product Value (GDP) of the sector, because it is accompanied by the free of charge allocation of social services for the population at the macro-level, as natural transfers of the state for individual consumption by the population. This reduces the population's demand for nonprofit institutions services.

The final consumption of households consists of many components and it is difficult to influence its size directly. At the same time, we believe that in order to increase the social efficiency of budget expenditures aimed at paying for public sector services, it is expedient in many cases to switch from a mechanism of subsidizing a service provider (organization of non-profit institutions) to subsidizing a service recipient (household) (figure 1).
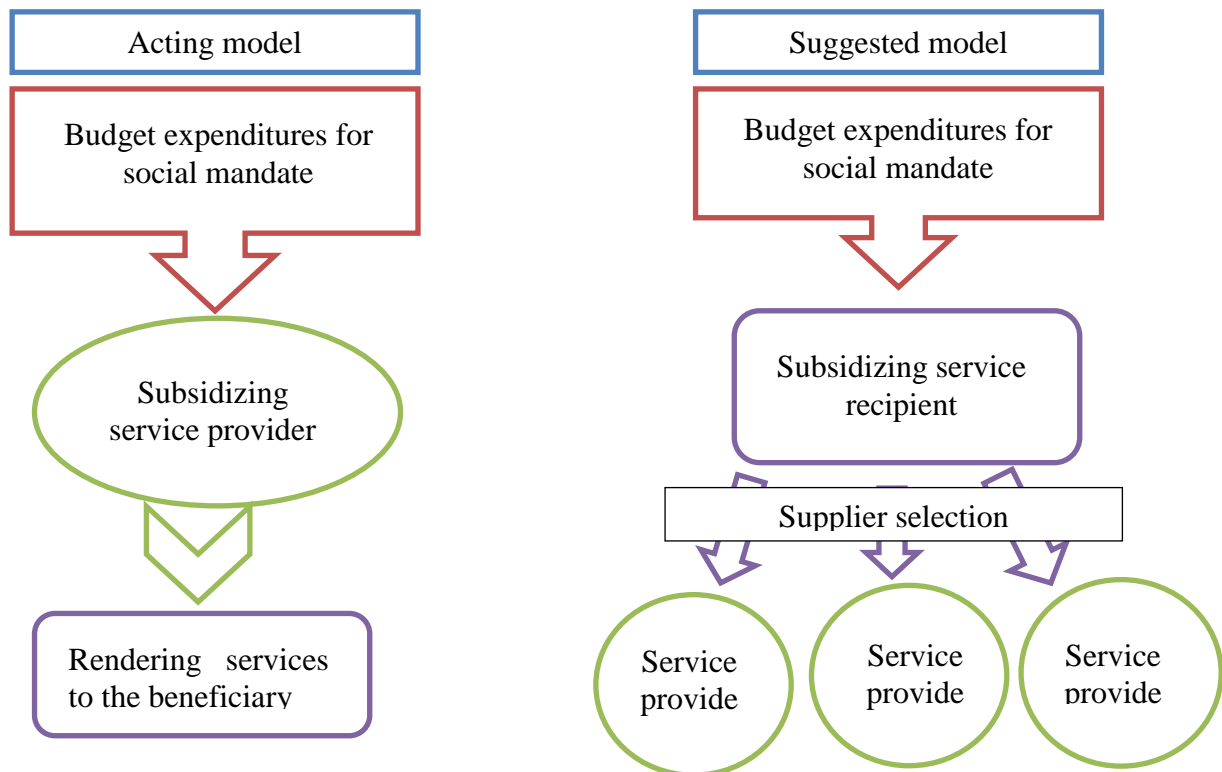
Figure 1. Transformation of the economic mechanism of budget expenditures distribution for the state social order
Source: compiled by authors

This subsidy may take the form of a certificate (voucher or security of any other quality), which is given to the applicant who is legally entitled to a public good, it actually increases his or her income (Makarov, 2018).

The applicant submits a certificate to the organization, and the organization submits the certificate to the state authorities for payment of its value to the organization.

At the same time, the individual has the option of selecting between service providers and will choose the organization that best suits his or her preferences.

Conclusions

Based on the results of the study, we draw the following conclusions.

Despite some additional transactions, developed mechanism, on the one hand, responds to the interests of the beneficiaries better, and on the other hand, supports more competitive institutions. It forms competition among suppliers of benefits and, finally, optimizes the number of non-commercial institutions among which the more competitive ones survive. As the results of our factor analysis show, it is the social demand from disabled people and pensioners that is one of the driving forces for the non-profit sector development.

Therefore, ultimately, this mechanism increases the efficiency of budget expenditures to support the non-commercial sector, since state social order funds are allocated for the service consumer and are not directly allocated to the non-profit sector.

In addition, the proposed economic mechanism will create an impetus for the social entrepreneurship growth. Under the conditions of limited budget funds, non-profit institutions with considerable experience in providing social services and highly qualified personnel will become more active in offering their services in the market.
As the world experience shows, such institutions often lack marketing programs and experience in doing business, but technical support from the development institutions (universities, business associations, etc.) will allow them to develop activities in the field of social entrepreneurship more efficiently.

In our opinion, social entrepreneurship should become a new idea and efficient practice that will enable experienced non-profit institutions, honest service providers to survive and develop which demonstrates a creative approach to their activities.

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ECONOMIC POTENTIAL OF THE COMPANY: EVALUATION AND RESERVES OF ITS INCREASING: A CASE STUDY

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Abstract. At present, one of the most important areas for improving management at the enterprise is the use of a mechanism adapted to modern conditions for assessing production and economic potential, which makes it possible to make an accurate diagnosis of the state of the enterprise's economy, to compare potential opportunities with real economic activity, and to choose directions for the further development of enterprises depending on predicted market conditions. In modern economic conditions, with the complete independence of economic entities and the growing role of resources, the goal of each organization is the optimal formation of the resource base. The principle of the current agricultural organization assumes a continuity of activity, which can be ensured by the presence and steady growth of the enterprise's potential. At present, one of the urgent problems not yet sufficiently developed in the theory and practice of the agrarian economy is the problem of quantifying the production and economic potential, analyzing the effectiveness of its use and practical application in the economic regulation of industrial production, in particular in the dairy industry. This article discusses the analysis of the capacity of the Kazakhstani dairy market, indicators of export and import of dairy products, which showed that it has potential growth reserves in terms of consumption and production. But the functioning of domestic milk processing enterprises is connected both with the long-standing problems of the industry, aggravated during the crisis, and with the current financial, sales problems that arise in the conditions of the Customs Union.

Keywords: production and economic potential; dairy industry; structure of potential; valuation methods; export; import

1. Introduction

The position of Kazakhstan in the world and Eurasian economic system will largely depend on the level of competitiveness of its economy, provided by the introduction of a new techno-economic paradigm based on high-level technologies, the increasing role of science and innovation, and the quality of human potential. World trends in socio-economic development show that the most effective growth factors are manifested in an urbanized economy, the implementation of capital-intensive and knowledge-intensive industries requires concentration of

infrastructure and professionally trained personnel. At the same time, highly productive agriculture is possible with the use of industrial technologies and forms of management that most adequately meet local climatic conditions.

The nation's plan "100 concrete steps to implement the five institutional reforms" involves attracting strategic investors to develop the production of milk and dairy products (as part of the implementation of the 60th step) (Nazarbayev, 2017). In this case, the main task is to ensure the export of up to half of the products to the markets of the CIS countries for three years. The inclusion of this step in the national plan indicates the important role of the dairy industry in ensuring the country's economic development.

The functioning of domestic milk processing enterprises is connected both with the long-standing problems of the industry, and with the current financial, marketing problems that arise in the conditions of the Customs Union, therefore:
-a necessary state sectoral program for the development of milk production and processing, the popularization of dairy products;
- state support is needed so that Kazakhstan dairy plants can update technologies, modernize equipment, improve assortment and train personnel.

2. Research background

One of the main tasks of the modern economy is to determine the real capabilities of economic entities. The study of scientific literature showed that the concept of "economic potential of the enterprise" does not have a clear definition. Most authors consider economic potential as a level achieved through resources actually involved in the production of products. A comparison of the characteristics of the existing terminology made it possible to clarify the concept of the economic potential of the enterprise, which takes into account all the identified advantages in the definitions proposed by scientists and reflects the characteristics of the subject of study.

Some authors in their publications note that the problem of providing the population with dairy products is one of the most important tasks of ensuring food security. Currently, manufacturers should pay attention to market niches, the development of which can be very promising. Such a niche, for example, is the market of milk and dairy products due to the fact that dairy products are important food products in the grocery basket of the population (Butsenko, Grigoryeva, 2018).

Others describe the problem of providing the population with dairy products and argue that it is exacerbated due to the fact that today in the whole world, including in Kazakhstan, there is a shortage of raw milk, increasing every year (Bélanger, Vanasse, Parent, 2016).

In the future the consumption of milk and dairy products will continue to outstrip the growth in production of whole milk (Smirnov, 2017).

It is assumed that the entire increase in milk production in the short term will be used only for domestic consumption, and the deficit will continue to be compensated by the supply of milk powder and vegetable fats, i.e. the shortage of raw milk from processors is covered by import, as some scientists describe in their articles the current state of dairy products (Akhmetov, Stratonovich, Fayzrakhmanov, 2018).

Under these conditions, import substitution is very important, because concerns the interests of both producers of milk and dairy products, and consumers. Domestic raw materials should be fully used for the manufacture of dairy products both at milk processing and agricultural enterprises. For this, it is necessary to stimulate production

and state support for producers, at least information, improve market infrastructure, and provide access to the market (Krapchina, Kotova, 2015).

Analyzing the general approaches to the essence of the production and economic potential, taking into account the well-known features of the functioning of agricultural enterprises in the dairy industry, some authors made it possible to determine the essence of the production and economic potential of agricultural enterprises in the dairy cattle breeding industry, as their ability to produce optimal competitive market (milk) volume corresponding to market demand with the efficient use of balanced-interacting production, labor, financial resources, state support resources, high organizational, managerial and marketing level from the perspective of the reproductive approach of productive systems the industry (Generalova, Dzhamalodinova, 2015).

Other authors describe the production potential, or production capacity, of an enterprise (or an individual industry) - as an opportunity expressed by the volume of production in physical terms, which depends both on the quantity, quality and ratio of resources, and on the level of their return. Elements of production potential, reflecting the specifics of a particular production, characterize the type of enterprise, and the level of return depends on the organization and production management system, as well as on the level of innovation of the technologies used, which, in turn, affects the formation of the organization's development strategy. Thus, the resource potential of an agricultural organization serves as a criterion in determining its production capabilities or production potential (of a separate industry), therefore, it is advisable to use the principle of assessing the effectiveness of resource potential according to a single criterion for classifying resources taking into account industry characteristics, this assessment is based on a resource-cost approach (Fedorova, Gorodov, Gorodova, 2017).

3. Materials and methods

A number of authors, exploring the formation and use of the production potential of the enterprise, argue that for the effective use of the production potential in dairy cattle breeding, it is necessary to observe a number of principles:
- comprehensiveness - providing agricultural production with the necessary types of resources that are in demand for solving strategic development goals, respectively, violation of complexity, revaluation of individual resource elements or elements of the production process entail a production failure, and, consequently, a decrease in the economic efficiency of the agricultural organization;
- proportionality - compliance between the individual elements of production of optimal quantitative proportions of a certain structure, in particular proportionality is expressed in the choice of the right ratio between power and working machines, and, more importantly, in dairy cattle breeding, scientifically based proportions of nutrient content in feed are necessary, which act as the basis for obtaining genetically incorporated productivity of dairy cattle;
- normative - the application of scientifically based standards for the cost of resources for the maintenance of one cow and the production of 1 centner of milk;
- targeted use - the concentration of necessary resources on solving specific problems, taking into account all objective conditions, in particular the concentration of resources, as well as methods and forms of organization of production and management, which is expressed in the system of agriculture or industry;
- modeling - management of production potential in accordance with a certain model of the development of an agricultural organization, which allows us to predict the state of the economy of the organization in time to select the best strategy for the formation of the use of production potential, achieve a given goal with minimal resources. Mathematical models are necessary to develop the optimal strategy and tactics for achieving a given goal (Lepitanova, Romanov, Kosenko, 2015).

Based on the foregoing, to assess the production potential, it is advisable to apply an integrated methodological approach:

1. Assessment of the use of resource potential, ie, the assessment of resource supply and resource yield in the dairy industry.

2. Formation of an economic-mathematical model of production potential in the form of a regression equation for assessing the influence of various factors attributes on the production result, in our case, on the gross milk production, which is planned with the available resources and the production technology used, or by changing the technological chain.

3. Assessment of additional opportunities to attract elements of production potential that are at a minimum in order to optimize the production program based on the balanced use of resource potential (table 1) (Generalova, Dzhamalodinova, 2015).

Table 1. The system of absolute indicators of the production and economic potential of agricultural enterprises of the dairy industry

№	Indicator	Indicators
1	Technical and technological potential	1.1. The proportion of new highly productive breeds of cattle dairy direction 1.2. Fixed assets growth rate 1.3. The coefficient of physical depreciation of fixed assets 1.4. The coefficient of mechanization of production (milk) 1.5. The coefficient of automation of production (milk) 1.6. The proportion of marketable products (milk) of the highest quality
2	Innovation potential	2.1. The saturation coefficient of progressive and technological techniques in the dairy industry in the enterprise 2.2. The share of costs for innovation and research enterprise 2.3. The proportion of marketable products (milk) produced by new innovative technologies
3	Information potential	3.1. The share of costs for information services in total costs 3.2. The proportion of information fixed assets including computers in the total value of fixed assets 3.3. Extent of external advisory services
4	Labor potential	4.1. The proportion of workers with higher education 4.2. The proportion of highly skilled workers 4.3. Staff turnover rate 4.4. Share of bonuses in the annual income of one employee 4.5. The ratio of enterprise costs for continuing education, culture and leisure to the wage fund 4.6. The ratio of the average wage of agricultural workers in the dairy industry with the average wage in the region's industry
5	Financial and economic potential	5.1. The coefficient of financial independence (autonomy) 5.2. Investment ratio 5.3 Absolute liquidity ratio 5.4. Efficiency of using state support funds for the dairy industry of the enterprise
6	Organizational and management potential	6.1. Management efficiency ratio 6.2. The proportion of management workers in the total number of employees 6.3. Level of computerization of managerial work 6.4. Level of organization of labor and production
7	Marketing potential	7.1. Market share of the enterprise 7.2. Price competition coefficient 7.3. The effectiveness of the system of promoting goods on the market 7.4. The effectiveness of advertising
8	Foreign economic potential	8.1. The proportion of products (milk) of the enterprise for export in total sales 8.2. The share of foreign currency earnings in the total revenue of the enterprise
9	Natural resource potential	9.1. Land use ratio 9.2. The utilization rate of agricultural land 9.3. Arable land utilization ratio

Source: compiled and calculated by authors

From the point of view of economic efficiency, Fedorova argues that milk production should be beneficial for agricultural organizations, which is a prerequisite for ensuring expanded reproduction of the industry (Fedorova, 2017).

Milk is one of the most important human foods. Many countries use mainly cow's milk. In Kazakhstan, the consumption of cow's milk is about 95% of the total amount consumed by the population. The world is growing in demand for milk with a high content of natural fat (> 4%) and protein (> 3.3%). Manufacturers get the maximum profit on innovative products, for example, on milk without lactose up to 30% (market share of about 10%). World milk prices are currently on the rise after a sharp decline in 2014, when prices fell below $40.
As of the end of 2018, the price of milk was $8.6. A strong influence on the cost is exerted by: feed prices and labor, natural disasters and agricultural policy.

The strategically advantageous location of Kazakhstan, coupled with rich natural resources, gives significant potential for the development of the dairy industry. Meanwhile, in neighboring countries with Kazakhstan, there has been an increase in the consumption of milk and dairy products. For example, according to the FAO, consumption in China grew by 7.6%, in India - by 3.3%, in the USA - by 2.7%, in South Africa - by 8.2%, in the EU - by 1, 8%.

Monitoring of the milk and dairy products market showed that up to 80% of imported dairy products on the shelves do not always comply with the Technical Regulations of the Customs Union (CU).

Milk is the food product of the vast majority of the population, as well as the basis for the preparation of a huge range of dairy and sour-milk products (cottage cheese, butter, cheese, yogurt, kefir, etc.) (table 2) (Data of the Kazakh-Grain Information Agency for 2017-2018).

Table 2. Dairy production for 2017-2018 in Kazakhstan, tons

Indicator	2018	2017	Annual growth
Liquid processed milk and cream	535501	481888	11,%
Cheese and cottage cheese:	27546	25192	9,3%
- cheese unripe or unrestrained and cottage cheese	18518	17653	4,9%
- low-fat cottage cheese	6435	7069	-9,0%
- fat cottage cheese	8826	7831	12,7%
Grated cheeses, powdered cheeses, blue cheeses and other unprocessed cheeses, except processed cheese:	7456	5918	26,0%
- hard cheeses	5048	4256	18,6%
- soft cheeses	496	310	60,0%
- brine cheeses	1013	843	20,2%
- cream cheese not grated and not in powder	1572	1621	-3,0%
Other dairy products	219142	215232	1,8%
- condensed milk and cream, with or without additives of sugar or other sweetening matter, not in solid forms	8259	9224	-10,5%
- fermented yogurt, milk and cream	198575	192895	2,9%
- koumiss	890	958	-7,1%
- shubat	1807	1619	11,6%

Source: compiled and calculated by authors

The production of other dairy products, including condensed milk and cream, as well as yogurts, kefir, ayran and other similar products grew by 1.8% year-on-year, to 219.1 thousand tons.

4. Results and Discussion

In recent years, in the Republic of Kazakhstan, as a result of a focused agricultural policy, especially in the dairy cattle industry, some progress has been achieved in increasing milk production and animal productivity. According to the Agency of the Republic of Kazakhstan on Statistics, over the past five years (2014-2018), there has been a significant increase in the number of breeding dairy cattle. So, for the period under review, the number of pedigree dairy cows in the Republic of Kazakhstan increased by 23.1%. Scientific journals also note that the milk production of cows has also increased in pedigree farms where animals of foreign selection have been imported (Data of the Committee on Statistics of the Republic of Kazakhstan for 2014-2018).

According to the country's breeders, in the south-east of the republic, a new dairy type of brown cattle "Ak-Yrys" was created by crossing bulls of Schwitz breed with cows of the Alatau breed with an average milk yield of cows per lactation at the level of 5000-5400 kg with a fat content of 3.8% .

In the east of the country, using the bulls of the red-motley Holstein and Ayrshire breeds based on the cows of the Simmental breed, a new red-motley type "Ertys" was created and tested. The average milk yield in these animals is 5200-5600 kg with a milk fat content of 3.8%.

In the central regions of Kazakhstan, using the Holstein black-motley bulls, a new type was tested - Priishimsky and Sayram, the average milk yield of these cows is 5000-5200 kg per lactation with a milk fat content of 3.7-3.8%.

In the context of regions, the highest indicators, corresponding to scientifically sound recommendations of scientists, are in the Almaty region, where in 2018 the productivity of one cow was 2888 kg, North Kazakhstan - 2832, Kostanay - 2579, Akmola - 2662 kg (Table 3) (Data of the Committee on Statistics of the Republic of Kazakhstan for 2014-2018.

Table 3. The dynamics of the productivity of one cow in the context of some regions of the Republic of Kazakhstan for the period from 2013-2018.

Region	Year					
	2013	2014	2015	2016	2017	2018
Almaty	2357	2590	2686	2744	2839	2888
Kostanay	2453	2472	2493	2502	2520	2579
North Kazakhstan	2769	2789	2786	2804	2814	2832
Akmola	2303	2334	2498	2520	2618	2662

Source: compiled and calculated by authors

Thus, an increase in the productivity potential of breeding resources and an increase in the volume of sales of pedigree young stocks to commodity herds contributed to a significant increase in the average milk yield per cow in the republic.

According to EAEU experts on mutual trade published on the website of this international organization, the volume of exports of dairy products of the Republic of Kazakhstan to the territory of the Russian Federation in terms of milk amounted to about 20 thousand tons, the volume of Russian exports to Kazakhstan in terms of milk is approximately 300 thousand tons (Table 4) (Data of the Ministry of Agriculture of the Republic of Kazakhstan for 2016-2017).

Table 4. Export of dairy products

Indicators	January-April 2016		January-April 2017		2017 volume to 2016 volume
	tons	US dollar	tons	US dollar	
Processed milk	2,5 thousand	1,3 million	4,5 thousand	2,5 million	75.7% increase
Sour-milk products	1,3 thousand	836 thousand	2 thousand	1,8 million	54% increase
Butter	33,3	92,5 thousand	121,7	285,5 thousand	3.6% increase
Cheese and cottage cheese	343,3	640,9 thousand	374,2	1,5 million	9% increase
Ice cream	67,6	146,6 thousand	45,5	106,3 thousand	decrease by 32.7%

Source: compiled and calculated by authors

In January-April 2017, the volume of processed milk export to Russia amounted to 3.7 thousand tons in the amount of $ 1.87 million. Kazakhstan also supplied 1.6 thousand tons of dairy products for $ 1 million, 71.9 tons of butter for $ 271, 3 thousand and 286.3 tons of cheese and cottage cheese for $ 1.2 million. For the same period, Kyrgyzstan sent: 258.6 tons of processed milk for $ 212.2 thousand, 285.7 tons of dairy products for $ 447.7 thousand, 49.8 tons of butter for $ 14.2 thousand and 61.9 tons of cheese and cottage cheese for $ 176.9 thousand. In addition, Kazakhstan exported 519 tons of processed milk to Turkmenistan. The ministry also announced the interest of enterprises in exporting dairy products to China.Thus, the export volume is 54.8 thousand tons, and the import volume is 574.0 thousand tons, and domestic consumption is 10.8 million tons. According to experts and the State Revenue Committee of the Ministry of Finance of the Republic of Kazakhstan, the share of imports in the structure of consumption of milk processing products is from 10 to 40%. The main countries supplying these dairy products to the Kazakhstan market are: the Russian Federation, Kyrgyzstan and Belarus. However, in In general, over the past two years, there has been a decrease in milk imports in US dollars (figure 1) (Data of the State Revenue Committee of the Ministry of Finance of the Republic of Kazakhstan for 2011-2017). See Figure 1 below.
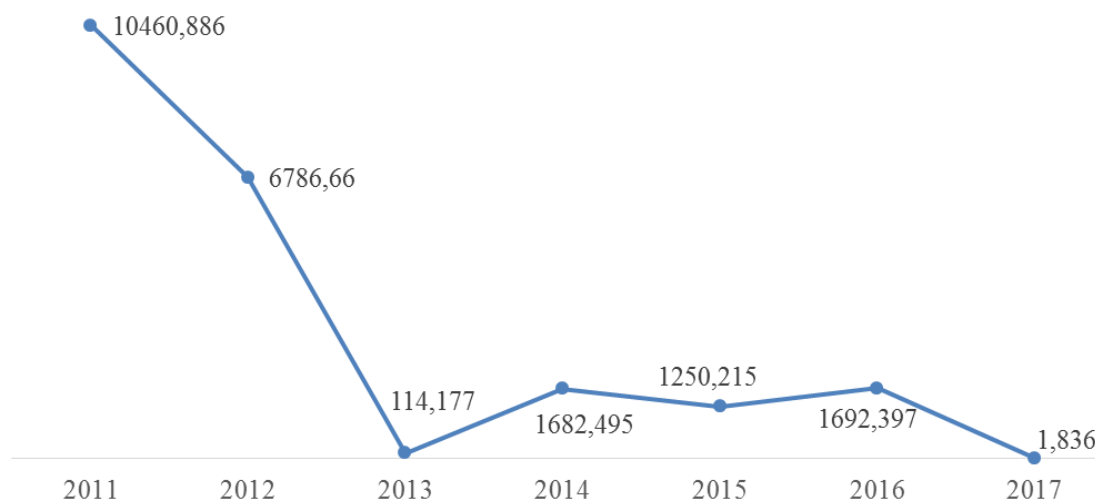
Figure 1. Dynamics of milk imports to the Republic of Kazakhstan for the period from 2011-2017, thousands of US dollars
Source: compiled by authors according to data of the State Revenue Committee of the Ministry of Finance of the Republic of Kazakhstan for 2011-2017

According to the academician of NAS RK Zh.Zh. Suleimenova, "there is a very big difference between the imports and exports of dairy products of the Republic of Kazakhstan, since imports of dairy products strangle Kazakhstan producers. Kazakhstan's producers will be forced to lower prices for domestically produced dairy products, and consumers of the final product will lose high-quality dairy products on the market and will be forced to consume foreign products, which after its production will be on the way to sales for a long time " (table 5).

Table 5. Market capacity and consumption of milk and milk products in the Republic of Kazakhstan for 2015-2017, thousand tons

Indicator	2015	2016	2017
Stocks at the beginning of the year	531,4	402,3	371,1
Production	5182,4	5341,6	5503,4
Export	97,1	46,8	54,8
Import	568,9	592,4	574,0
Market volume	6282,7	6336,3	6448,6
Per capita consumption, kg / year	237,0	238,9	241,2
Need, thousand tenge	1130,9	1112,7	1085,8

Source: compiled and calculated by authors

Let us analyze the impact of imports and exports on milk production in the Republic of Kazakhstan. Figure 2 shows the statistics needed to build a two-factor regression model.
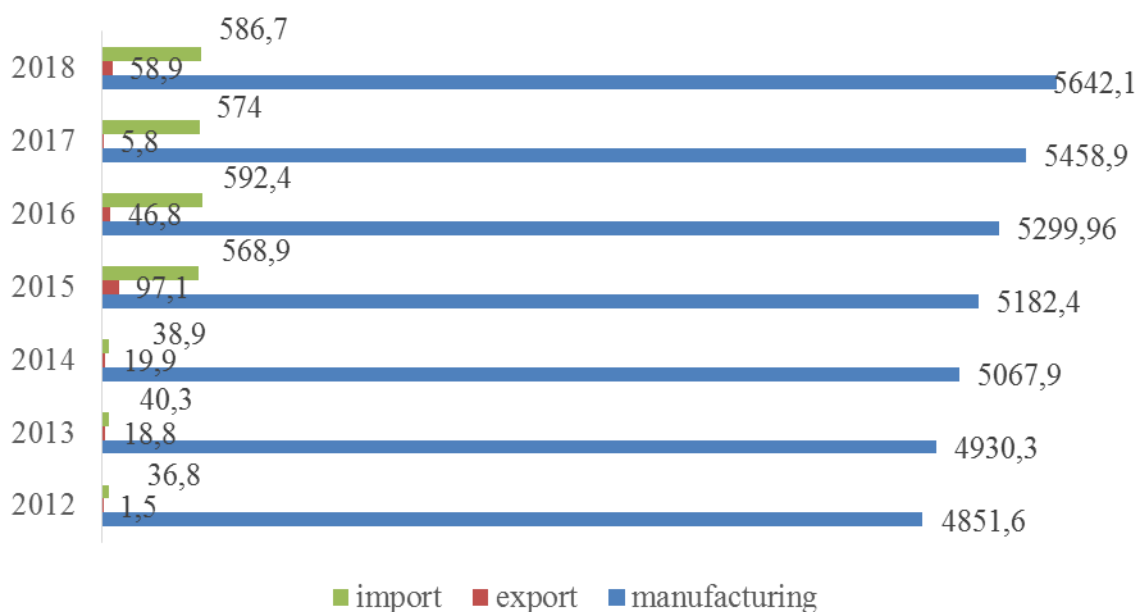
Figure 2. Dynamics of production, import and export of milk in the Republic of Kazakhstan for 2012-2018, thousand tons
Source: compiled by authors

We introduce the following notation:
y – milk production (thousand tons);

x_1 – milk imports (thousand tons);

x_2 – milk export (thousand tons).

We will evaluate the parameters of the two-factor regression equation using the Regression analysis tool (Data Analysis in Excel). As a result of the data approximation, the following multiple linear regression equation was obtained:

$$y = 4945,573 + 1,094\,x_1 - 2,865\,x_2$$

The multiple correlation coefficients is equal, which indicates a close relationship of the resulting trait with two factor traits at the same time.

Check the statistical significance and reliability of the obtained regression equation and its coefficients. From the data of the regression analysis execution protocol, we have that the observed value of the Fisher criterion is $F_{obs} = 7,788$. The critical value of the Fisher test at a significance level $\alpha = 0,05$ and number of degrees of freedom $k_1 = m = 2$, $k_2 = n - m - 1 = 4$ (where n – number of observations, m – number of factors) is $F_{crit.}(0,05; 2; 4) = 6,944$. Because $F_{obs} > F_{crit}$ ($7,788 > 6,944$), then we can conclude about the statistical significance and reliability of the obtained regression equation (Sedelev, 2017).

Let us analyze the obtained regression coefficients:
- with an increase in milk imports by 1 thousand tons, milk production will increase by 1,094 thousand tons;
- an increase in milk exports by 1 thousand tons entails a decrease in milk production by 2,685 thousand tons.

One of the indicators with which you can evaluate the measure of the response of one variable to a change in another is the coefficient of elasticity. In our case, it will show the ability to change the volume of milk production depending on changes in the volume of imports and exports.

We define the aggregate average elasticity coefficients:

$$E_{yx_1} = -6,19\%, \quad E_{yx_2} = -0,59\%.$$

Having analyzed these elasticity coefficients, we obtain the following conclusions:
1) with an increase in the volume of milk imports by 1% of the average level, the volume of milk production increases by 0.073% of its average level with a constant volume of exports;
2) with an increase in the volume of milk exports by 1% from the average level, the volume of milk production decreases by 0.023% from its average level with the same volume of imports.

Thus, we can conclude that for domestic producers it is more advantageous to satisfy the domestic dairy market, and then export their products abroad. This is due to the fact that the main task of producers in the country is to withstand competition from foreign companies, increasing the supply of high-quality goods at affordable prices and, accordingly, increasing innovative activity in the field of technologies for the production of milk and dairy products.

To do this, it is necessary to ensure a growing demand for milk by increasing domestic production and technological modernization of equipment and the technological process for the production of milk and dairy products. The main competition is expected from the EurAsEC member countries. A number of measures can be proposed here. One of them is the attraction of foreign investment in the country's agriculture.

According to the analysis of the Dairy Union of Kazakhstan, the market in this segment for many years shows an increase in consumption by an average of 5.2%.

Livestock farmers in the East Kazakhstan, Turkestan and Almaty regions are becoming leaders in milk production (Figure 3) (Data of Kazagromarketing JSC for 2018).
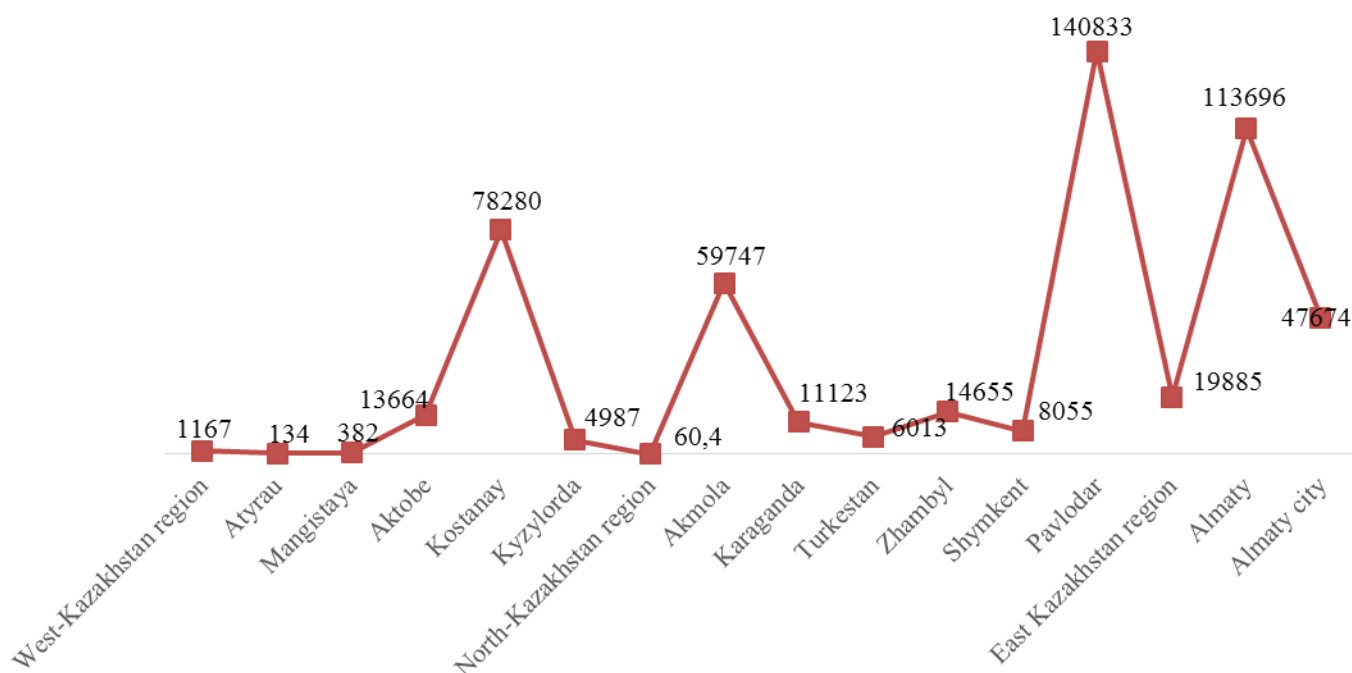
Figure 3. Dairy production by region of the Republic of Kazakhstan for 2018, tons
Source: compiled by authors

For 2018, almost 750 thousand and 805 thousand tons of products were produced in these regions. According to the Ministry of Agriculture, over the past year, about 5.5 million tons of milk has been produced in the Republic of Kazakhstan, of which 80% is produced in personal farm households. At the same time, the share of processing from the total production volume is 35%, or 1.68 million tons.

According to official figures, today in Kazakhstan there are 148 milk processing enterprises. Of these, 5.4% are large, 29% are medium and 65.5% are small. Over the past five years, seven new enterprises have appeared: two in the Akmola region, one in the Aktobe region, one in Almaty, one in East Kazakhstan and one in the South. The total capacity is 1.8 million tons of milk per year, of which 72.6 thousand tons accounted for opened over the past five years. The total workload is 60%; in 2015 this figure was 58%. Domestic enterprises provide the domestic market with dairy products by 92% with a total demand of 5.77 million tons. Kazakhstan processed milk covers 95.6% of the demand, dairy products - 86%, butter - 66%, cheeses and cottage cheese - 56%.

There are no clearly defined leaders on the Kazakhstan market - each company is strong in its segment (Figure 4) (Report on market research in the industry by code General classifier of types of economic activity 10.51 "Milk processing and cheese production").
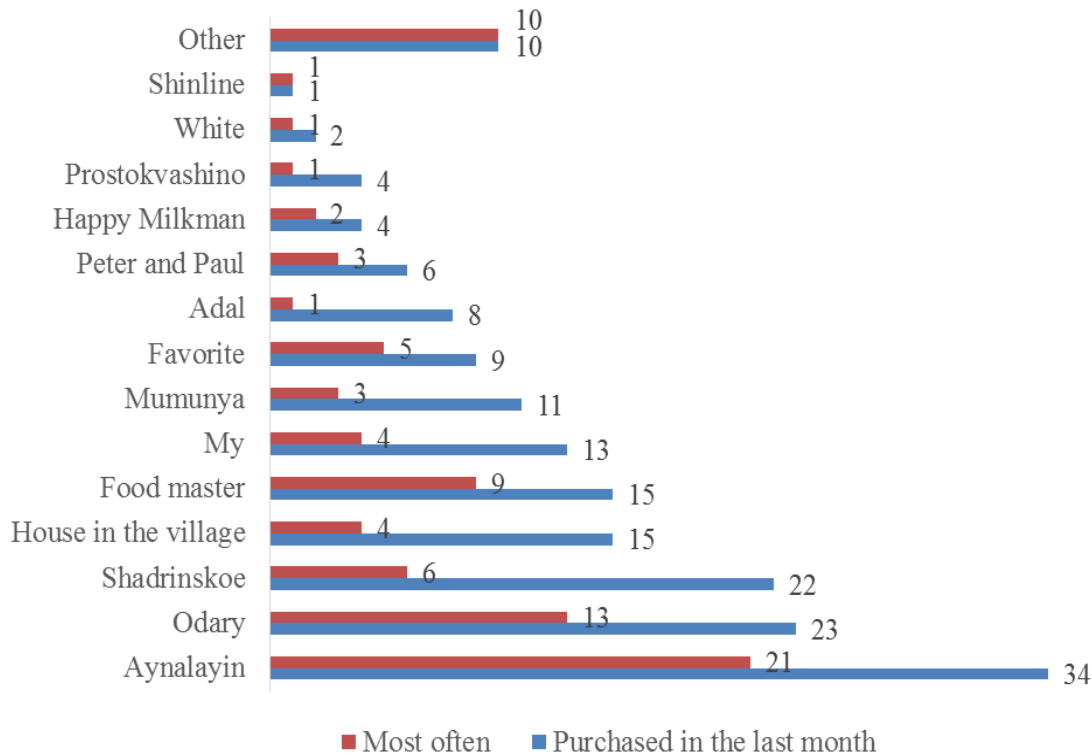
Figure 4. Analysis of preferred brands of milk in Kazakhstan in 2018
Source: compiled by authors

So, for example, the leaders in ultra-pasteurized milk are:
1) domestic manufacturers:
- "RaimbekAgro LLP with the Ainalayyn brand", which occupies about 30% of the market;
- LLP "Agroproduct" (the leading brand "Mumunya" - 20% of the market);
- LLP "RG BrandsKazakhstan" - ("Mine" - 14%);
- JSC FoodMaster Company, which was acquired in 2004 by the French company Lactalis, which is Europe's second largest producer of dairy products, (brands Korovye, Domashnoye and a share of about 10%),
2) foreign manufacturers:
- "Wimm-BillDann" - Kyrgyzstan ("Village House" and "Merry Milkman");
- Unimilk - Russia, which have approximately 8% of the market.

In the pasteurized milk segment, market shares are relatively evenly distributed among Kazakhstani producers, and the leaders in this sector are:
- FoodMaster with 29% (including 14% of Pavlodar Sut JSC, which was acquired by FoodMaster in 2008);
- LLP "DEP" (Kostanay), occupying 14%;
- Vostok-Milk LLP accounts for 12%;
- JSC "APK" Adal "- 10%.

In 2010, Danone joined these enterprises, the world's largest producer of dairy products with a global market share of 12%, investing 21 million euros (4.2 billion tenge) in the construction of its first plant in Kazakhstan with a capacity of 24 thousand tons dairy products manufactured under the brands "Activia", "Rastishka" and "Danone".

Analyzing the Almaty region, according to 2018 data, there are about 15 milk processing enterprises with various levels of processing capacity and technological, stock and raw materials equipment. Meanwhile, the resource potential of raw milk in the Talgar, Ili and Enbekshikazakh districts amounts to 62.38-107 thousand tons per year, according to general estimates.

The following enterprises operate in the consumer market of the city of Almaty:
1 FoodMaster JSC - takes the greatest opportunities for the supply of raw materials, the network of procurement points which cover more than 170 farms in Almaty, Turkestan and Pavlodar regions. With a processing capacity of up to 45 thousand tons of milk per year, the company processes about 38 thousand tons of raw materials.
2 Raimbek Agro LLP - occupies the second position in the region in terms of milk procured and processed, the processing capacity of which is up to 17 thousand tons of milk per year.
3 JSC "APK Adal" - which accounts for no more than 5 thousand tons of milk, the remaining enterprises process significantly smaller volumes of raw materials and, accordingly, occupy the lowest positions in the total production. The level of consumption is a very important indicator for the dairy market of Kazakhstan.
4 Smak LLP.

Over the past 10-15 years, milk consumption in the Republic of Kazakhstan has doubled, however, the level of milk consumption is three times lower than the norm (the medical norm is 340 kg per person annually). If the consumption level continues to grow and reaches the recommended medical norm, say, by 2020, then, with the help and protection of the state, this will give Kazakhstan producers a chance to develop and strengthen their positions in the dairy market.

According to the calculations of J.J. Suleimenova (calculation of the profitability of milk production using the example of a milk producer from Northern Kazakhstan), income / profit per head amounted to 837.62 tenge, profitability threshold - 128.32 tenge, marginal income per 1 kg of milk - 33.91 tenge, and income / profit per 1 kg of milk without taxes - 0.15 tenge, which allowed us to draw the following conclusions:
- the company at a given price level works profitably;
- feeds account for the largest share of expenses;
- without subsidies, the company would be unprofitable;
- at this level of milk prices, it is unprofitable for an enterprise to invest in new production (low return on equity);
- at a given level of milk prices, but using external financing, the company's profitability would be negative;
- to stop production is also unprofitable (losses occur in the amount of 190.76 tenge per head).

Thus, the level of milk production must be raised by establishing breeding services in the country, which makes it possible to increase the growth potential of productivity of breeding animals. The milk market in Kazakhstan grew over the half-year by only 0.85%, when annual consumption growth averages 5.2%, and this already shows a low level of milk production in the country.

The large difference between the indicators of import and export shows that domestic producers are largely uncompetitive; therefore, to improve productivity, a clear development of subsidizing the costs of producers is necessary.

The level of milk consumption by the population of Kazakhstan is three times lower than the medical norm, and, in connection with this, the growth in milk production is very low. To meet the quality requirement, market

participants must apply the requirements of the technical regulation of the Customs Union, which means the application of the EAEU requirements. This, of course, will lead to a five-fold reduction in the supply of raw milk, since up to 90% of the private household plots do not correspond to bacterial contamination (> 500 thousand / cm^3), and more than 50% of the raw materials in summer are collected collective farm milk, which is not available in winter.

Conclusions

The most important role in ensuring the quality and safety of finished dairy products belongs to the quality of the feedstock - milk.

The production and economic potential of agricultural enterprises in the dairy industry is the ability to produce an optimal volume of competitive products (milk) that meets market demand with the efficient use of balanced interacting production, labor, financial resources, government support resources, a high organizational, managerial and marketing level from the perspective of the reproductive approach of productive forces industry enterprises.

The main directions for improving it are:
- breeding work to form a productive herd;
- providing the herd with complete feeds and the development of new effective feeds with biological additives and fillings;
- equipping farms with modern milking installations, coolers, storage tanks, other equipment and its competent use;
- harmonization of domestic regulatory documents that define the requirements for raw milk, as well as methods for assessing its performance with international requirements and standard;
- strict observance of the terms and conditions of storage of transportation of raw milk to dairy enterprises, correct and timely primary processing of milk;
- creation and implementation of a system for the collection, delivery, evaluation and payment of raw milk from individual distributors and farmers;
- development and implementation of settlements with suppliers of an optimized pricing system that takes into account the quality of milk.

The share of milk delivered for processing in the total global production volume is 62%, while this indicator in Kazakhstan is only 27%. However, the processing enterprises are unprofitable in the total mass, they need cost optimization. The share of feed in the cost is 40-60% in Europe, 70-90% - in arid countries.

Feeding costs are closely related to farm management skills. The prime cost of milk and, importantly, its quality is the key to the competitiveness of the industry. Thus, the cost of milk in Kazakhstan is $ 19/100 kg of milk, which is incomparable with the countries of Europe, North and South America. Despite the fact that Kazakhstan almost completely provided itself with the main line of food products, import dependence on several types of goods still remains on the domestic market.

For example, poultry, sugar and milk. However, each such "dependence" is explained by a whole set of reasons. Thus, the widespread milk production is hindered in our country, first of all, by the shortage of large professional farms and model farms of medium and small dairy businesses. After all, dairy farming is an entire art, under which a huge and complex infrastructure is brought.

The main challenges facing Kazakhstan's dairy business in Kazakhstan:
- distorted statistics;

- personal subsidiary plots (LPH);
- the dispersion of small producers in the vast territory of the republic;
- weak business of the production of related items, for example, the same packaging, according to the regulations of the Customs Union (CU).

The necessary conditions for the development of agribusiness in the dairy industry are as follows:

1) Low cost of feed production.

2) High genetic potential of animals and compliance with technology of keeping.

3) Availability of markets.

The main directions of development of agribusiness in the dairy industry are as follows:

1) Construction of 20 industrial-type dairy farms with a nominal capacity of 1,200 milking heads, or a total capacity of 24,000 milking heads.

2) Construction of 2,000 mini family-type dairy farms, which will contain 187,000 milking heads with a total milk yield of 689 thousand tons of milk per year.

3) Increase in capacity and modernization of 100 existing dairy farms, on which the growth of the dairy livestock will be 23.3 thousand heads, which will ensure an increase in the milk output by 74 thousand tons.

4) An increase in the productivity of the existing livestock and the volume of milk produced in agricultural enterprises and personal subsidiary plots by 750 thousand tons.

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THE INFLUENCE OF CORPORATE GOVERNANCE MECHANISM ON THE INTEGRATED FINANCIAL REPORTING AND INVESTMENT RISK OF THAI LISTED COMPANIES[*]

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Abstract. This study was to examine relationships between corporate governance mechanism, integrated financial reporting, and investment risk on the stock exchange in Thailand. This study has investigated determinants and consequences of integrated financial reporting by analyzing Form 56-1 for year-end 2015 of the 240 Thai listed firms. To examine the relationship, an integrated financial reporting checklist was developed to identify the level of integrated reporting of listed firms on the Stock Exchange of Thailand. An index was based on seven dimensions of the International Integrated Reporting Framework. An integrated financial reporting is then analyzed using content analysis. An integrated financial reporting and corporate governance mechanism were collected from Form 56-1 for year-end 2015. Investment risk data was collected from SETSMART database. The analysis was conducted using structural equation modeling (SEM). The statistical results from factor analysis found that all seven dimensions are appropriate measurements of integrated financial reporting. The empirical result is that positive relationships were found for stakeholder-oriented corporate governance mechanism, shareholder-oriented corporate governance mechanism and integrated financial reporting; integrated financial reporting and investment risk. The model identified mediating relationship of integrated financial reporting between shareholder-oriented corporate governance mechanism and investment risk.

Keywords: corporate governance; integrated reporting; integrated financial reporting; investment risk

1. Introduction

This paper studies the determinants and consequences of the integrated financial reporting (IFR) on Investment Risk in Thailand. Integrated financial reporting may be briefly defined as "a process founded on integrated thinking that results in a periodic integrated report by an organization about value creation over time and related communications regarding aspects of value creation." Where an annual integrated report "communicates an organization's strategy, governance, performance, and prospects in the external environment" (International Integrated Reporting Council [IIRC], 2013). Integrated financial reporting was first initiated in 2009 by Prince Charles, the Prince of Wales, and the International Federation of Accountants (IFAC), The Global Reporting Initiative (GRI) and other parties. They established the International Integrated Reporting Council (IIRC) in 2009 and published a framework in December 2013. The number of corporations applying integrated reporting remained relatively low during the early years, but this was followed by a rapid surge in popularity between 2009 and 2012. However, the level of integrated reporting then went into a period of decline after they published a framework in December 2013. It might be that the framework was confusing for the companies (Demirel & Erol, 2016).

The integrated reporting principle adoption varied widely in developed countries (Demirel & Erol, 2016). It is just beginning to permeate into Southeast Asia (e.g., Malaysia, Singapore, and Thailand). Graham (2014) suggested that the principal's adoption in developing countries should be studied due to their low integrated reporting. Especially in Thailand, the Securities and Exchange Commission announced in 2015 that corporate reports of listed companies should integrate non-financial and financial information. That is the first step to integrated reporting in Thailand. However, some organizations are struggling to determine whether their statements are integrated ones. That's why, the integrated reporting in Thailand has proved to be a somewhat complicated distinction in reporting practice, as well as, the emergence and effects of integrated financial reporting in Thailand.

2. Literature review
Background of Integrated Reporting

European enterprises were the first to adopt integrated reporting in 2002, followed by American companies in 2008 and South African listed firms in 2010 (Abeysekera, 2013; Eccles & Saltzman, 2011). However, there remained ambiguity and a lack of clarity over the definitions, framework, and standards of integrated reporting. Some of the international organizations and famous scholars developed different integrated reporting definitions. For instance, the Integrated Reporting Committee (IRC) describes integration as "a holistic and integrated representation of a company's performance regarding both finance and sustainability" (IRC, 2011). In addition, IIRC defines integrated reporting as "a process founded on integrated thinking that results in a periodic integrated report by an organization about value creation over time and related communications regarding aspects of value creation" (IIRC, 2013). An integrated report "communicates an organization's strategy, governance, performance, and prospects in the external environment" (IIRC, 2013). Robert G. Eccles opined that integrated reporting presents various issues, including social, environmental, and corporate governance, in one amalgamated report (Eccles & Saltzman, 2011). To summarise, an organization's future values can be affected by integrated reporting which presents non-financial and financial performance information, such as corporate strategy and governance, environmental, social and economic.

Nowadays, integrated reporting principle is at an early stage in Southeast Asian Countries. For instance, in 2013, the Institute of Singapore Chartered Accountants (ISCA) and the Malaysian Institute of Accountants (MIA) in 2014 created Integrated Reporting Steering Committees (IRSC), which have a vital roles in developing integrated reporting (Abdullah, Husin, & Nor, 2017). The integrated reporting is still unknown in Malaysia and not yet

integrated (Graham, 2014; Jamal & Ghani, 2016). PWC (2014) noted that most of the Top 30 companies listed on the Bursa Malaysia already disclose at least some of the content elements in the international integrated reporting framework (IR framework). However, there is a lack of linkage between these elements. Also, a survey of ISCA and National University of Singapore [NUS] (2014) indicated low level of knowledge about integrated reporting in Singapore but a higher level than the other Southeast Asian countries. Thailand, however, still has voluntary disclosure of integrated financial reporting in the Stock Exchange of Thailand (Suttipun, 2017). Thai listed companies started to integrate financial reporting into their corporate reports in 2015 (Aujirapongpan & Chanatup, 2015). As the principle of integrated reporting is in its initial stages, it is increasing academic attention.

Although the integration of reporting has been carried out continuously since 2002, a definitive reporting framework is still currently being developed. Internationally IIRC is vital for creating an IR framework (Velte, 2014). IIRC was formed in 2010 through a partnership between GRI and the Prince of Wales Accounting for Sustainability Project (Main & Hespenheide, 2012. They published their first framework in December 2013. Practitioners should focus on the international integrated reporting framework for the purpose of comparison at that national and international level. Under this framework, the basic concepts and principles of the annual integrated report consist of content elements, guiding principles and fundamental concepts (IIRC, 2013). The details are as follows (Table 1):

Table 1. Summary of international integrated reporting framework

Fundamental Concepts	Guiding Principles	Content Elements
1. Capitals	1. Strategic focus and future orientation	1. Organizational overview and external environment
1.1 Financial	2. Connectivity of information	2. Governance
1.2 Manufactured	3. Stakeholder relationships	3. Business model
1.3 Intellectual	4. Materiality	4. Risks and opportunities
1.4 Human	5. Conciseness	5. Strategy and resource allocation
1.5 Social and relationship	6. Reliability and completeness	6. Performance
1.6 Natural	7. Consistency and comparability	7. Outlook
2. Value creation		8. Basis of presentation

Source: (Stent & Dowler, 2015)

Corporate Governance Mechanism and Integrated Financial Reporting

Corporate governance (CG) is a concept that has existed for centuries. However, the definition is different according to the views of academics. Tricker (1984) mentioned that CG is a control role not related directly to the company's operations creating satisfaction for the supervisory authorities while controlling management. Keasey and Wright (1993) defined corporate governance as 'a structure, process, culture and system that contributes to the successful operation of the organization'. Parkinson (1994) defined CG as 'supervising processes to ensure that the operations of the company are consistent with the interests of shareholders'. Gillan and Starks (1998) found corporate governance was 'a legal system, rules, and factors that control the operations of the company'. OECD (2004) defined CG as 'referring to the company guidance and control system. The structure of CG represented the allocation of rights and responsibilities of various groups in the company such as the board of directors, shareholders and other stakeholders'. It was also determining rules and work processes to be used as a guide in making decisions about business operations. With good governance, the company will have a structure that helps in determining objectives and methods for monitoring performance and achieving objectives. SET (2006) has defined CG as a system that provides a structure and process of relations between shareholders, management team and the board of directors, to "create competitiveness, lead to growth and add value to shareholders in the long term with regard to other stakeholders". From the definition of CG, it can be concluded that CG is controls company operations to achieve objectives in accordance with the interests of stakeholders.

In the past, CG was "an important mechanism to reduce problems between the management and the shareholders of the company by controlling and monitoring the operations of the management department through the board of directors to create maximum benefits for shareholders" (Lazonick & O'Sullivan, 2000). However, the current business philosophy changed from taking into account the best benefits of shareholders to consider the benefits of all stakeholders such as the environment, related communities, customers and employees, etc. (Pfarrer, 2010). Therefore, CG must give priority to other stakeholders to maintain the interests of shareholders. It is associated with the objectives of integrated financial reporting that focuses on users of both reports e.g. group of funding providers or shareholders, and other stakeholders. According to the study of Shao (2009) and Mallin, Michelon, and Raggi (2013), it could form a group of CG mechanisms affected business information disclosure into 2 groups. 1) Stakeholder-Oriented CG Mechanism: STCG consists of ownership diversity, board size, non-independent directors, community directors, environment directors, CSR committees, women directors, and board interlocks. 2) Shareholder-Oriented CG Mechanism: SHCG consists of CEO duality, independent directors, insider ownership, institutional ownership, and ownership concentration.

From the literature review and related research, that the following relationship between the disclosure of business information and the CG-oriented mechanism and. Allegrini and Greco (2013) studied the relationship of CG mechanisms and information disclosure of listed companies in Italy. It found a positive correlation of the disclosure of business information with that the distribution of shares conflicting with Mallin et al. (2013). United States studies of the relationship of social and environmental information disclosure, social performance, and CG mechanisms. The size of the directors has a positive influence on the disclosure of business information while the distribution of shares is negatively correlated with social and environmental information disclosure (Akhtaruddin & Rouf, 2012; Allegrini & Greco, 2013; Jizi, Dixon, & Stratling, 2014; Rouf, 2011). In addition to the distributed shareholding structure and the size of the business, it affects the level of information disclosure of the business. Shao (2009) and Mallin et al. (2013) found that directors who are related to the community, environmental organizations and many companies were an important factor causing an increase in the level of information disclosure of the company. In addition, according to the study of Cai, Keasey, and Short (2006), it was found that the disclosure of business information were positively related to female directors.

In the past, there was a study of the relationship of the shareholder-oriented CG mechanism and business information disclosure. The corporate governance mechanism was an important factor that causes the level of information disclosure to increase and decrease in the same direction and opposite direction with Shao (2009). The study found that if the company shares were held by many institutional investors, the level of information disclosure of the company has decreased as well as holding shares by persons within the company or holding by executives and directors. The independent directors' proportion positively correlates with the disclosure of business information (Arcay & Vazquez, 2005; Cheng & Courtenay, 2006; Clemente & Labat, 2009), and the merger of the Chairman and CEO. It was also an important factor causing the level of information disclosure to increase and decrease (Akhtaruddin & Rouf, 2012; Gul & Leung, 2004; Rouf, 2011).

Stakeholder-Oriented Corporate Governance Mechanism and Integrated Financial Reporting

At present, businesses are facing pressure from economic, social and environmental problems, allowing business owners and executives to increase transparency in operations and consider the impact on society more including efforts to report activities that affect stakeholders of the business. Ullmann (1985) believes that any action of a stakeholder-focused entity would affect the amount of information disclosure that was associated with more stakeholders. According to the study of Sacconi (2006) and Mallin et al. (2013), it was found that the corporate governance mechanism that focuses on stakeholder groups is related to the level of disclosure of qualitative information about the business regarding responsibility for society and environment. According to a study by Churet and Eccles (2014), it found that businesses with good governance, social and environmental, performance affect the integrated financial reporting data disclosure of the business which corresponds to the research results

of Frias-Aceituno, Rodriguez-Ariza, and Garcia-Sanchez (2014). The results found that the level of disclosure of social responsibility according to GRI's reporting framework affects the integrated financial reporting level of the company. It could be seen that the focus on business stakeholders is related to the integrated financial reporting. The researcher therefore set the research hypothesis as follows:

H1: Focused CG Mechanism Stakeholders are positively related to the Integrated Financial Reporting.

Shareholder-Oriented Corporate Governance Mechanism and Integrated Financial Reporting

CG was a mechanism to monitor the operations of the management department to maintain shareholders' best interests (Fama, 1980). The mechanisms reduced agent problems that have a long history. The quality of information disclosure in company reports is affected by Good corporate governance (Williamson, 1981). Most of the research results found that company information disclosure is associated with corporate governance (Arcay & Vazquez, 2005; Cai et al., 2006; Eng & Mak, 2003; Gul & Leung, 2004; Ho & Wong, 2001; Jizi et al., 2014; Mohamad & Sulong, 2010; Rouf, 2011). It was consistent with Durak (2013)'s study which found that companies with a strong and diverse regulatory structure of the Board of Directors influence the integrated financial reporting of the business. Although the director had a duty to report the business performance to the shareholders, the CG mechanism would increase the amount of information disclosure and reduce the asymmetry of information between executives and shareholders. However, the corporate governance mechanism had many elements and not all components would have a positive relationship only. Some elements were related in the opposite direction to the level of information disclosure (Mallin et al., 2013).

H2: CG Mechanism focusing on the group of shareholders has a negative relationship to the Integrated Financial Reporting.

Integrated Financial Reporting and Investment Risk

Europeans recognized the term risk about 1,200 years ago as a term used to describe uncertainty (Kast & Lapied, 2006). Frank H. Knight is the first economist to separate the definition of risk and uncertainty clearly. He wrote the book titled "Risk, Uncertainty and Profit" published in 1921 (Holton, 2004). In Knight's view, risk means an event that can predict the outcome of the probability calculation, while uncertainty means an event that cannot predict the outcome because it is impossible to know the probability of the outcome. In 1960, Harry M. Markowitz proposed the theory of securities selection based on risks and rewards rather than receiving (Brigham & Ehrhardt, 2013). Investment risk is an important factor in investors' investment decisions. The risks can be defined as follows (Thailand Securities Institue, 2013): In general, risk means uncertainty that may result in one of the future opportunities under certain probability levels, and risk from investment. Investment Risk means the opportunity or possibility that investors will not receive the expected return. The stock exchange is a major source of funds for listed companies. Investors can choose to invest in assets based on acceptable risks and returns. Therefore, the listed company is responsible for disclosing information that is relevant to the decision to investors.

In the past, the study of the relationship of the risk of investment in securities and the level of information disclosure of the business and focused on developed countries such as Australia, the United Kingdom and the United States, (Clarkson & Satterly, 1997; Clarkson & Thompson, 1990; Firth, 1984). According to Clarkson, Guedes, and Thompson (1996) and Clarkson and Satterly (1997), the level of information disclosure and investment risk associated with each other is in the opposite direction. For developing countries, there were not many studies in this area and there are also different opinions. Lam and Du (2004) studied the relationship of information disclosure and risk from investment in the Chinese stock market. They found that compulsory disclosure is related to investment risks of securities. However, they did not find the relationship of voluntary

sector disclosure and risk from investment in securities. Hassan, Giorgioni, Romilly, and Power (2011) found the relationship between voluntary disclosure levels and risks from investment in securities through studying Egypt's relationship of voluntary disclosure and investment risks. From this relationship, there is a probability of the relationship between integrated financial reporting and investment risk. The researcher therefore set the research hypothesis as follows:

H3: Integrated Financial Reporting has negative relationships with Investment Risk.

Conceptual Framework

The relationships of variables in this study are shown in the conceptual framework in Figure 1. The relationship of stakeholder-oriented corporate governance mechanism is expected to be positive, but negative to integrated financial reporting. Finally, the relationship of integrated financial reporting to investment risk may be negative.
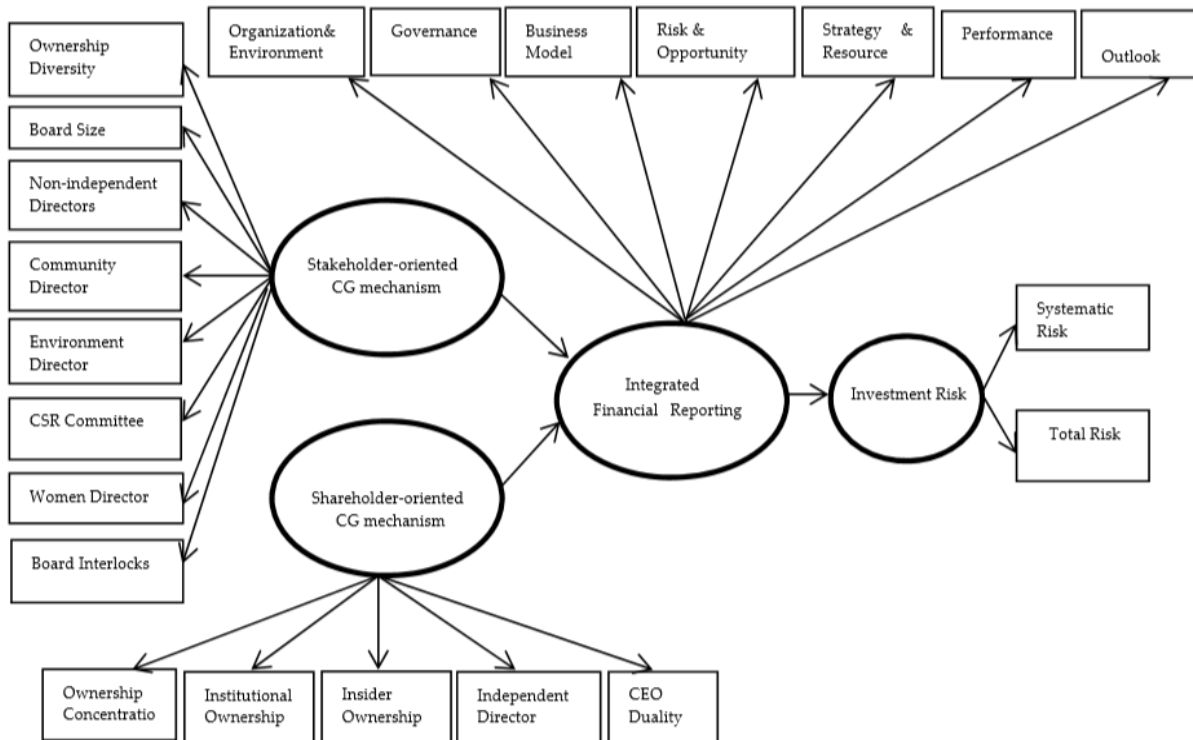
Figure 1. Conceptual framework of the study

3. Research Methodology

Sample and Population

This study's population consisted of 583 Thai Stock Exchange listed companies in 2015. Of these, 65 were excluded as property funds. In addition, 38 were excluded because of under rehabilitation. This study employed a structural equation modeling (SEM) approach. According to the concept of Bentler and Chou (1987), the number of samples should be 5-10 samples per 1 observed variable. The resulting sample proportion to the observed variable 10:1 was 240 firms. The data were collected from the annual registration statement (Form 56-1) for year-end 2015. This year was chosen because it was the first time that the Securities and Exchange Commission had mandated corporate social responsibility information be disclosed by all listed companies on form 56-1.

The Integrated Financial Reporting Measurement

The researchers employed the content analysis approach to examine how the corporate reporting of the sample organizations adopted of the IR framework. The level and extent to which integrated financial reporting had been applied in previous studies (Herath & Gunarathne, 2016; Stent & Dowler, 2015) was determined using the content elements of the IR framework. In the current study, the basic of presentation element was excluded because it is difficult to be measured objectively. Therefore, the integrated financial reporting index consisted of 34 items across seven categories: business model (5 items), strategy and resource allocation (4 items), performance (7 items), governance (5 items), organizational overview and external environment (7 items), risk and opportunities (3 items), and future outlook (3 items). The researchers applied dichotomous scoring to indicate the level of integrated financial reporting. An item scores one if it is mentioned otherwise it scores zero. Disclosure Index (DI) is calculated by:

$$DI = \sum_{i=1}^{n} di \bigg/ \sum_{i=1}^{m} di$$

Where;

di = 1 if the item is mentioned and 0 if not;

n = the number of mentioned items;

m = the maximum number of items;

Disclosure Index takes values between 0 and 1 ($0 \leq INDEX \leq 1$). A value closer to 1 indicated a greater applies the International Integrated Reporting Framework into corporate reporting.

Data Analysis

Structural equation modelling (SEM) was used due to its superior flexibility and capabilities (Byrne, 2016). The measurement model was examined with confirmatory factor analysis (CFA) and the relationships within the model were examined using path analysis (Kline, 2011).

4. Research Finding

Causal Modeling

The direct and indirect relation between investment risk and the corporate governance mechanism, through the integrated financial reporting is studied using a structural equation model (SEM). The structural model (Figure 2) shows the relationship among thevariables included in our study. Goodness of fit indicators (Table 1) demonstrate that themeasures selected are consistent with a good fit, including chi-square 194.40 (p = 0.10),CMIN/DF (1.13), GFI (0.97), AGFI (0.96), CFI (1.00), NFI (1.00), RMSEA (0.02). Accordingly, this model was generally consistent with empirical data and the rule of model fit.
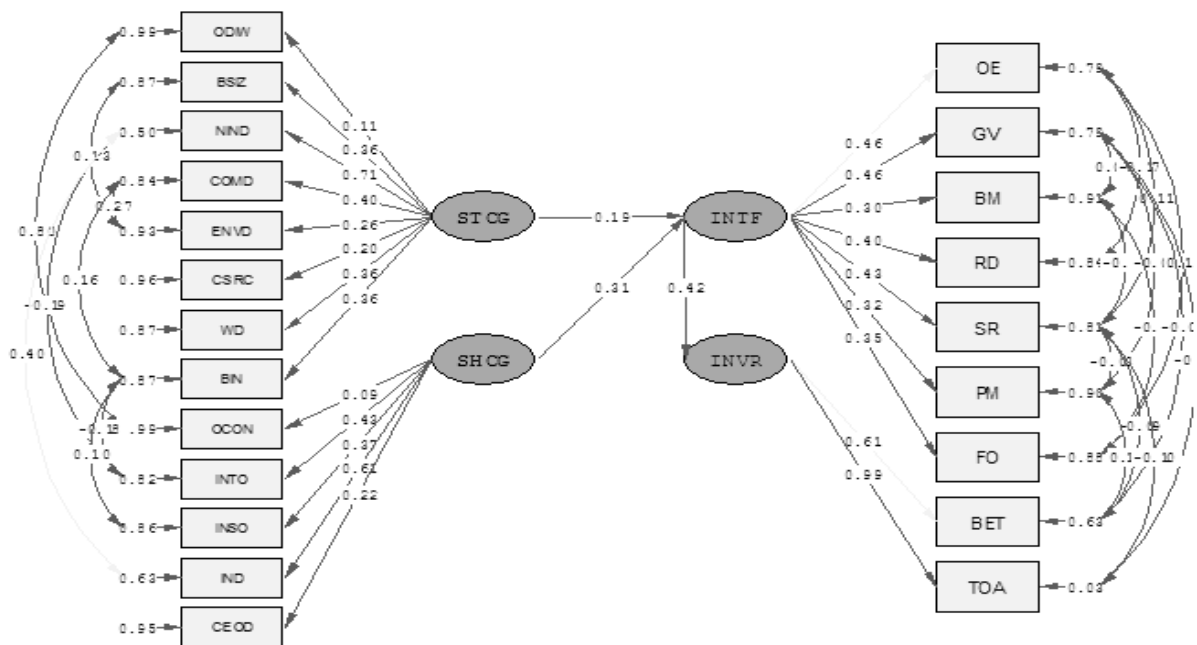
x^2=194.40 df=171 p=.10 GFI=0.97 AGFI=0.96 CFI=1.00 NFI=1.00 RMSEA=0.02

Figure 2. Structural Model

Structural equation modelling, path analysis extended the regression model results, to assess the significance of the proposed relationship paths in the model at $p < 0.05$. Of the proposed factors in integrated financial reporting, both(stakeholder-oriented CG mechanism and shareholder - oriented CG mechanism) had a significant positive relationship. The standardized regression weights indicated that the shareholder-oriented CG mechanism ($\beta = 0.31$) is higher than than the stakeholder-oriented CG mechnism ($\beta = 0.19$). In addition, the shareholder-oriented corporate governance mechanism had a significant positive relationship to investment risk proxies, while the stakeholder-oriented CG mechnism dit notsignificant. The regression weights showed that the shareholder-oriented CG mechanism ($\beta = 0.13$) is higher than the stakeholder-oriented CG mechnism ($\beta = 0.08$). Finally, the integrated financial reporting had a significant positive relationship ($\beta = 0.42$) to investment risk.

Table 2. Model effects

Variable	Integrated Financial Reporting			Investment Risk		
	DE	IE	TE	DE	IE	TE
Stakeholder-oriented CG mechanism	0.19*	0.00	0.19*	0.00	0.08	0.08
	(1.97)		(1.97)		(1.68)	(1.68)
Shareholder-oriented CG mechanism	0.31**	0.00	0.31**	0.00	0.13**	0.13**
	(3.44)		(1.97)		(1.68)	(1.68)
Integrated Financial Reporting	0.00	0.00	0.00	0.42**	0.00	0.42**
				(2.70)		(2.70)

*Note: *Level of significance 5%, ** Level of significance 1%*

The model effects (Table 2) show the standardized coefficients and the direct and indirect effects on and statistical significance of the investment risk proxies. From Table 2, it was found that the causal model affecting investment risk was directly influenced by integrated financial reporting variables. It has a positive influence coefficient of 0.42 which is a significant influence statistical at level 0.01. In addition, investment risk variables are indirectly influenced by shareholder-oriented CG mechanisms. It has a positive influence coefficient equal to 0.13 which is the influence of statistical significance at the 0.01 level. Stakeholder governance mechanism has positive influence coefficient at 0.08. In addition, it can determine the causal model that affects reporting integrated finance as follows:

The causal models affect integrated financial reporting directly influenced from shareholder-oriented corporate governance mechanisms with the highest influence coefficient equal to 0.31. It is an influence that has statistical significance at level 0.01 and is positively influenced by the stakeholder-oriented corporate governance mechanism with the lowest influence coefficient of 0.19. It has the influence of statistical significance at the level of 0.05. The predictive coefficient was found that the causal model could explain 18.00 percent of the investment risk ($R^2 = 0.18$). The causal model can together explain 28.00 percent of integrated financial reporting ($R^2 = 0.28$).

Hypothesis Outcomes

Based on the the analysis of the relationship between shareholder-oriented corporate governance mechanism, corporate governance-oriented stakeholders, integrated financial reporting, and risks from investment of the business by using structural equations modelling (SEM) to test the Measurement Model it is consistent with empirical data. In addition, the variance obtained from the regression analysis can analyze the results of the research hypothesis as follows:

> **H1:** *Focused Corporate Governance Mechanism Stakeholders are related positively to the Integrated Financial Reporting.*

From the analysis results, it was found that the stakeholder-oriented corporate governance mechanism had a positive correlation with integrated financial reporting with statistical significance at the level of 0.05 with the positive influence coefficient, the lowest is 0.19. Therefore the study supports the hypothesis.

> **H2:** *Focused Corporate Governance Mechanism, the shareholder group has a negative relationship with Integrated Financial Reporting.*

From the analysis results, it was found that the shareholder-oriented corporate governance mechanism had a positive correlation with integrated financial reporting with statistical significance at 0.01 level with a maximum positive influence coefficient of 0.31. Therefore, the study results do not support assumptions.

> **H3:** *Integrated Financial Reporting has a negative relationship to Investment Risk.*

From the results of the analysis, it was found that integrated financial reporting had a positive correlation with investment risk with statistically significant level 0.01 with a coefficient of influence equal to 0.42. Therefore, the study results do not support assumptions.

Conclusions

For analyzing the relationship between factors to prove the hypothesis the researcher used the Lisrel version 8.72 program to analyze using Path Analysis to test all 3 hypotheses. It was found that statistical results support 1 research hypothesis and statistical results do not support 2 research hypotheses. From the analysis of results, it was found that the stakeholder-oriented corporate governance mechanism had a positive correlation with integrated financial reporting with statistical significance at the level of 0.05 with the lowest influence coefficient of 0.19. Therefore, the study results support the assumptions. In accordance with Sacconi (2006) and Mallin et al. (2013) studies found that stakeholders-oriented corporate governance mechanisms relate to the level of qualitative information disclosure of businesses, especially the disclosure of social and environmental responsibility.

In addition, businesses with environmental, social and good corporate governance performance are associated with the disclosure of integrated financial information for businesses (Churet & Eccles, 2014). The level of social responsibility disclosure according to the Global Reporting Initiative (GRI) influences the level of integrated financial reporting of the company. The focus of corporate governance mechanisms on stakeholders has a positive influence on integrated financial reporting. It may be caused by such corporate governance mechanisms giving priority to stakeholders and having an effort to communicate to stakeholders about the overall business performance by presenting financial performance reports and non-financial performance in one integrated financial report. From the analysis results, it was found that the shareholder-oriented corporate governance mechanism had a positive correlation with integrated financial reporting with statistical significance at 0.01 level with the maximum influence coefficient of 0.31. Therefore, the study results do not support assumptions. It is in conflict with the findings of Mallin et al. (2013) that found that the shareholder-oriented corporate governance mechanism is in the opposite direction to the level of disclosure of the business.

This research found a similar relationship between the shareholder-oriented corporate governance mechanism and integrated financial reporting. Due to the integrated financial reporting, the focus is on the disclosure of holistic performance data to stakeholders who are the funding providers, primarily investors and shareholders. Therefore, the shareholder-oriented corporate governance mechanism, which gives priority to maintaining benefits for shareholders has a positive influence on the level of integrated financial work. From the results of the analysis, it was found that the integrated financial reporting had a positive correlation with investment risk with statistically significant level at 0.01, with the influence coefficient equal to 0.42. Therefore, the study results do not support assumptions. The results of this research are consistent with the studies of Hassan et al. (2011) which found the relationship between voluntary disclosure of business and investment risks in Egypt. But there is a conflict with Lam and Du (2004)'s study that does not find a relationship between voluntary disclosure and investment risks.

However, the finding that compulsory disclosure to the risk of investing in the Chinese stock market also contradicts the results of Clarkson et al. (1996) and Clarkson and Satterly (1997) which found that the disclosure of the business has a negative relationship with the risk of investing in the United States United Kingdom and Austria. This research found a positive relationship between integrated financial reporting and investment risk. It is because the sample group has a high level of risk exposure and business opportunity. Such factors may affect the behavior of investors who are sensitive to information and affect the confidence of investors. The researcher summarizes the results of analyzing the relationship between factors and proof of assumptions as follows. Stakeholder-oriented corporate governance mechanisms and corporate governance-oriented mechanisms for shareholders are positively related to the level of integrated financial reporting, and integrated financial reporting has positive correlations with the investment risk of the sample that is listed on the Stock Exchange of Thailand.

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IMPLEMENTATION OF INTEGRATED REPORTING: A CROSS-COUNTRIES' STUDY[*]

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Abstract. This study aims to provide a comprehensive comparative study about the implementation of integrated reporting in four countries, Indonesia, South Africa, Japan, and Singapore. Using content analysis, we document that, in terms of elements of integrated report content firms listed in the two countries in which integrated reports are not mandatory, Japan and Singapore, are equal with South Africa, which requires its listed firms to publish integrated report. We also document that, in Indonesia, the five firms selected are shown to outline most of the elements of integrated reporting content and its principles guidelines even though it's not comprehensive

Keywords: Integrated Reporting; Indonesia; value creation; investment information

1. Introduction

Asymmetry information is always present in markets. As result, markets demand more future oriented and detailed information which will improves market efficiency (Ernst & Young, 2014). Those needs have already been attempted to be addressed by issuing sustainability reports or corporate social responsibility reports, but are not fully integrated with firms' annual reports (KPMG, 2011). Originally intended to provide additional information to stakeholders, instead it became a boomerang by providing too much information at once. Information disclosed by firms is not simply a matter of the amount of information, but rather integrating it so it can create value, either in the short, medium, or long term. These phenomena drive a new framework called Integrated Reporting (IR) that focuses on nonfinancial information and data, creating a motivation for long-term

investments related to environmental, social, governance (ESG) and financial factors that parallel with financial reporting (Pavlopoulos, Magnis, & Iatridis, 2019). IR can hopefully serve as a breakthrough in terms of the previous reporting format constraints of conventional financial reporting and sustainability, by providing information and perspectives which are more comprehensive, integrated, effective, and transparent in one reporting format (Brown & Dillard, 2014; Cheng, Green, Conradie, & Romi, 2014; Lai, Melloni, & Stacchezzini, 2018; Reuter & Messner, 2015).

Basically, IR is classified as subjective compared to financial reporting as it reports both historical and prospective data that shares quantitative and qualitative characteristic (Maroun & Atkins, 2015; Simnett, 2015). As implied by The International Integrated Reporting Council (IIRC), information provided by a financial reporting framework does not help managers to create long-term future forecast and strategies (Pavlopoulos et al., 2019) as mostly it omits structural data, such as ESG information (KPMG, 2013). It makes stakeholders lack of knowledge on how firms deal with long-term challenges and issues if they only rely on financial reporting.

As needs to be noted, IR does not simply eliminate short-term information and only focus on long-term ones, rather, it provides both financial and non-financial information (Ioannou & Serafeim, 2015) which means management can monitor and control current firm operations (Eccles, Krzus, & Tapscott, 2010, p. 252; IIRC, 2013; Potter & Soderstrom, 2017) and at the same time provide information to stakeholders about a firm's strategies (Abeysekera, 2013). By integrating both financial information in financial reports and ESG information, mostly composed in sustainability reports, IR provides insight that firms not solely focus on profit numbers but also sustainable decisions and long-term objectives so that stakeholders can measure how a firm is actually performing (Adams, 2015; IIRC, 2011).

Contrary with benefits offered by IR, all listed firms are only required to disclose their financial reporting in annual reports whereas non-financial information is not mandatory. Currently, IR has been only mandatory in the Johannesburg Stock Exchange (JSE), South Africa, while, in others, it is mostly as voluntary reporting (Burke & Clark, 2016). An additional point about IR, as it still new and unfamiliar, is that it has no standard format, so stakeholders are required to make investment decisions and associate sustainability with economic valued based on the internet (Eccles & Saltzman, 2011). This issue means firms can simply decide what elements of IR are disclosed. Matters are worsened by the fact that IR is not mandated to be audited, so the assurance of IR itself becomes the responsibility of the firm itself based on their Corporate Governance (IIRC, 2013) and the standard on establishing assurance level of IR is very limited (Warren, 2018). From the point of view users, most stakeholders view IR as secondary information sources (Rensburg & Botha, 2014) as they don't completely understand its beneficial aspects. It can be concluded that there are disparities between the theory of usefulness of IR and the implementation process, as it not shown to be as smooth as expected.

This study aims to provide a comprehensive-comparative study about the implementation of IR in four countries. We select South Africa, Japan and Singapore as comparative countries with Indonesia in terms of implementation of IR in each country. First, we describe implementation of IR in the first three countries and compare each with the other to provide insight on the practices of IR in a country that mandates the IR implementation (South Africa) and countries that do not mandate (Japan and Singapore). Further, we discuss implementation of IR in Indonesia, as it is that lagged with Japan and Singapore in terms of IR implementation. It becomes interesting to study as Indonesia ranked 8th of largest Gross Domestic Products-Purchasing Power Parity in 2016 and is forecast to be ranked 5th in 2030 and 4th in 2050 (PwC, 2014, 2017). Imagining those economic potentials of Indonesia synchronized with fully implemented IR would be fruitful for Indonesia and this study is interested in that matter.

Our sample consist of four countries: South Africa, Japan, Singapore, and Indonesia, of which, for the first three countries, we select two listed firms, one in financial industries and the other in non-financial industries. This

selection criteria is chosen based on the financial and non-financial industries not sharing similar reporting standards. As for Indonesia, we select five listed firms that already implement IR to provide better insight on the IR implementation process in Indonesia. For each selected firm, we identify its IR based on its principles guideline and elements of content and compare it for each country.

We document that, in terms of elements of IR content, firms listed in both countries where IR is not mandatory, Japan and Singapore, these are equal with South Africa which requires its listed firms to publish IR. However, as regard principles guideline of IR, Japan and Singapore are lagged with South Africa. It is concluded that, in order to maximize the implementation of IR, government needs to devise regulations that force firms to create and publish IR. In Indonesia itself, the five firms selected show outlines of most elements of IR content and its principles guideline, even it's not comprehensive. Further, we found that the description of elements of IR content and its principles guideline is not as detailed and profound as other countries.

The rest of this manuscript is as follows: section 2 provides the institutional setting of Indonesia, section 3 discusses the adopted research methodology and, in section 4, we elaborate our research findings. This manuscript ends in section 5 which outlines our conclusion, implication, and future research recommendation.

2. Integrated Reporting Needs Worldwide

2.1. The Urgencies of Integrated Reporting in Indonesia

Indonesia's modern economy has been long in the making, shaped by periods of extended prosperity, a major socioeconomic and political crisis in the late 1990s, and a strong and sustained recovery during the past 20 years (Asian Development Bank, 2010; Breuer, Guajardo, Guajardo, Kinda, & Fund, 2018; Oberman, Dobbs, Budiman, Thompson, & Rosse, 2012; Sasongko, Hunga, Julana, Wahyudi, Leliak, & Huruta, 2019; Sasongko, Huruta, & Wardani, 2019).

Positioned as 8th in terms of largest Gross Domestic Products-Purchasing Power Parity in 2016 and forecast to be ranked 5th in 2030 and 4th in 2050 (PwC, 2014, 2017), inflation has shown decreasing trends from double into single figures and government debt as share of GDP is now lower than the majority of advanced economies.

Indonesia is also strategically positioned in that it is located in heart of the resurgence in Asia. For the next 15 years, approximately 1.8 billion people will join the global consuming class oh which more than percent lie within Asia (Dobbs et al., 2012). This phenomenon will drive in its home economic region promises of an abundance of demand for the resources and commodities that the country supplies (Oberman et al., 2012) including Indonesia. Indonesia's business development speed will be boosted rapidly, creating a surge of how business practices information are demanded both from local and foreign investors. Business information needs must be detailed yet easy to comprehend in order to make investment decisions in the short and long-term period.

Indonesia's listed firms need to capture this market need by providing appropriate reporting that serves the needs of the market yet at the same time is efficient and effective. Based on *Otoritas Jasa Keuangan,* a statutory body that regulates the Indonesia Stock Exchange, currently Indonesia has three common kinds of reporting, which are annual report, sustainability report, and financial report for listed firms. Unfortunately, these reports contents have overlapped each other, such as corporate social responsibility activities are disclosed in both annual report and sustainability report. These practices are aggravated by different framework guidelines to be followed for each type of report.

The implementation of IR in Indonesia should address these problems. The information provided by IR will be more concise and easier to understand as there will be no more overlapping of contents. IR provides a holistic and

integrated representation of the company's performance in terms of both its finance and its sustainability (IRCSA, 2011), which is suitable for Indonesia's current reporting issue.

2.2. Integrated Reporting in South Africa, Japan, and Singapore.

We select South Africa as comparative country as only in the Johannesburg Stock Exchange (JSE) is IR mandatory (Burke & Clark, 2016). Another justification for selecting South Africa is that it has highest quality in terms of IR worldwide (Eccles, Krzus, & Solano, 2019). As for Japan and Singapore, we select those countries as they are located in Asia and thus share similar characteristics of Indonesia. Japan and Singapore also have advanced economies that are suitable for IR implementation.

3. Research Methodology

This study uses qualitative methods in terms of data collection and analysis. The researchers used the literature review method to answer the research questions. Literature sources consisted of e-books, international journals, and various government regulations. Multiple case studies also support to address research question. This is because the researchers want to understand the five companies in Indonesia that have claimed to implement IR. Multiple case studies are needed because each case in the company can show something similar or different. Multiple case studies allow researchers to dig deeply into
t a phenomenon.

Content analysis is used to answer the fourth research question about IR implementation in Indonesia compared to other companies in the world. The researchers used an integrated report from five companies in Indonesia, two Japanese companies, two companies in Singapore, and two companies in JSE South Africa. This foreign company was chosen because it was registered on the IIRC website. The researchers analyzed the aspects of the content element and guiding principle of the published IR and concluded that the unit of analysis in this research is the implementation of integrated reporting in companies in Indonesia, Japan, Singapore and South Africa.

In content analysis, researchers will use descriptive statistical analysis to see the differences and similarities in the IR elements revealed by each company and also the type of industry. Researchers will provide descriptions and mapping in the form of graphs or diagrams to facilitate the mapping of IR elements revealed in each industry. This mapping is expected to provide a more comprehensive analysis related to the implementation of IR in companies in Indonesia.

4. Result and Discussion

4.1 The Implementation of Integrated Reporting in Japanese, Singaporean, and South African State Companies as seen from the Concept / Framework, Elements, Content

Based on 226 integrated reporting researches from 2010-2020 in the library database, Scopus, as of April 2019, there were a total of 33 researches that discussed integrated reporting. There were 30 researches in South Africa (90.9%), one in Japan (3.0%), and two in Singapore (6.1%). See Figure 1.
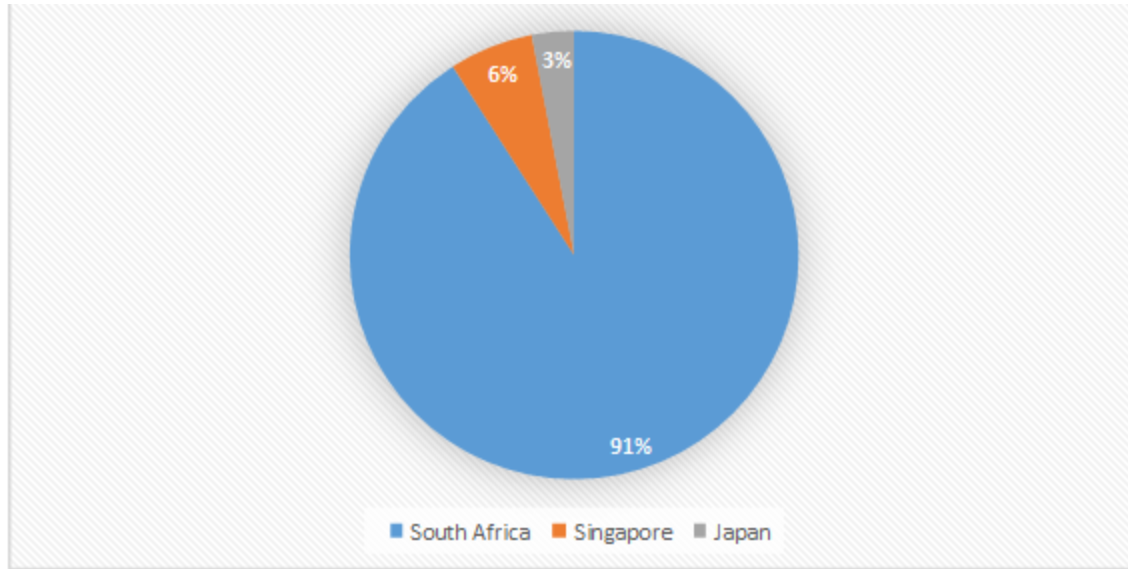
Figure 1. The Distribution of Integrated Report Research

4.1.1. Examples of Integrated Reports Implementation in Companies in Japan, Singapore and South Africa

4.1.1.1. Integrated Reporting Research in South Africa

There were 31 integrated report studies in South Africa from 2010-2020. Most of the integrated report research in South Africa discusses the use, implications, and application of the integrated report. From 30 integrated report studies on South Africa, the researchers found 19 studies that used qualitative methods (63.34%), 10 studies that used quantitative methods (33.34%), and one study that used a combination of qualitative methods and quantitative (3.34%). From the research that discusses integrated reports in South Africa, the researchers conclude that the integrated report contains much information that has a good impact on the company, even though there are still doubts from its users.

Classification according to the topic shows that there are 16 (53.34%) researches which address the implementation of the integrated report, which explain how companies report and integrate a company's multiple financial statements into a single unit. With the implementation of the integrated report, companies in South Africa assume that they will be able to be transparent and responsible for the reports they make, and can communicate the company's ability to create and maintain value. Companies that are well-established in integrated reporting and show a positive experience will also have an impact on performance. Furthermore, companies can also simultaneously show their behavior through an integrated report.

There are seven studies (23.34%) that explain the effect of the implementation of the integrated report on the company. The introduction of integrated reports in South Africa has undoubtedly increased the level of information disclosure about the six capitals, which includes human capital, financial capital, manufactured capital, intellectual capital, social and relationship capital, and natural capital of companies listed on the JSE (Johannesburg Stock Exchange). It was also found that integrated reports can reduce information processing costs in companies with complex operating and information environments while increasing the integrated performance of a company.

BIn addition, there are three (10%) researches which discuss the relationship between integrated reporting and the Audit Committee in the company. It can be concluded that the Audit Committee ability and Audit Committee

meeting are positively related to the quality of integrated reporting quality. Some research also shows that the effectivity of the whole audit committee function has strong positive relationship with the quality of integrated reporting practice.

4.1.1.2. Integrated Reporting Research in Singapore

There are two studies that discuss integrated reporting in Singapore. Both are exploratory studies. One study discusses the application of integrated reporting at the Development Bank of Singapore (DBS), and another study discusses the overall public companies in Singapore. The results of both studies indicate that integrated reporting has a good impact on the company. Although integrated reporting in Singapore is still currently voluntary, Singapore is ready and able to apply integrated reporting to all companies.

4.1.1.3. Integrated Reporting Research in Japan

There is only one research on integrated reporting in Japan and which explains the impact. This study combines two methods, namely the case study method in Japanese companies and the interview method of Mitsubishi Heavy Industries company employees. From this study, it can be concluded that the impact of the implementation of the integrated report in Japan improves company performance. However, the interviews concluded that implementing mandatory integrated reports required organizational culture reform.

4.1.2. The Implementation of Integrated Reporting

Tables 4.1, 4.2, 4,3 and 4.4 are tables of integrated reporting implementations for companies in South Africa, Japan, and Singapore.

4.1.2.1. Financial Company

Table 4.1. Comparison of Integrated Report Content Element

Element	South Africa	Japan	Singapore
Organisational overview and external environment	✔	✔	✔
Business Model	✔	✔	✔
Outlook	✔	✔	✔
Basis of Preparation and Presentation	✔	✔	✔
Strategy and Resource Allocation	✔	✔	✔
Risks and Opportunities	✔	✔	✔
Governance	✔	✔	✔
Performance	✔	✔	✔

Table 4.2. Comparison of Integrated Report Guiding Principles

Guiding Principles	South Africa	Japan	Singapore
Strategic focus and future orientation	✔	✔	✔
Information Connectivity	✔	✔	-
Relationships with stakeholders	✔	✔	✔
Materiality	✔	✔	✔
The compactness of the content	✔	-	-
Reliability and completeness	✔	✔	✔
Consistency and comparability	✔	✔	✔

4.1.2.2. *Non-Financial Company*

Table 4.3. Comparison of Integrated Report Content Element

Element	South Africa	Japan	Singapore
Organisational overview and external environment	✔	✔	✔
Business Model	✔	✔	✔
Outlook	✔	✔	✔
Basis of Preparation and Presentation	✔	-	✔
Strategy and Resource Allocation	✔	✔	✔
Risks and Opportunities	✔	✔	✔
Governance	✔	✔	✔
Performance	✔	✔	✔

Table 4.4. Comparison of Integrated Report Guiding Principles

Guiding Principles	South Africa	Japan	Singapore
Strategic focus and future orientation	✔	✔	✔
Information Connectivity	✔	✔	✔
Relationships with stakeholders	✔	✔	✔
Materiality	✔	-	✔
The compactness of the content	✔	✔	✔
Reliability and completeness	✔	✔	✔
Consistency and comparability	✔	✔	✔

4.1.3.   Comparison of Content and Guiding Principles of Integrated Reporting

Researchers took six samples of companies from the countries studied, namely two samples of South African companies, two samples of Singapore companies, and two samples of Japanese companies. Data are taken from the Integrated Reporting Examples Database IIRC (International Integrated Reporting Council).

4.1.3.1. South Africa and Japan

First, the researchers analyzed the 2016 Annual Report from Mitsui & Co. PLC is a publicly-traded company and is engaged in finance. In the Annual Report published by the company, the Mitsui value creation process, including its business model, is shown in full on pages 26-31 (Appendix 3). The business model explains the five types of capital inputs and how these are transformed through integrated core corporate functions and business activities to provide industry solutions that create value. The company also includes a diagram that provides a clear picture of the company's main business activities, including the purpose of these activities. This diagram also identifies potential challenges in meeting changing needs and shows the connectivity of its various product segments in its seven leading strategic domain value chains.

Second, the researchers analyzed the integrated reporting on the Dentsu PLC in 2017. Dentsu shows an overview of the organization that is in line with the guiding principles of the Integrated Reporting Framework paragraph 3C, namely stakeholder relations. This section begins with a clear description of the company's philosophy and business activities supported by crucial quantitative information, including the number of employees and the countries in which they operate (4.5). The company also explains through a leadership statement, an overview of

future industry trends (4.6-4.7) and stakeholder expectations, demonstrating their understanding of changing stakeholder needs, and highlighting how they responded (Appendix 4).

Integrated reporting in Japan is not an obligation (mandatory), so it is still applied voluntarily (voluntary), whereas in South Africa it is mandatory. In general, the integrated report in South Africa has covered the IIRC framework standards in full, while, in Japan, it is still incomplete. The problem is that one company still does not cover one of the points from the guiding principles of integrated reporting, which is the Dentsu PLC Company. This company does not yet have a guiding principle regarding materiality, while the content elements themselves are quite complete in the two sample companies.

Table 4.5. Comparison of Integrated Report Content Element

Element	South Africa		Japan	
	Strate (Financial Company)	Sasol (Non-Financial Company)	Mitsui (Financial-Company)	Dentsu (Non-Financial Company)
Organizational overview and external environment	✔	✔	✔	✔
Business Model	✔	✔	✔	✔
Outlook	✔	✔	✔	✔
Basis of Preparation and Presentation	✔	✔	✔	✔
Strategy and Resource Allocation	✔	✔	✔	✔
Risks and Opportunities	✔	✔	✔	✔
Governance	✔	✔	✔	✔
Performance	✔	✔	✔	✔

Table 4.5 compares the integrated report content element between two companies in Japan, namely Mitsui and Dentsu. It can be concluded that the elements of the integrated report content in Japan have fulfilled the Integrated Report Framework standards issued by IIRC (International Integrated Reporting Council).

Table 4.6. Comparison of Integrated Report Guiding Principles

Element	South Africa		Japan	
	Strate (Financial Company)	Sasol (Non-Financial Company)	Mitsui (Financial-Company)	Dentsu (Non-Financial Company)
Strategic focus and future orientation	✔	✔	✔	✔
Information Connectivity	✔	✔	✔	✔
Relationships with stakeholders	✔	✔	✔	✔
Materiality	✔	✔	✔	-
The compactness of the content	✔	✔	-	✔
Reliability and completeness	✔	✔	✔	✔
Consistency and comparability	✔	✔	✔	✔

Table 4.6 compares the guiding principles of the integrated report between two companies in Japan, namely Mitsui and Dentsu. It can be concluded that the guiding principles of integrated reports in Japan have fulfilled six of the seven integrated report guiding principles, that is, except the principle of conciseness, which is dense in its contents at the Mitsui Company, and the materiality principle in the Dentsu Company.

4.1.3.2. South Africa and Singapore

RThe researchers analyzed financial companies, namely DBS Group Holdings. In the Annual Report published by the company in 2017, it was found that DBS provides an overview of how banks create value for internal and external stakeholders. The company also explained how to use critical resources to carry out the company's strategy. DBS shows its value proposition by outlining how businesses distinguish themselves from other banks, through "Asian banking". This model then provides an overview of how the business is managed and the use of the Balanced Scorecard to measure financial and non-financial performance. The results of DBS activities can be seen on page 24 (Appendix 5).

RThe researchers also analyzed Tata Steel. In the integrated reporting published by the company in 2016, Tata Steel explained a comprehensive overview of the organization's vision and mission. Tata Steel also described in the form of tables the main risks that can affect an organization's ability to create value in the short, medium and long term to achieve its strategic objectives on pages 11, 12, and 18 (Appendix 6). Strategic objectives, which are grouped in two main areas, namely Value Creation and Corporate Citizenship, were identified based on challenges and opportunities that arise from the business environment. The effect on capital is also illustrated concerning both risk and strategy.

Integrated reporting in Singapore is not mandatory, so it is still applied voluntarily, while in South Africa it is mandatory. In general, the integrated reporting in South Africa has covered the IIRC framework standards in full, while, in Singapore, it is still incomplete. Two sample companies in Singapore have listed all elements of content. However, the guiding principle is still incomplete, in the DBS Company it still does not include information connectivity points and concise points that are densely packed.

Table 4.7. Comparison of Integrated Report Content Element

Element	South Africa		Singapore	
	Strate (Financial Company)	Sasol (Non-Financial Company)	DBS (Financial Company)	Steel (Non-Financial Company)
Organizational overview and external environment	✔	✔	✔	✔
Business Model	✔	✔	✔	✔
Outlook	✔	✔	✔	✔
Basis of Preparation and Presentation	✔	✔	✔	✔
Strategy and Resource Allocation	✔	✔	✔	✔
Risks and Opportunities	✔	✔	✔	✔
Governance	✔	✔	✔	✔
Performance	✔	✔	✔	✔

Table 4.7 compares the integrated report content element between two companies in Singapore, namely DBS Group Holdings and Tata Steel. It can be concluded that the content elements of the integrated report in Singapore have met the Integrated Report Framework issued by IIRC (International Integrated Reporting Council.

Table 4.8. Comparison of Integrated Report Guiding Principles

Element	South Africa		Singapore	
	Strate (Financial Company)	DBS (Financial Company)	DBS (Financial Company)	Dentsu (Non-Financial Company)
Strategic focus and future orientation	✔	✔	✔	✔
Information Connectivity	✔	-	-	✔
Relationships with stakeholders	✔	✔	✔	✔
Materiality	✔	✔	✔	-
The compactness of the content	✔	-	-	✔
Reliability and completeness	✔	✔	✔	✔
Consistency and comparability	✔	✔	✔	✔

Table 4.8 compares the guiding principles of the integrated report between two Singapore companies, namely DBS Group Holdings and Tata Steel. It can be concluded that DBS Group Holdings has fulfilled five of the seven guiding principles, except for information connectivity points and concise contents, while Tata Steel has fulfilled seven guiding principles of the integrated report.

Tables 4.5 and 4.7 compare the elements of the integrated report between two companies in South Africa, namely Strate PLC and Sasol PLC. It can be concluded that the elements of the integrated report content in South Africa have met the Integrated Report Framework standards issued by IIRC (International Integrated Reporting Council). Tables 4.6 and 4.8 compare the guiding principles of the integrated report between two companies in South Africa, namely Strate PLC and Sasol PLC. It can be concluded that the guiding principles of integrated reports in South Africa have met the Integrated Report Framework standards issued by IIRC (International Integrated Reporting Council). This is because in South Africa requires public companies listed on the Johannesburg Stock Exchange (JSE) to issue integrated reports following the Integrated Report Framework standards issued by IIRC (International Integrated Reporting Council).

The Integrated reports in two sample companies in South Africa show more communicative information to stakeholders. The first example, Strate PLC briefly describes its business model in the integrated report published by the company in 2017 on pages 16-17 (Appendix 1). The description of the business model presents information on how value is created from six capitals into company outputs and outcomes. The second example, Sasol PLC, briefly describes its business model in the integrated report published by the company in 2017 in two pages working papers (Appendix 2). The first working paper summarizes the six capitals, the primary process, the results of the business model before the quantified data, have an impact on the financial and sustainability of the company. The second working paper provides a scoreboard of the six capitals that presents more detailed information about the elements of the model and a data table about the primary inputs and stakeholder values created in connection with the six capitals. The points also describe 'actions to enhance outcomes (for stakeholders)', which indicate alignment with paragraph 3A of the International Integrated Reporting Framework - the strategic focus and future orientation. The additional column then provides a more in-depth insight into the model by discussing 'sacrifice' related to the capital influenced by Sasol.

4.1.3.3. Indonesia

A comparison of elements of content and guiding principles of the integrated report uses companies in Indonesia who claim to have conducted integrated reporting: PT. BFI Finance, PT. OCBC NISP, PT Timah (Persero) TBK,

PT Pertamina Geothermal Energy, and PT. XL Axiata. The reporting year used is not the same because of the limitations of the reporting year.

In Indonesia, integrated reporting is not mandatory, but companies can voluntarily implement it. The researchers used five sample companies that voluntarily implemented integrated reporting, namely BFI Finance, OCBC NISP, PGE Pertamina, PT. Timah, and XL Axiata. However, these five companies are not listed in the IIRC Database.

4.1.3.3.1. BFI FINANCE

Table 4.9 shows the comparison of Integrated report content element in BFI Finance while Table 4.10 shows the comparison of Integrated report guiding princples in BFI Finance. BFI Finance issued integrated reports in 2016, 2017, and 2018. In addition, the company also issues an annual report. When compared to South Africa, some elements of BFI Finance content follow the IIRC framework standards, but are not yet comprehensive, but, when viewed based on BFI Finance guiding principles, they do not yet include the concise points that are densely packed. Also, the level of disclosure of aspects of the content of the integrated report is still not comprehensive. For example, BFI Finance does not describe a business model that includes inputs, business activities, and outputs comprehensively. BFI Finance only explains about outputs from business activities.

Table 4.9. Comparison of Integrated Report Content Element

No.	Descriptiom	BFI FINANCE			
		2017		2018	
		Exist/ not?	Page	Exist/ not?	Page
1	Report Title	2017 Integrated Annual Report	cover	2018 Integrated Annual Report	cover
2	Number of pages	408		408	
3	Compilation Base	PSAK, Global Reporting Initiative (GRI), Integrated Reporting Framework (IIRC)	3	PSAK, Global Reporting Initiative (GRI), Integrated Reporting Framework (IIRC)	3
4	Organizational overview and external environment	√	36, 114	√	48
5	Governance	√	160	√	194
6	Business Model	√	119	√	145
7	Risks and Opportunities	√	63, 218, 234	√	269, 296
8	Strategy and Resource Allocation	√	84, 156, 272	√	98, 331
9	Performance	√	8, 290	√	10, 358
10	Outlook	√	159	√	191
11	Basis of Preparation and Presentation	√	392	√	462

Note: Although BFI Finance has made a report with the title Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report Version IIRC as a whole

Table 4.10, Comparison of Integrated Report Guiding Principles

No.	Descriptiom	BFI FINANCE			
		2017		2018	
		Exist/ not?	Page	Exist/ not?	Page
1	Report Title	2017 Integrated Annual Report	cover	2018 Integrated Annual Report	cover
2	Number of pages	408		408	
3	Compilation Base	PSAK, Global Reporting Initiative (GRI), Integrated Reporting Framework (IIRC)	3	PSAK, Global Reporting Initiative (GRI), Integrated Reporting Framework (IIRC)	3
4	Strategic focus and future orientation	√	29,35	√	43,131,153,292,
5	Information Connectivity	√	8,290	√	10,158,358
6	Relationships with stakeholders	√	267,393	√	327,464
7	Materiality	√	392	√	462
8	The compactness of the content	-	-	-	-
9	Reliability and completeness	√	126	√	42,43,191,
10	Consistency and comparability	√	158,159	√	189,190

Note: Although BFI Finance has made a report with the title Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report Version IIRC as a whole.

4.1.3.3.2. OCBC NISP

The second company that was studied was OCBC NISP which published Annual Integrated Reports in 2016 and 2017. Table 4.11 shows the comparison of Integrated report content element in OCBC NISP while Table 4.12 shows the comparison of Integrated report guiding princples in OCBC NISP. When compared with South Africa, OCBC NISP content elements follow the IIRC framework standards, although are not yet comprehensive because they do not include basic points of preparation and presentation. Also, if viewed based on the OCBC NISP guiding principle, it still does not include concise points that are densely packed and points of reliability and completeness. For example, OCBC NISP only mentions the business model in its report, without explanation.

Table 4.11. Comparison of Integrated Report Content Element

No.	Descriptiom	2. OCBC NISP			
		2016		2017	
		Exist/ not?	Page	Exist/ not?	Page
1	Report Title	2016 Integrated Annual Report	cover	2017 Integrated Annual Report	cover
2	Number of pages	409		388	
3	Compilation Base	PSAK, ASEAN Corporate Governance, Global Reporting Initiative (GRI G-4), Integrated Reporting Framework (IIRC)	ii	PSAK, ASEAN Corporate Governance, Global Reporting Initiative (GRI G-4), Integrated Reporting Framework (IIRC)	Ii
4	Organizational overview and external environment	√	24, 64, 65	√	25, 58
5	Governance	√	90	√	101
6	Business Model	√	21	√	14
7	Risks and Opportunities	√	154, 163	√	164, 176
8	Strategy and Resource Allocation	√	58, 75, 84	√	87, 95
9	Performance	√	4,64, 68, 197	√	5, 209
10	Outlook	√	88, 89	√	99
11	Basis of Preparation and Presentation	-	-	-	-

Note: Although OCBC NISP has made a report titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report version IIRC as a whole.

Table 4.12. Comparison of Integrated Report Guiding Principles

No.	Descriptiom	2. OCBC NISP			
		2016		2017	
		Exist/ not?	Page	Exist/ not?	Page
1	Report Title	2016 Integrated Annual Report	cover	2017 Integrated Annual Report	cover
2	Number of pages	409		388	
3	Compilation Base	PSAK, ASEAN Corporate Governance, Global Reporting Initiative (GRI G-4), Integrated Reporting Framework (IIRC)	ii	PSAK, ASEAN Corporate Governance, Global Reporting Initiative (GRI G-4), Integrated Reporting Framework (IIRC)	Ii
4	Strategic focus and future orientation	√	88,138	√	98,99
5	Information Connectivity	√	67,68,197	√	80,81,209
6	Relationships with stakeholders	√	168, 138,139	√	383
7	Materiality	-	-	√	382
8	The compactness of the content	-	-	-	-
9	Reliability and completeness	-	-	√	382
10	Consistency and comparability	√	87	√	152,158

Note: Although OCBC NISP has made a report titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report version IIRC as a whole. OCBC NISP issued integrated reports in 2016 and 2017 and, in addition, also issued an annual report.

4.1.3.3.3. PT. TIMAH (Persero) TBK

The third company is PT. Timah which published integrated reports in 2015 and 2016. Table 4.13 shows the comparison of Integrated report content element in PT. Timah while Table 4.14 shows the comparison of Integrated report guiding princples in PT. Timah. Just like the companies previously mentioned, when compared to companies in South Africa, PT. Timah has not yet published the Integrated Report in full, because there are no basis points for preparation and presentation. As for the guiding principle itself, there are also several points that PT. Timah did not include in its integrated report. That is, the first does not cover information connectivity points, does not include concise points that are densely packed in contents, and does not include points of reliability and completeness. For example, while PT. Timah has explained its business model, which includes six capitals, inputs, value-adding activities, outputs, and outcomes in the form of images, this business model has not, however, been comprehensively linked to the company's value creation process.

Table 4.13. Comparison of Integrated Report Content Element

No.	Descriptiom	3. PT TIMAH (Persero) Tbk			
		2015		2016	
		Exist/ not?	Page	Exist/ not?	Page
1	Report Title	2015 Integrated Annual Report	cover	2016 Integrated Annual Report	cover
2	Number of pages	475		698	
3	Compilation Base	Global Reporting Initiative (GRI G4), Integrated Reporting Framework (IIRC)	27	Ketentuan Otoritas Jasa Keuangan (OJK), IIRC, Pedoman Pelaporan Keberlanjutan Versi 4 dan Mining and Metal Sector Supplement	1

				(MMSS) oleh GRI G4.	
4	Organizational overview and external environment	√	54, 146	√	76, 182
5	Governance	√	224	√	252
6	Business Model	√	136	√	167
7	Risks and Opportunities	√	110	√	142
8	Strategy and Resource Allocation	√	212, 342	√	7, 120, 509
9	Performance	√	10, 473	√	16, 18
10	Outlook	√	19	√	40, 54, 235
11	Basis of Preparation and Presentation	-	-	-	-

Note: Although PT. Timah Persero has made a report titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report version IIRC as a whole.

Table 4.14. Comparison of Integrated Report Guiding Principles

No.	Descriptiom	3. PT TIMAH Persero			
		2015		2016	
		Exist/ not?	Page	Exist/ not?	Page
1	Report Title	2015 Integrated Annual Report	cover	2016 Integrated Annual Report	cover
2	Number of pages	475		698	
3	Compilation Base	Global Reporting Initiative (GRI G4), Integrated Reporting Framework (IIRC)	27	Ketentuan Otoritas Jasa Keuangan (OJK), IIRC, Pedoman Pelaporan Keberlanjutan Versi 4 dan Mining and Metal Sector Supplement (MMSS) oleh GRI G4.	1
4	Strategic focus and future orientation	√	212	√	238
5	Information Connectivity	√	12,198	√	18,228
6	Relationships with stakeholders	√	138	√	169
7	Materiality	√	45,51	√	65
8	The compactness of the content	-	-	-	-
9	Reliability and completeness	√	53	√	72
10	Consistency and comparability	√	219	-	-

ote: Although PT. Timah Persero has made a report titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report version IIRC as a whole. PT. TIMAH (Persero) TBK issued integrated reports in 2015 and 2016 as well as an annual report.

4.1.3.3.5. PT. PERTAMINA GEOTHERMAL ENERGY (PGE)

The fourth company is PGE Pertamina, which implemented an Annual Integrated Report in 2015. Table 4.15 shows the comparison of Integrated report content element in PT. PERTAMINA GEOTHERMAL while Table 4.16 shows the comparison of Integrated report guiding princples in PT. PERTAMINA GEOTHERMAL. For reports published by PGE Pertamina itself, when compared to reports published by companies from South Africa in general, all content elements from the integrated reporting have been included, but it is not yet comprehensive because it does not yet cover the primary points of preparation and presentation. Also, the explanation of each content is not yet detailed. PGE Pertamina also has not fulfilled the concise points that are the full contents in the guiding principles of the integrated report. For example, Pertamina PGE has presented a more detailed business model from the two previous companies, but has not provided information related to inputs, business activities, outputs, and outcomes. The business model also has not been linked to the process of creating corporate value.

Table 4. 15. Comparison of Integrated Report Content Element

No.	Descriptiom	4. PT Pertamina Geothermal Energy (PGE)	
		2015	
		Exist/ not?	Pages
1	Report Title	Integrated Annual Report 2015	Cover
2	Number of pages	288	
3	Compilation Base	Law No. 40 of 2007 concerning Limited Liability Companies, Bapepam LK No X.K.6, G4 Sustainability Reporting Guidelines (GRI G-4), Guidelines for the Management of Subsidiaries and Companies Joint Venture Pertamina No. A-001 / H00200 / 2011-S0 Revision 1, Integrated Reporting Framework (IIRC)	11
4	Organizational overview and external environment	√	10, 60, 94
5	Governance	√	138
6	Business Model	√	72
7	Risks and Opportunities	√	211
8	Strategy and Resource Allocation	√	114
9	Performance	√	105
10	Outlook	√	115, 122
11	Basis of Preparation and Presentation	-	-

Note: Although PT Pertamina Geothermal Energy (PGE) has made a report titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report Version IIRC as a whole.

Table 4.16. Comparison of Integrated Report Guiding Principles

No.	Descriptiom	4. PT Pertamina Geothermal Energy (PGE)	
		2015	
		Exist/ not?	Pages
1	Report Title	Integrated Annual Report 2015	Sampul
2	Number of pages	288	
3	Compilation Base	Law No. 40 of 2007 concerning Limited Liability Companies, Bapepam LK No X.K.6, G4 Sustainability Reporting Guidelines (GRI G-4), Guidelines for the Management of Subsidiaries and Companies	
4	Strategic focus and future orientation	Joint Venture Pertamina No. A-001 / H00200 / 2011-S0 Revision 1, Integrated Reporting Framework (IIRC)	11
5	Information Connectivity	√	115, 122, 211
6	Relationships with stakeholders	√	12, 105
7	Materiality	-	-
8	The compactness of the content	√	3
9	Reliability and completeness	-	-
10	Consistency and comparability	√	303-366

Note: Although PT Pertamina Geothermal Energy (PGE) has made a report titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Report Version IIRC as a whole. PT Pertamina Geothermal Energy issued an integrated report in 2015 and, in addition to that year, the company issued an annual report.

4.1.3.3.6. XL AXIATA

The last company analyzed was XL Axiata, which does not publish integrated reports, but, rather, annual reports. Table 4.17 shows the comparison of Integrated report content element in XL Axiata while Table 4.16 shows the comparison of Integrated report guiding princples in XL Axiata. The researchers took a sample of the 2017

Annual Report but this had elements that are in the standard IIRC framework. Compared to the integrated reports issued by companies in South Africa, the content of the Annual Report published by XL Axiata is incomplete because it does not cover the basic points of preparation and presentation. In addition, it can also be concluded that the guiding principle is not yet complete because it does not yet include three points: a concise point that is densely contained,   reliability and completeness points, and   consistency and comparability points. For example, XL Axiata only mentioned the business model in its report without giving a detailed explanation.

Table 4.17. Comparison of Integrated Report Content Element

No.	Descriptiom	5. XL Axiata	
		2017	
		Exist/ not?	Page
1	Report Title	Laporan Tahunan 2017 Annual Report	Sampul
2	Number of pages	480	
3	Compilation Base	Financial Accounting Standards at Indonesia and regulatory body Capital Markets and Financial Institutions (BAPEPAM-LK) No. VIII.G.7 concerning Presentation and Disclosure of Issuer's Financial Statements or Public Company, which is enclosed in Decree No. KEP-347 / BL / 2012.	
4	Organizational overview and external environment	√	86
5	Governance	√	170
6	Business Model	√	81
7	Risks and Opportunities	√	307
8	Strategy and Resource Allocation	√	73
9	Performance	√	18
10	Outlook	√	46, 58, 169
11	Basis of Preparation and Presentation	-	-

 Note: Although PT XL Axiata has made a report   titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Version IIRC version as a whole.

Table 4.18. Comparison of Integrated Report Guiding Principles

No.	Descriptiom	5. XL Axiata	
		2017	
		Exist/ Not?	Page
1	Report Title	2017 Annual Report	Cover
2	Number of pages	480	
3	Compilation Base	Financial Accounting Standards at Indonesia and Capital Market and Financial Institution Supervisory Agency (BAPEPAM-LK) regulation No. VIII.G.7 concerning Presentation and Disclosure of Financial Statements of Issuers or Public Companies, which is attached in Decree No. KEP-347 / BL / 2012.	385
4	Strategic focus and future orientation	√	18, 87, 307
5	Information Connectivity	√	76
6	Relationships with stakeholders	-	-
7	Materiality	-	-
8	The compactness of the content	-	-
9	Reliability and completeness	-	-
10	Consistency and comparability	√	20, 153

Note: Although PT XL Axiata has made a report   titled Integrated Annual Report, the report does not follow the conceptual framework of the Integrated Version IIRC version as a whole. XL Axiata has never published a report with the title Integrated Reporting, but the company publishes a report with an annual report and claims to have applied the Integrated Reporting Framework in its annual report.

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5. Conclusions

The conclusion from the five sample companies from Indonesia is that most have included the content elements of integrated reporting and the guiding principles of the Integrated Reporting Framework, although this is not yet comprehensive. Furthermore, the discussion of the content elements and guiding principles contained in the published report is not explained in detail and depth, but only in general and with a very brief explanation, for example, only mentioning the word "business model" without being accompanied by a complete and in-depth explanation. When compared with the integrated reporting   published by companies in South Africa, these are very detailed and in depth in explaining the points in the content elements and guiding principles of the integrated reporting, whereas in reports published in Indonesia this is not the case.

The finding of this research is in line with previous research done in   Japan, Singapore, and South Africa. The result shows that integrated reporting helps companies improve their performance. Companies that use integrated reporting are proven to be able to serve reports that contain extensive information, which also improves the transparency and responsibility of their reports. It is also proven effective for companies as a way of communicating their ability of creating and maintaining company value. Furthermore, integrated reporting can reduce information processing costs, as well as improve the audit committee's effectivity. This research may become a great reference for government policy related to corporate report assembling in order for it to be more eloquent. Therefore, some future research related to integrated reporting is needed, especially if is begun to be applied in Indonesia.

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MARKETING POSITIONING OF COUNTRIES IN THE FIELD OF INNOVATIONS: QUESTIONS AND ANSWERS[*]

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Abstract. This article addresses the issues of the marketing positioning of countries in the field of innovations. To date, the level of development and dynamism of the innovation sphere form the basis for the country's sustainable economic growth. The concept of "innovation" is closely related to the concepts of "novation", "invention", and "discovery", which are the products of creativity. The paper examines some of the basic marketing characteristics of such countries as Japan, China, South Korea, India, and Russia. The authors hypothesize and prove that if a country chooses to focus on education and high technologies in its development, it can ensure high development of the national information and communication technologies. They also selected and evaluated the indicators of innovative development for these countries. Based on the correlation-regression analysis, the initial hypothesis was confirmed.

Keywords: marketing positioning of countries; creating an innovative economy; diagnostics of marketing positioning

1. Introduction

The successful functioning of the national innovation system depends not only on advanced science and education but also on the entire complex of other institutional conditions: a competitive business sector as the major generator of innovation (Hirschhorn, 1988; Carayannis & Grigoroudis, 2014; Salamzadeh et al., 2016; Zemlickiene & Maditinos, 2012); integration into the global innovation sphere as the most important condition for the development of the national high-tech industries; priority of state policy in the development of education, science, and technology, creating a favorable institutional environment for innovation-based growth (Sweet, 2001; Cohen & Zysman, 1987; Zhang & Yang, 2013; Sekerin et l., 2015; Tvaronavičienė 2019; Girdzijauskaite et al. 2019).

According to the well-known Chinese scientist and economist Hu Angang, the constant increase in the technical and technological level of production in the formation of the national innovation system is the most important factor in the state's transition from an extensive to intensive growth. Creation of an innovative economy is a process that involves not only the actual field of economics and science (Onetti et al., 2012). It is much bigger and covers the areas of state-building, education, and culture.

2. Concept

Creation of an innovative economy is a process that involves not only the actual field of economics and science. It is much bigger and covers the areas of state-building, education, and culture. The effective functioning of the national innovation system requires comprehensive government support, including budget allocations, tax regulation, government procurement, etc. The decisive factor is the country's choice of innovative motivation, which will form the basis of the national transformative strategy. A request for implementing an innovative project is primarily a political choice of those countries, which leaders seek effective participation in international competition to designate ambitions for regional or global leadership. It has long been argued that only those countries that adhere to the "right" liberal-democratic course in politics and market priorities in the economy have a monopoly on progress and intensive development (Zhang & Yang, 2013; Zemlickiene & Maditinos, 2012; Kanter, 2001; Zeibote et al. 2019).

Only through the modernization of the economy and the development of innovative industries, it is possible to realize the potential in the field of education and science and transform them from a social sector to a production one. New technologies play a leading role in overcoming the stagnation of global economic instability. The way out of a deep crisis is usually accompanied by a change in technological structure and leading countries. Much has been done in Russia to create the necessary innovative environment. In particular, a system of development institutions, as well as tax incentives for innovative companies and reduced rates of insurance premiums have been introduced. Moreover, an opportunity to create small enterprises at universities has appeared; 30 technology platforms have been approved and innovative clusters and business incubators have been created while state-owned companies have developed innovative development programs.

Despite the significance of all these efforts, there is every reason to believe that Russia is only at the very beginning of its innovative path. Therefore, the practice of other countries with the relevant experience is invaluable.

The experience of such states as China, India, Japan, South Korea is especially important.

3. Methods

Assessing countries in terms of information and communication technologies.
The marketing positioning of countries in the field of information and communication technologies (ICTs) can be defined as the technologies used to access, collect, manipulate, present or report information. ICTs include both hardware (equipment) and software (used by hardware) (Panova & Danko, 2017).

Examples of ICT: satellite navigation systems (GPS); DVDs and CD-ROMs; laptops; personal computers; mobile phones; digital cameras; electronic instruments and recorders; the Internet; satellites; radio, television. In short, ICT is part of everyday life, moreover; the experience in ICT is the skill of the 21st century, along with communication skills (including in foreign languages), analytical skills, innovative thinking, creativity, decision tasks, interaction, and collaboration.

The formation and development of information society (IS) involves the widespread use of ICTs in education, medicine, politics, economics, commerce, culture, sports, everyday life, etc. This is determined by several factors (Westerman et al., 2014; Olanrewaju et al., 2014; Accenture, 2015).

First, the development of ICTs in the country significantly accelerates the transfer of information and the accumulated technological and social experience of mankind, not only from generation to generation but also from one person to another. Moreover, ICTs help to deliver information from one user to another over huge distances as quickly as possible (Danko et al., 2016a, 2016b).

Secondly, modern ICTs allow a person to more successfully and quickly adapt to the environment and the ongoing social changes. This provides everyone with an opportunity to receive the necessary information both today and in the future.

Finally, the active and effective introduction of these technologies into people's lives is an important factor in the development of information society and the reform of the political and economic system in the light of the modern industrial society requirements.

Let us consider some of the basic marketing characteristics of the selected countries.

Japan. An island state in East Asia. It is located in the Pacific Ocean to the east from the Sea of Japan, China, North and South Korea, and Russia. Japan covers the territory from the Sea of Okhotsk in the north to the East China Sea and Taiwan in the south. It is commonly known as the Land of the Rising Sun. Japan covers an area of 377,944 km². The estimated population is 126,225,000 people (as of 2018). The capital of Japan is Tokyo (since 1868). The largest Japanese cities are Tokyo, Kyoto, Osaka, Yokohama, Saitama, Fukuoka, Sapporo, Nagoya, Kobe, and Kawasaki.

China. A state in East Asia. It is the largest country in the world in terms of population; it has the third largest territory, yielding to Russia and Canada. The area of China is approximately 9,598,962 km², and its population amounts to 1,386,000,000 people (as of 2018). At the moment, the capital of China is Beijing. The largest Chinese cities are Hong Kong, Beijing, Shanghai, Guangzhou, Shenzhen, Harbin, Chongqing, Taipei, and Tianjin.

South Korea. A country in East Asia, located on the Korean Peninsula. It covers an area of 99,720 km². According to estimates, the population of South Korea is approximately 51,446,201 people (as of 2017). The capital of South Korea is Seoul. The largest cities are Seoul, Busan, Incheon, Daegu, Gwangju, Ulsan, and Daejeon.

India. A state in South Asia. Its population amounts to 1,340,468,000 people, and its territory is 3,287,263 km² – in both of these indicators India is the largest country in South Asia. It is the world second country in terms of population and seventh in the territory. The capital of India is New Delhi. The largest cities include Mumbai, Delhi, Calcutta, Bangalore, and Chennai.

Russia. A state located in Eastern Europe, Central and Northern Asia. The territory of Russia within its constitutional structure is 17,125,191 km² (Cohen & Zysman, 1987); the country's population (within its declared territory) is 146,880,432 people (as of 2018). It is the largest country in the world in terms of territory. The capital of Russia is Moscow. The largest Russian cities are Moscow, St. Petersburg, Novosibirsk, Yekaterinburg, Nizhny Novgorod, Kazan, Chelyabinsk, Samara, Omsk, Rostov-on-Don, Ufa, Krasnoyarsk, Perm, Voronezh, Volgograd, and Krasnodar.

4. Research methodology

The working hypothesis is that if a country chooses to develop with an emphasis on education and high technologies, then it can ensure the high development of ICT in the country (Ekimova et al., 2016).

The review of scientific literature has allowed allocating eight factors that affect the disclosure of the subject. The authors focused on the first three factors since they are the most significant in this study. To confirm the hypothesis, the authors reviewed the existing scientific literature on the topic under consideration. This allowed identifying the maximum number of possible factors (eight factors) that can influence the identification of trends in the development of ICTs in the countries. Until the 1960s, few articles on innovation were published. The only and the most important exception was the work of the famous Austro-American economist Joseph Schumpeter. First, he introduced the concept of entrepreneurship and studied the impact of the business cycle on the birth and death of businesses. Later, when working at Harvard, he turned to big business as a source of innovation able to finance R&D. However, by the time of Schumpeter's death, in the 1950s, the economy was dominated by static, equilibrium mathematical theories and tools typical for the neoclassical school. However, scientists and politicians soon appreciated the importance of the long-term scientific, technological and social development processes which did not fit into the set of equations. The upswing came in the 1960s and is still ongoing. This rise was launched in the US. At the beginning of the "cold war", the country's leadership realized that global supremacy is only possible while maintaining technological leadership. Not only numerous research and technology centers were created, but also organizations involved in the management and economics of the R&D sector. The main of them, RAND Corporation, was established in 1946 on the initiative of the US Air Force. Reputable economists Richard Nelson and Sydney Winter worked specifically at RAND. The founding fathers of innovation research involved university scientists. The most famous of them is Zvi Griliches, who used hybrid corn to show that innovations were spreading in a market economy in a logistic curve. In 1962, RAND economists in collaboration with colleagues, incl. Griliches, released the joint monograph "The Rate and Direction of Inventive Activity", which explored the origin of inventions, the relationship of science and industrial R&D, the allocation of resources for optimal knowledge generation. This paper is available on the web.

Though initially emerged in the United States, the Center's scientific activity rather quickly moved to Europe, where most centers for Innovation Studies are located. The Science Policy Research Unit of the University of Sussex, created in 1965 by Christopher Freeman, was the first and model center of its kind. Under one roof, it gathered economists, sociologists, psychologists and people from the field of engineering and technology, who developed the first specialized master's and doctoral programs. In addition to educational activity and onsite scientific work, the center began to actively involve third-party customers: The International Schumpeter Society (ISS), the Danish Research Unit for Industrial Dynamics (DRUID) and other organizations.

This information allows selecting and evaluating countries' innovative development indicators. The authors chose the following indicators of development for the countries:

- Development of ICTs
- Educational Level
- High-tech development
- R&D expenditure (% of GDP)
- Innovative development
- The number of patent applications (per person)
- Number of trademark applications (per person)
- GDP per capita ($)

In this study, the authors chose the following research tools: correlation analysis, regression analysis, projection function, which allow establishing the relationship between the development of the chosen indicators and ICTs.

4. Results

Next, the authors will proceed with assessing the indicators required for the study. Countries' ranking by the level of education (United Nations Development Programme, 2017):

Table 1. Countries' ranking by the level of education in 2017

Country	World ranking	Index
South Korea	19	0.862
Japan	22	0.848
Russia	49	0.832
China	86	0.644
India	130	0.556

Source: Compiled by the authors

According to the graphic statistics, South Korea is the leader among these countries in terms of quality and level of education (0.862) (Table 1). South Korea ranks high on this indicator since in recent years the country has managed to successfully implement innovative STEM education system aimed at developing students in the technical direction. This may also be due to the fact that South Korea is famous for encouraging most deserving students – providing grants, scholarships from the government and the university (even to extrabudgetary students). However, education is accompanied by strict control of the knowledge learned by students at school through constant tests and examinations. In this regard, from this perspective, let us conduct further investigation on the innovation index and on the development of high technologies. Russia (0.832) is following close behind South Korea and Japan (0.848). Japan and Russia are roughly similar in terms of education. All Russian and Japanese students strive to get into prestigious universities since the diplomas of higher education obtained at these universities almost guarantee a high level of income to its graduates. China lags far behind Russia (0.644). This lag is due to the fact that in China students simply cram the material, which is why they have no desire to achieve success in their studies. Next comes India (0.556). The low level of education in this country is due to the difficult economic situation in the country, the consequence of which is that people with low income cannot afford to study at universities, because education in India is quite expensive. However, the level of education that can be obtained at Indian universities in India is just as good as in the leading European universities.

Table 2. Countries' ranking in terms of high technologies' development (2017) (IMD World Competitiveness Center. 2017)

Country	World ranking	Index
South Korea	14	87.983
Japan	22	82.17
Russia	30	74.796
China	40	65.207
India	48	57.066

Source: Compiled by the authors

South Korea (87.983) is the leader in terms of high technologies' development among the top five countries, as shown in Table 2. This may be linked to the fact that companies producing high-tech goods in large quantities are actively developing in South Korea. Japan is not far behind in this index; however, Japan is currently catching up South Korea. China is in the 3rd place (Danko & Golubev, 2013). The high-tech market is also actively developing in this country, even though the country is not yet a leader in this area. However, it is possible to predict a fast growth rate in this indicator since the Chinese economy is one of the most stable in the world.

Unfortunately, Russia and India cannot boast of high rates in this area and significantly lag the above countries. This phenomenon might be due to the unstable economic situation in India and Russia in the world market, as well as the constant crises that hinder the development of the high-tech market. Sanctions are another factor hindering the development of production in these countries. In terms of R&D expenses (research and development), the leader is again South Korea. The remaining countries are arranged in the same order as in the high-tech index. Therefore, it is possible to conclude that R&D expenditure and the index of high-tech development are directly related to one another. As in the previous indicator, South Korea ranks first among these five countries, and Japan, in turn, is very close to South Korea. This is due to the STEM system, which was implemented in South Korea for an in-depth study in technical educational institutions.
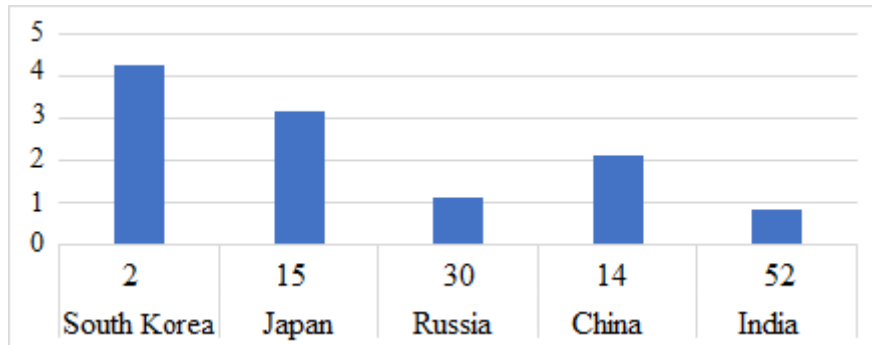
Fig. 1. Differentiation of R&D expenditure by countries (% of GDP) in 2017 (OECD, 2017)
Source: Compiled by the authors

Table 3. Countries' ranking in the Innovation Index in 2017 (World Intellectual Property Organization. 2012)

Country	World ranking	Index
South Korea	11	57.7
Japan	14	54.72
Russia	22	52.54
China	45	38.76
India	60	35.47

Source: Compiled by the authors

Japan ranks second, as it is one of the most innovative countries in the world, like South Korea, in which the development of robotic technology is in full swing. China (52.54) is also very close to these countries, as shown in Table 3. China is actively adopting the experience of introducing innovations from its foreign colleagues. Sad enough, but Russia is again in the last lines together with India. These countries are now experiencing a deep crisis. Moreover, the innovation sector is experiencing a shortage of money, as budget funds are not enough to sponsor the high-tech market and support domestic producers. This explains such a low innovation index (38.76). Today, innovation, research, and development are an important part of political ambitions in most developed and developing countries. Global expenditure on R&D continue to grow, and the share of business is increasing.

The decade of unsustainable development was replaced by global economic growth. However, several things are encouraging. First of all, an increase in R&D expenses – those have increased by 3% in 2016 (there are no more recent data in the report). According to R&D Magazine, total R&D spending in 2016 amounted to more than $2 trillion, of which the USA accounted for $521 billion, China – $427 billion, and Russia – $56.2 billion. R&D Magazine predicts that in 2018 global spending on R&D will grow by 4.1% to $2.19 trillion. Russia's strategic goal in terms of scientific development is to return to the list of leading countries, to create a research and development sector capable of conducting fundamental and applied studies in areas relevant to the world economy and science, which are in demand by Russian and international companies. Achieving the competitiveness of the scientific complex on a global scale requires solving numerous objectives, including: improving the quality of human resources; increasing the efficiency of the R&D sector, in particular through the restructuring of several scientific organizations; enhancing the research capacity in key areas; developing coordination mechanisms and tools, and interaction of all participants in the innovation process. The next indicator chosen for the analysis is the index of ICT development.

Table 4. ICT Development Index by countries in 2017 (World Bank, 2017)

Country	World ranking	Index
South Korea	2	8.85
Japan	10	8.43
Russia	45	7.07
China	80	5.6
India	134	3.03

Source: Compiled by the authors

As shown in Table 4, Korea (8.85) ranks second in this index in 2017 and first among the 5 countries under study. Next comes Japan (8.43) and Russia (7.07). Russia is far ahead of China (5.6) in this indicator; it is currently repeating the same trends as the rest of the world. High-speed Internet is growing at a tremendous pace. The demand for digital content is significantly increasing; this includes not only books, movies and music, but also educational programs and services. This indicates that ICTs in Russia are gradually reaching a fundamentally different level.

During the study, the authors had to deal with the problem that the population significantly affected the indicators of the number of patent applications, trademark applications, and the GDP. Therefore, the data were recalculated per capita according to the table below "Countries' population".

The following indicators of patent and trademark applications were recalculated per capita, as the number of people in these countries differed significantly. China, for example, has the largest population of 1.386 billion people, and South Korea – the smallest – 51.47 million people. This is almost 27 times less. Thus, the following data were obtained:

Table 5. The number of patent applications per capita by country in 2017 (World Intellectual Property Organization, 2018)

Country	Number of patent applications per one person
South Korea	0.0054
Japan	0.0041
Russia	0.0010
China	0.0003
India	0.00004

Source: Compiled by the authors

Table 5 shows that South Korea (0.0054) is the leader in terms of patent applications per capita, i.e. one patent application accounts for about 185 people. Next comes Japan (0.0041), where one patent application accounts for 244 people. The third line is occupied by China (0.0010), in which, on average, one patent application accounts for 1,000 people. Following China is Russia (0.0003), where one patent application accounts for 3,333 Russian people, on average. India (0.00004) occupies the fifth position – with one patent application per 25,000 people. These statistics are highly evidential for studying the degree of countries' intensity and activity in the creation and registration of patent products.

In terms of trademark applications, Japan (0.0054) shares the first line with South Korea (0.0054). This indicates that one trademark application accounts on average for 185 people. They are followed by Russia (0.0021), with one trademark application per 476 people. The fourth line is occupied by China (0.0010) with one trademark application per 1,000 people. It is noteworthy that China is the undisputed leader in the number of applications for trademarks and patents. However, once these figures are recalculated per capita, the picture changes dramatically and China becomes the fourth in this indicator. In turn, India (0.0003) still occupies the fifth position with one application for a trademark per 3,333 people (Fig. 2).
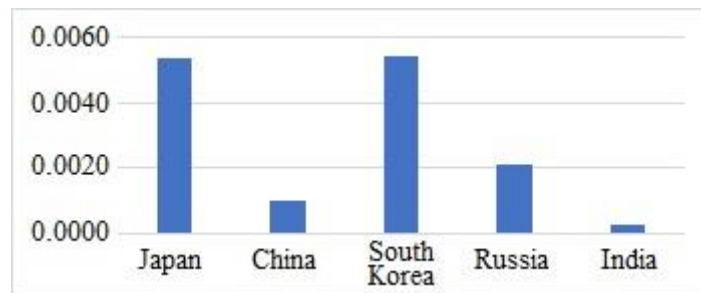
Fig. 2. The number of trademark applications per one person
Source: Compiled by the authors

Table 6. GDP per capita ($): (World Bank, 2018)

Country	GDP per capita, $
Japan	38,428.1000
South Korea	29,742.8400
Russia	10,743.1000
China	8,826.9900
India	1,939.6100

Source: Compiled by the authors

It is noteworthy that this is the only indicator by which South Korea (29,742.8400) is not the leader but occupies the second line (Table 6). In this case, the first position is occupied by Japan (38,428.1000). Russia (10,743.1000) takes the third place in GDP per capita, slightly ahead of China (8,826.9900). India (1,939.6100) ranks fifth in this indicator.

5. Conclusions

To date, South Korea is the undisputed leader among the five countries in most of the above indicators (as was noted earlier, it yielded to Japan in only one indicator – GDP per capita). This country places a tremendous emphasis on the development of innovations and has made a huge leap in this industry. It was always followed by Japan, which is a no less progressive country. However, frequent natural disasters affect the investments in the tech industry – the government has to spend huge funds to restore structures destroyed by nature, which of course cannot but affect the development of high technologies. The third and fourth lines were alternately occupied by Russia and China (although China occupied the third line more often). However, it is worth noting that with the calculation of indicators per capita, Russia is not so far behind China, but somewhere even ahead, for example, in GDP per capita and trademark applications. India turned out to be an outsider in almost all indicators among the five countries, which may be due to the difficult economic situation in the country and a large share of poverty among its citizens.

Thus, it is possible to define clear leaders in this analysis: South Korea and Japan. Russia and China are competing on a number of positions. India is still the last in all indicators, although it is absolutely clear that its potential has not yet been revealed – though it can manifest itself in the near future.

To identify the relationships among factors and the level of ICT development, the authors used correlation analysis. Statistical and correlation analysis of the obtained data revealed a strong correlation between the ICT development index and the following indicators: Innovation coefficient (index), Education, High technology development, GDP per capita ($), R&D expenditure (% of GDP). Correlation analysis showed that Education and GDP per capita ($) were the most closely related to the ICT development indicator, high technology development, and R&D expenditure. Their correlation with the analyzed indicator was the greatest – 0.962 and 0.870 respectively, which allowed concluding about their strong direct connection since the calculated coefficients had positive values. Based on the regression values, it can be concluded that the change in the development of ICTs is mostly influenced by 2 indicators: education and the percentage of R&D expenditure of GDP. Therefore, the correlation-regression analysis confirms the initial hypothesis *that if a country chooses to focus on education and high technologies in its development, it can ensure high development of the national ICTs.*

In the study, the authors have clarified that there are at least 2 more factors that have significant impact on the result identification. These are GDP per capita ($) and R&D expenditure (% of GDP). To determine the development trend of ICT in South Korea, Japan, China, India, and Russia in the next 3 years, the authors collected information on the development of this sphere in 2012-2017, and built a graph reflecting the value of the indicator for Japan, South Korea, Russia, China, and India for this period.

Using the forecast function in Excel, the authors estimated a possible development option for ICT in 2018, 2019 and 2020 (Fig. 3)
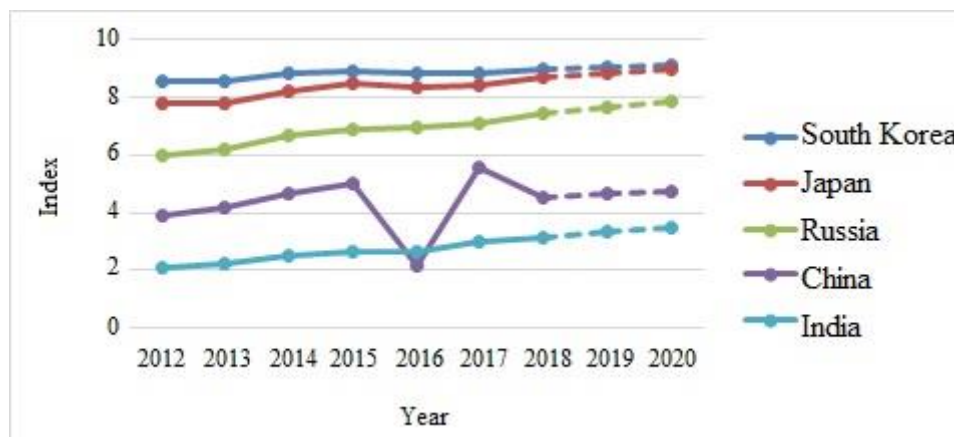
Fig. 3. Projected trends in the development of ICTs for the countries under study
Source: Compiled by the authors

This study has resulted in a series of data which indicate that the development trends (that are fairly stable in their development) are increasing in all countries, except China. This predictive estimate is an estimate of multifactorial development. It reflects general trends, while the development of one indicator is affected by other factors. Since one factor can absorb and neutralize the other, the ideal is to move to a multifactorial study.

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DEVELOPMENT AND VALIDATION OF A SAFETY CLIMATE SCALE FOR UNITED ARAB EMIRATES OIL AND GAS INDUSTRIES[*]

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Abstract. This study aims to develop and validate a safety climate scale for United Arab Emirates (UAE) oil and gas industries to enhance the process safety performance. This study was performed at the Abu Dhabi Oil National Company (ADNOC) in the UAE. Principal component analysis was used to analyze the response data, resulting in the identification of five safety climate dimensions. Confirmatory factor analysis (CFA) was then performed to test the relationships among the constructs of safety climate dimensions as conceptualized in a measurement model. Finally, a structural model was developed to measure the significance of these five safety climate dimensions in the oil and gas industries in the UAE. This paper confirms the importance of measuring and incorporating multiple factors comprehensively to obtain a complete picture of the implementation and perceptions of safety climate in oil and gas companies in the UAE. It also provides a reliable and validated instrument and first- and second-order models for measuring the safety climate dimensions, which affect the performance of safety in general, and process safety, which is specifically useful for informing practitioner regarding focus area to enhance safety performance.

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1. Introduction

Safety performance is indicated by the safety climate. Typically, safety performance can be applied in the prediction of safety results such as occupational injuries or recommended safety behaviors (Meliá et al. 2008, Olsen 2010; Bernardi 2019).

It is essential to apply a validated scale for measuring safety levels accompanied by supporting data (Seo et al. 2004, Yeung and Chan 2012). To realize practical applications of a validity test accompanied by data, organizations have evaluated their safety levels using this verified test. Additionally, the objectives behind this test were to collect quality outcome. Thus, it is evident that the process of assessing reliability is limited to measurement errors of the scale applied (Yeung and Chan 2012).

Despite the efforts by organizations to understand the pillars of safety climate and apply them to their company, an inclusive safety agreement has not been attained. This fact has been proved by evaluation of findings from research that had been previously conducted on commitment levels to establish a common safety platform (Glendon and Litherland 2001, Mohamed 2002, Lu and Shang 2005, Seo 2005, Flin et al. 2006, Evans et al. 2007, Vinodkumar and Bhasi 2009, Chen and Chen 2012). According to one of the safety proposals by Seo et al. (2004) on safety climate dimensions, five categories can be applied in analyzing safety. These include safety support from coworker, supervisor, and commitment levels by management to attain safety standards. Other categories are employees' competence levels, employees' involvement in safety activities, and decision-making when safety climate is in question.

On a related evaluation of outcomes from 18 surveys, Flin et al. (2000) provided six considerations that are always applied to achieve safety climate. These include risk levels, safety of the system, and management involvement. Further, the findings were based on the procedure applied in performing task, competency, and work pressure issues. Moreover, safety rules, safety procedures, supervisory environment, safety training, and safety communication can be also defined as additional dimensions (Lu and Shang 2005, Lin et al. 2008, Tharaldsen et al. 2008, Høivik et al. 2009).

The assessment and validation of measuring instrument have been performed using varied methods. For example, to validate the content obtained, developmental and judgment stages are always taken into considerations (Vinodkumar and Bhasi 2009). Consequently, the developmental stage is managed through conducting critical literature review, while in other cases, research is done in this stage using focused group discussions or interviews. For the judgmental stage to be attained, the qualitative method is applied, and on some occasions, qualitative methods appear the most appropriate where opinion is required (Evans et al. 2007, Høivik et al. 2009). This process is thus found to either focus on literature or panel decision on the most appropriate application.

The content validity of climate safety has been applied by different studies on past findings. The peer previewed outcome on safety climate have always focused their literature review findings on the application of quantitative methods (Mearns et al. 2004, Flin et al. 2006). Only a few panelists have used quantitative methods, thus making it less suitable for safety climate analysis. Another factor that is normally taken into consideration is the validation of instruments (Mohamed 2002). Typically, an expert has preferred using the analysis of exploratory factors followed by a confirmation of the factor analysis applied (Basen-Engquist et al. 1998, Cox and Cheyne 2000, Gershon et al. 2000, Davies et al. 2001).

Measurement of safety climate has resulted in the development of a number of instruments to be used in different parts of the world. Originally, the first innovation of these instruments was conducted with an objective of developing a safety climate scale in manufacturing companies situated in Iran (Seo 2005). Different scales for measurement of safety climate across parts of the world were influenced by culture contexts, types of industries, sector specifications, and specialization requirements (Hussin et al. 2012). Additionally, procedures for applying these instruments were based on data collected using well-structured questionnaires. Additional considerations were given to scales of measurements and validity and reliability that could be offered.

To attain the desired validity, categories were provided to offer in-depth findings. Among the categories obtained were essentiality, usefulness, and elimination of less useful materials (Huang et al. 2006, Hutchinson et al. 2006). To conduct a parallel study and establish safety climate, this study was developed. A descriptive statistic was thus used for the evaluation and extermination of the content validity of the scale used. Using the expert analysis applied by the panel, various parameters were evaluated (Kho et al. 2005).

The aim of this paper is to investigate and validate the dominant safety climate dimensions in oil and gas industries using principal component analysis (PCA) and confirmatory factor analysis (CFA). The objectives of the present paper are to (i) explore the safety climate dimension in UAE oil and gas industries, (ii) suggest a comprehensive framework for the safety climate dimentions and (iii) investigate and validate the relationships among the dominant safety climate dimensions by introducing first- and second-order CFA models.

The rest of this paper is organized as follows. The section entitled "literature review" reviews the relevant literature aimed at (i) factors affecting safety climate, (ii) major safety accidents around the world and in UAE, and (iii) providing insights into the industry wherein the study was conducted in UAE. The section entitled "Plan and Research Methodology" presents the methodology implemented in the present research. The sections entitled "Data Analysis" and "Discussion and Implications" report and discuss the analysis and findings, whereas the section entitled "Conclusions" concludes the paper.

2. Literature Review

2.1. Background on Process Safety

Industrial processes at mass scale emerged after the Second World War, resulting in the birth of the safety movement in the early 1960s (Swuste et al. 2016). This crucial movement in the safety domain came to be known as "loss prevention." Following the upscaling of the production processes in the chemical industry, the complexity of controlling such processes increased, leading to toxic substance emissions, fires, and explosions. These incidents had significant impacts on plant premises and beyond. Back then, the public became more anxious about the different forms of pollution and the likelihood of accidents occurring on a large scale (Carson 1962). This was followed by numerous UK and US publications about loss prevention (Fawcett 1959, Association of British Chemical Manufacturers 1964). However, this was subsequent to a series of process accidents and incidents in low-temperature separation and ammonia plants in the early 1950s (Hendershot 2009). The development of process safety has also been affected and influenced by many other global incidents in high-risk process industries, such as the 1986 Chernobyl and 2011 Fukushima nuclear incidents and the 1984 Bhopal and 2005 Texas City petrochemical incidents (Swuste et al. 2016). The article by Kerry that was published in the *Chemical Engineering and Processing* journal in 1956 triggered dialog during the December 1956 Boston meeting of the American Institute of Chemical Engineers. That meeting culminated in the formation of the "Safety in Air and Ammonia Plants" symposium that began in 1957 and became an annual event going forward (Hendershot 2009).

2.2. Factors Affecting Safety Climate

The concept of a safety climate has various definitions, among which the definition proposed by Zohar (2011) will form the basis of this study . Zohar defined safety climate as the perception behind the practices, procedures, and policies pertaining to safety measures. Zohar's definition covers the holistic aspects of safety climate within an organization and plays an antecedent role in the safety performance of various workplace settings (Griffin and Hu 2013). The safety climate is strongly related to the perceived risk of accidents and injuries at a workplace (Curcuruto et al. 2015). Therefore, developing a comprehensive safety culture ensures the overall health and safety of the employees working in a specific organization. Safety culture can effectively determine the perceptions, values, attitudes, and overall commitment and proficiency to safety and health management among employees. This information will enable the organization to effectively ensure the well-being of its employees. As such, organizations will focus their efforts on creating mutual trust and shared perceptions with their employees on the benefits of maintaining safety in the workplace (Curcuruto et al. 2015). Obtaining knowledge about the safety culture will enable the organization to arrange possible means of disseminating the correct information to its employees via techniques such as workshop training, whereby they would be educated about the safety measures needed to handle various machines with caution and the importance of wearing protective clothes. Therefore, safety climate enables the organization to acquire particular statistics concerning overall perceptions among employees, effectively limiting their risk by curbing process accidents (Nahrgang et al. 2011).

Safety culture influences the development of process-safety tools used for curbing hazards, disasters, and catastrophes. Based on numerous industrial-incident cases, a strong focus was placed upon the organizational safety culture of various firms with a special emphasis on the existent culture during management of various major hazards. A report by the Baker Panel urged all companies within the industrial field to consider assessing their safety culture and offered important questions to foster discussions of safety climate among employees and their employers and within the refineries of Baker Panel (De Rademaeker et al. 2014). The status of the Baker Panel was such that it inspired more serious consideration of the matter, and the Process Safety Leadership Group has advocated for the development of process-safety programs, focusing more on the growth of safety culture on a positive spectrum (Binch et al. 2012). Considering the high number of reported hazardous cases, it was declared that process-related industries ought to develop climate tools that were solely tailored for process safety. Such tools could determine the messages that were both accessible and inaccessible to workers in hazardous scenarios and those that could nto be accessie as well as the messages that do not get to them. A safety climate would, therefore, facilitate the structuring process of a tool used to reduce the high number of process safety cases.

Researchers and organizations can take decisions regarding safety based on safety climate. The instruments used for assessing safety climate use demographic discrimination among people (Santos et al. 2012). Therefore, the different experiences of different demographics limit the development of a well-informed decision-making system because only the groups with the attained design goals can discern the degree of process-safety culture compared to those who are inadequately informed.

Therefore, the uninformed groups cannot make predictions on the process-safety performance of industries, which in turn leads to disasters. Effects of safety climate on process safety remains understudied, which also considerably contributes to the ignorance of the industry's overall safety culture. This factor incapacitates managers from making the right decision when it comes to processing safety.

Poor decision-making in industries with hazardous content may worsen any directed motives of curbing disasters. It is therefore important for regulated bodies to consider making changes in the way they disseminate their safety climate knowledge and to ensure that each industry is mandated to follow set regulations. In this way, all industries, even those less informed about the safety climate, can include cautionary measures in their process-safety initiatives. Successful installation of the right safety climate procedures and tools will considerably impact

the safety cultures of organizations. It will only be a matter of time before the number of major disasters is considerably reduced (Santos et al. 2012).

2.3. Major Accidents around the World and in the UAE

Many accidents go unreported because of employers' disciplinary programs and employees' fears of reprisal (Fagan and Hodgson 2017). However, some process safety accidents have been quite significant. Examples include the 1974 Flixborough disaster in the UK, the 1984 Bhopal gas tragedy in India, the 1988 Piper Alpha disaster in the North Sea, the 1992 Sodegaura Refinery disaster in Japan, the 2003 DSM chemical plant and 2004 Stockline Plastics explosions in the Netherlands, and the 1989 Phillips 66 Disaster and the 2005 explosion at the Texas City Refinery in the US. These cases from around the world have been reviewed extensively by Okoh and Haugen (Okoh and Haugen 2013).

In the oil and gas industries in the UAE, many safety accidents had been reported. For instance, two incidents occurred at the Abu Dhabi Company's (ADCO) onshore Shah oil field and the Abu Dhabi Gas Liquefaction Company (ADGAS) in February and March 2009, respectively (Carlisle 2009). The Shah field accident claimed three lives and left one worker unconscious during an attempt to drain a transfer line inside the confined space of a corrosion-coupon pit. Moreover, In the March 2009 incident, three employees (a supervisor and two technicians) were hospitalized after an explosion occurred at the Das Island facility. The cause of the explosion was attributed to an electrical discharge (Carlisle 2009).

In 2011, ADNOC, which is a leading fuel distribution company in the UAE and a global leader in the field of oil and gas production and distribution, reported seven significant incidents involving hydrocarbon spills, which resulted in the release of around 4,209 m^3 of hydrocarbons (ADNOC Sustainability Report 2011). In the afternoon of October 22, 2015, another incident occurred in the Abu Dhabi industrial area of Mussafah. An explosion was reported following a high-volume leakage of carbon monoxide in the Gulf Piping Company. Although no fatalities were reported, an estimated 11 injuries were reported, of which seven were described as critical (Al Kuttab 2015). In the same year, 20 hydrocarbon spills were reported, of which three were significant, and there were two nonhydrocarbon spills involving chemical solvents. In addition, there were five fatal incidents: two from burns or explosions, two from being struck, and one from a high fall. One fatal incident each was reported from production operations, land transport, inspection testing and maintenance, commissioning/decommissioning in construction, and drilling, workover, and well services (ADNOC Sustainability Report 2015).

On January 11, 2017, a tragic accident involving a fire preceding an explosion occurred at the ADNOC Takreer Refinery (Takreer Incident 2017). This led to the incident being classified as a Tier 1 process safety event, and the company required $800 million to restore the unit back to its original operation parameters (Takreer Incident 2017).

3. Plan and Research Methodology

This study was undertaken in three major phases (Fig. 1). From the questionnaire information collected, a review of the literature was made, and 662 safety climate items were collected (Koene et al. 2002, Mearns et al. 2003, Wills et al. 2005, 2006, Lu and Tsai 2008, Strahan et al. 2008). Narrowing down to the main objectives and aims of the current study, the number was reduced to 47 after the process of screening.The method used was on the basis of inclusion and exclusion criteria. After that, an exploratory approach to collect empirical data from oil and gas industry companies in the UAE, with specific focus on firms based in Abu Dhabi. In total, 30 health, safety, and environment (HSE) experts working for ADNOC were interviewed. The pool of experts was obtained from both upstream and downstream units. The researcher asked the experts to report on both the external and the internal dimensions that underlie their commitment and desire to adopt, adhere to, and maintain safety climate

that affect the process safety performance. All responses were filtered, which resulted in the identification of 47 valid safety dimention items within the oil and gas industries in the UAE.
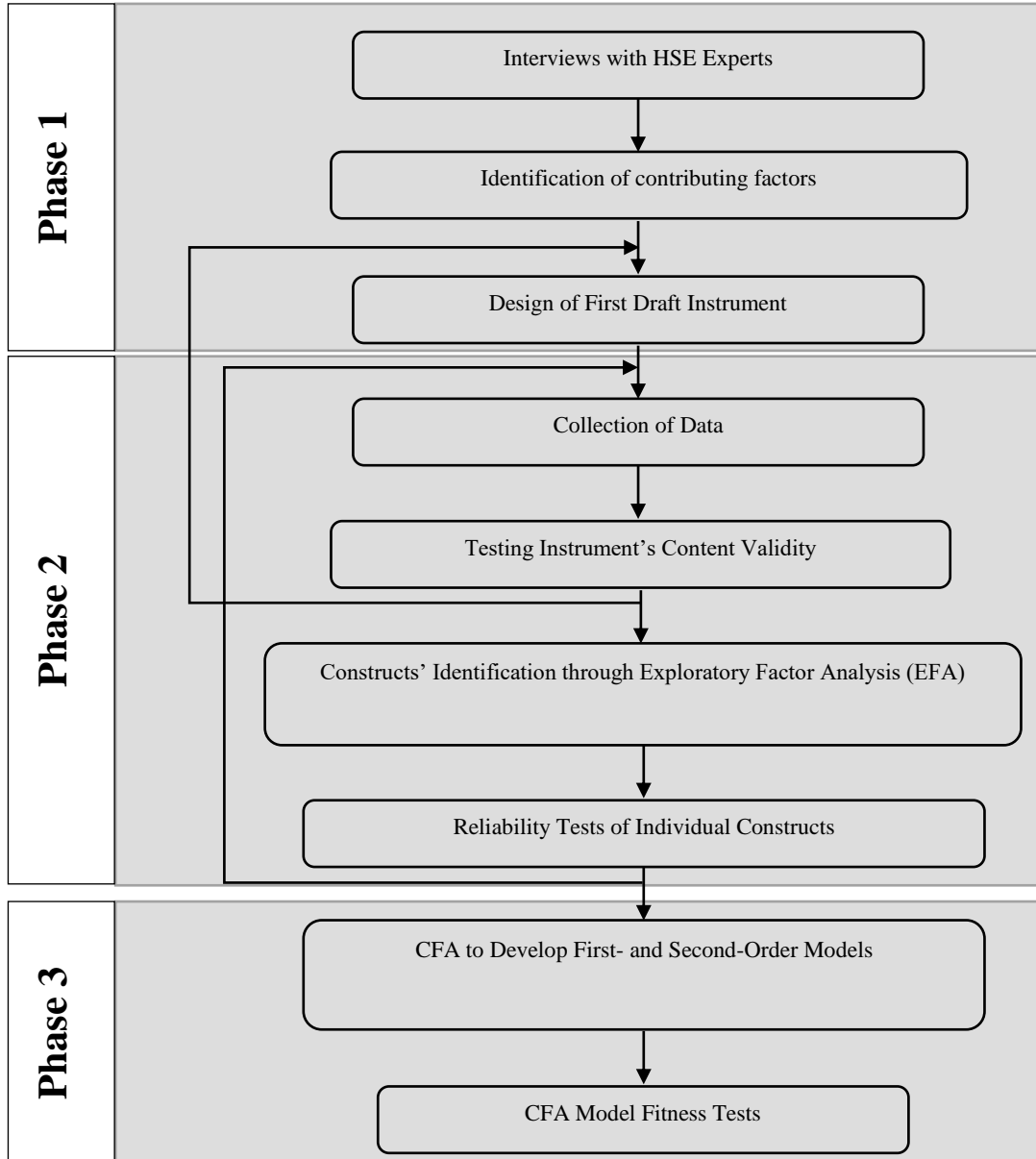
Fig. 1. Research methodology

As illustrated in Fig. 1, the second research phase involved implementing quantitative research methods to generate a pool of items that were included in a scale for measuring the constructs of the safety climate dimentions. This was a critical phase in the research because of the fragmented existing literature on safety climate dimensions. The outcome of this process was a 51-item instrument based on a seven-point Likert scale. A pilot study was conducted to establish the relevance of the first-draft instrument. The main outcome of the pilot study was preliminary validity and reliability information about each measurement scale. Upon completion of this

phase, SurveyMonkey was used as the platform for administering the final data-collection instrument, and this led to 180 responses from various actors in downstream and upstream units of ADNOC.

4. Data Analysis

During the third phase, the 180 responses obtained from the survey were tested. To explain the highest possible common variance with the fewest explanatory constructs (latent variables or factors), PCA was undertaken. These factors denote different highly correlated clusters of safety climate dimensions. A Cronbach's alpha coefficient (Cronbach 1951) of 0.962 affirmed the reliability of the responses for further analysis. Next, the constructs describing the safety climate dimension of the oil and gas industry in the UAE were assessed and validated using CFA.

4.1. Exploratory Factor Analysis

Exploratory factor analysis (EFA) was performed during the pilot study phase involving different safety actors, workers, supervisors, and managers in various units and departments. Before proceeding with EFA on the items, some conditions must be satisfied, and this can be assessed through various tests. The Kaiser–Meyer–Olkin (KMO) test (Kaiser 1970) and Bartlett's test of sphericity (Bentler 1992) were among the tests that were performed. As shown in Table 1, the considerably high KMO value (0.955) indicates that the items are appropriate for undertaking factor analysis because no serious multicollinearity issues are indicated within the dataset. Bartlett's test of sphericity (Sig. < 0.01) showed that the interitem correlations were adequate for running factor analysis (Table 1).

Table 1. Results of the KMO test and Bartlett's test of sphericity

KMO measure of sampling adequacy		.955
Bartlett's test of sphericity	Approx. Chi square	8,125.709
	df	1,081
	Sig.	.000

Subsequent to these two suitability tests, the 51-item instrument was subjected to EFA using PCA as the factor extraction method while varimax rotation was invoked. The factor retention approach was based on the robust combination of theoretical salience, scree plots, and eigenvalues greater than 1.0 for the rotated factors. According to Stevens (Stevens 2009), the ideal situation is for an item to load above 0.40 on its respective factor and below that threshold on any other factor. These resulted 47-instrument items accounted for 68.27% of the variance in all responses.

Table 2 shows the rotated component matrix presenting the item loadings and respective factor pattern. The first factor (F1) accounted for a maximum of 51.44% of the variance in all responses. The questionnaire items that loaded into F1 seem to relate to various aspects of organization commitment to safety (OCS) and safety practices. Thus, F1 was labeled as OCS, and it contained 16 items. The 10 items loading into the second factor (F2) relate to the supervisor commitment to the safety of subordinates. Thus, F2, which accounted for 5.25% of the variance in all responses, was labeled as supervisor–subordinate commitment to safety (SSCS). The eight factors that loaded into the third factor (F3) accounted for 4.83% of the variance in all responses. They were mainly about training on safety (TOS), and this led to F3 being labeled as TOS. Six factors loaded into the fourth factor (F4), which explained 3.51% of the variance in all responses. They all appeared to be about the extent to which the employees were engaged in safety, which informed the labeling of F4 as employee engagement with safety (EES). Finally,

the fifth factor (F5) accounted for 3.24% of the variance and contained three items regarding compliance with HSE standards, practices, and procedures. Therefore, F5 was labeled HSE compliance (HSEC).

Table 2. Rotated component matrix

Items		F1	F2	F3	F4	F5
Q14	The management ensures reliable and safe equipment	.737				
Q15	The management eliminates potential safety issues	.736				
Q19	My company engages an HSE third-party audit to ensure that safety rules and regulations are followed	.726				
Q2	The company maintains records of all first-aid treatments, inspections, incident investigations, and training activities	.726				
Q11	The management conducts regular hazard inspections in your work area	.725				
Q18	My organization enforces a PTW system in all types of work	.712				
Q16	The management provides and participates in safety campaigns	.708				
Q9	My company provides sufficient personal protective equipment and gas detectors for the workers	.682				
Q8	My management encourages raising near misses, unsafe acts, and unsafe conditions	.680				
Q1	The management considers safety as a core organizational value	.639				
Q12	The management investigates near misses, unsafe acts, and unsafe conditions in a timely manner	.634				
Q5	The management considers production to be more important than safety	.631				
Q17	My company has clear hydrocarbon and chemical spill response procedures	.625				
Q10	My company provides enough safety training programs	.612				
Q13	The management considers production to be more important than environmental pollution	.578				
Q41	The management exercises safety consequences management standards in case of violation of safety measures	.491				
Q26	My immediate supervisor conducts sufficient toolbox talks		.817			
Q25	My immediate supervisor discusses safety issues with others before performing tasks		.808			
Q28	My immediate supervisor ensures that the workload and work patterns are adequate		.760			
Q20	My immediate supervisor enforces safe work behaviors		.756			
Q24	My immediate supervisor corrects near misses, unsafe acts, and unsafe conditions		.707			
Q29	My immediate supervisor considers human error as part of the risk assessment		.702			
Q27	My immediate supervisor investigates workplace accidents		.697			
Q21	My immediate supervisor cascades the corporate HSE KPIs to the employees		.677			
Q22	My immediate supervisor ensures work permits are obtained and signed		.677			
Q23	My immediate supervisor ensures that the employees' skills and abilities match the job tasks		.609			
Q43	New recruits are trained adequately to learn the safety rules and procedures			.634		

Q42	My company ensures that contractors are trained to perform their tasks safely			.598		
Q47	The safety training given to me is adequate to enable me to assess hazards in the workplace			.589		
Q44	The safety training is specific to the job, including hazardous materials, equipment, noise, fire, and other physical hazards			.564		
Q32	The safety training includes hazard control measures, such as department-specific safe operating procedures, acceptable practices, lock-out/tag-out, and working after hours or alone			.547		
Q46	The employees' training hours are linked to the overall performance of my department			.523		
Q36	The safety training provided is adequate for responses to emergency seniors and to control safety incidents.			.500		
Q33	Employees changing jobs or taking extra responsibilities are trained on the new safety regulations			.490		
Q38	I feel that my organization is keen on eliminating process safety incidents				.684	
Q37	I believe that it is possible to achieve zero process safety events/incidents in my organization				.680	
Q40	Employees regularly break the safety rules if they think they will not get caught				.652	
Q39	Safety professionals are viewed as law enforcement officers				.633	
Q35	Safety performance does not improve despite adequate OSHA compliance, leadership commitment, and training				.531	
Q34	Employees' participation in safety committees, training, and other safety-related meetings is low				.452	
Q31	My organization performs an assessment and audit of compliance with applicable HSE laws					.843
Q30	My organization conducts mock drills to evaluate the emergency response plan					.816
Q3	My organization has HSE measurable performance metrics					.442
	Average variance extracted (%)	51.44	5.25	4.83	3.51	3.24
	Construct reliability	.963	.958	.935	.894	.778

4.2. Content Validity and Internal Consistency

Reliability speaks to the magnitude of consistency in the responses pertaining to a respective construct. Normally, Cronbach's alpha is the common measure for these tests. As illustrated in the bottom row of Table 2, the five latent constructs constituted from the contributing factors of safety climate were between 0.778 and 0.963. The results indicate that the five proposed constructs have good psychometric properties.

4.2.1. Convergent Validity

The Bentler–Bonett's normed fit index (NFI) is commonly used for evaluating convergent validity (Bentler 1995). This index shows the extent to which the various approaches employed in measuring a given construct are likely to yield consistent results (Ahire et al. 1996). Bentler (1995) asserted that the rule of thumb is that NFI values of at least 0.90 imply an acceptable fit index. The five constructs had acceptable NFI values, which meant that their constituent items converge well to warrant further analysis, as shown in Table 3.

Table 3. Construct validity analysis

Factors/construct	Convergent validity Bentler–Bonett NFI	Discriminant validity Factor Cronbach's α–Average correlation between factors
F1	.923	.243
F2	.977	.238
F3	.962	.215
F4	.990	.174
F5	1.00	.058

4.2.2. Discriminant Validity

Bagozzi et al. (1991) explained that this type of validity refers to the degree of distinction of distinct latent constructs and their respective indicators from other constructs and indicators.

The computation of discriminant validity involves comparing a latent construct's Cronbach's alpha with its average correlations with the other latent constructs. When the comparison yields a significant difference in the two measures, discriminant validity is confirmed (Ghiselli et al. 1981). The values shown in Table 3 demonstrate a conceptual distinction between the five latent constructs.

4.3. Confirmatory Factor Analysis

The EFA led to the identification of OCS, SSCS, TOS, EES, and HSEC as the initial safety climate dimension in the oil and gas industries in the UAE. The first-order model contains OCS, SSCS, TOS, EES, and HSEC as the correlated safety climate factors in the oil and gas industry in the UAE.

The first-order model is shown in Fig. 2. Alternatively, the safety climate factors can be operationalized through a second-order model in which the five constructs of contributing factors are governed by a higher-order factor (i.e., safety climate factors; see Fig. 3).
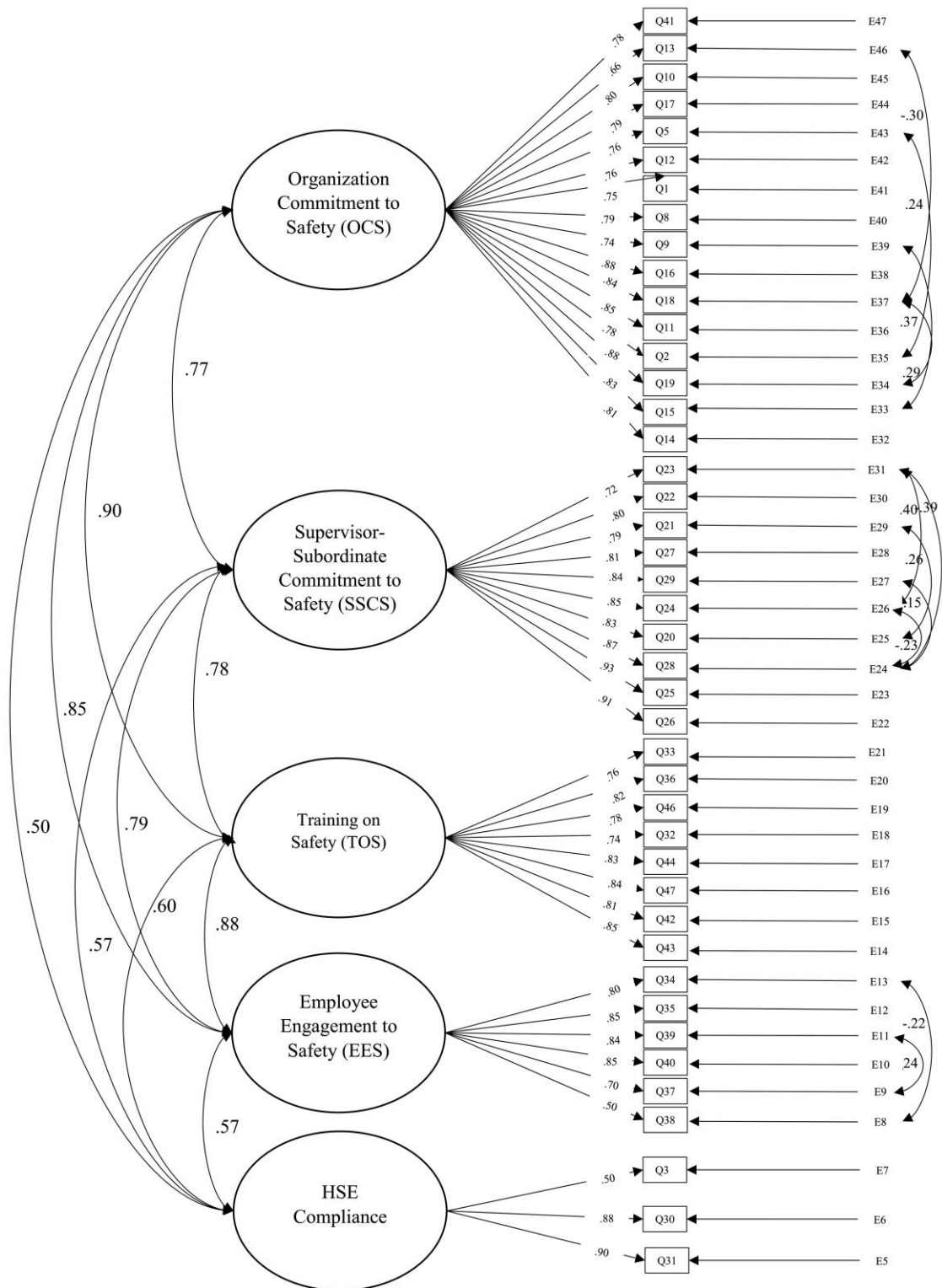
$X^2 = 1748.356$, DOF = 833, CMIN/DOF = 2.099, CFI = 0.881, TLI = 0.871, RMSEA = 0.078

Fig. 2. First-order measurement model for safety climate dimensions
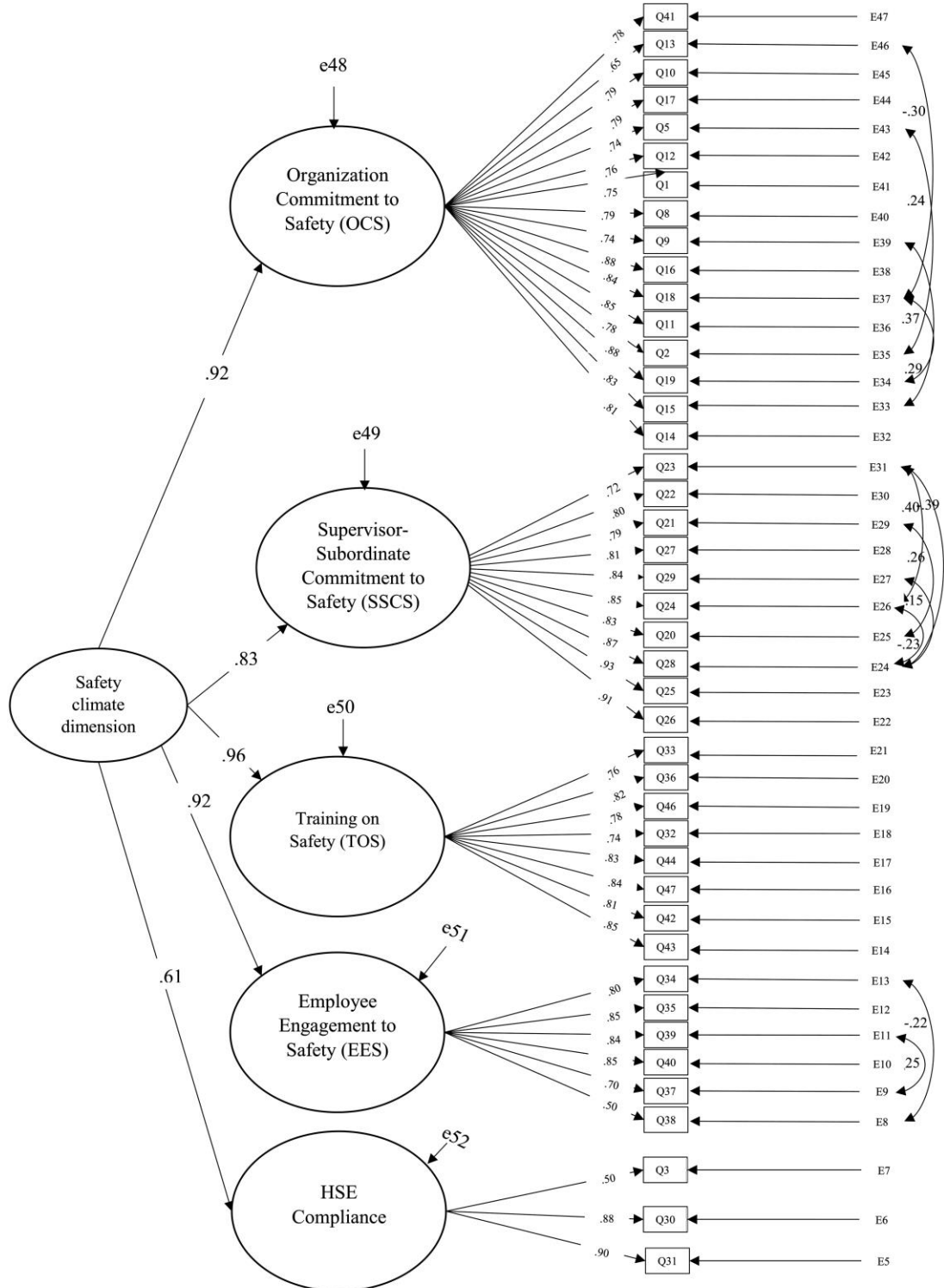
$X^2 = 1759.215$, DOF = 838, CMIN/DOF = 2.099, CFI = 0.880, TLI = 0.871, RMSEA = 0.078

Fig. 3. Second-order measurement model for safety climate

The first-order model for safety climate dimension shown in Fig. 2 implies correlations between OCS, SSCS, TOS, EES, and HSEC, although not under the governance of one shared latent factor. Despite χ^2 being statistically significant ($p = 0.000$), the other model-fit indices shown in Fig. 3 back up the first-order model for safety climate dimensions in UAE oil and gas industry .

The results obtained after running the second-order model shown in Fig. 3 indicate that safety climate dimensions as the higher-order latent factor or the overarching trait of safety dimension implementation govern the correlations among OCS, SSCS, TOS, EES, and HSEC. In addition, this second-order model yielded good model-fit indices. Examining the second-order model of safety climate dimension implementation in the oil and gas industries in the UAE reveals the significance of all the coefficient estimates associated with OCS, SSCS, TOS, EES, and HSEC describing the relationships of the five contributing factors on the higher-order construct of safety climate dimension. The results show that TOS had the highest impact on safety climate, whereas HSEC had the lowest impact.

5. Discussion and Implications

This study primarily aimed to develop a safety climate scale and validate the scale's reliability. Through this study, 51 items were found to be satisfactory on the developed scale in terms of reliability and validity. However, after a follow-up analysis on EFA and reliability, only 47 items were sufficiently reliable and EFA satisfactory. Using quantitative methods, this study aimed to understand the legitimacy of the content and investigate the validity of the constructed scale using EFA and CFA. Interestingly, the internal-consistency reliability was satisfactory, indicating that the scale is legitimate and dependable for measuring the safety climate. A significant result concerning the relative validity of the safety climate was not acquired herein based on participants' experience with accidents.

Herein, EFA was used to measure the attributes of safety climate in dimensions. Results were then used to label the dimensions of the safety climate as "OCS," "supervisor–subordinate commitment to safety," "training on safety," "employee engagment on safety," and "HSE complaince." Results of this study were similar to those reported previously that recorded the organizational commitment to safety, employee engagment, supervisory committment to safety, training, and audits as factors that infleunced safety performance. An organization's commitment to safety has been described as the fundamental component of safety culture (Flin et al. 2000, Luria and Rafaeli 2008). It manifests in the efforts that are made to ensure that aspects of all organizational operations are adjusted for safety maintenance (Wiegmann et al. 2004). An organization's commitment to safety is judged based on the procedures and equipment of the organization and the employee training and selection (Luria and Rafaeli 2008). This commitment has been shown to be crucial for influencing the way employees perceive, commit to, and ensure a safety culture and to take charge of safety (Morrison and Phelps 1999), resulting in an inclination toward actively taking safety measures (Geller et al. 1996). All effective safety programs require that top management provides a written commitment toward safety, back it up with sufficient resources, provide ongoing training, and fund it adequately (Price and Forrest 2016).

Employee engagement is generally an indispensable contributor to organizational safety. For example, (Harter et al. 2006) found that companies with low employee engagement had over six times more safety incidents than those with higher engagement (Lockwood 2007). found that employees with high engagement had a five times lower likelihood of experiencing safety incidents. They were also seven times less likely to register lost-time safety incidents compared to their nonengaged counterparts. According to (Cooper 2018), employee engagement aims at helping to ensure that employees commit to the values and goals of an organization while motivating them to contribute to the organization's success. The principal aspect is to ensure an understanding that engagement

entails mutual dialog, leading to joint decision-making while acting together. Employee engagement implies creation of genuine safety partnerships between the workforce and management to enhance safety performance (Cooper 2018). Moreover, supervisors are considered critical role players in showing workers the need to prioritize safety because supervisors inform their subordinates about the types of behavior that are supported and valued within the workplace (Zohar 2002). Their everyday interactions with both management and employees is regarded among the safety climate's building blocks (Bronkhorst et al. 2018). Unsurprisingly, numerous authors have focused on the need to increase the perception that the supervisor is committed to safety (Zohar and Luria 2003, Kines et al. 2010, Zohar and Polachek 2014). In general, results of all these studies have demonstrated that offering feedback and coaching to supervisors on their everyday safety instructions enhanced the perceptions of workers toward prioritizing safety. Supervisory commitment to safety has been shown to predict safety behavior (Taylor and Snyder 2018).

The effect of employee training upon process-safety outcomes has been demonstrated via various industry reports and process-safety literature. However, the most resounding effect has been the revelation that employee training (or the lack of it) has been associated with major process-safety events around the world. For example, the accident that was strongly linked to the lack of employee training with the explosion at BP Texas City resulted in the deaths of 15 individuals and 180 casualties. It was demonstrated that management did not assure the operators' training development for a long time before the process-safety event occurred (Halim and Mannan 2018). Thus, training employees on process safety has been shown to enhance operator performance within the process industry (Nazir and Manca 2015, Yamamoto 2015, Mkpat et al. 2018). However, such training should also be job-specific and extended to new recruits and contractors, as explained in the following three subsections.

Finally, compliance audits are PSM techniques for verifying "that the implementation of the PSM program is in compliance with OSHA standards and to identify potential deficiencies in the PSM program used" (Majid et al. 2014). Such audits have now become integral to implementing safety management in diverse industries because it enables an organization and/or employer to determine the extent to which the 13 PSM components are compliant with the OSHA PSM 29 CFR 1910.119. If the compliance audit is performed as it should be, safety loopholes and weaknesses that could hinder successful maintenance of the facility personnel's safety and of the public around the facility have been identified (Birkmire et al. 2007). Failure to ensure compliance has been linked to the emergence of adverse process-safety accidents such as the Phillips 66 Disaster of 1989 (Okoh and Haugen 2013).

The present paper confirms the importance of measuring and incorporating multiple factors comprehensively to obtain a complete picture of the implementation and perceptions of safety cluture in oil and gas organizations.. Focusing on one construct of safety climate factors even at the item level disregards the potential benefits that are accruable from taking actions that would motivate the organizational stakeholders in all the five construct areas.

These findings demonstrate that oil and gas organizations must adhere to coherent and comprehensive approaches for developing more favorable perceptions toward safety climate in the oil and gas industry. Looking at the second-order model developed in this study from a high-level governing factor to latent constructs, which trickle down to 47 items, provides the foundations of such comprehensiveness and coherence in developing favorable safety climate in oil and gas organizations.

6. Conclusions

6.1. General Conclusions

The aims of this paper were to (i) explore the safety climate factors contributing to the reduction of process safety accidents in the oil and gas industry in the UAE and (ii) investigate and validate the relationships among the dominant safety climate contributing factors by introducing first- and second-order CFA. While companies in the oil and gas industries in the UAE have been investing considerable efforts into achieving zero accidents and incidents in their overall operations, evidence shows that they still struggle with eliminating process safety events. Because achieving an effective safety climate in the oil and gas industry entails a collective effort from different stakeholders in an organization and beyond, there are often conflicting perceptions about what works and what does not. The scarcity of an empirically proven and sound research framework for understanding safety climate, which places the various stakeholders and the way they interact within the organization's safety climate framework, makes it more difficult for researchers, managers, and employees to understand the issues that underlie safety climate within this context. In turn, this makes it difficult for oil and gas organizations to implement an effective safety climate successfully both in research and in practice.

6.2. Limitations and Future Directions for Research

The framework proposed herein is based mainly on the perspectives of various organizational stakeholders, especially those within the oil and gas industry. The expectation is that the contributing factors of safety climate identified in this paper will be applicable beyond the oil and gas industry and into other complex process-driven industrial sectors such as neuclear industry. Clearly, the proposed framework is an effective and valid instrument for measuring the contributing factors of safety climate. Being knowledgeable about the focus contributing factors of safety climate will aid oil and gas managment in the UAE to foucous more into the safety climate factors to help minimizing process safety accidents.

Despite accomplishing its objectives, this paper was encumbered by some limitations. First, the survey respondents during the primary data-collection phase were drawn from different units of the oil and gas sector. Future studies may also investigate the applicability of the second-order framework to oil and gas sectors outside Abu to other complex process sectors, such as the chemical and neuclear industry. The uniqueness of the oil and gas industries in other emirates (e.g., Dubai) will further help validate and extend the framework developed in this research. In addition, the UAE shares similarities with numerous countries in the Gulf region. Undertaking comparative studies between the oil and gas companies of the UAE and those elsewhere in the Gulf based on the framework proposed in this paper would also be helpful.

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CHALLENGES OF OUTSOURCING ACCOUNTING IN LATVIA AND LITHUANIA

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Abstract. Accounting provides around 80 % of information of any type and sort of activity of legal entity and significantly influences the decisions of accounting information users. The accountant profession, which had faced many challenges over the past few years, now is proving to be no exception. The article looks at both theory and practice and attempts to determine and understand problematic issues about outsourcing accounting challenges. The purpose of the research is to evaluate outsourcing accounting challenges in Latvia and Lithuania. The research deployed the survey, the inductive and deductive methods, the methods of systematisation, comparison and a summary of information. Research object – companies providing outsourcing accounting services in the Republic of Latvia and the Republic of Lithuania. From the results of the research the authors have come to the following conclusions: the biggest challenges for accounting outsourcing companies of both countries are keeping up with new regulations and standards and technology developments. Both countries have quite a similar view on challenges of accounting outsourcing companies, however, Lithuanian respondents provided opinion on more significant challenges such as attracting new customers, differentiating from competition and experiencing pressure to lower fees, as Latvian respondents – emphasized challenge of keeping up with new regulations and standards.

Keywords: accounting; outsourcing accounting

1. Introduction

In Latvia and Lithuania accounting outsourcing does not have rich experience as first companies started to provide accounting services after both countries regained their independence in 1990. However, in the 30 years the companies achieved a good reputation, national companies had developed to an international level, international companies expanded their activity, and recently the companies have qualified staff and provide efficient services at both national and international level. Although as any other companies, they face challenges, which may influence not only the companies, which provide accounting services, but buyers of accounting services as well as all other accounting information users.

Research results of various authors (Bartkus etc., 2009; Kutuzov, Kotsiuba, 2015; Bagieńska, 2016; Liakhovych, 2017; Mwangi, Mutiso, Mungai, 2018 and others) confirm the usefulness of accounting outsourcing. However, numerous researches in the area of accounting profession and provision of accounting services show that the companies and accountants face such challenges as accountant's ability to adapt to the rapid pace of change or talent, client satisfaction or trust, automation, the impact of new technologies, Brexit, and so on. (Hood, 2018, MindSpace, 2018, IFAC 2019). That served as a background for the evaluation of the challenges of accounting outsourcing in Latvia and Lithuania.

The purpose of the research is to evaluate accounting outsourcing challenges in Latvia and Lithuania. The research deployed the survey, the inductive and deductive methods, the methods of systematisation, comparison and a summary of information. Research object – companies providing outsourcing accounting services in the Republic of Latvia (here and after - Latvia) and the Republic of Lithuania (here and after - Lithuania).

2. Research methodology

Figure 1 presents the methodology of the research, which was carried out in several phases to evaluate outsourcing accounting challenges in Latvia and Lithuania. First stage includes investigation of outsourcing accounting worldwide and in selected countries. Latvia and Lithuania were chosen for the research as countries, which have similar economic, political and cultural background as well as had started their development at the same conditions and are developing at quite similar level: GDP per capita makes around half of the EU 28 indicator in both countries (Main GDP aggregates per capita, 2020), growth of real GDP is at the same level and during 3 last years made around 0,9 percentage change (Gross domestic product, 2020), employment rate had reached around 77 percent in 2018 (Employment rate, 2020), the level of minimum wage make around 430 Eur (in Lithuania official value of minimum wage is estimated 607 Eur for 2020 year, although the value was recalculated by eliminating result of 2019 tax reform for comparison of indicators) (Trading Economy, 2020), etc. In both countries actively perform the Big4 international companies (Ernst & Young (EY), (PricewaterhouseCoopers (PwC), Klynveld Peat Marwick Goerdeler (KPMG), Deloitte Touche Tohmatsu Limited (Deloitte)) as well as other national/ international legal entities, which provide accounting services.

Fig. 1. Research methodology

Source: compiled by authors
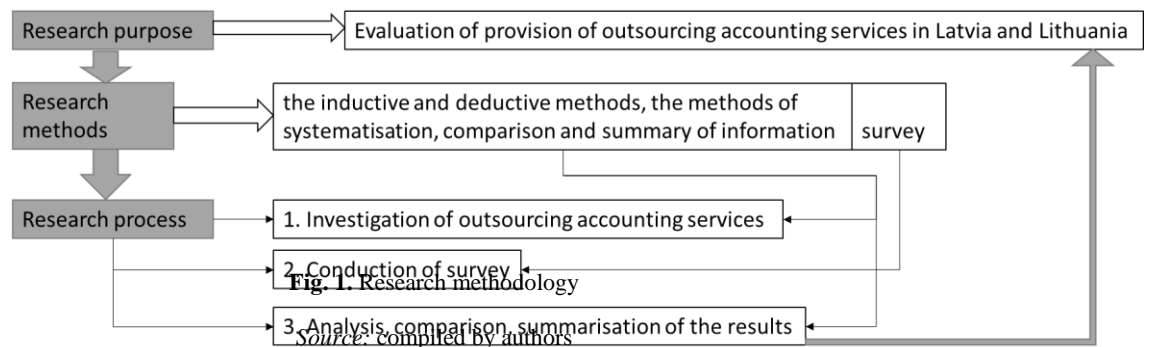
Second stage of the research was dedicated to the preparation and conduction of the survey. The survey was conducted in November, 2019 in Lithuania and Latvia. The questionnaire was prepared for executives of accounting outsourcing companies, heads of the accounting departments. The structure of questionnaire is presented in Table 1. Different types of questions where provided in the questionnaire: multiple choice (MCHQ), Likert scale (LS), open ended questions (OQ). The questionnaire was situated on public on-line system. 81 responses from Lithuanian outsourcing accounting companies and 87 – from Latvian outsourcing accounting

companies were received. Results included answers from the Big4 companies and make around 30 % of outsourcing accounting market.

Table 1. Structure of the questionnaire

No.	The aim of the part of questionnaire	Indicators			Type of question
1	To identify the demographics of respondents	Size	duration of activity	type of category	MCHQ
2	To assess the information on the companies, for which respondents provide accounting services	type of activity	type of category		OQ
3	To investigate the challenges and problems, which respondents face	identified challenges	problems and challenges identified by respondents		LS / OQ
4	To assess characteristics of accountant profession	personal	professional	social	LS / OQ
5	To identify peculiarities of the respondents	employees by age	employees by time regime	employees by the size of salary	OQ

Source: compiled by authors

For evaluation of challenges and problems, which companies face by providing accounting services, Likert scale of 5 points questions were formulated as well as open ended questions. Likert scale of 5 points and open ended questions were used for evaluating characteristics of accountant profession, too. Characteristics for accountant's profession were distinguished according to proposition of Mackevičius, Subačienė (2016). Authors presented 3 groups of characteristics: 1) personal, 2) professional and 3) social. Personal group consist of such characteristics as: accuracy; analytical skills and logical thinking; integrity; ability to resist workspace routine; ability to learn; responsibility; determination; ability to resist stress and pressure; independence; ability to independently and continuously learn; ability to gather, process, analyse and critically evaluate the data; creativity; management ability; risk taking; decision-making. Professional group of characteristics consists of such person's abilities: to record economic transaction to accounting documents and registers; to prepare financial statements; to prepare different statements of different accounting types and spheres; to form financial accounting policy; to form tax accounting policy; to form management accounting policy; to form information system of the company; to plan, analyse and evaluate company's performance; to conduct researches and present analysis results; to support internal control system; to present analytical results, to identify problems and propose alternatives to problem solving to make decisions; to be interested in innovations and changes in regulation. Social group of characteristics includes such abilities: to communicate with colleagues and persons from other institutions; to cooperate with colleagues and persons from other institutions; to work in a team. Respondents in addition were asked to indicate other characteristics, which might be important for accountant as open ended questions. Open ended questions were formulated for evaluation of such indicators of respondents as employees by age; employees by time regime, employees by the size of salary. The third stage includes analysis of the survey's results in each country as well as comparison and summarisation of the results.

3. The overview of outsourcing accounting

Development of every business process may persist or arise contradiction between the need of improvement and the limited company resources. The experience of many companies around the world shows that in such cases, it is the best not to try to improve business processes, but to borrow the process from companies in the industry and take advantage of it. Outsourcing external resources helps the company focus on its core business. The freed up of internal resources can be directed for improvement of the efficiency of the organization, focusing only on the specialization of the company and realization of its' main tasks. (Bartkus etc., 2009). So, one of the possibilities for the business is purchase accounting services. The main advantages of accounting outsourcing may be defined such as savings on accounting staff salaries; cost savings on organization of working places in accounting,

department software, training staff; access to skilled counseling; improvement of the quality and reliability of the functions performed by the outsourcer (Kutuzov, Kotsiuba, 2015). Research results of G. M. Mwangi, A. Mutiso, D. Mungai (2018) show, that accounting outsourcing has a positive influence on financial performance of small and medium-sized enterprises (SMEs), purchase of accounting services enhance relevancy, reliability, and improvement in financial performance of small and medium enterprises. In addition, authors of the study conclude that the size of the enterprise as an indicator of accounting outsourcing does not influence financial performance of the SMEs (Mwangi, Mutiso, Mungai, 2018). The same opinion on the usefulness of accounting outsourcing provide A. Bagieńska (2016). The author under the research results concludes that the most important factors influencing the entrepreneur's cooperation with the accounting office are: high quality of services resulting from the competence of the employees of the office, the range of services offered by the company, advising on finance management, correctness of tax accounting, the possibility of using additional services (Bagieńska, 2016).

In general, the main reasons why companies outsource their services are to ensure a high level of productivity and to offer maximum quality to their own customers. The area of outsourced service is vast, including but not limited to business process outsourcing, human resources services, and information technology outsourcing. Some of the most outsourced global services are financial accounting services, generating much of Business Process Outsourcing revenue. The largest global payers in this area are Deloitte, PricewaterhouseCoopers, Ernst&Young, and KPMG constituting The Big4 offering services such as accounting, auditing, corporate finance or insurance services (Popovici, Moraru, 2018). Like other forms of outsourcing, finance and accounting outsourcing has evolved significantly in recent years (Krell, 2011).

The main element of the process of provision of accounting services is employees of the companies. And employees as members of accountant profession will face significant changes in the next three decades. They as well as professional organizations, their members, and educational institutions, will have to respond. The three changes, namely, evolving smart and digital technology, continued globalization of reporting / disclosure standards, and new forms of regulation, are also significant challenges for the profession (Islam, 2017). For now, the Framework for International Education Standards for Professional Accountants and Aspiring Professional Accountants (2015) defines such requirements for the accountant profession: preparing, analyzing, and reporting relevant and faithfully represented financial and nonfinancial information; partnering in decision-making and in formulating and implementing organisational strategies; developing and examining relevant tax information (Bruna I. et al, 2017).

In Latvia, there are no mandatory requirements regarding education for a practicing accountant. Public authorities of the Republic of Latvia should genuinely look at the accountancy profession to determine the level of qualification and experience required to establish and ensure that skilled accountants manage a company's financial statements (Millere, Faitusa et.al. 2018). Amendments to the Law on Accounting are planned with licensing rules for outsourcing accountants in 2020. Requirements for a professional accountant as well as regulations for outsourcing accounting companies and outsourcing accountants are defined in the Law on Accounting (2019) in Lithuania. According to the Law on Accounting (2019) professional accountant is a member of professional organization of auditors and / or accountants of Lithuania or any other European Union Member State, which belongs to the International Federation of Accountants. Accountants have to meet special requirements and to pass special exams for achievement of the status of professional accountant. Accounting outsourcing companies or outsourcing accountants have to be insured by civil insurance.

It may be generalised that there are specific rules for outsourcing accountants just in Norway: external accountants must be authorized by the Financial Supervisory Authority of Norway (Finanstilsynet) and shall conduct their client's duties according to the accounting and bookkeeping legislation. External accountants shall do its business by sound accounting practice. External accountants shall prepare reports and information to their

clients that they must provide by law or regulation. These include annual accounts, value-added tax reports, reports for tax and national insurance, etc. (European Commission, 2019).

The International Federation of Accountants Global SMP Survey 2016 investigated practitioners from small and medium-sized practices across the globe on their challenges as well as how various environmental factors may affect them over the next five years (IFAC, 2017) (see Fig. 2, Fig. 3).
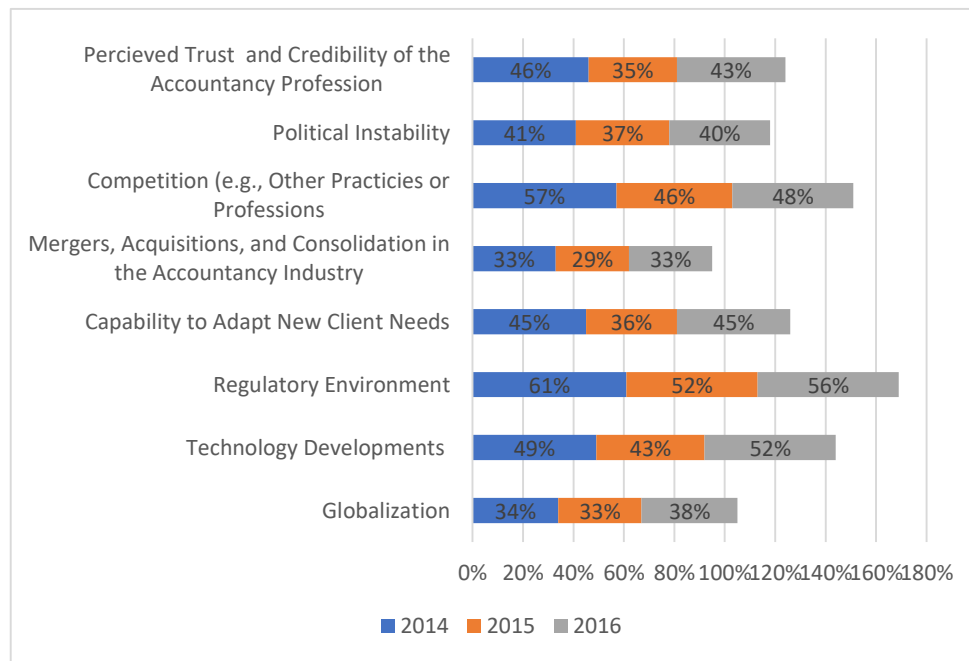
Fig. 2. Factors impacting accounting practises over next five years- comparison of 2014, 2015 and 2016 survey results

Source: compiled by authors, based on IFAC, 2017

The Figure 2 shows how respondents rated eight factors to indicate the degree to which they believe each element can impact their practice over the next five years. Consistent with 2014 and 2015, the regulatory environment continued to be viewed as the most impactful with 56% of respondents anticipating that it will have a high or very high impact. Technology developments at 52% up from 43% in 2015 were viewed as having the next highest potential impact on SMEs. The percentage of respondents that rated the anticipated implications of capability to adapt to new client needs as high or very high (45% up from 36% in 2015), and perceived trust and credibility of the profession (43%, up from 35% in 2015) increased substantially in comparison to 2015. For all four of the environmental factors noted, sensitivity to the factors increased in 2016, falling more in line with 2014 survey results (IFAC, 2017).
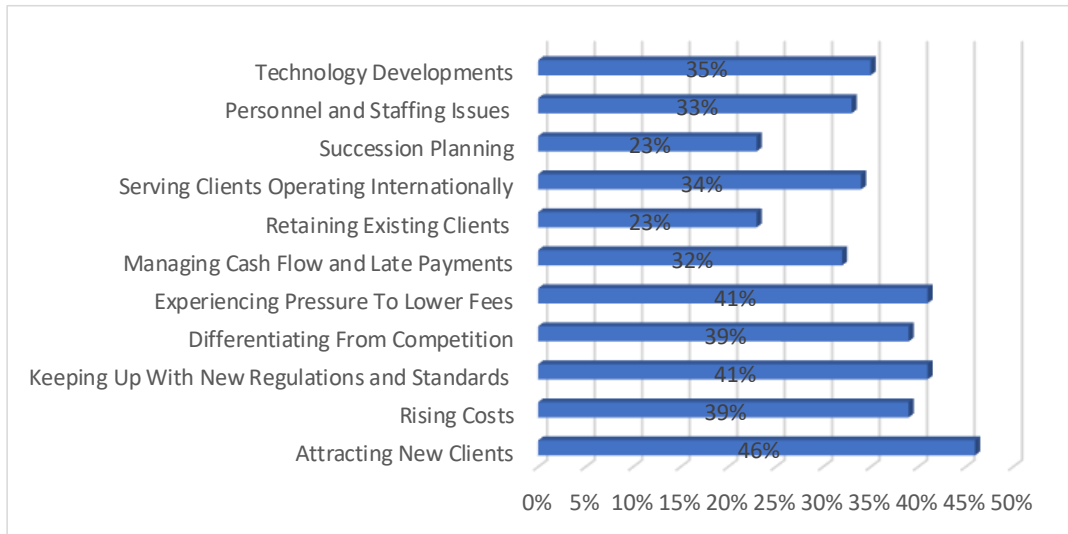
Fig. 3. Impact of 11 Challenges on small and medium-sized practices across the globe (2014,2015, 2016 sum of high and very high challenge)
Source: compiled by authors, based on IFAC, 2017

Analysis of data in Figure 3 results shows that certain challenges were viewed as more pressing with greater than 40% of respondents rating the following as high and very high challenge: attracting new clients, keeping up with new regulations and standards and experiencing pressure to lower fees (IFAC, 2017). The main elements of analysed survey were used for the evaluation of challenges of accounting outsourcing companies in Latvia and Lithuania.

4. Evaluation of the results of the research

The outsourcing accounting takes a rather significant place in both countries. In the last few years, more and more micro and small companies use outsourcing accounting instead of an employees' hiring. Research results show that most of the companies have one owner, who is self-employed accountant, (24 % in Lithuania (LT), 28 % in Latvia (LV) and 2-5 owners with staff (39 % LT, 43 % LV), although the number of such companies in Latvia is by almost 8 percentage points higher, what indicates that in Lithuania share capital of companies, who provide accounting services, is more differentiated. The Figure 4 presents age and category of the outsourcing companies in both countries.
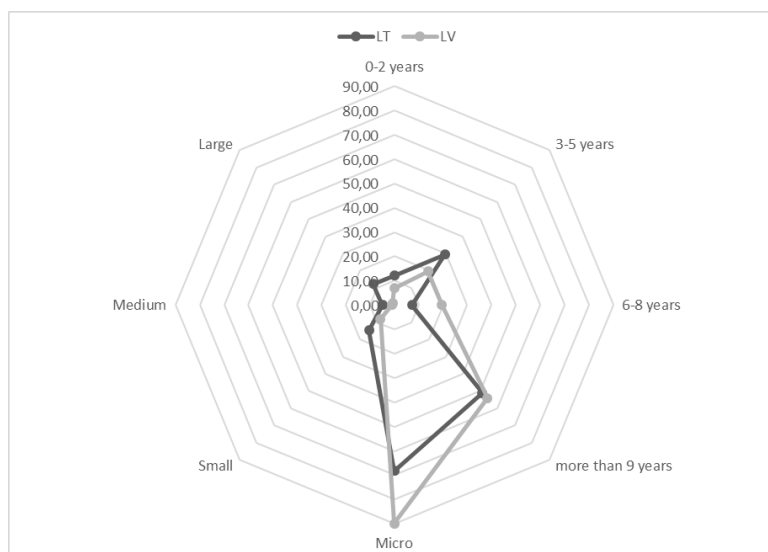
Fig. 4. The age and category of companies, %

Source: compiled by authors

More than half companies have performed for more than 9 years in both countries as well as most of the companies are micro (68 % LT; 90 % LV) as in both countries micro companies make the biggest part of all categories. At this aspect Lithuania may be characterized by wider diversity of categories in the sphere. Although the biggest part of companies has quite long period of performance, young companies, who operate till 5 years, make 42 % in Lithuania and 27 % in Latvia.

Types of activity and categories of companies, who use accounting services are presented in Figure 5.
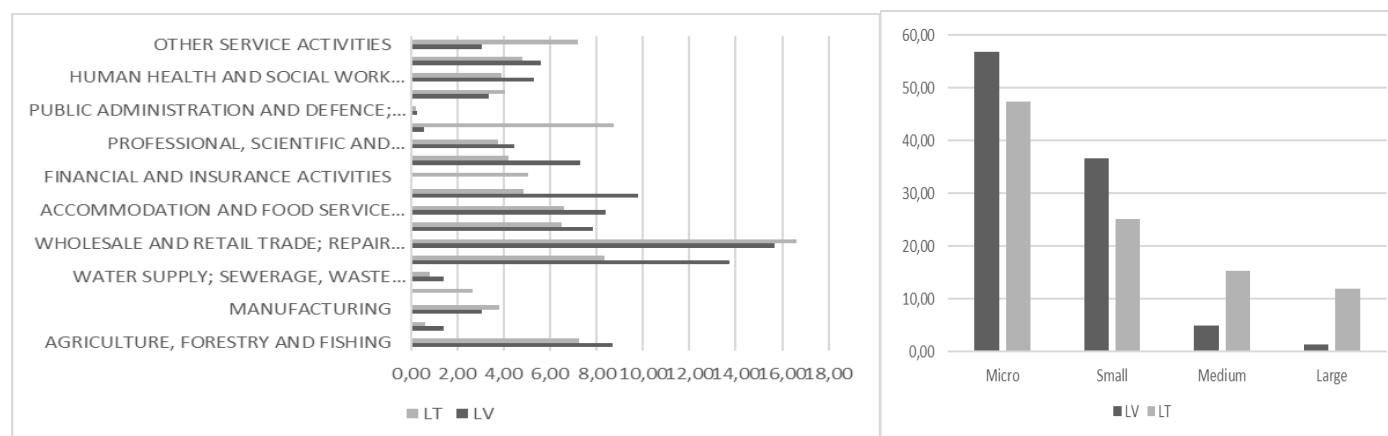
Fig. 5. Types of activity and categories of companies, who use accounting services, %

Source: compiled by authors

Research results show, that types of activity of companies, who purchase accounting services are sufficiently similar in both countries and do not differ more than 5 percentage points except of administrative and support service activities, which the number of Latvian companies exceed by more than 8 percentage points. Different situation shows analysis of categories of companies, who use accounting services: Lithuanian companies

provided accounting services for smaller companies (almost 94 % of companies are micro and small companies) than Latvian (more than 27 % are medium and large companies).

Figure 6 presents the respondents' opinion of challenges, which face companies providing accounting services. Research results show, that companies face more challenges by attracting new customers in Lithuania than in Latvia: more than 50 % of respondents in Latvia strongly disagree or disagree, that they face such a challenge, as in Lithuania this part makes only slightly more than 34 %. The same part of respondents agrees or strongly agrees on the statement in Lithuania as in Latvia the number makes – less than 21 %. Almost the same part of respondents (around 32 %) in Lithuania neither agree, nor disagree with the statement, in Latvia – more than 24 %. Respondents in both countries don't think, that rising costs are a significant challenge, their opinions distributed almost in equal parts: around one third of respondents strongly disagree or disagree with the statement as well as neither agree nor disagree and strongly agree or agree. Although there are differences in opinion on the statement, that keeping up with new regulations and standards is a challenge, as bigger part of Latvian companies by 25 % perceive the challenge while more than 26 % of Lithuanian respondents strongly disagree or disagree with the statement (Latvian – almost 5 %). It should be mentioned, that only one of the Big4 companies strongly disagreed with the statement. Although some of micro and small younger Lithuanian companies expressed the opinion, that in Lithuania legislation is edited too often and usually important amendments are enforced from the beginning of new year as the amendments are published at the end of the current year (last week or so of December), so companies have only one or two weeks to prepare for the changes. Inefficient work of information systems of social insurance fund and state tax inspectorate were also mentioned as problems. In Latvia the main question for outsourcing accountants today is the development of the internal control system in accordance with Law on the Prevention of Money Laundering and Terrorism and Proliferation Financing (Saeima, 2008). Lithuanian respondents faced the same problem recently, but still see the procedures as bureaucratic and time consuming. Accountants expressed the opinion, that this process and preparation of the procedures is a very bureaucratic process. Planning, lack of staff, the changes in legislation, competition were also mentioned as challenges for outsourcing accountants in Latvia.
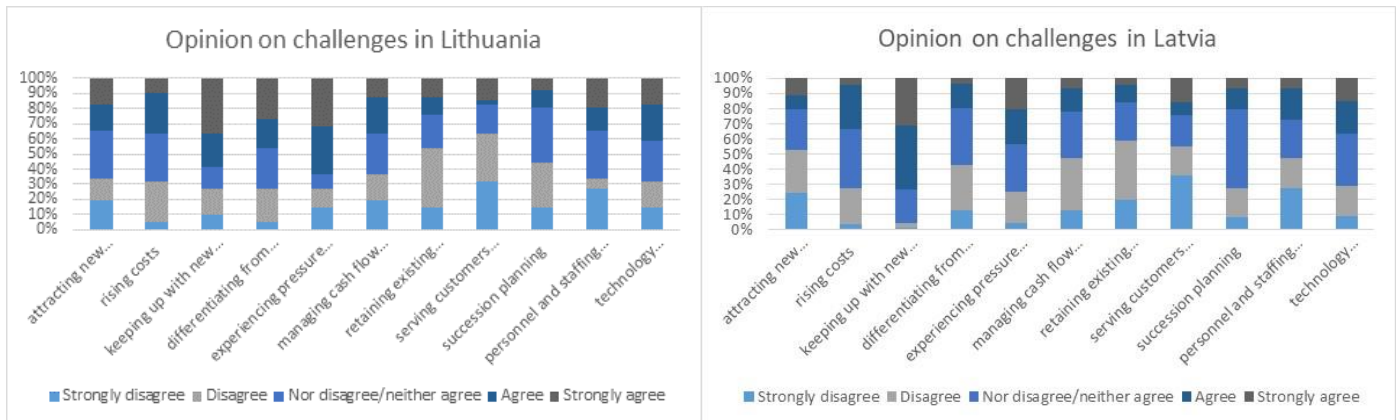
Fig. 6. Analysis of challenges in Lithuania and Latvia, %

Source: compiled by authors

It may be stated, that differentiating from competition is significantly more of a challenge for Lithuanian outsourcing accounting companies, as more than 46 % of respondents strongly agree or agree with the statement (including two the Big4 companies); in Latvia this number adds up to almost 20 %, as well as almost 38 % nor agree, nor disagree and 42 % strongly disagree or disagree with the statement (in Lithuania, both of these numbers make 27 % accordingly). Evaluation of results of the statement of 'experiencing pressure to lower fees' appears in a rather similar situation: by 45 % of Lithuanian companies perceive this challenge as more significant

and almost 10 % nor agree, nor disagree with the statement (in Latvia – 31 %). Around one fourth of respondents in both countries - strongly disagree or disagree with the challenge. It should be mentioned that respondents provided the opinion, that they face the challenges with reasoning of their work and its' importance to the clients as well as financial literacy of clients and receipt of accounting documents on time. Almost half of Latvian companies don't perceive challenge in managing cash flow and late payments and one third has neutral opinion. In Lithuania – the same part of respondents (37 %) strongly disagree or disagree or strongly agree or agree with the statement. Respondents of both countries don't face a challenge of retaining existing customers: 54 % Lithuanian respondents and 59 % of Latvian respondents strongly disagree or disagree with the statement, have neutral opinion accordingly – 22 % and 25 %. The same opinion is on serving customers operating internationally: 63 % of Lithuanian respondents and 55 % of Latvian respondents strongly disagree or disagree with the statement, in both countries 20 % of respondents have a neutral position. Besides, respondents of micro and small companies commented that the internal control system is very important for the company as well as qualification differentiation in rather small companies for responding the challenges in a proper way.

However, a different situation in analysed countries shows analysis of challenge of succession planning: although in both countries 20 % of respondents strongly agree or agree with the challenge, but only 28 % of Latvian respondents strongly disagree or disagree with the challenge. In Lithuania this part makes 44 %, neutral opinion is accordingly 52 % (LV) and 37 % (LT). More personnel and staffing issues face Lithuanian companies: 34 % of respondents strongly agree or agree with the statement, in Latvia it makes 28 %, and 47 % of respondents strongly disagree or disagree with the statement (in Lithuania – 34 %). The analysis' results may be supported by comments of respondents, which refer to the problems of lack of qualified staff in Lithuania, it cannot be considered that the problems are not for Latvian outsourcing accounting companies. Both countries have rather similar view on challenge of technology developments. Neutral opinion of the challenge of technological developments in Latvia have 34 % of respondents, in Lithuania – 27 %. Around one third of respondents in both countries strongly disagree or disagree with the statement.

Characteristics of accountant profession of personal sphere are presented in Figure 7. Research results show a rather interesting situation: respondents from both countries agree with around 5 percentage points difference, that the accountant profession has to have such characteristics as: accuracy, analytical skills and logical thinking, integrity, ability to resist work routine, ability to resist stress and pressure, ability to learn, responsibility.

Fig. 7. Characteristics of accountant profession of personal sphere in Lithuania and Latvia, %

Source: compiled by authors

Although 70 % and more of respondents of both countries agree or strongly agree with the characteristics of personal sphere as ability to independently and continuously learn, ability to gather, process, analyse and critically evaluate the data, and decision-making, however, 8 % of respondents in Lithuania and almost 4 % respondents in Latvia, strongly disagree or disagree with such qualities of accountant profession or almost 19 % of Lithuanian respondents and 15 % of Latvian respondents have neutral position. Differences between opinions lay on such abilities as independence (more than 3 % of Latvian respondents strongly disagree or disagree with the characteristic, almost 15 % have neutral opinion and Lithuanian respondents accordingly – almost 20 % and more than 24 %), creativity (almost 7 % of Latvian respondents strongly disagree or disagree with the characteristic, almost 36 % have neutral opinion and Lithuanian respondents accordingly – almost 22 % and more than 34 %), management ability (almost 13 % of Latvian respondents strongly disagree or disagree with the characteristic, almost 35 % have neutral opinion and Lithuanian respondents accordingly – almost 22 % and almost 59 %). Such results may be evaluated contradictory (especially for characteristic of creativity, which is most valued characteristic of any profession recently) as well as the fact that opinion was provided by different types of companies' categories: micro, medium and large, although the Big4 companies value the characteristics of independence and creativity. Around 62 % of Latvian respondents and 54 % of Lithuanian respondents strongly agree or agree, that risk taking is an important characteristic for the accountant profession.

Analysis of professional characteristics of accountant profession shows (see Fig. 8), that more than 80 % of respondents of both countries agree only on ability to record economic transaction to accounting documents and registers, and ability to prepare financial statements. 83 – 87 % of Latvian respondents agree or strongly agree, that accountant profession have to have such abilities as ability to form financial accounting policy, ability to form tax accounting policy and be interested in innovations as only 46 – 59 % of Lithuanian respondents have the same opinion.
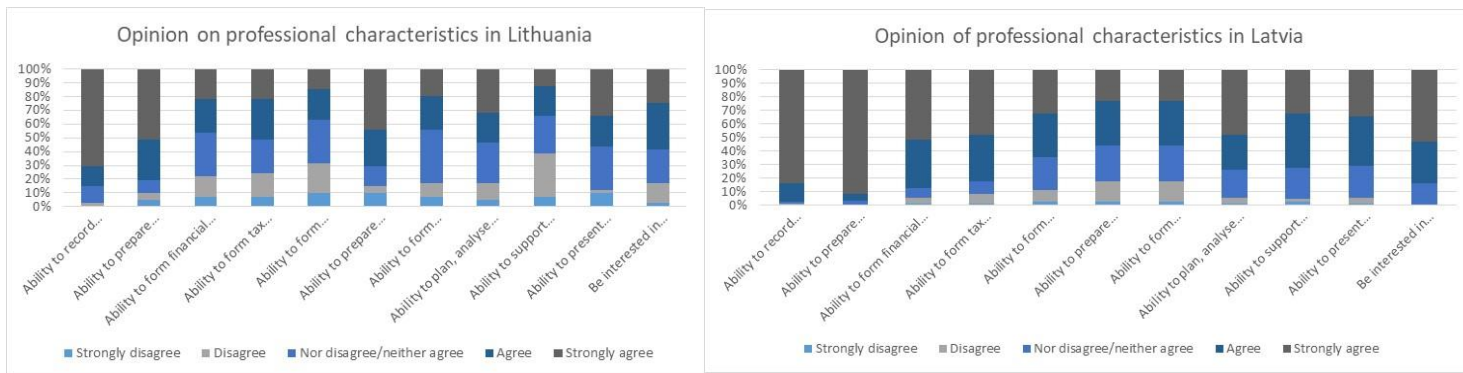
Fig. 8. Characteristics of accountant profession of professional sphere in Lithuania and Latvia, %

Source: compiled by authors

Almost 71 % Lithuanian respondents emphasized the ability to prepare different statements of different accounting types and fields (accordingly more than 56 % of Latvian respondents). Approximately 72 % of Latvian respondents agree or strongly agree with the importance of such abilities as ability to plan, analyse and evaluate company's performance, ability to support internal control system, ability to present analytical results, identify problems and propose alternatives to problem solving and only around 53 % of Lithuanian respondents have the same opinion (opinion on ability to support internal control system even less – 34 %). Besides, Latvian respondents pay more attention to the ability to form management accounting policy: almost 65 % strongly agree or agree that the characteristic is necessary for the accountant profession, more than 24 % - have neutral opinion,

and almost 12 % - disagree or strongly disagree as opinion of Lithuanian respondents was distributed by one third accordingly.

Respondents of both countries have a rather similar opinion on characteristics of social sphere: from more than 75 % to 90 % of respondents agree or strongly agree with necessity of such abilities as ability to communicate with colleagues and persons from other institutions, ability to cooperate with colleagues and persons from other institutions, ability to work in team. Respondents in open questions also emphasized the ability to communicate, loyalty to the client, ability to predict the impact of legislation changes, ability to understand the processes of the company, the company as a whole.

Age of employees and their gross salaries are presented in Fig. 9, which shows, that age of employees, who work in outsourcing accounting companies is higher in Latvia: more than 47 % of employees are younger than 30 years old in Lithuania and almost 24 % – in Latvia, more than 36 % employees are under the age of 30 – 50 years in Lithuania and almost 56 % – in Latvia.

Fig. 9. Age of employees and gross salaries in Lithuanian and Latvian outsourcing accounting companies, %

Source: compiled by authors

The value of gross salaries is higher in Lithuanian companies: almost 75 % of employees in Latvia earn a gross salary of below 1100 Eur, in Lithuania – 50 %. Lithuanian companies didn't indicate any employees, who earn minimum wage or lower. Besides, in Lithuanian companies almost 45 % of employees earn 1101 – 2100 Eur salaries and more than 5 % - earn more than 2101 Eur as in Latvia the numbers are accordingly almost 23 % and almost 3 %. Most of employees work part time: more than 76 % in Lithuanian companies and part time or part and full time – almost 65 % in Latvian companies.

Conclusions

The accounting profession will face significant changes in the next three decades, and professional organizations, their members, educational institutions as well as accounting outsourcing companies will have to take action and respond.
The outsourcing accounting takes rather significant place in Lithuania and Latvia. Last few years more and more micro and small companies had started using outsourcing accounting instead of hiring employees. IFAC survey results show that challenges for accounting outsourcing are attracting new clients, keeping up with the new regulations and standards and experiencing pressure to lower fees. In the time tendency of over the next five

years' regulatory environment was continued to be viewed as the most impactful, as well as technological development and capability to adapt to new client needs.

For evaluation of challenges of outsourcing accounting in Latvia and Lithuania the survey was conducted. The analysis results show that most of the accounting outsourcing companies have one owner, who is a self-employed accountant, and 2-5 owners with staff in Latvia and Lithuania. In both countries more than half of analysed companies had been performing for more than 9 years as well as most of the companies are micro. Research results show that in both countries the types of activity of companies, who purchase accounting services are sufficiently similar and do not differ more than 5 percentage points. Lithuanian companies provide accounting services for smaller companies than Latvian.

Accounting outsourcing companies face more challenges by attracting new customers in Lithuania than in Latvia, although in average, the research results refer to the results of the International Federation of Accountants Global SMP 2016 survey. Respondents in both countries aren't of the opinion that the rising costs is a significant challenge. However, opinions on the statement for keeping up with new regulations and standards is a challenge, differentiate: three fourths of Latvian respondents strongly agree or agree with the challenge, as one fourth of Lithuanian respondents – strongly disagree or disagree. Although differentiating from competition is more of a significant challenge for Lithuanian outsourcing accounting companies. Experiencing pressure to lower fees is evaluated at a rather similar level in both countries and around one fourth of respondents in both countries - strongly disagree or disagree with the statement, although 63 % of Lithuanian companies strongly agree or agree with the challenge (Latvian – 44 %). Almost half of Latvian companies don't perceive a challenge in managing cash flow and late payments as in Lithuania this part makes around 40 %. More than half of respondents in both countries strongly disagree or disagree with the challenge of retaining existing customers as well as the challenge of serving customers, who are operating internationally. Succession planning is significantly more of a challenge for Latvian accounting outsourcing companies, although more challenges with the personnel and staffing issues have Lithuanian companies (the difference of opinions doesn't exceed 15 percentage points). Both countries have a quite similar view on the challenge of technology developments: around one third of respondents of both countries strongly disagree or disagree with the statement.

Accounting outsourcing companies have quite the same view on characteristics of accountant profession in Latvia and Lithuania, although some differences may be distinguished. Research results show that respondents in both countries agree with around 5 percentage points difference, that accountant profession has to have such characteristics as accuracy, analytical skills and logical thinking, integrity, ability to resist work routine, ability to resist stress and pressure, ability to learn, responsibility. And 70 % and more of 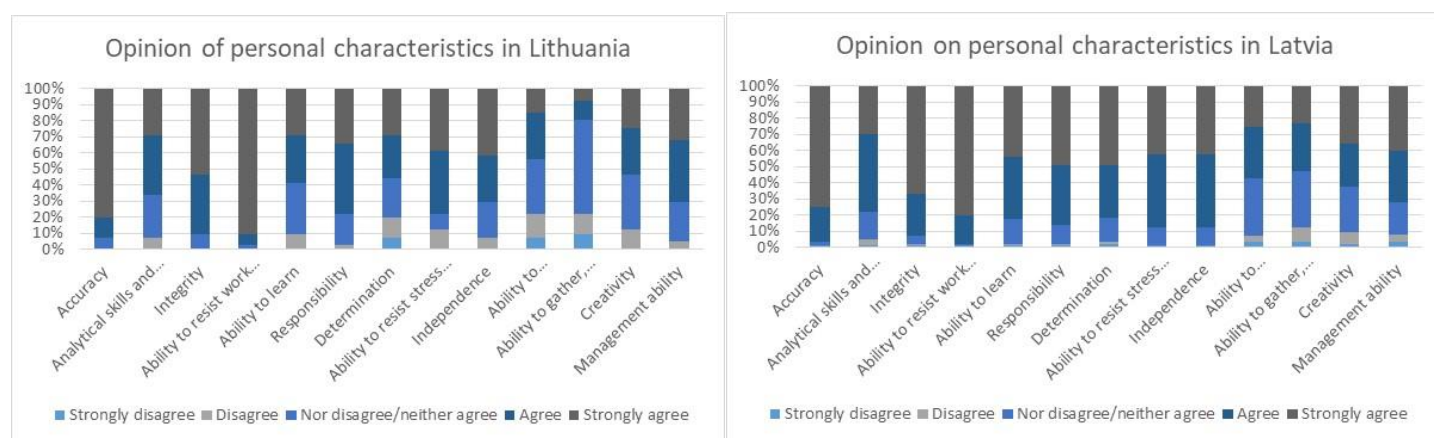respondents of both countries agree or strongly agree with the characteristics of personal sphere as ability to independently and continuously learn, ability to gather, process, analyse and critically evaluate data, and decision-making. However, 82 % of Latvian respondents strongly agree or agree, that independence is an important ability for accountant profession but only 56 % of Lithuanian respondents have the same opinion, as well as characteristics of management ability, opinions of respondents distributed accordingly by 53 % (LV) and 20 % (LT). Around 62 % of Latvian respondents and 54 % of Lithuanian respondents strongly agree or agree, that risk taking is an important characteristic for the accountant profession. The most interesting result is the evaluation of characteristic of creativity – only 44 % of Lithuanian respondents and 58 % of Latvian respondents strongly agree or agree with the necessity of such ability for accountant profession. Creativity is the most valued characteristic to a person of any profession, therefore such results may be contradictory evaluated. Analysis of the characteristics of professional sphere results show that more than 80 % of respondents of both countries agree only on ability to record economic transaction to accounting documents and registers, and ability to prepare financial statements. Latvian respondents almost twice more than Lithuanian respondents value more such abilities as to form financial accounting policy, ability to form tax accounting policy and ability to support internal control system. Although almost 71 % of Lithuanian respondents emphasized the ability to prepare different statements of

different accounting types and spheres (56 % LV), 56-84 % of Latvian respondents – ability to form information system of the company, the ability to plan, analyse and evaluate company's performance, the ability to present analytical results, identify problems and propose alternatives to problem solving, be interested in innovations. Latvian residents pay more attention to ability to form management accounting policy. Respondents of both countries have quite similar opinion on characteristics of social sphere.

Research results show that the level of age of employees of outsourcing accounting companies is higher in Latvia. However, the value of gross salaries is higher in Lithuanian companies. Most of employees work part time in both countries.

Further research may be conducted in time perspective for an evaluation of the development of analysed aspects as well as expanding the research to other countries.

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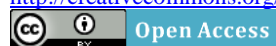
GLOBAL CLIMATE CHANGE AND GREENHOUSE EFFECT

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Abstract. The climate has changed significantly under the influence of human behavior. And first of all, this is due to the change in the proportionality and concentration of greenhouse gases in the atmosphere (water vapor, carbon dioxide, methane, ozone, PFC (perfluorocarbons). This paper analyzes the dynamics of greenhouse gas emissions. Climate change has many consequences on human health throughout the world, especially in African countries. The growth of greenhouse gas emissions is viewed as a cause of infectious and non-infectious diseases, negative effects on nutrition, water security and other social disruptions. The global average temperature gradually increases, and the atmospheric CO_2 concentration has exceeded 400 ppm due to the intensification of greenhouse effect. The method of energy balance was featured to simulate the trends in Greenhouse Gas Emission Forecast in different sectors until 2030. Through sensitivity analysis, we found that the reduction of anthropogenic CO_2 emissions from people (cars and households) would deescalate the consequences of the above trends. Emissions are mostly associated with industries, which can be reduced if local Government will want to achieve the Paris Agreement goal.

Keywords: global warming; emission reduction; greenhouse effect; climate change; greenhouse gases

1. Introduction

Global climate change is an important problem in this time. It leads to a gradual increase in the average annual temperature of the planet, which began with the industrial revolution in the beginning of the XX century. Extreme weather in recent years has made the talks about the growth of Earth's temperature more intense. The change in temperature is explained by high levels of manufacturing and economic activity that includes emissions of main greenhouse gases: carbon dioxide, methane, etc. (Albergel et al., 2010).

The climate system of the Earth covers the atmosphere, the ocean, the land, the cryosphere (ice and snow) and the biosphere. The figure suggests a visual representation of its components and operations of the process. The climate is described by such characteristics as temperature, the amount of precipitation, air humidity and soil, the state of the snow and ice cover, and many others. The climate is constantly changing due to many different natural factors. A significant new factor, which has been influencing the Earth's climate more and more in the last 200 years, has become human activity. Its impact is defined by the so-called greenhouse effect (Alirezaei et al, 2017; Bayer, 2015; Moumen et al., 2019; Chehabeddine, Tvaronavičienė, 2020).

An additional stumulation to its popularization in the 20th century was machine learning modeling of global temperature, which, according to reserchers, proved the anthropogenic greenhouse effect (Babic, 2017).

The introduction of this paradigm into the mass consciousness began in USA and Europe in the last century. This paradigm was a subject of many critiques after the 1997 Kyoto conference. Highly developed countries were determined there. They can create a general cataclism in the future, or, alternitavely, reducte green house emissions. It will stimulate the companies to more attentive research for global warming evidence (Bergamaschi, 2013).

Climate change has been caused by the influence of natural processes. However, anthropogenic influence factors are becoming significant in relation to global warming. There are two major reasons of global climate change: Earth's magnetic field changes and greenhouse gases in the lower levels of Earth's atmosphere (Chen and Chen, 2016).

According to last researches, the global temperature of the Earth grew 0.5-1 °C in the last 100 years. Moreover, it is reported that the total greenhouse gas emissions in Russia are likely 404.9 million metric tons of carbon dioxide, which is the equivalent to 0.0086154 metric tons per capita (Cui et al., 2016). There is an exclusion in the regions of sub-Saharan Africa from the global trade converges with the climatic productivity of agriculture.

In the past ten years, the problem of climate change caused by antropologic activities has become the most serious amongst environmental issues. This problem is also adjacent to population growth, deforestation, globalization, economic growth, production and consumption of industrial goods (Chen et al, 2015; Cloy, 2018).

2. Literature review

The calculations of the International Commission on Climate Change show that the average global temperature by the next century will rise by 6 °C if the current trends in the use of fossil fuels and deforestation are not reversed (Denisova et al., 2019; Elzan and Hohne, 2008; 2010).

Climate change also occurs in parallel and in combination with other pressured situations affecting global health, including widespread changes like globalizaiton. Furthermore, it is expected that the global population will increase more than 30 per cent by 2050. Such pressure often has a geographic specificity. For example, in sub-Saharan Africa, the increase of population growth leads to increased demand for natural resources which, in combination with regional exclusion from the global trade, damages the climatic productivity of agriculture. There is already disproportionately high infectious disease in the region, which becomes increasingly more dangerous if it is also participants in global environmental change and other serious and related problems (Denisova, 2019; Fan et al., 2010).

A firm understanding of subject links and their differential effects, based on differential socio-economic conditions is needed to completely prepare and respond to current and short-term problems of climate change on health and societies. Moreover, it is necessary to develop and include new and effective preventive approaches of negating long-term negative health effects (Flolking et al., 2006).

A report of the Commission on Climate Change includes short-term investments in research, monitoring of climate change and health consequences, the adoption of mechanisms to facilitate intra- and intergovernmental cooperation with emphasis on the extent to which additional global environmental changes affect health outcomes. The report also discusses the processes of phasing from coal-fired power generation and transition to human and planetary cities (Gotovsky et al., 2018).

This research makes an important contribution to the body of knowledge on carbon emissions' forecasting. Furthermore, it works to complete the gap in research on the role of carbon emissions in climate change that remains a debate for previous researchers through empirical testing of mediating role aiming for no climate change in (Lopatin, 2019b; Meynkhard, 2019b; Meynkhard, 2020).

The greenhouse effect is an increase in the temperature of the earth's surface due to the heating of the lower layers of the atmosphere by the accumulation of greenhouse gases. As a result, the air temperature is greater than it should be, and this leads to such irreversible consequences as climate change and global warming (Huang et al., 2016).
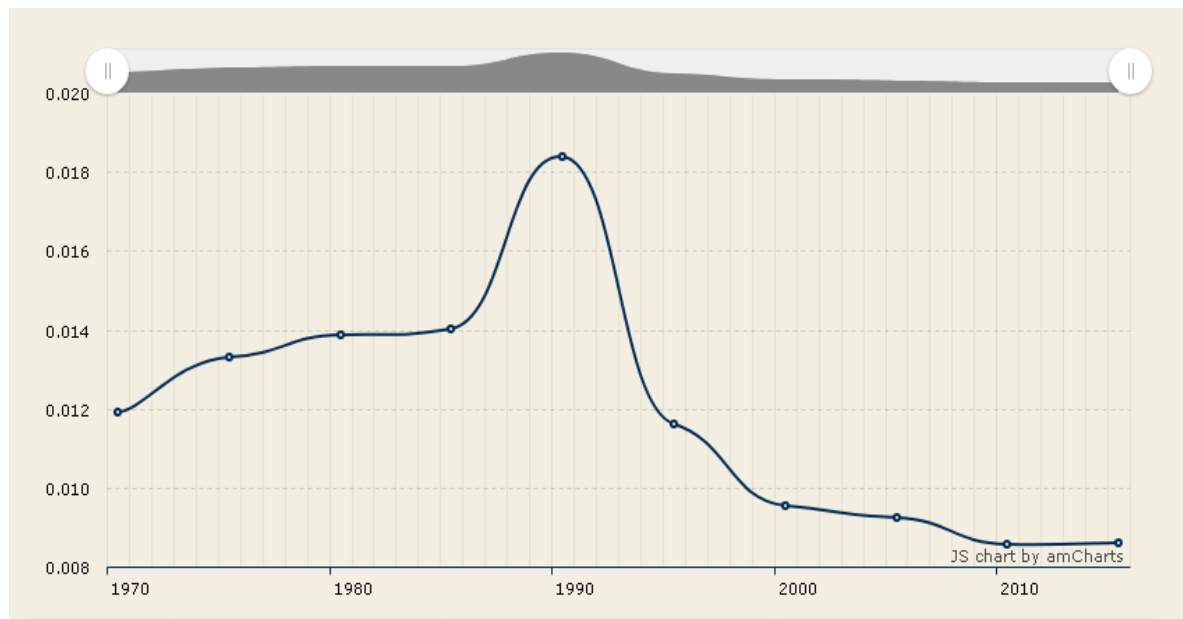
Fig. 1. Total greenhouse gas emissions (metric tons per person)
Source: European Environment Agency. https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6

Discussions about the phenomenon first began in 1827. An article by Jean Baptiste Joseph Fourier "A note on the temperatures of the globe and other planets" detailed ideas about the mechanism of the greenhouse effect and the

causes of its appearance on Earth (Inamdar, 1994). The latter conducted experiments with a blackened glass vessel closed and placed under sunlight. The temperature inside the vessel was much higher than outside. This is explained by the following factor: thermal radiation can not pass through the darkened glass, and therefore remains inside the container. In this case, the sunlight boldly penetrates through the walls, since the vessel remains transparent outside (Isacs et al., 2016; Kohler et al., 2017).

Table 1. Greenhouse gas summary

Compound	Formula	Concentration in atmosphere (ppm)	Contribution (%)
Water vapor and clouds	H_2O	10–50,000[A]	36–72%
Carbon dioxide	CO_2	~400	9–26%
Methane	CH_4	~1.8	4–9%
Ozone	O_3	2–8[B]	3–7%

Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6

The causes of the greenhouse effect are as follows: the use of combustible minerals in industries - coal, oil, natural gas, which emits a huge amount of carbon dioxide and other harmful compounds into the atmosphere when burned; different means of transportation - cars and trucks emit exhaust fumes that also pollute the air and enhance the greenhouse effect; deforestation, which absorbs carbon dioxide and releases oxygen, and with the destruction of each tree on the planet the amount of CO2 in the air increases; forest fires are another source of plant destruction on the planet (Table 1). The increase in population affects the growing demand for food, clothing, housing. Correspondingly, on order to comply with this demand industrial production is growing, which is increasingly polluting the air with greenhouse gases; agro chemistry and fertilizers contain a different number of compounds, the evaporation of which releases nitrogen - one of the greenhouse gases; decomposition and burning of garbage at landfills contributes to the increase of greenhouse gases (Levin, 2012; Li, 2017; Lisin, 2020).

3. Materials and methods

In Northern Europe, especially in the Baltic region, the amount of surface and channel flow may increase exponentially (Lopatin, 2019a; Meynkhard, 2019a).
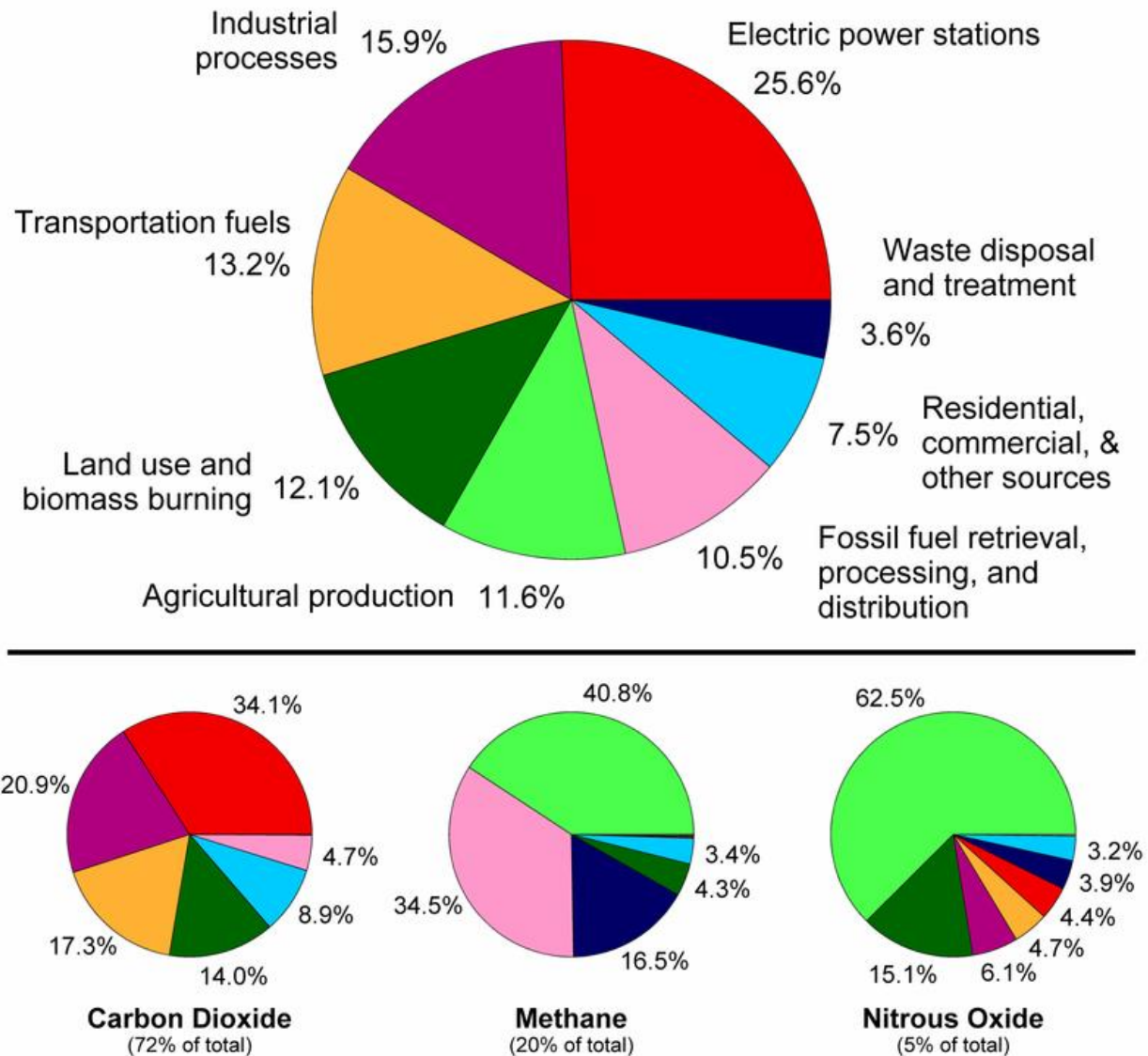
Fig. 2. Greenhouse Gas Emissions by Sector.
Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6

This will be caused by changes in nitrogen concentration (Fig. 1, 2). The underlying results of this process will be pollution and arising problems in varios ecosystems (Mikhaylov, 2018; Magazzino, 2016). Global temperature growth will cause the decrease of the share of minearals in legumes or the increase of the number of available chemical elements. The rate of mineralization can change the release of nitrogen.

A method of energy balance: this mode is mainly based on the energy balance model established under the law of conservation of energy. The energy balance equation is Equation 1:

$$C \, dT/dt = \text{Rad}{\downarrow} - \text{Rad}{\uparrow} \tag{1}$$

where C is the thermal inertia of land, ocean and the atmosphere, Rad↓ is the incoming radiation, Rad↑ is the outgoing radiation.
Equation 1 can be converted into Equation 2:

$$C\ dT/dt = Q\ (1-\alpha) - \Delta I - E(F) \tag{2}$$

where Q is the solar radiation, α is the reflectivity, ΔI is the outgoing long-wave radiation, E(F) is the net energy flux along the circle of latitude.
The atmospheric CO_2 equilibrium equation is as follows:

$$dT/dt = Pfos + Pbio + Kma(Nm + \xi nm) + Kam(Na - na) + Fbi,a + Fa,bi + Fh,a \tag{3}$$

where Pfos is the CO_2 release rate of fossil fuels, Pbio is the rate of CO_2 release due to land use change, Kma is the ocean atmosphere exchange coefficient, Kam is the atmosphere ocean exchange coefficient, Nm is the total amount carbon in the ocean, Na is the total carbon in the atmosphere, na is the atmospheric carbon increment, ξnm is the ocean buffer factor, Fbi, a is the CO_2 exchange flux from land to the atmosphere, Fa, bi is the CO_2 exchange flux from the atmosphere to land, Fh, a is the CO_2 exchange flux from soil humus to the atmosphere.

Climate change will cause efficiency in agriculture and forestry to fall. The impact of economic growth on the environment is observable. Moreover, it is likely to lead to a change in the model of precipitation (Marino et al., 2017; Meinshausen et al., 2009).

Russia ratified the Paris agreement on combating global climate change, which replaced the Kyoto Protocol. Countries participating in the Paris Agreement should prevent increasing the average global temperature by more than 2 degrees Celsius (Ogle et al., 2018; Perry et al., 2012).

4. Results

Russia has been a participant of the world climate agreements for many years: the Kyoto Protocol and the Paris Agreement. For Russia, the issue of climate change is very important. This is a chance for us to build an economy on new foundations: on energy efficiency, a low-carbon economy is a chance to move to a new level of development (Pugh et al., 2016; Shao et al., 2016).
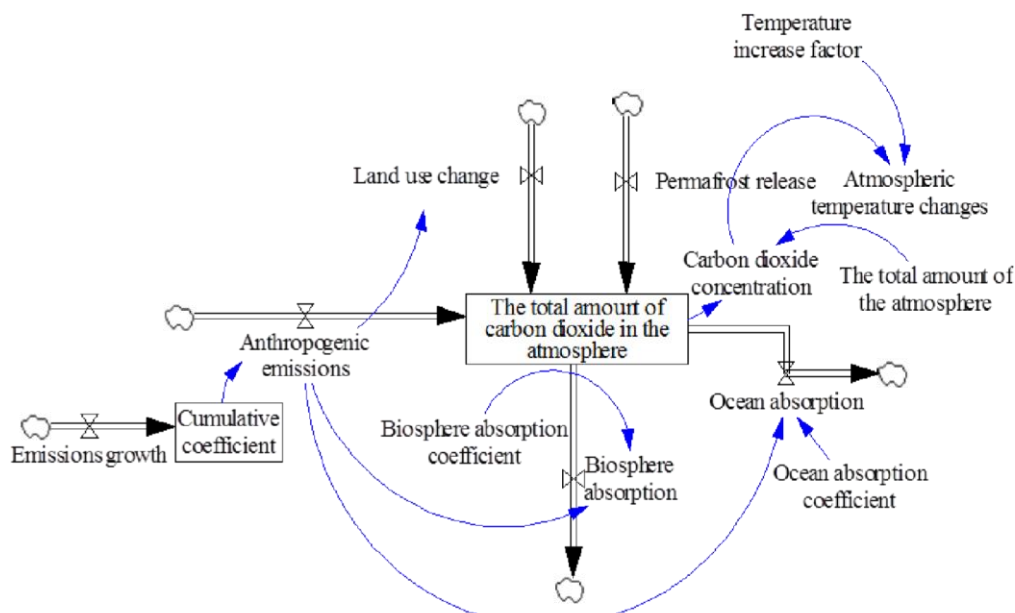
Fig. 3. Greenhouse Gas Emissions Scheme.
Source: author

The Paris Protocol poses several major challenges for all countries to achieve the goal. These goals are the end of the fossil fuels era, the development of low-carbon technologies and the adaptation of countries to climate change. Total emissions in 2017 were 2.2 times lower than in 1990 and decreased from 853 to 393 million tonnes of carbon equivalent.

From 1990 to 2017, carbon dioxide emissions decreased by 2.2 times (from 643 to 297 million tonnes of carbon equivalent), methane decreased by 2 times (from 151 to 73 million tonnes of carbon equivalent), nitrous oxide emissions dropped by 2.5 times (from 59 to 24 million tons of carbon equivalent).

The largest share of total greenhouse gas emissions in 1990 was carbon dioxide - about 75 percent. Methane emissions in 1990 were about 18 percent, and nitrous oxide were 7 percent of total emissions. This distribution practically did not change by 2017: carbon dioxide emissions accounted for 76 percent, methane for 18 percent, and nitrogen for 9 percent (Shi and Guo, 1997).

The greatest contribution to total greenhouse gas emissions comes from the extraction, production and consumption of energy resources; from 1990 to 2007 it fluctuated between 76 and 86 percent. The reduction in energy emissions from 1990 to 2007 was one of the most significant among all industries and amounted to 54 per cent. In 1990, net greenhouse gas absorption by forests was 73 million tonnes, and by 2007 it had been reduced to 44 million tonnes of carbon equivalent. The Russian government adopted the Energy Policy untill 2035 in the Sphere of Climate Change. This document is at the state level, which aims to limit the amount of CO2 emissions. Under the agreement with the EU, the country should also introduce an internal system for trade in greenhouse emissions. Russia needs to develop a quota allocation plan and introduce permits for greenhouse gas emissions in order to achieve this (Fig. 3, 4).

But before quotas can be earned, it is necessary to collect accurate data on the amount of CO2 is being emitted by industrial enterprises. For industrial regions, it is a good opportunity to improve the ecological situation and attract environmental investments. Industrial enterprises must decide on the means of reducing emissions (Sikharulidze et al., 2016; Stark et al., 2018).
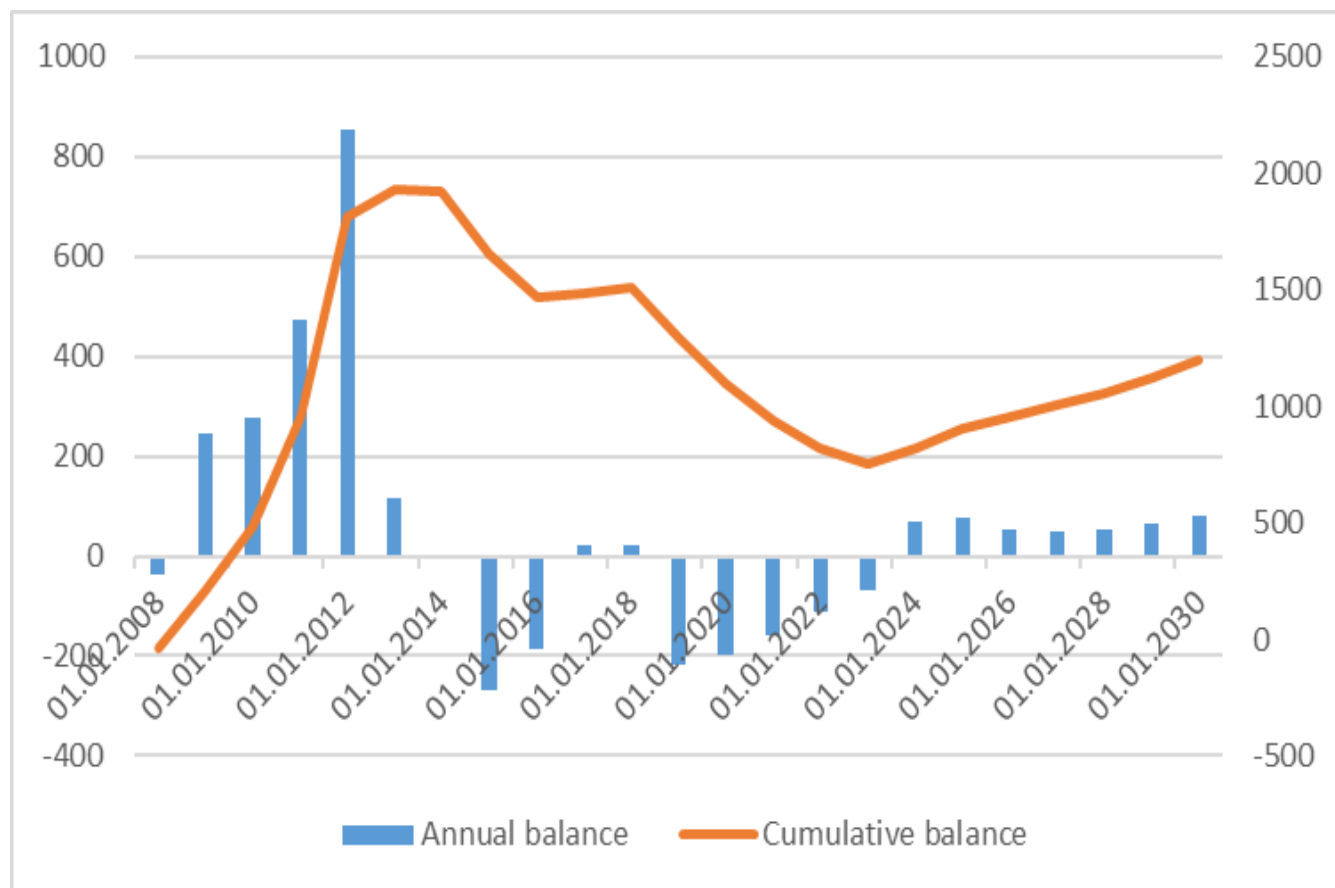
Fig. 4. Greenhouse Gas Emissions Balance Forecast.
Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6

First, Russia will create a monitoring system for verification of emissions reporting. Then the Russian Federation will develop and begin to execute a plan of distributing quotas among six sectors of the economy. The quotas themselves are most likely to be paid. Having received a certain quota, the enterprise can implement measures aimed at reducing greenhouse gas emissions and selling surplus quota to another enterprise that lacks its own (Van den Berrgh and Botzen, 2015).

Furthermore, on a global scale, a World Bank program is now introducing pilot projects in six sectors of the economy in order to develop reporting templates for greenhouse gas emissions (Xu and Shang, 2016).

The quota system itself will force enterprises to either buy quotas or implement measures that will reduce emissions. This will make it possible to obtain quotas based on reliable data. The basis of the PMR project is to develop a monitoring and verification system for reporting data on such indicators as emissions, so that the developed scheme is the basis of the legislation. Rosneft is a company that represents the energy sector and is one of the largest emitters of greenhouse gas. Therefore our participation in the project is very important. And, of course, we are preparing for the introduction of an internal emission trading scheme in Russia. In the end result, this will lead to the implementation of measures aimed at reducing the burden on the environment.

The goal of this system is to reduce greenhouse gas emissions, as well as stimulate economic modernization. In the world about 20 per cent of CO2 emissions are given by machines with an internal combustion engine. At the

same time, the number of machines in the world is growing. At the current pace there will be about 1 billion cars in the world until 2030, and well over a billion in 2050 (Tu, 2015; Zhang et al., 2018).

The Ministry of Infrastructure offers to release the following volumes of imported electric vehicles until 2021: vehicles from VAT - 16.8 per cent, collection to the Pension Fund - 4.8 per cent and excise duty - 109 euros. In addition, the government wants to make a tax rebate to car dealers on the income tax and reimburse part of the cost to the car buyer. The government wants to to cancel VAT and introduce a preferential land tax rate until 2028 for domestic manufacturers of electric vehicles, furthermore, collections to the Pension Fund will be canceled only until 2021. They also plan to cancel the import duty for electric cars' components and establish a delay from the paying of VAT for six months.

The nature of this phenomenon is explained by the different transparency of the atmosphere for radiation from space and from the surface of the planet. For the sun's rays, the atmosphere of the planet is transparent, like glass, and therefore they easily penetrate it. And for thermal radiation, the lower layers of the atmosphere are "impenetrable", too dense for passage. That is why some of the thermal radiation remains in the atmosphere, gradually sinking to the lowest layers of it. At the same time, the amount of greenhouse gases that condense the atmosphere is growing. Even at school we were taught that the main cause of the greenhouse effect is human activity. Evolution led us to industrialization, so we burn tons of coal, oil and gas, get fuel, fill roads with cars. The consequence of this is the release of greenhouse gases and substances into the atmosphere. Among them - water vapor, methane, carbon dioxide, nitrogen oxide.

When we talk about the consequences of the greenhouse effect, we understand its influence on the Earth's climate. First of all, it is global warming. Many identify the concepts of "greenhouse effect" and "global warming", but they are not equal, but are interrelated: the first is the cause of the second. Global warming is directly related to the world's oceans. Here is an example of the two cause-effect relationship.

The average temperature of the planet grows; liquid begins to evaporate. This applies to the oceans: some scientists are afraid that in a couple of hundred years, they will begin to "dry out." At the same time, because of the high temperature, glaciers and sea ice will begin to melt actively in the near future. This will lead to an inevitable increase in the level of the World Ocean. We already observe regular floods in the coastal areas, but if the level of the World Ocean increases substantially, all the approximate parts of the land will be flooded, our harvest will die.

Greenhouse gases are steam (from water), carbon dioxide (carbon dioxide), methane, ozone. The prior is the main contributor to the formation of the greenhouse effect (up to 72 per cent). The next most important is carbon dioxide (9-26 per cent), methane and ozone share 4-9 and 3-7 per cent, respectively.

Recently, you can often hear about the greenhouse effect as a serious environmental problem. But this phenomenon has a positive side. Due to the fact that the greenhouse effect exists, the average temperature of our planet is about 15 degrees above zero. Without it, life on Earth would be impossible. The temperature could only be minus 18.

The reason for the appearance of the effect is the activity of many volcanoes on the planet millions of years ago. At the same time, the concentration of water vapor and carbon dioxide in the atmosphere significantly increased. The concentration of the latter reached such a value that a super-strong greenhouse effect appeared. As a result, the water of the World Ocean almost boiled, its temperature became too high.

The appearance of vegetation everywhere on the surface of the Earth caused a fairly rapid absorption of carbon dioxide. The accumulation of heat has decreased. Equilibrium was established. The average annual temperature on the surface of the planet turned out to be close to the present (Table 2).

Table 2. The contribution of atmospheric components to the greenhouse effect for various numerical models of the general circulation of the atmosphere.

Source	BA	Cloudiness	BA+Cloudiness	CO_2	Rest greenhouse gases
Schmidt	39,0–61,9	14,5–36,3	66,9–80,9	14,0–24,3	4,9–9,2
The NASA model	36–66	16	66–85	9–26	2–8
The average value	37,5–64,0 (~50)	15,3–36,3 (~25)	66,5–83,0 (~75)	11,5–25,2 (~20)	3,5–8,6 (~5)

Source: author

Water vapor is not taken into account as a climatic factor. Direct emissions of water vapor from anthropogenic activities create preneglibibly small contribution to the radiation forcing.
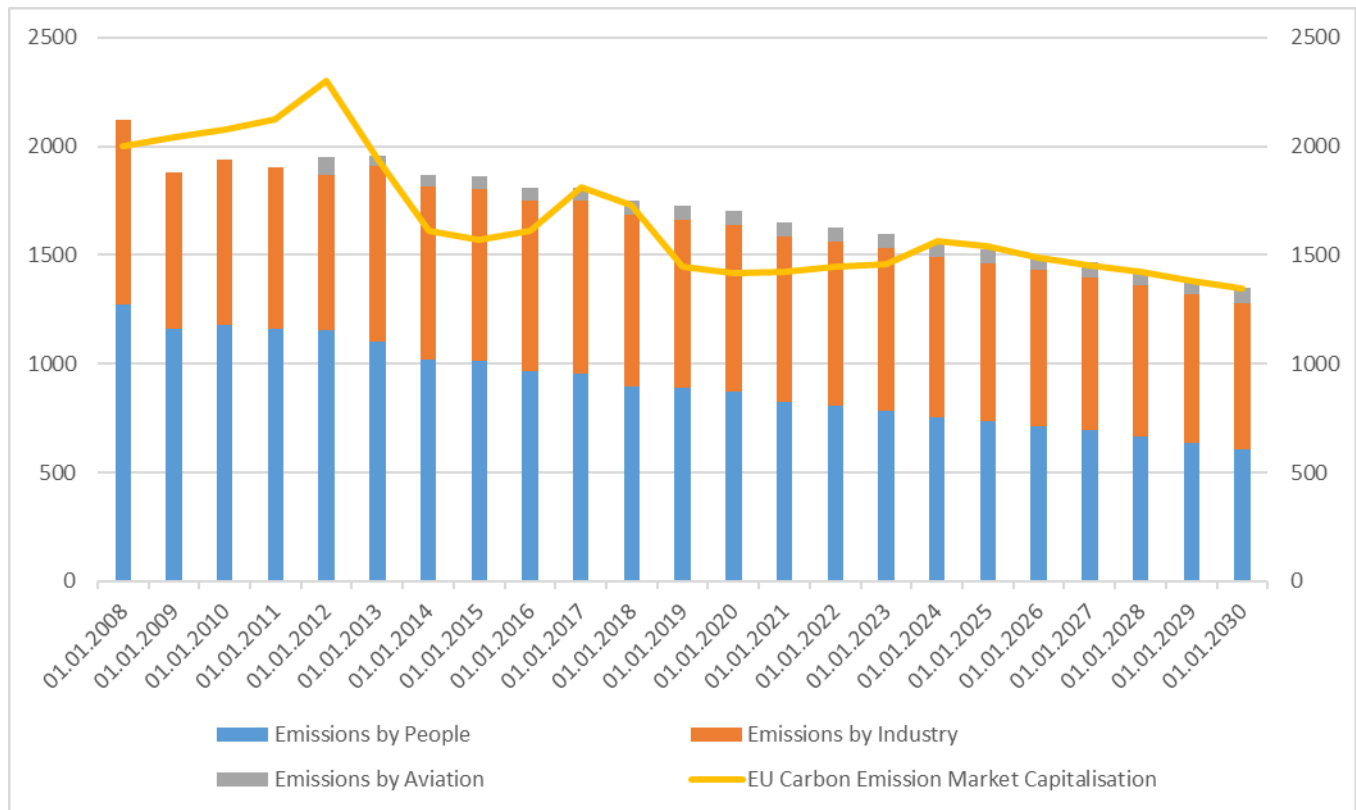
Fig. 5. Greenhouse Gas Emission Forecast by People and Industry.
Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6c
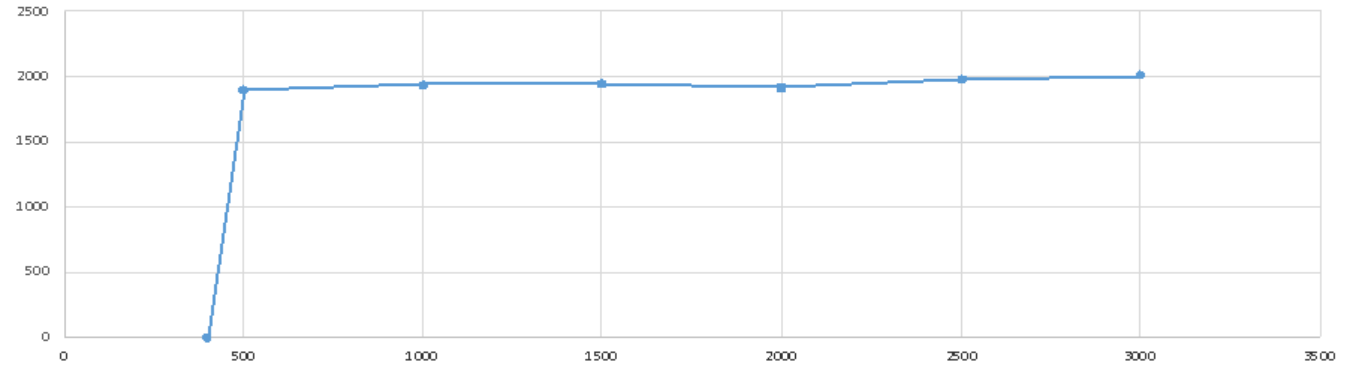
Fig. 6. Greenhouse Gas Emissions by Sector.
Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6

Since water vapor content is directly dependent on evaporation, then, in fact, the trend of irretrievable water consumption can be considered as part of the trend of atmospheric moisture content. In the 20th century it was 0.013 mm / year. If we take into account that the area of the globe is 510 million km^2, then the trend in the water use will be 39 km^3 year / 510 000 000 km^2 = 0.0764 mm / year (Fig. 5, 6).
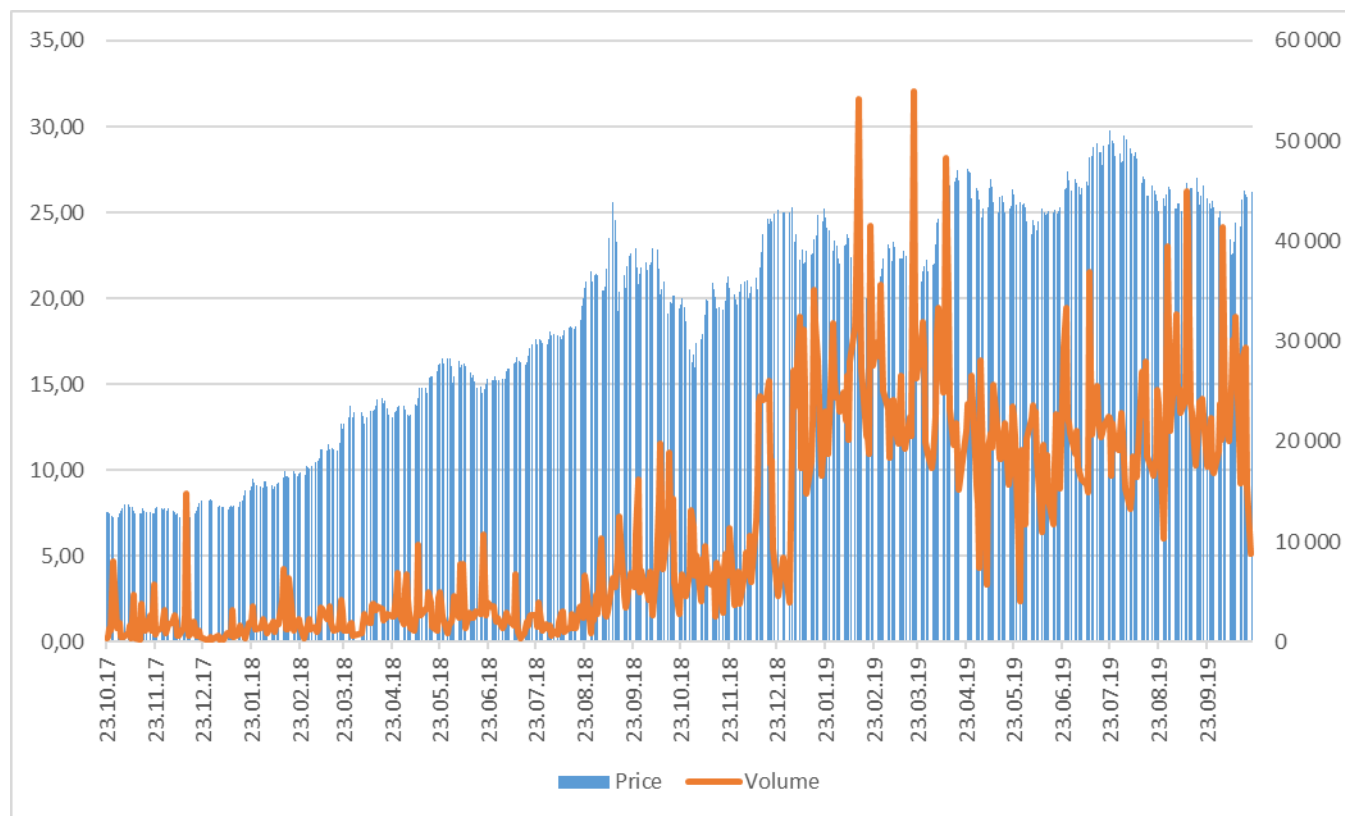
Fig. 7. European Union Allowance (EUA) price history.
Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-6

The consequences of the greenhouse effect can be harmful to humans: the melting of polar ice is the cause of rise in sea levels. As a result, coastal fertile lands are under water. If flooding occurs at high rates, there will be a serious threat to agriculture. The crops sink, the area of pastures is reduced, sources of fresh water disappear. First of all, the low-income strata of the population will suffer, whose life depends on their harvest, growth of domestic animals. Many coastal cities, including highly developed ones, may be under water in the future. For example, New York, St. Petersburg. Or whole countries. For example, the Netherlands. Such phenomena will cause the need for a massive displacement of human settlements. Scientists suggest that in 15 years the ocean level can rise by 0.1-0.3 meters, and by the end of the 21st century - by 0.3-1 meter. To completely flood the above-mentioned cities under water, the level should rise by about 5 meters.

The increase in temperature of air leads to the fact that within the continents the period of snow presence is reduced. It begins to melt earlier, as soon as the rainy season ends. As a result, the soil is over-dried, unsuitable for growing crops. Lack of moisture is the cause of desertification of land. Experts argue that an average temperature increase of 1 degree in 10 years will lead to a reduction of forest areas by 100-200 million hectares. These lands will become steppes. The ocean covers 71 per cent of the surface area of our planet. As the air temperature rises, water also heats up. Evaporation increases significantly. And this is one of the main reasons for strengthening the greenhouse effect.

If the water level in the world ocean rises, temperature threatens biodiversity, many species of wildlife can disappear. The reason is the changes in their habitat. Not every species can successfully adapt to new conditions.

The consequence of the disappearance of certain plants, animals, birds, other living things is the direct violation of food chains, the equilibrium of ecosystems.

The rise in water levels causes climate change. The boundaries of seasons are shifting, the number and intensity of storms, hurricanes, and precipitation increases. Stability of climate is the main condition for the existence of life on Earth. The stop in the greenhouse effect saves human civilization on the planet.

High air temperature can adversely affect people's health. Under such conditions, cardiovascular diseases worsen, respiratory organs suffer. Thermal anomalies lead to an increase in the number of injuries, the development of some psychological disorders. The rise in temperature entails a more rapid spread of many dangerous diseases, for example, malaria, encephalitis.

5. Discussion

Today, the problem of the greenhouse effect is a global ecological issue. Experts believe that the widespread adoption of the following measures will help solve the problem: changes in the use of energy sources. Reduction in the proportion and quantity of fossil fuels (containing carbon peat, coal) and oil. The transition to natural gas will significantly reduce CO2 emissions. An increase in the share of alternative energy sources (sun, wind, water) will reduce emissions, because these methods allow to receive energy without troubling the environment. When using them, harmful gases are not released. Change in energy policy. An increase in efficiency at power plants. Reduction of products' energy intensity at enterprises. Introduction of energy-saving technologies. Even the usual warming of houses' facades, window openings, heating plants give a significant result, decreasing the amount of emissions. Solving the problem at the enterprisal, industrial, state levels entails a global improvement of the situation. Everyone can contribute to solving this problem: energy saving, proper disposal of garbage, warming up their own home: development of technologies aimed at obtaining products in new, environmentally friendly ways; use of secondary resources, which is also one of the measures to reduce waste, the number and volume of landfills; restoration of forests, fighting fires in them, increasing the area as a way to reduce the concentration of carbon dioxide in the atmosphere.

Today, the fight against greenhouse gas emissions is at the international level. World summits devoted to this problem are being held, documents are being created aimed at organizing a global solution to the problem. Many scientists of the world are engaged in finding ways to reduce the greenhouse effect, maintaining balance and life on Earth.

It is desirable to invent ways to combat the greenhouse effect. For example, in the United Kingdom and the United States, groups of scientists have already created a device of active molecules that decompose greenhouse gases, and then turn them into useful aerosols. In those years there was not enough technically developed equipment that would allocate these molecules in a free form.

The results of this study support previous research conducted by (Marino et al., 2017; Meinshausen et al., 2009) which finds that carbon emissions and climate change is determined by utilization of networks as a source of opportunities and utilization of resources and their networks to provide service and respond to customers for change towards sustainability. Another research paper was supported in this study, stating that company's uniqueness through product creation may improve product success in customers' market through creation of climate change friendly products (Tu, 2015; Zhang et al., 2018).

This study also supports previous findings that product success in carbon emissions is influenced by company policy (Shi and Guo, 1997). In line with this discovery (Xu and Shang, 2016) carbon emission productivity in achieving performance through response to increasingly dynamic environment.

6. Conclusion

Moreover, climate change is believed, by some researchers, to be company's new long-term breakthrough while maintaining competitive advantage and environmental sustainability (Isacs et al., 2016; Kohler et al., 2017). To enhance reputation and access to customers and wide and broad new markets, climate change is developed in corporate strategy, particularly by adopting greenhouse emissions friendly technology (Van den Berrgh and Botzen, 2015).

Although the carbon emessions study remains a debate among previous researchers, this issue is an interesting study in this article, where we develop and order to fill this gap of carbon emissions and climate change. This study proposes two forecasting models for greenhouse gas emissions balance forecast and greenhouse gas emission forecast until 2030 by industry to be a solution to the aforementioned research gap. This research also develops an empirical research model to further discuss their relationship.

7. Contribution to the Body of knowledge

This paper summarizes the literature review on carbon emissions and climate change into a new implication research. The empirical research shows the effect of carbon emissions on climate change. Therefore, this study suggests that an organization should allocate less carbon emissions into air in the next 10 years. This research makes at least three important contributions to the body of knowledge. The first contribution is the method of energy balance, particularly with regard to long term forecasts. The second contribution is achieved through empirical testing, determining a mediating role to prove that human and industrial carbon emissions fill the gap about emissions' role in climate change which remains a debate to previous researchers. The third one is that the paper found the trends in Greenhouse Gas Emission Forecast until 2030 by industry, people and aviation sector.

This research has limitations. The first one is the use of the method of energy balance. Another method can lead to different results. The second limitation is the source of data (European Environment Agency).

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ENTREPRENEURIAL POLICY OF THE GERMAN MINING COMPANIES AND ITS IMPACT ON THE GEORGIAN ECONOMY IN THE LATE 19TH AND EARLY 20 TH CENTURIES

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Abstract. The interest of leading representatives of German monopolistic and financial capital both before and after World War I was related to Georgia. The German iron and steel manufacturers, as well as the heads of the firms employed in other fields, were attracted by the fossil wealth of this area. In this regard, it is very important to analyze their activities, in particular, how their interests were intersect in the Caucasus and how significantly they influenced on the German state policy towards Georgia.

1. Introduction

German capital occupied important positions in Georgia, in particular in the manganese industry of Chiatura. The manganese deposit was discovered in 1846 by an academician Abich. Subsequently, a large scientific article was published in the Mining Journal (GCSHA, Fund 264). Great Georgian poet Akaki Tsereteli made a great contributed to popularization of the results of geological exploration of manganese ores in Georgia (Kochlavashvili 1958).

A thorough research has shown that the Chiatura manganese deposit with its reserves, higher quality, favorable possibilities of extraction, as well as due to its its proximity to railway and sea nets, was important not only for the

Russian Empire, but for the world in general. The worldwide importance of the Chiatura manganese deposit has increased in particular due to the development of the metallurgical industry in the leading capitalist states, so they became interested in this field from the very beginning, including among them Germany with its special interests to this field. Industrial and commercial firms from these states fled to Chiatura and since 1879 began buying or leasing rich-by-deposit lands there. Prominent Georgian public figures and entrepreneurs have resisted such foreign invasions.

In addition to the Germans, the French, Italians, Greeks and others were trying to strengthen their positions in Chiatura (Dadiani, newspaper "Droeba" 1879). The aliens appeared as soon as the ore was extracted - since 1879. Such their invasion was followed by a heightened rivalry between local and foreign businessmen. Despite the financial advantage of foreigners, this struggle was not in their favor from the beginning. Georgian industrialists were led by such energetic businessmen as Gedevan Chubinidze and Pavle Moseshvili (Chanishvili 1960).

2. Methodology

Both general and specific research methods were used in this article, namely – the methods of analysis, synthesis, historical, logical, induction, deduction, scientific abstraction, comparative analysis, statistics (selection, grouping, observation, dynamics, etc.), static, as well as the methods of experimental evaluation.

3. Results

Prominent Georgian public figures were interested in developing the industries based on the use of the local forces and resources. They have begun taking measures for preventing the transfer of Chiatura manganese deposits to foreigners. Sergei Meskhi also responded in 1879 in the "Droeba" Newspaper to transfer of the local lands to foreigners by their owners and warned them (the locals): "My advice is, not be hurry, do not trust all unknown strangers, do not trust their notarial assurances ... If you tolerated this manganese ore for so long, wait for one or two years too, before everything becomes known in details this ore is needed for such a case that if it is not added afterwards, it will never fall below its price" (Meskhi, newspaper "Droeba" 1880).

Akaki Tsereteli also opposed the transfer of Chiatura deposits to suspicious persons and foreigners. He explained to the owners: "Here's what can happen: some with poverty, some with greed, some with ignorance will lose this glorious job and get into the hands of having to gloat over their necks and" not expecting "and" not thinking, " But that doesn't help them much when black landlords will turn into black workers and start begging" (Tsereteli, newspaper "Droeba" 1880).

3.1 Entrepreneurial Activities of Mining Joint Stock Companies: " Gelsenkirchen " and "Caucasus Mining Partnership" in Georgia

Prominent Georgian public figures who preached the need for industrial and economic development objectively assessed the possibility and consequences of foreign capital invasion in the country. Hence, it is natural that they have resisted against the dominance of foreign capital in Chiatura. Despite the steady lack of domestic industrial capital, local industrialists sustained the entrepreneurship, they have managed to resist the invasion of the foreign capital and maintained strategically important positions in Chiatura industry for a long time. Local industrialists constantly tried to unite the forces in order to resist the foreign capital inflow. This struggle was led by the representative organization - „Shorapani Manganese Industrialists' Congress", the mentioned organization was headed by the prominent representatives of the Georgian intelligentsia: G. Zdanovich (Maiashvili), Ivane (Kita) Abashidze, Nikoloz Gogoberidze, Petre Tsulukidze, Solomon Tsereteli, etc.

It should be noted that the industrialist congress, despite its limitation, has played a positive role in Chiatura's manganese industry. Subsequent attempts to establish aliens in Chiatura have failed. In competitive rivalry, Georgian business people have become dominant (P. Moseshvili, G. Chubinidze, etc.), and they coped with existing challenges. The support of advanced Georgian society was vital to avoid the foreign industrial capital dominance in Chiatura. Georgian business people managed to preserve the best manganese deposits, and they could lease or have the deposits in ownership.

Since 1985 the aliens have quitted Chiatura deposits for some period and moved to other local manganese deposits (Ajamaeti, Chkhari, Nakhshirgele) as they were located near the railway. Due to the failure in the process of manganese extraction, they attacked the local manganese market (mainly Zestafoni, Gomi, Poti, Batumi) and took over the prevailing situation there. So that, foreign capital, including German investments, moved into the field of manganese ore export (Margiani 1988).

Considering mentioned above, only local industrialists positioned in the Chiatura industry, but the vast majority of them due to the lack of working capital could not proceed with the economic activity. With the lack of financial resources of Georgian entrepreneurs, foreign exporters and their agents have benefited most, because of the credit conditions of local entrepreneurs, they were getting ore at a discounted price. Foreign creditors easily trapped local industrialists, they were forced directly or through merchant intermediaries contact to international companies purchasing ores. The Export of Chiatura ore was almost entirely in the hands of foreign actors. Foreign firms artificially created the situation in the ore market when the quantity of extracted ore exceeded demand. By leaving the purchased ore stocks, foreigners were able to lower the price of the ore artificially. Thus, foreign capital through a loan subjugated local manganese industrials by leaving the stock of ore purchased immediately and exaggeratedly dumping its price, correspondingly they received more of its surplus-value as a trading profit.

The German capital, as was mentioned before, has appeared in Chiatura at the initial stage after the discovery of manganese ore, but then could not position steadily. From the 90s of the 19th century, the German capital invasion intensively started in the Chiatura manganese production. Very soon, it takes monopolistic positions competing with local, Russian, and foreign capital (Gavasheli 1957).

The Germans used the economic crisis of 1900-1903 effectively and gradually conquered positions not only in manganese export but also in production. One of the representatives of Berlin manganese syndicate - "Bank of Berlin", or "Accounting Society" was particularly active in Chiatura during this period, which was in a connection to the union of Georgian industrialists "Black Stone" (CSHAL). The Berlin „Accounting Society" and the joint-stock company, „Arthur Koppel", now allowed in Russia, have been operating jointly since 1905. After the repeated requests from the society representatives, the government approved in 1906 the company - „Chiatura Trade-Industrial Society of Manganese Elevators and Mechanical Buildings", created by the societies mentioned above. This society has built elevators, conventional, and air-cab ways. Herewith, they signed a preliminary agreement with the, „Frankfurt Iron Ore Society" which undertook the sale of ore from Chiatura (Margiani 1988). The society has been rejected by the government to build Tsirqval-Kvirila air-cab way and got permission to build a similar road from Tsirkali to Chiatura. The German joint-stock company refused to do the project and did not want to continue working activities. It ceased to exist on November 15, 1911. The actual owner of the German joint-stock company, at first glance, easily decided to liquidate the company, not for the reason that they finished the economic activities, but because earlier it has become one of the shareholders of the influential German business entity's "Gelsenkirchen Mining Company" allowed for operation in Chiatura (Margiani 1988).

It is true the Chiatura's manganese industry was still in hands of local entrepreneurs, but the vast majority of them could not continue their business due to lack of capital. Foreigners, who were gradually using their credits to convert local entrepreneurs into loans, benefited the most from a lack of capital of Georgian businessmen. As a

result of these processes, the German capital was strengthened in the production of manganese in the late 19th and early 20th centuries, represented by the following strong firms: the "Gelsenkirchen Joint Stock Mining Company", the "Kaiser Mining Society of Germany" and the "Caucasus Mining Partnership with Limited Liabilities. Among these, the first name company was especially active which was the largest enterprise in the German mining industry. This company started operating long before the Russian government allowed to carry out operations in Chiatura, and, by help of a German businessman Guillert purchased the manganese deposits on over 82 hectares area in the villages Itkhvisi and Mgvime (Margiani 1988). According to numerous authoritative sources, the German Emperor Wilhelm himself was a shareholder of Gelzenkirchen (Central State Historical Archives).

The German firm has undertaken many large-scale operations in the Chiatura industry. First, it began to subjugate and subordinate local entrepreneurs - by providing loans and advances (purchasing and exporting large amounts of ore); Second, the long-term lease and purchase of the manganese ores; Third, rational, technical arrangement of operation of mines, mechanization of ore transportation from the deposits to Chiatura railway branch, construction of ore enrichment plant in the village of Rgani; Fourth, the firm took care of expanding its industrial-trade operations and arranging for its own port in Kobuleti (which was rejected because of resistance by side of the military establishment in 1912), and finally, the firm started industrial operation of the deposits, a bit later.

What was the relationship between ,,Gelsenkirchen" company and the local industrialists? The company invested a large amount of capital in Chiatura, intending to purchase ore from the local industrialists at the possible lowest price. To gain an advantage over competing foreign companies, the firm has begun issuing long-term interest-free loans and advances to a local industrialist. Therefore, other export-oriented firms rarely did the same activity, and it was relatively negligible. It should also be noted that,,,Gelsenkirchen" company from its purchasers - German metallurgical plants, was supported with a large amount of capital (through Tbilisi Commercial Bank). The German firm never offered these loans and advances to the local industrialists from the disinterested perspective. All of its debtors were obliged to provide the creditor with a notarized signature and declare all documents for property or leased property related to ore deposits. Herewith, they should sell the extracted ore as a whole or most of it to the German company at current market price. When repaying the debt, the creditor returned the debtor all the submitted documents, if the debtor will not repay within a prescribed period, the creditor became the full owner of the mentioned documents. In fact, local industrialists were subjugated and subordinated by the ,,Gelsenkirchen" company in this way.

In the Chiatura industry ,,Gelsenkirchen" company considered as the most powerful tool to capture the richest manganese deposits for a long period. The company started acting in this direction before the official launch of its operations in Chiatura and enhanced the large capital investments. From 1903 to 1909, the "Gelsenkirchen" company received leased ore deposits on over 76 hectares of land in Mgvimevi and Ikhvisi from the German industrialist O. Gillert. After the formal approval, additionally, the company received leased deposit in Rgani as well, from the famous German company,, Shalke", and spent up to 83.800 rubles (Margiani 1988). From 1909 to 1914, the "Gelsenkirchen" company actively continued to purchase deposits, raw land, and platforms in Rgani, Mgvimevi, Perevisa, Ikhvtisi, and also close to Chiatura treasury railway.

As we have already mentioned, the firm was trying to construct the port in Kobuleti. The company addressed to the Russian government in 1912 for this purpose. Both the viceroy and the king's government were ready to accept the request, but due to the intervention of a military unit that found it dangerous to arrange a foreign port near Batumi fortress, the German company was rejected to construct the port.

Thus, it can be said that the "Gelsenkirchen" company actively was trying to achieve a monopoly position in the industrial district of Chiatura. These aspirations were prevented by World War I. After the war started, based on

the government resolution, the German companies operating in the Chiatura suspended activities. Specially created liquidation division has estimated the "Gelsenkirchen" company's entire real estate in Chiatura totally 2.578.858 (slightly reduced) rubles.

In parallel with "Gelsenkirchen" in September 1911 the second German firm "Caucasus Mining Partnership with Limited Liability" started functioning in Chiatura. The founders and holders of the firm were German merchants and businessmen. (CSHAL, f. 23, inv. 28, c. 514), but, as it revealed later, the actual owner of the firm was Kruppe - one of the largest representatives of German industrial-financial capital. This information became known to the government after the Ministry of Finance notified the Committee of Ministers of the Empire at the end of 1914: "We have learned from reliable sources that the partnership is a major supplier of German military plants, a major supplier of manganese ore to the Krupp plants." (CSHAL, f. 23, inv. 28, c. 507).

Thus, as the German capital sought to capture Georgia's richest manganese deposits, German firms Gelsenkirchen and the Caucasus Mining Partnership have been working vigorously in this direction. They took possession of several hundred acres of manganese-containing and manganese-free landas, invested large amounts of money, and equipped their enterprises with the most advance technologies of that time. At the same time, they managed to subordinate through various means the local entrepreneurs and obtained large quantities of deposits at the reduced prices. As a result, much of the ore extracted in Chiatura before World War I was sent to Germany, which was wholly processed there. It met the demands of a prevailing part of the German industries, while the ferroalloys were exported to other countries, often - to Russia.

3.2 Entrepreneurial Activity of Mining Society „German Kaiser" in Georgia

German steelmakers were primarily interested in the rich manganese deposits. Georgia was the area of the most important manganese deposits in the world. As earlier as before the WWI Chiatura region held the top position in the world in extracting the manganese deposits, This region was far ahead of the deposits found in India and Brazil by that time. More manganese was found in this area than in the major deposits of South Africa, Ghana, Morocco, Congo, Mexico, Japan, and the United States (Benekenstein 1971).

By this time, we can already talk about the purposeful intentions of German capital in the Caucasus. Hugo Grothe, one of the propagandists and "traveler-researcher" of the German Empire, wrote in 1913: "What are the ways for a "peaceful penetration" to the Eastern exploitable areas, that is aimed at exercising cultural, economic and political influences there? First of all, these are the means of scientific research" (Grothe 1913).

Such "scientific research" of the Caucasian region was started in the mid-nineteenth century, by geologists, economists, geographers, ethnographers, historians, and others. These researches have provided more or less complete information on both the problems and the wealth of this peripheral area of the Tsarist Russia to the German state servants and entrepreneurs. Thus, a comprehensive picture was created about the importance of the Caucasus as an economic, political, cultural and military-strategic object (Grothe 1902, Class, Radde 1942).

Our purpose here is to analyze the activities of the entrepreneurs involved in the iron and steel industry, in particular, how their interests were intersect in the Caucasus and how significantly they influenced on the German state policy towards Georgia during the World War I. The Thyssen Concern played a special role in this regard. This company established close, often personal, ties with the Kaiser Germany's state machinery of that time. The purpose of this union was to increase its profits through using the militaristic and political instruments.

August Thyssen (father of Fritz Thyssen) turned out to be successful in his efforts of creation of one of Germany's largest mining companies before World War I - the entire industrial empire, starting with the extraction of raw

materials (coal, iron ore) and ending with the production of steel production, mechanical engineering, own ports and transport. Thyssen was striving to the ever-expanding raw material base that was needed for the operations of his company. Just for the purposes of seizure of new sources of raw materials he was in the hurry to invade into the rich-by-raw materials regions of French Lorraine and Normandy, as well as Ukraine and Georgia (Pinner (Frank Fassland) 1924).

Thyssen was one of those who insisted on annexing foreign territories for the sake of increasing their own profits. This is confirmed by the Memorandum of Understanding of August 28, 1914, which unequivocally expressed the plans of the iron and steel industry. This Memorandum also required the capture of not only France and Belgium, but also the coal and iron ore districts of the Caucasus in order to open the way to the Middle Eastern countries and Iran. The Memorandum stated: "... Given the importance of the minerals, it is just the Caucasus that is essential for Germany. Today, the Caucasus is the region that produces the largest manganese products, without which steel production is unimaginable.   Owner of this ore will be able to have a more or less impact on prices even in the American steel industry too, which now imports much of its ferromanganese from Germany or England (DZA Potsdam, Reichskanzlei, N2476, Vorbereitung des Friedensschlus-schlusses, Bl. 67).

The idea that the extraction of manganese ore would reinforce Tysen's dominance in the steel production and enable him to control other industrialized countries, or steelmakers, or manganese raw material owners, or any single owner, was determining significantly Tysen's economic and political activities. In 1914, the Thyssen Concern produced 1/10 of Germany's total steel and steel products, which obviously required a large amount of manganese.

In Germany, manganese was imported mainly from the Caucasus. In 1913 only, about 2/3 of a total volume of manganese imported in Germany, was of the Caucasian origin. The prevailing part of which was for the needs of the Gelsenkirchen Mining Joint Stock Company, which, as we know, was led by Kirchdorf, and the German Kaiser Society, where Thyssen was the sole owner. Both these firms were operating the Chiatura deposits since 1901 through a joint venture. In Nilopolis (Ukraine) too these firms were represented by a single "Pyrolyzite Joint Stock Company", which had been operating in Nicopolis since 1906 and owned 60% of the total ore stock (DZA Potsdam, Auswaertiges Amt, N2094, Volkswirtschaft, Russland, Bl. 195-197).

With 3 million tonnes of steel produced in 1913, which accounted for one-eighth of Germany's total steel production, both these firms strengthened significantly their positions. In 1915-1916, when due to the "War Time Laws" adopted by the Tsarist Russian government, both Gelsenkirchen Mining Joint Stock Company and Thyssen occurred face-to-face with a threat of loss of their properties in Russia, they have tried to avoid the liquidation of their assets by transferring it to the Swedish firm: "Immediately following to enactment of the liquidation laws in Russia, for protecting our multi-million investments in this industry and preserving this critically important field at the disposal of Germany, we without delay transferred all production to the Swedish firm that has good contacts with both the Swedish Government and the privileged circles of Russia, so that Russia could regard this property as Swedish property before the truce". (DZA Potsdam, Auswaertiges Amt, N 2094, Volkwirtschaft, Russland, Bl. 112-119, 124-139, 198-204).

3.3 The „Gelsenkirchen" and „Thyssen" concerns negotiations with the Georgian delegation and signed agreements

The interests of leading representatives of German monopolistic and financial capital even before the World War I had long been associated with Georgia. German iron and steel industrialists, as well as the owners of the firms employed in other fields, were attracted by the fossil wealth of this area.

The Thyssen Concern and the Gelsenkirchen Mining Society, accordingly, took the following steps to seize Georgia's wealth: On May 18, 1918, both of them applied to the Ministry of Foreign Affairs for the State to exercise the rights of German industrialists in ore mining and processing in Chiatura, in order to oppose the anti-German initiatives in the Caucasus: "We find it necessary for the government to intervene for the old owners could get back free their property. The state will be able to transfer the land acquired through the government intervention at favorable prices to the interested firms''. (DZA Potsdam, Auswaertiges Amt, N 2094, Volkswirtschaft, Russland, Bl. 199-204). On May 18 of the same 1918, Thyssen and Kirchdorf asked the German Government to entrust Nadolne, the Head of the Eastern Section of the Ministry of Foreign Affairs, with their interests in the Caucasus (DZA Potsdam, Auswaertiges Amt, N 2094, Volkswirtschaft, Russland, Bl. 199).

On June 12, 1918, both these Concerns were advised Ministry of Foreign Affairs   by the following telegrams, to apply to the Georgian delegation in Berlin: "It would be useful to establish personal contacts with the Georgian delegation stayed here in the Hotel Adlon, especially with Dr. Nikoladze. The named person is ready for this. Please coordinate in advance a venue of meeting with the Ministry of Foreign Affairs" "(DZA Potsdam, Auswaertiges Amt, N 2094, Volkswirtschaft, Russland, Bl. 206-207).

The personal contacts of both Concerns with the Georgian delegation for the first time revealed their claims on the Georgian manganese and the readiness of the representative of the Republic of Georgia to acknowledge these claims. As it turns out, Dr. Nikoladze demonstrates his firm position before the government of his country for promoting the interests of German companies in Georgia.

The German firms used the presence of the Georgian delegation in Berlin for concluding numerous agreements with the representatives of the Republic of Georgia for the benefit of the German industrial and banking capital. On July 12, 1918, three such agreements were   signed, according to which three German-Georgian societies were established. These societies were created for exploiting the Georgian manganese deposits with transferring to their ownership the Shorapan-Chiatura Railway and the Poti Port.

During the negotiations between the Georgian delegation and the German Ministry of Economy, a financial agreement was also signed on the introduction of the Georgian currency for circulation between the Republic of Georgia and the German state. On August 15, 1918, this agreement was signed between one group of German banks and the Government of Georgia. Under this agreement, the Georgian government was to receive   54 million German Marks as loan (with 6% interest rate) and repay it during 28 years. The loan guarantee would be the income that the Georgian government would receive from the societies created under the agreement dated July 12, 1918.

Tactical steps of influence on the Georgian economy were defined during one of the talks at the Spa city between the representatives of the German government and the higher command of the army. Ambassador von Rosenberg formulated the views of the Kaiser government as follows: "I consider our economic relations with Georgia to be hopeful. The "accounting society" has established a consortium of a strong capital that can give this country from 50 to 80 million marks. In doing so, the necessary capital requirement will be covered at first. The monetary loan should be secured by the Poti Port duties and taxes on export of manganese. With this agreement we will gain an influence on Georgia's raw materials, most importantly – on manganese and also on the road system''. (DZA Potsdam, Reichswirtschaftsministerium, N 1071, Allgemeines Wirtschaftsabkommen mit Georgien, Bl. 94-99).

Dr. Cindy, a direct trustee of the Thyssen Concern, received a directive from the German Ministry of Economy to ensure the ratification and implementation of these agreements in Tbilisi.

The most interested in influencing Georgia was the Thyssen Concern Therefore, it is not surprising that the first letter from the representative of the German Ministry of Economy was sent to Thyssen soon after his arrival in

Tbilisi on October 17, 1918 (DZA Potsdam, Reichskanzlei, N 2477, Besprechungen ueber Kriegsziele, Bl. 192). In this letter, Dr. Cindy indicates on his negotiations with the Minister of Finance Juruli, as well as with the Minister of Internal Affairs of Georgia and the Acting g Minister of Foreign Affairs Mr. Ramishvili, concerning approval at the Council of Ministers of Georgia of the   agreements concluded in Berlin. He informed Thyssen that on October 17, 1918, on the advice of the Georgian Council of Ministers, the Parliament unanimously approved these agreements and instructed the government to secure their entry into the force. Afterwards, Dr. Cindy   asked Thyssen to Tbilisi soon to "give the gentlemen some sedative medications during the period of your stay here" (DZA Potsdam, Reichswirtschaftsministerium, N 1071, Wirtschaftsabkommen mit Georgien, Bl. 54-56).

It was due to Cindy's activity that accelerated the loading and sending the manganese to Germany, as well as the recovery of ore mining in Chiatura mines.

Thyssen's visit to Georgia was hampered by Germany's defeat in World War I, and more importantly by the start of the November 1918 revolution in Germany. But, despite this failure, the German delegation led by Kresenstein and Cindy continued to operate in Georgia. On January 17, 1919, the Ministry of Foreign Affairs received in Berlin a report from the delegation, according to which on November 30, 1918 a German-Georgian trade bank was established in Tbilisi, on the basis of the aforementioned 54 MIO Mark Credit (DZA Potsdam, Reichswirtschaftsministerium, N 1071, Wirtschaftsabkommen mit Georgien. 89).

Conclusions

The import of manganese into Germany was mainly carried out from the Caucasus by the Gelsenkirchen Mining Joint Stock Company headed by Kirchdorf and the German Kaiser Society, whose sole owner was Thyssen. Both firms were exploiting the Chiatura field through a joint venture since 1901.

On July 12, 1918, Thyssen and Kirchdorf, on the advice of the German Ministry of Foreign Affairs, met with the Georgian delegation in Berlin and Dr. Nikoladze in person. Three agreements were concluded between the parties, according to which three German-Georgian societies were established. These societies were created for exploiting the Georgian manganese deposits with transferring to their ownership the Shorapan-Chiatura Railway and the Poti Port.

By these agreements, Germany sought to strengthen its economic influence on Georgia, that is, through German firms, concerts, banks, and so on. They would control the whole economic life of Georgia and gain absolute advantage over the most important minerals and transport means, as well as the entire state finances. But, with the victory of the Soviet government, the economic goals of Thyssen and his competitors remained unfulfilled in Georgia.

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INCOME DISTRIBUTION PECULIARITIES OF HOUSEHOLDS WITH CHILDREN: A CASE STUDY[*]

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Abstract. The article explores family income indicators in the context of the transformation of the family model in Kazakhstan in terms of large families- households with children. The purpose of the article is to assess the level and dynamics of families´ incomes with children in Kazakhstan to develop recommendations for improving the support policy, that will provide new consumption patterns and sustainable growth of entrepreneurship activities, including social entrepreneurship.The methodology for studying the income level of families with children was based on economic and statistical methods for assessing the inequality of incomes of families with children based on a comparison of the characteristics of the distribution series and quintile groups. An income structure assessment within population is presented in the quintile groups, and the dynamics of the proportion of children in the first quintile group. The authors substantiated the use of the children´share indicator of child poverty in the absence of a corresponding indicator in official statistics in the first quintile group. An analysis of favorable dynamics related to number of children living in low-income families within the first quintile group makes possible to assess current trend as negative. An assessment is made of the differentiation of income within a group of households (HH) with children: the parameters of the distribution series by the indicator of income used for consumption are compared; the ratio of income used for consumption with a living wage is estimated as well. There is estimated uniformity and asymmetry of the distribution series of families with children. To identify common and special characteristics, the distribution series were compared with the similar characteristics of the distribution series for all households. The most significant substantive result identified by the authors is the growing inequality in the distribution of income between small families (1-2 children) and large families (3 or more children) while maintaining a high proportion of children in the first quintile. The authors developed a number of recommendations towards social policy, the introduction of an official indicator of child poverty in official statistics to adequately assess measures taken by the state, and the development of social entrepreneurship as an effective tool to empower children from low-income families.

Keywords: households; children; income; quintile groups; characteristics of a number of distributions; purchasing power of the population, social entrepreneurship

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1. Relevance

Modern society considers the family one of the main institutions for forming of the human potential of the country. There are especially factors acting on the side of the family, to a large extent determine individuals´ possibilities to realize their genetic inclinations and accumulate the human capital during the growing up period. (Nikolskaya 2006).

G. Becker, one of the founders of the theory of human capital, proved the direct connection between the value of human capital and the well-being of the household, the most important proxy of which is determinate the level of personal income. (Becker, 1994)

Studies of human capital in modern economic science use the concept of the household as a basic economic unit with its characteristics as corresponding incomes, expenses and consumptions are.

It can be noted that the understanding of the household as a group of people living together, and partially or fully combining their income and expenses, better corresponds to the empirical picture of society and provides more effective state support for the group. (Bekteleeva 2012)

The Republic of Kazakhstan managed to overcome the negative trends of the transformation period, given in decrease in the birth rate, especially in urban households. Over the past ten years, a significant structural shift in the structure of families with children has been recorded in favor of a large family with three or more children. At the same time, large families significantly differ from small families (1-2 children) with lower incomes and purchasing power, which undoubtedly affects their ability to form human capital.

International studies of households (HH) with children and child poverty identify the problem as one of the most urgent in the modern world. Researchers from different countries and international organizations provide a lot of convincing evidence on the relationship between family incomes with children and the subsequent social and economic risks that occur in their lives of adults. (Schouten 2019)

In this regard, the assessment of the dynamics and structure of the income of large families is an urgent task, including for state regulation of employment and the standard of living of the population. At the same time, the redistribution of society's incomes in the context of positive dynamics of the number of children in large households is a prerequisite for the growth of domestic demand for goods and services, that is, a sustainable driver of entrepreneurship.

2. Review of recent research

Family policy issues are considered as a set of measures in the state social policy system.

Interesting research results on the dependence of the human capital of children on family incomes are presented in the works of many foreign authors, such as (Harding 1996), (Halpern 2000), (Arriaga et.al., 1998), (Ridge 2007), (Ferguson et.al., 2007), (Rothman 2007), (Cahn et.al., 2018).

Many studies confirm the impact of income distribution in society on the development of entrepreneurship, as large low-income families have a significant deferred demand for goods and services. (Lévesque, Minniti 2011), (Ribeiro, Fonseca 2018), (Tvaronavičienė 2019)

A considerable body of research has been formed in the post-Soviet space by such authors as (Kolosova 2016), (Elizarov, Zvereva 2018), (Sidorov 2015), (Pivovarova, Artyukhov 2011), (Gribovsky 2019) and others. Family policy measures are considered in the context of the formation of human capital by such authors as (Sinyavskaya 2011), (Potapova 2016), (Tyumentseva 2018), (Pritvorova, Bektleeva 2014) and others. These and many other authors talk about the significant impact of family income on the human capital of children.

The research results confirm that the formation of the human capital of children in low-income families' proceeds with difficulties and is characterized by a lower progress compared to families with higher incomes. Thus, the problem of the formation of socially acceptable family incomes in connection with their influence on the development of the human potential of children remains an urgent topic in the world economic literature.

Another important aspect of overcoming income inequality between different classes of households with children is the impact of their consumer models on the development of entrepreneurship in general and social entrepreneurship in particular. The results of many studies point to a high level of dependence between the smoothing of income inequality and the dynamics of entrepreneurial activity in a variety of fields. (Sasongko et al., 2019; Tvaronavičienė, Gatautis, 2017)

The purpose of the article is to assess the level and dynamics of families´ incomes with children in Kazakhstan to develop recommendations for improving the support policy, that will provide new consumption patterns and sustainable growth of entrepreneurship activities, including social entrepreneurship.

The methodology for studying the income level of families with children was based on economic and statistical methods for assessing the inequality of incomes of families with children based on a comparison of the characteristics of the distribution series and quintile groups. A comparative analysis of the parameters of the distribution series for the groups "all households" and "households with children" was also used. To assess the structure of children living in families of different types, the paper compiled a model according to which the number of children in households of the corresponding type is calculated as the product of the proportion of families, taken together the number of children in one household of the specified type.

3. The results of the study

A study of the level, dynamics and income inequality in the households sector with children was carried out according to the following analytical sections:
   1) The number of children in the family;
   2) Quintile groups of the population: income structure, share of children in accordance with groups by consumption expenditures;
   3) Differentiation of income within a group of households with children: parameters of the distribution series, the ratio of income used for consumption with a living minimum wage;
   4) Comparative analysis of households incomes with children in the group of "all households".
   For the period 2009-2018, the family model in Kazakhstan has noticeably transformed in the direction of large families. (Figure 1)

This vector of changes is observed together in the context of the city / village.
As in 2009, 49.2% households, that are almost half, raised one child, so in 2018 their share decreased to 41.1% in favor of all other groups. Structural shift in families with three children (4%) is remarkable and with four children (3%) is more significant.

Structural changes in the direction of large families continue in rural areas: the share of families with three children increased by 3% and with four children by 4%.
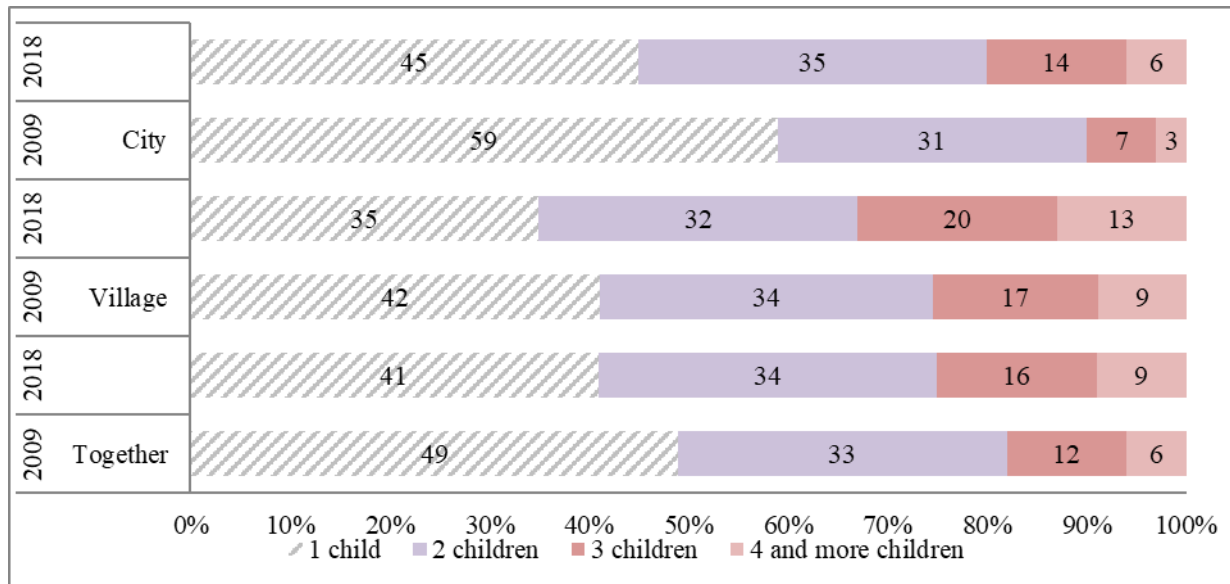
Figure 1. The structure of households (HH) with children by the number of children, %
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/

The most noticeable shift in the increasing reproduction model has occurred in urban families. The households with three and four children significantly doubled in 2018 in comparison with the year 2009. The proportion of families with three children increased from 7% to 14%, and with four children increased from 3% to 6%. The share of households with two children increased by 4% and this led to a decrease of single-parent families by the share of 14%. The urban model of reproduction during ten years has undergone the most significant changes in the direction of large families.

We have compiled a model according to which the number of children in families of the corresponding type is calculated as the product of the proportion of all families together (Figure 1) by the number of children in one family of the specified type. According to this calculation model, the number of children living in families is presented in columns 3-8 (Table 1).

In columns 9-14, there is a calculation of the children´ structure, according to 46% of children live in large households in 2018. Moreover, the proportion of large households´ children increased by 10% comparing to 2009.

Table 1. Structure of children living in households according to corresponding types

Type of family	№ of chldn	Number of children in HH, persons						The structure of children in HH, %					
		2009	2018	2009	2018	2009	2018	2009	2018	2009	2018	2009	2018
		Together		Village		City		Together		Village		City	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1child	1	49	41	42	35	59	45	27	20	20	16	38	24
2 chldn	2	66	68	68	64	62	70	36	34	33	29	39	37
3chldn	3	36	48	51	60	21	42	20	24	25	27	13	22
4 and more	5*	30	45	45	65	15	30	17	22	22	29	10	16
The proportion of children in large HH with 3 or more chldn								**36**	**46**	**47**	**56**	**23**	**39**
* The average number of children in a family is given empirically													
** *Source:* compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/													

At the same time, 56% of children come from large families in rural areas.
The urban model of reproduction has undergone, as we indicated above, the most radical changes. The proportion of children from large families has increased by 16% and amounts to almost 40%.

Quintile groups of households with children: structural changes in income, share of children in the first quintile group

Over a period of 10 years, the structure of cash income per 1 household member in 20% of the poorest households with children has undergone dramatic changes. The labor income share increased by 25.1%, and social transfers increased by 4.8%. At the same time, the share of income from the sale of agricultural products decreased by 28.5% and the share of other cash receipts by 1.4%. (Table 2)

Table 2. Income structure per household member of the first and fifth quintiles of households with children under 16 years old, 2018-2009

Elements of population income	1 quintile	5 quintile	1 quintile	5 quintile	1 quintile	5 quintile
	2018		2009		Structural shift 2018/2009	
Income from work	75,9	84,2	50,8	83,1	25,1	1,1
Agricultural products revenues	2,4	1,9	30,8	2,1	-28,5	-0,2
Social transfers	18,1	8,3	13,4	5,7	4,8	2,6
Other cash receipts	3,5	5,6	5,0	9,1	-1,4	-3,5
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/						

There are not very significant changes in the income structure related to 20% of the richest households with children. The share of social transfers in this group increased, but structurally it amounted to a lower value of 2.6%.

Despite some positive trends that indicate the social policy of the state, we revealed a tendency to increase the level of children in the first quintile, i.e. the poorest group of households.

The lack of data on Kazakhstan's statistical indicators does not allow an analysis of its dynamics in the visible period. For this purpose, we have used the indicator of population distribution by age calculated in domestic statistics in the first quintile group, as Kazakhstan researchers T.Pritvorova and D. Bekteleev did earlier. (Pritvorova, Bekteleeva 2014)

The concentration of children under 14 years of age in the first quintile group was gradually increasing: this group had 35.4% of children in 2009, 36.8% in 2012, and 39.2% in 2018. We can say that if in 2009 in every third quintile group there was already a child age under 14 years, and then in 2018, the representativeness of children has increased and is approaching 40%.

Thus, along with the positive trend of increasing the share of labor incomes and social transfers among the low-income population group, more and more children from 0 to 14 years are concentrated in this group. A similar trend is observed in many European countries. (Guio et al., 2018) This allows us to conclude that the absolute and relative income growth of households with children is lagging, especially households with three or more children, as they are studied in details below.

Income within a group of households with children

Within the group of households with children, there is a clear differentiation in terms of per capita income used for consumption.

Distribution curves for small households are shifted to the right, which characterizes their level of consumption as higher compared with the whole group as a whole. Distribution curves for large households are shifted to the left, indicating a lower consumption level for one household member. The curve for all households with children is shifted to the right, because these households numerically dominate the aggregate.

The basic parameters of the distribution series are presented in table 3.

Table 3. Basic parameters of the general population of households with children under 16 in terms of average per capita income used for consumption per month in 2018, thousand tenges

A type of family households	Mode		Median		Arithmetic mean	
	Absolute value	Deviance from group value "All households with children"	Absolutev alue	Variance from group value "All HH with children"	Absolute value	Deviance from group value "All households with children"
All with children	45,6	0	37,0	0,00	21,2	0,00
with 1 chld	43,6	0,6	42,4	5,6	26,6	5,4
with 2 chldn	44,1	0,2	37,1	0,1	21,1	-0,2
with 3 chldn	43,7	*-15,2*	32,0	*-5,0*	17,9	*-3,3*
4 and more chldn	28,4	*-17,91*	27,9	*-9,0*	16,4	*-4,8*
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/						

All calculated characteristics of the distribution series for households with three, four or more children show a negative deviation from group indicators. So, if the average group value of the median income was 37.02 thousand tenge, then for households with three children the median is 32.02 thousand tenge, and for households with four or more children 27.98 thousand tenges. Comparison of distribution curves with similar curves of 2009 allows us to conclude that the parameters for households with two children are improved. Mode and median for this subgroup are characterized by greater values than for the entire group of households. In 2009, only one-child households had better general distribution parameters than group-wide ones. (Kaydarova 2011)

Based on the calculated values of the distribution parameters, it is possible to determine the values of the coefficient of variation and asymmetry. (Table 4)

Table 4. Assessment of the degree of homogenity and symmetry of the distribution

	All households with children	Households with 1 chld	Households with 2 chldn	Households with 3 chldn	Househ.with 4 and more chldn
Coefficient of variation,%	45, 1	39, 24	43, 28	41, 8	35, 01
Asymmetry coefficient	0, 47	0, 27	0, 29	0, 36	0, 52
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/					

The coefficient of variation is defined as the ratio of the standard variation to the arithmetic mean and characterizes the homogeneity or heterogeneity of the population (formula 1).

$$\frac{\sigma}{xcp} * 100\% = V$$

(1)

- σ -the mean quadratic variation of distribution series;
- x_{cp} – arithmetic mean. (Shmoylova et al., 2014)

According to the values of the coefficients of variation, all groups of households with children can be considered heterogeneous, because the upper limit of the coefficient at which the agreggate is recognized as homogeneousis 33%. Closer than others, a group with 4 or more children approaches the threshold value of homogenity. The coefficient for this group is 35.1%.

The asymmetry index is determined by the formula 2:

$$As = (x_{cp} - Mo) / \sigma$$

(2)

σ the mean quadratic variation of distribution series;
x_{cp} - arithmetic mean;
Mo - Mode

As for the asymmetry coefficient, according to statistical canons, with a value above 0.5 (regardless of the sign), it is considered significant, and less than 0.25 insignificant. According to this criterion, for the distribution of households with one child, the value of the asymmetry coefficient is closest to the norm and is 0.27. The most significant asymmetry is characteristic for households with four or more children and for all households with children.

Characterizing the different sets of households with children, we can draw the following conclusions:
- Households with three and four children are characterized by a right shift limit in the distribution of per capita income used for consumption relative to the distribution representing a group of households with children as a whole. Both types of households are heterogeneous, but the coefficient of variation for households with four children is closer to the boundary of homogeneity, i.e. the aggregate is almost homogenous. Moreover, the group has a more epressed asymmetry. In fact, this means that most of the group consists of homogeneous low-income households, the distribution of which by level of income used for consumption has significant right-side asymmetry.

- Households with one child and two children are characterized by a left-side shift, as the entire group of households with children is. These groups have a higher level of income used for consumption by groups as a whole compared with the distribution representing the group of households as a whole. Households with one child and two children have an asymmetry coefficients of 0.27 and 0.29, respectively, it means that the distribution is close to the normal statistical distribution. Moreover, the coefficient of variation is high, which indicates the heterogeneity of this group by income.

The ratio between the cost of living and the main indicators of income used for consumption, as a rule, is used to assess the real purchasing power of the population. (Yakovleva et al., 2017)

It should be noted that in this case the cost of living is a measure representing the minimum consumer basket, in our case, for the physiological survival of a person. (Malaeva 2009)

The cost of living is currently determined by a very controversial method, in which a food basket of 48 products is calculated and equated to 55%. The rest of consumer spending is determined as the other 45%, despite the fact that even the first quintile group has this the value is 55%.

At the same time, these indicators can be used to measure the differentiation between the purchasing power of intragroup incomes.
In this regard, we have adopted the following prerequisites for determining the differentiation of purchasing power:
1) Determination the ratio of the main characteristics of the distribution series (mode, median, arithmetic mean) with the value of the cost of living in the corresponding year or the ratio of income to a living wage minimum;
2) Determination of the absolute difference between the coefficient values for households with one child and all other groups of households;
3) Determination of the absolute difference between the values of the coefficients for the households of neighboring groups, i.e. households with one and two children, two and three children, three and four or more children.
Household purchasing power, measured as the ratio between income indicators and the cost of living, i.e. the minimum consumer basket has increased. (Table 5)

Table 5. Purchasing power of households with children in 2009 and 2018

Indicators	2009					2018				
	All HH with chldn	1 child	2 chldn	3 childn	4 and more chldn	All HH with chldn	1 child	2 chldn	3 chldn	4 and more chldn
Mode, thous. tenges	8,9	13,7	11,0	8,0	6,4	43,5	44,1	43,7	28,4	25,6
Median, thous. tenges	11,3	15,0	12,0	8,9	7,0	37,0	42,4	37,1	32,0	28,0
Arithmetic mean (AM), thous. Tenges	13,6	15,4	13,7	10,3	7,7	21,2	26,6	21,1	17,9	16,4
Living wage (LW), thous. Tenge	12,4					23,8				
Mode /LW, coefficient	0,7	1,1	0,9	0,7	0,5	1,8	1,9	1,8	1,2	1,1
Median /LW, Coefficient	0,9	1,2	1,0	0,7	0,6	1,6	1,8	1,6	1,4	1,2
AM/LW, Coefficient	1,0	1,2	1,1	0,8	0,6	0,9	1,1	0,9	0,8	0,7
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/										

The ratio between the living wage value and the main indicators of consumption income has improved and characterizes the growth of living standards of households with children in terms of income.

If in 2009, only 5 out of 15 indicators were more than the living wage, i.e. the coefficient was more than one; in 2018 only 4 coefficients have a value less than one. That is, the main group of coefficients is in the "white" zone.

According to all the characteristics, only households with one child had the consumption per person higher than the living wage in 2009 but in 2018, there are more households with 1 child.in the "white" zone.

Only arithmetic mean values are below the living wage value, which indicates a significant differentiation within the groups, because its value markedly depends on the extreme values of the distribution series.
At the same time, the differentiation in incomes between small and large families, correlated with the living wage level, has been increasing (Figure 2).

According to calculations, the difference between the group with one child and the group with two children decreased: for example, for mode it was 0.2 in 2009, and became 0.1 in 2018; for the median it was 0.2, and it became 0.18, respectively. It is obvious, that groups have become closer in terms of incomes. At the same time, the difference in the arithmetic mean between the groups increased, that indicates an increase in heterogeneity within the group, because the arithmetic mean value strongly depends on the extreme values of the distribution series.

In 2018, a group with three children differs from a group with two children in the greater difference in the value of the coefficient characterizing the ratio of modal income and the living wage. The groups became closer by the coefficient for the arithmetic mean and median income.
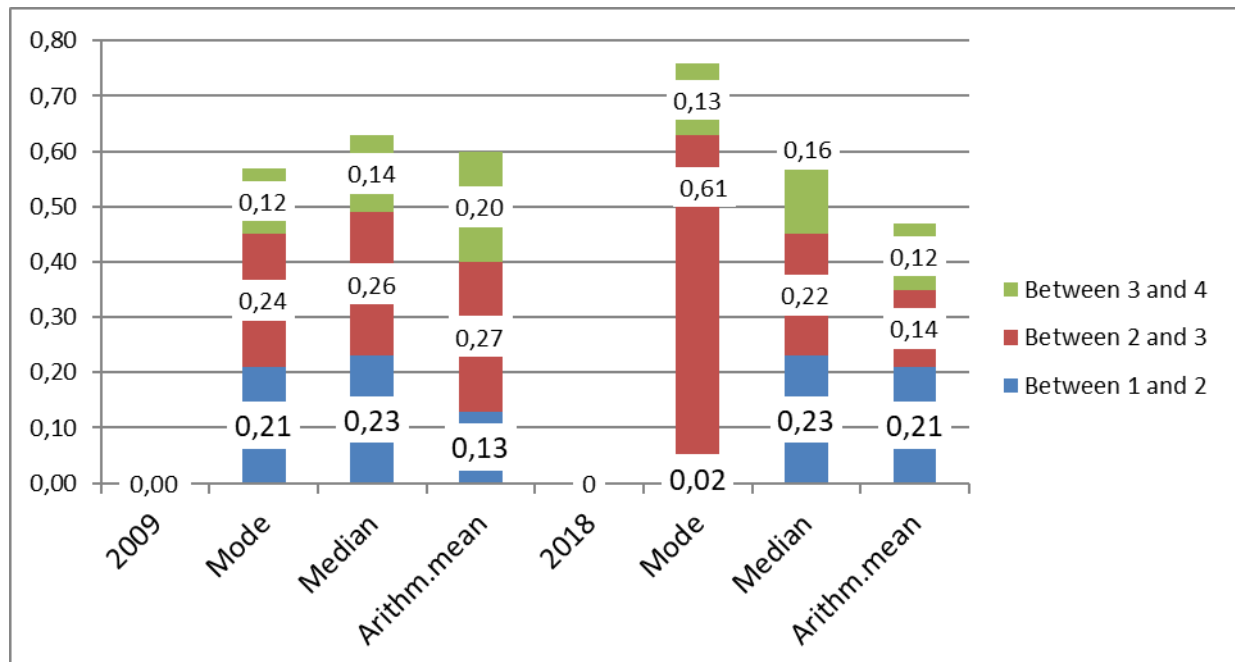
Figure 2. Differentiation between households with different numbers of children as a difference in the coefficients of the ratio of income indicators to the living wage level, in 2009 and 2018.
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/

Thus, the assessment of income differentiation within a group of households with children allows to draw the following conclusions:

-The composition of all four groups is not homogeneous, as the coefficient of variation in all four cases is more than 33%.

-The curves for small households (1-2 children) are shifted to the right relative to the distribution curve for all households, which characterize their consumption level as higher compared to the whole group as a whole. Distribution curves for large households (3-4 children) are shifted to the left, which indicates a lower level of consumption for one member of the household.

-The ratio of the main distribution parameters (mode, median, arithmetic mean) with the living wage in 2018 has improved significantly. If in 2009 only a group with one child was characterized by coefficients of more than one, then in 2018 the ratio is less than one for the arithmetic mean of groups with two, three and four children. At the same time, the value of the living wage itself remains, in our opinion, underestimated, because not consistent with the structure of consumption of the first quintile.

-Within groups, especially the groups with two and three children, there is significant heterogeneity, which shows the coefficient of variation.

Comparative analysis of household incomes with children with the group "all households"

In Figure 3 distribution of the statitical population of all households, households with children under 16 years old, households with 4 children by average per capita income used for consumption per month is presented.

Figure 3. Distribution of the statitical population of all households, households with children under 16 years old, households with 4 children by average per capita income used for consumption per month, 2018.

Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan
Statistics committee http://stat.gov.kz/
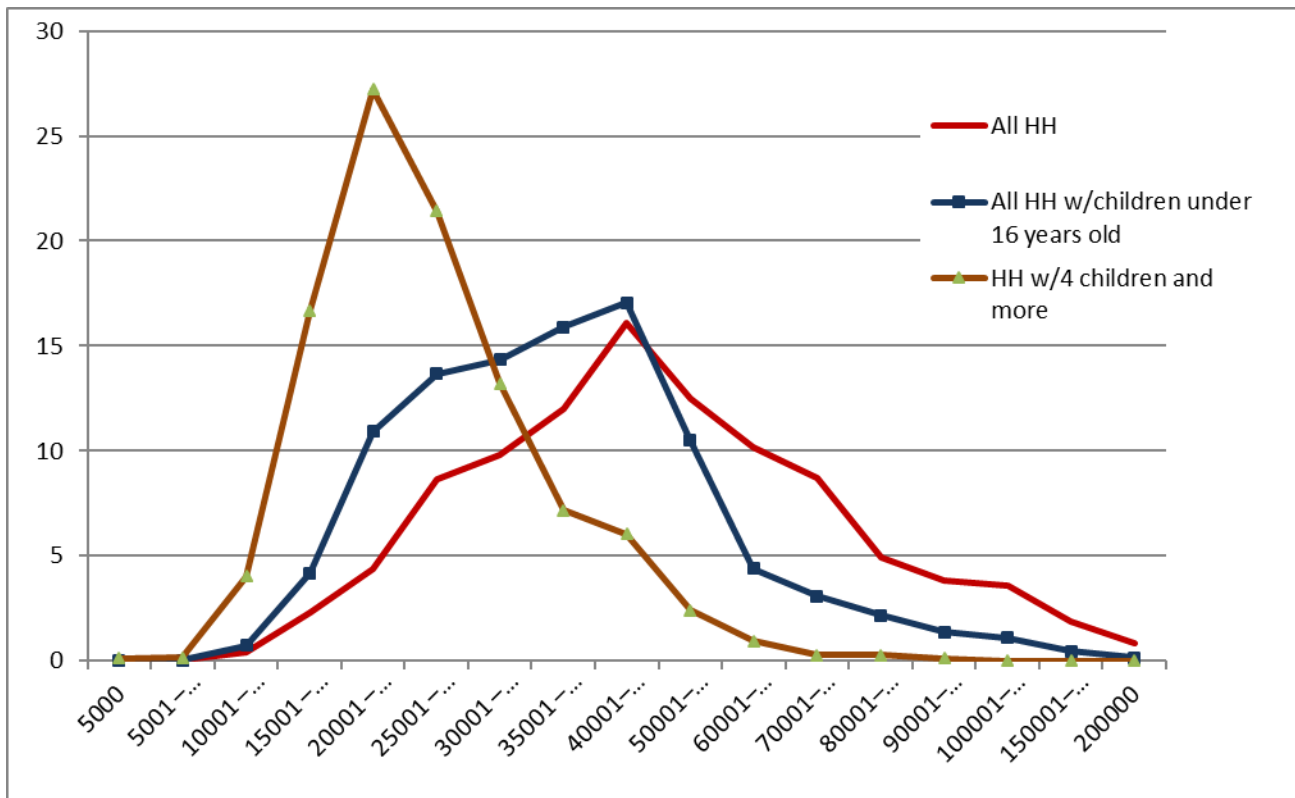
The distribution of the statistical population of all households is closer to the uniform distribution and their bulk is concentrated in the central part of the graph.

The distribution of households with four children has a clear left-side shift and most of the households are in the lower-income zone compared to all households.

An analysis of the main characteristics of the distribution series allows us to conclude that households with children to varying degrees but lag behind the standard of living from the group "all households". The difference between the absolute values of mode, median and arithmetic mean is negative in all cases. (Table 6)

Table 6. Main characteristics of the general aggregates of all households and different types of households with children under 16 years old by average per capita income used for consumption per month, 2018, thous. tenge

Distribution characteristics	Groups of households (HHs)				Deviation from the group of households 'All'		
					All HHs w/children	HHs w/1 child	HHs w/4 children
	All	All HHs w/children	HHs w/1 child	HHs w/4 children	group 3-group 2	group 4-group 2	group 5-group 2
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Arithmetic mean	28289	21243	26601	16435	-7046	-1688	-11854
Mode	46813	43520	44120	25614	-3293	-2693	-21199
Median	45361	37015	42360	27981	-8346	-3001	-17380
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan Statistics committee http://stat.gov.kz/							

The smallest deviation is demonstrated by households with one child, where deviation from the "all households" group indicators is a small, economically insignificant value.

The deviation for households with four children is -42% for mode, -45% for the median, -38% for the arithmetic mean.

The most significant deviation is observed for median income. Since the median income indicator better reflects the essence of the distribution series than the mode and arithmetic mean (which strongly depends on the frequency of the extreme values of the distribution series). The difference between median incomes for households with four children and all households is 90% of the living wage value.

FIn connection with the foregoing, it is advisable to evaluate the purchasing power of all households and households with children by the ratio of the main characteristics of the distribution number and the minimum wage (or minimum wage, since since 2010 they have been equal). (Figure 4)
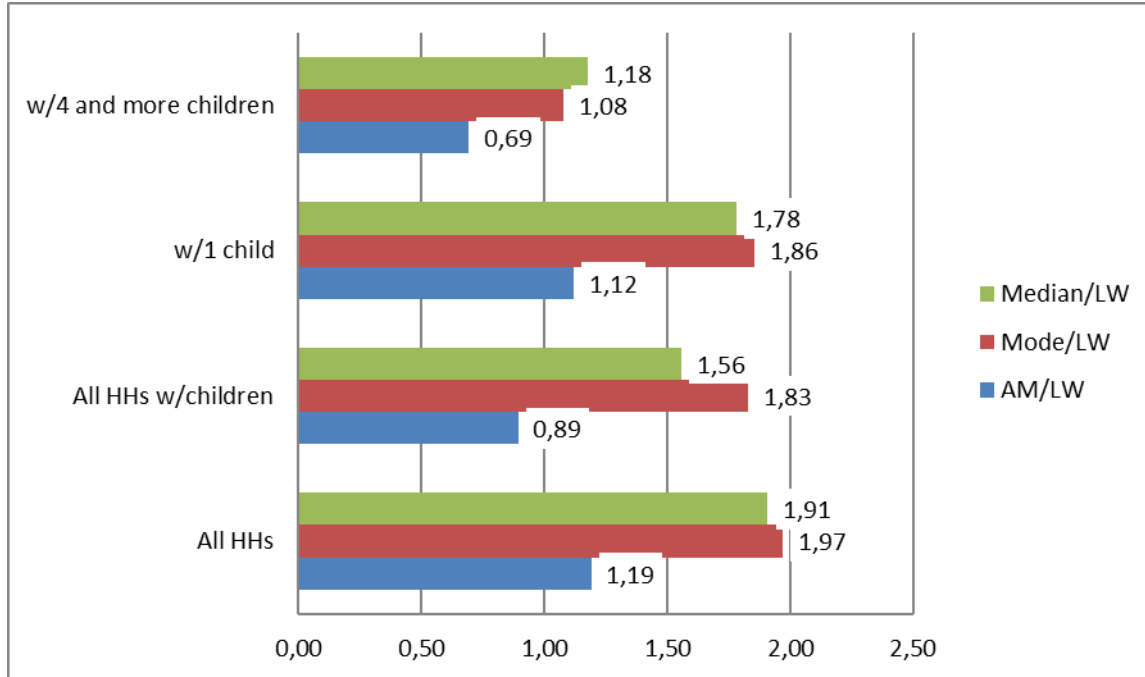
Figure 4. Purchasing power ratios for all households and different types of households with children, 2018.
Source: compiled by authors according to official website of the Ministry of National Economy of the Republic of Kazakhstan
Statistics committee http://stat.gov.kz/

Conclusions

Thereby, in the socio-economic situation of families with children in Kazakhstan, there are both positive and negative trends that must be taken into account to develope measures for improving the family policy.

Positive trends in terms of population reproduction and household income dynamics are as follows:
-For the period from 2009-2018, the family model has noticeably transformed in the direction of large families. In 2009, 49% of households raised one child under 16 years old, then in 2018 their share decreased to 41%, and the proportion of large families with 3 or more children increased to 25%. The urban model has undergone the most significant shifts in the direction of large families, as the share of such families increased from 10% to 20%;
-According to calculations and to our model, the number of children in households of the corresponding type is calculated as the product of the proportion of households in total to the number of children in one household of the specified type. In 2018, 46% of children live in large households, and 56% children in rural areas. The proportion of children from large households in the city is 39%;
-Over a period of 10 years, the structure of cash income per 1 household member in 20% within the poorest households with children has undergone dramatic changes. The share of labor income increased by 25.1%, and the share of social transfers increased by 4.8%, amounting to 18%.

The negative characteristics of the socio-economic situation of households with children are represented by the following phenomena:
- The concentration of children under 14 years old in the first quintile group consistently increased: in 2009, this group had 35.4% , in 2012 - 36.8%, in 2018 - 39.2%. Since there is no official indicator of child poverty in the

statistics of Kazakhstan, it is possible only estimate its extent by the proportion of children in 1 quintile (the poorest) group of households.

-There are existence of two groups, according to the indicators of per capita income used for consumption, related to the households with children,. Households with one and two children in all respects of the distribution series have the opportunity to implement a more progressive consumption model than the whole population. Comparison of distribution curves with similar curves of 2009 allows to conclude that the parameters for households with two children are improved. Distribution curves for large households are shifted to the left, indicating a lower consumption level for one household member. All calculated characteristics of the distribution series for households with three, four or more children show a negative deviation from group indicators. The curve for all households with children is shifted to the right, because these households numerically dominate the aggregate.

-At first glance, an analysis of the relationship between the living wage and the basic parameters of the distribution incomes series used for consumption represents extremely positive trends in increasing the purchasing power of households with children. At the same time, it is generally and officially recognized, that the cost of living has been underestimated for more than five years, and the ratio of food and non-food expenses needs to be clarified.

-The ratio of the main distribution parameters (mode, median, arithmetic mean) with the cost of living in 2018 has improved significantly compared to 2009. Considering that in 2009 only a group with one child was characterized by coefficients of more than one, then in 2018, the arithmetic mean ratio of groups with two, three and four children is less than one. At the same time, the value of the living wage itself remains, in our opinion, underestimated, because it does not correspond to the structure of consumption of the first quintile.

-An analysis of the main characteristics of the distribution series allows concluding that households with children to varying degrees but lag behind the standard of living from the group "all households". The difference between the absolute values of mode, median and arithmetic mean is negative in all cases.

-The smallest deviation is demonstrated by households with one child, whose deviation from the indicators of the "all households" group is a small, economically insignificant value. The deviation for households with four children is -42% for mode, -45% for the median, -38% for the arithmetic mean.

In connection with the foregoing, the following suggestions can be made to increase the income level of households with children:

-Bringing the size and structure of a living wage in accordance with the structure of consumption of the first quintile. Since some allowances for children from low-income families and households are tied to the subsistence level, this will lead to their increase. It is necessary to introduce a special allowance for children from large families (4 or more children), it depends on their financial situation.

-The introduction of a profiling procedure at the Employment Centers with provision of clients from the target group of low-income households with children with an targeted package of measures developed taking into account the specific needs of employment for this social group. This measure will be aimed at increasing the absolute value of labor income.

-Stimulating the development of social entrepreneurship with the participation of target groups in difficult life situations as clients or employed in this business. The development of social entrepreneurship creates the conditions for expanding the capabilities of households with children both on the basis of social services provided to such families free of charge or at economically reasonable prices.

-It is necessary to introduce in Kazakhstan an official statistical assessment of the level of child poverty, since in the system of regulatory instruments this is the first in importance, since all measures of family and social policy must take into account its value in dynamics. It is this assessment that will allow us to adequately assess the efforts undertaken by the state to improve the standard of living of children and expand their social capabilities.

-Successful family policy with a high level of natural demographic dynamics will increase consumer activity of households with children and will be a sustainable impetus for the development of entrepreneurial activity. Even a

small increase in the income level of large households, the number of which is growing rapidly, will stimulate the development of social entrepreneurship, which in Kazakhstan works mainly with children.

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THE EFFECT OF ARTIFICIAL INTELLIGENCE ON THE SALES GRAPH IN INDIAN MARKET

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Abstract. Artificial Intelligence (AI) has been the biggest revolution of the 21st century impacting every aspect of the business, sales being no different. The paper experiments the effect of marketing on 4500 customers using AI and humans. The outcomes of the research reveal the effectiveness of AI is the same as experienced salesmen and 2.7 times better than inexperienced salesmen is closing the sales calls. The sales graph experienced a dip by over 86.23% when it was revealed to the customer that the interface is with the machine, not humans and reduced the duration of the call substantially. The paper shows that Indians do not believe Artificial Intelligence and still prefer human interface as they do not trust machines over human emotions. The effectiveness of AI drastically reduces despite its superiority over humans in various aspects. The paper identifies the strategies to overcome the trust deficit that exists among Indian customers. The outcomes show how AI can be used, and how marketing could be done using AI in conservative markets such as India.

Keywords: Artificial intelligence; machines; sales; marketing; human resources

1. Introduction

The paper aims to find out the scope for Artificial Intelligence (AI) in sales and marketing, to reveal what the benefits and costs are. It tries to find how efficient can AI be in comparison to humans who are experienced in selling. It also looks whether AI can replace humans in the long run, and, if so, at what cost.

The potential of Artificial Intelligence is enormous coupled with other latest technologies like data mining and machine learning. Artificial Intelligence is computer performing tasks, which need visual perceptions, decision making and speech recognition, which demands humans typically. Artificial Intelligence does the same through voice commands and chats. The latest Artificial Intelligence systems can fix appointments wherein the potential customers are unaware that they are in touch with machines and not humans (Ghassemi et al. 2019).

Artificial intelligence market is seeing exponential growth worldwide from $100 million in 2012 to $1.5 billion in 2025 (Martínez-López, Casillas 2013). More than 80% of youth in Western countries refer to Artificial intelligence for shopping (Del Valle 2018). The Indian market has seen users like Amazon, Facebook, Instagram use Artificial Intelligence (Srivastava 2018). The Artificial intelligence has provided the marketer with plenty of advantages such as services being automated and making sales pitch (Luo et al. 2019). Today's Artificial intelligence is capable of handling words spoken by customers and replying with compassion and emotion (Wilson et al. 2017). The superiority over humans lies in the fact that humans vary at the end of the day because of tiring out. In contrast, machines powered by Artificial intelligence are still the same with no loss of strength (Luo et al. 2019). The algorithm is also modified in some cases to suit sales needs (Dietvorst et al. 2016). The growth of IT and BPOS services in India has made the use of machines even more critical to handle the bulk of communications.

These aspects show the benefits of the machines powered by Artificial intelligence from the demand aspects of customers (Froehlich et al. 2018). Indian market is still consisting of conservative buyers who resist the use of machines in assisting them with their shopping. Indian customers consider the online transactions with devices as riskier as Indians considered machines devoid of emotions and empathy towards the buyer (Desai 2019). This has forced the players in the Indian market to hide the use of Artificial intelligence-driven machines from prospects. This severely limits the ability of Artificial intelligence because of the conservatism shown by Indian customers. In Western countries, customers wonder on whether they are talking to humans or machines on the other side, which is the ethical side of the business (Wise 2018; Hawaldar et al. 2016). Also, the privacy of customers data is a prime concern to the customers today (Federal Trade Commission 2017) In India, the recent trends of protecting their privacy is also an issue forcing the companies to reveal actual identities (Chaturvedi et al. 2008; Ullal and Hawaldar 2018).

The experiment was conducted on revealing the identity of the machine in case of a sales call. 4,500 customers were called by sales teams which consisted of machines driven by AI and salespeople. The identity of the caller was not revealed at all in 25% of the cases, in 25% of calls revealed at the beginning, in 25% of the calls after sales presentation, in 25% of the call the identity was revealed after the decision was taken. The effect of revealing Artificial intelligence on the customer can be identified, and comparison with the salesman can be made. The outcomes show that AI is as good as experienced salesmen and 2.7 times better than inexperienced salespeople in closing the sales call as per our results. The Indian customer strongly abstains any interaction with machines driven by AI. The outcomes are subjected to rigorous methods to double-check on the issues. The call duration was another finding where disclosure of devices reduced the call length by 71%.

The behaviours of consumers were mapped with the information from the survey and on chat records. The outcomes were that the Indian customers purchased less on revealing the identity of the machine as the conservative Indian think machines lack human emotions. The data mining of the messages exchanged in case of

experiments where the identity was not disclosed proves the effectiveness of devices is as good as an experienced salesman (Hawaldar et al. 2019a). The perception of average Indian effects the authenticity of the sales call. The article explores the strategies to overcome the opinions of Indians towards machines driven by AI and thus to increase spikes in sales graph. The timing of disclosure is found to be the most effective strategy to overcome this perception and thus drive on this experience to change the perception of AI based on the previous lesson. The article contributes to the field of sales and marketing by conducting experiments in actual settings and identifies the potential of AI in sales. The tests and the data mining have found evidence of the negative effect of machines driven by AI on Indian customers and revealed the reasons for the perceptions. The findings increase the knowledge about the tremendous potentials of the AI for usage in sales and marketing. The trust about AI in India can be built by companies through experience and change the attitude of the Indian customers about machines. The research sees the impact of machines on Indian customers and human salespeople on Indian customers and compares both in a genuine sense. Our results prove that replacing humans in sales and automation of the marketing process is a change which companies must accept as soon as possible. The only element stopping this could be the perception of the Indian customers against technology-driven machines. The companies currently ahead of the trend are trying to find the right balance between AI and humans in their sales teams across Indian markets. The BPO surge in India after the 1990s has created a vast market for AI based telemarketers in India which is still one of the primary methods used in sales (Hawaldar et al. 2019b). AI can assist in sales by relying on the vast repositories of knowledge in reply to questions which could best be done only by machines driven by AI. The repositories could of discounts and price comparison, which attract Indian customer (Hawaldar et al. 2019a).

2. Literature review

The positive aspects of AI have been well researched even in conservative and backward markets like Asia. Customers are tremendously affected by advertisements (Ullal and Hawaldar 2019). Analysis of stock is done through AI to trade (Trippi, Turban 1992). The recent mergers of Indian banks have opened huge potential for AI application in this field to identify the grey areas such as fraud and improve efficiencies through AI driven know how, as AI can increase banks effectiveness (Fethi, Pasiouras 2010). India has robust healthcare sector, the biggest in Asia, AI can help doctors in decision making thus helping in saving time in crucial decisions and overcome human error (Pinto et al. 2019; Esteva et al. 2017). The efficiencies of hospitals can increase manifold by the help of AI (Patel et al. 2009, Bennett, Hauser 2013). The empathy shown by the machines will be the crucial aspects about AI in marketing (Huang, Rust 2018). AI is all set to replace humans (Brynjolfsson, Mitchell 2017).

The AI plays important role in depth analysis of diseases in healthcare sector (Esteva et al. 2017). The efficiency of AI in replacing salesman is commendable (Churchill et al. 1985). Online agents and AI also help new and existing customers adjust to different service contexts (Köhler et al. 2011). One of the greatest revolutions of AI is its ability to learn and adapt to new technologies (Monostori, Barschdorff 1992). Humans are affected by perceived crowding and job insecurities (Yoo et al. 2016). The managerial ability of AI is always questionable (Young, James E., Cormier, Derek 2014). AI can be a big chance in cancer diagnosis (Lachman, Merlino 2017). Recently customers have started trusting AI more than humans (Logg et al. 2019). AI is all set to create more jobs in future (Wilson et al. 2017). The presence of virtual agents in a commercial web site has a positive effect on the perceived interactivity which helps the marketing (Saad, Abida 2016). AI plays a vital role when the information is limited (Sivaramakrishnan et al. 2007). AI must customise websites and sales needs to be according to the profiles of the customers (Mimoun et al. 2017). This has resulted in AI financial deals crossing 1.5b $ in 2019 (Desai 2019). The negative side of technology when identity is disclosed on sales is presented by actual field survey. The reactions to AI in sales calls is negative in conservative market like India even though AI is as competent as an experienced salesman in sales is shown in the paper. The research was limited to voice and

text-based sales calls. Voice calls are more dynamic to research as they reveal the tone and pitch which represents actual human emotions and feeling more than text-based messages (Luo et al. 2019). Also, in advertisements faces affect how a viewer reacts to an advertisement on the metrics that advertisers care about (Xiao, Ding, 2014). This research adds to the existing literature on AI in sales. Use of data and voice mining software's were used during the research to identify the human side of the voice which involves aspects like feelings and sentiments. The research aims to find sales numbers and purchases through experiments in actual sales settings. Also, this research focuses on learning data mining and voice mining to study the effect of behavior that has a negative influence on disclosure of machines backed AI on sales graph.

Timing of initial purchase of a new product is based on the number of previous customers who have made the purchases (Bass, 1969). Humans are more unpredictable than robots (Briggs, Scheutz, 2016). Personalisation of performance can be achived by adapting to the behavior of the customers (Chung et al., 2016). Today the empowered customers decide what they want and get it delivered to their doorstep (Edelman, Singer, 2015). Customers retreat from unpleseant services enabled by technology as an interpersonal barrier (Giebelhausen, M., Robinson et al., 2014). Service provision is fundamental for the economic exchange to happen rather than the goods themselves (Vargo et al., 2014). Technology today can anlyse images and diagnose diseases (Leachman, Merlino, 2017). AI thus is reshaping service by performing various tasks and threatening jobs (Soucy, Pascal 2016). AI can be used to personalise the sales for individual customers (Vargo, Lusch 2014). Interpersonal elements of the service by providing control cues, raising social presence and working on human trust mechanism can gain more acceptance among customers rather than driving features of technology itself (Wünderlich et al., 2013).

3. Selection of companies and methodology

The experiment was conducted by one of the leading Chennai based data collection and experimentation agency which is ranked number 1 in India with over 7 million customers. This agency has been selected for its geographic reach and its technological acumen. All the customers were online buyers who used e-commerce portals frequently and were active users of social media. This company which takes up outsourced marketing contracts for leading companies in India, employs machines backed by AI and humans for sales. 4,500 responses were collected after filtering out all the calls which were not answered and not connected. The calls of discounts and offers, which are the regular way to attract sales hikes were made on Fridays and Saturdays considering the weekend mood of the regular Indian buyer. The company has software's to make calls and provide services that have a conversation in natural settings with customers. The machines here backed by AI are well trained to perform the routine tasks of experienced salespeople. The initial calls are pre-recorded because of the standard of presentation set by the clients of the company who want to reach their customers. In the first case, the identity of the caller was not disclosed, and a female voice with a neutral accent was used.

In the experiment, the company exactly divided the customers into two parts, 50% each, and assigned one lot to machines and another to human salesmen. The number of calls was limited to 1 and randomly allotted to one of the experimental conditions.

The experimental conditions are explained below in figure 1. The first condition call made by machine backed by AI which revealed its identity after customer has taken purchase decision. The second condition is machine backed by which reveals the identity after the offer presentation but before the customer purchase decision. The third condition was machine supported by AI, which discloses its identity before the offer presentation. The fourth condition is to use AI without revealing its identity. The fifth condition is the call from an experienced salesman with over 5 years in the industry. The sixth condition is the calls from the non-experienced salesmen. The fourth, fifth and sixth conditions had the same line for the introduction. All the conditions follow the same standard

procedure of sales. Purchase includes agreeing to buy and make the transactions within 48 hours with e-commerce portals.
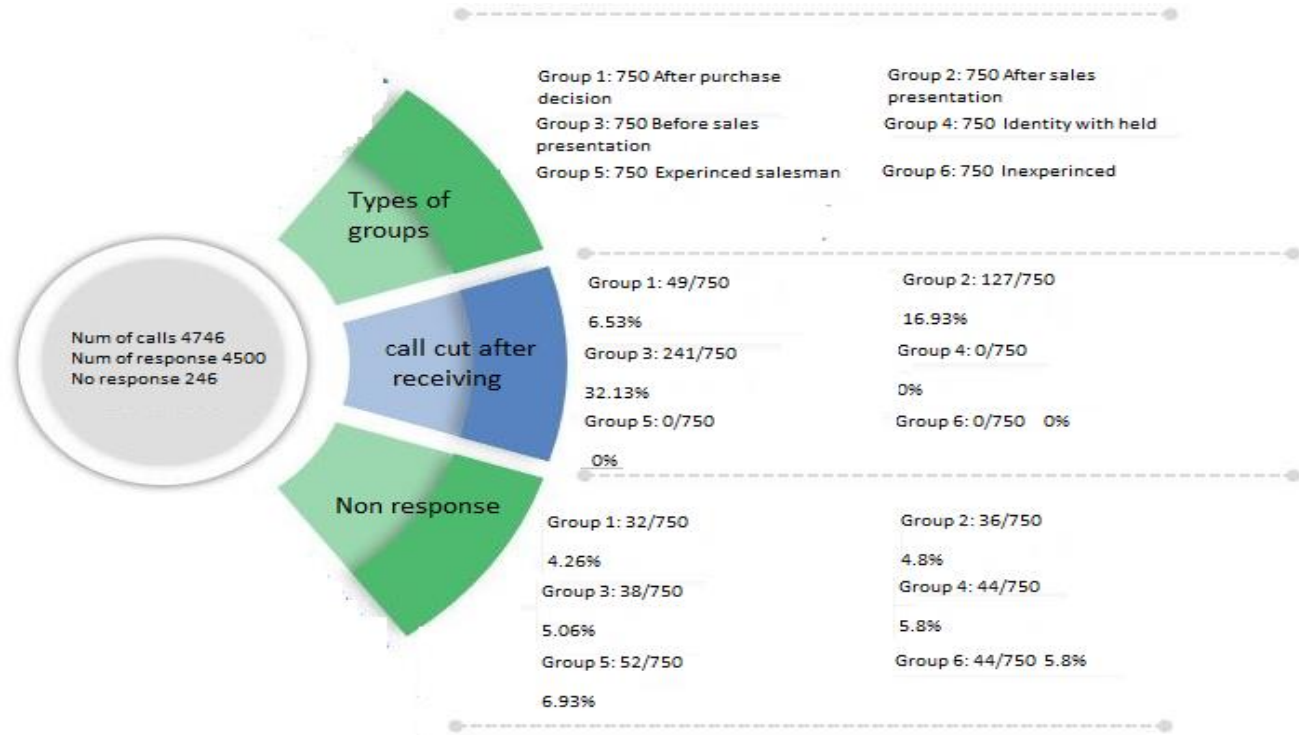
Figure 1. Call details

Table 1. Descriptive Statistics of calls

Figure Variables	Description	Minimum	Maximum	Mean	25th percentile	50th percentile	75th percentile	90th percentile
Male/Female	Male M Female F	NA	NA	0.672	M	M	M	M
Age	As mentioned by the customer	21	45	31.76	22	26	35	43
Education	1 = Graduate 2 = Postgraduate	1	2	2.832	1	2	2	2
Purchases in numbers	Made in year	1	7	1.36	1	2	2	3
Purchase amount spent in 30days	Made in one single transaction after receiving the call	1800	4600	3200	1891	3122	3788	3789
Amount spent in a year	Six months before and after the call	8110	16488	12299	8820	13100	17600	21200

As it is shown in table 1, 72% of the customers were men with a mean age of 34.8 years, and all were above college degree in education. The prospects for the research were tech-savvy young people who use e-commerce portals and shop online. Buying averages was 2.71 online in the last 30 days, with an average of Rs 12,299 spent over the year and Rs 3200 spent in the previous 30 days. Randomisation checks were conducted with background variables. The outcomes as shown in Table 3 show that the variables are not significantly different in six conditions on conducting f-test.

Revealing Artificial Intelligence identity

The six conditions based on table 2 and table 3 show that revealing AI at the beginning of the sales call reduced the purchase rate, had more call drops and reduced the duration of the call by 80%. Econometric models were applied to test the impact as we have randomised experiments aimed at identifying causal effects. The logistic regression model is used, which determines the unnoticed chance of purchase as a logistic regression function of randomised condition.

$$\text{Chance of purchase} = \frac{\text{Exp}(N_i)}{\text{Exp}(N_i) + 1}$$

$N_i = a + a_1$ x Non experienced salesman $+ a_2$ x Undisclosed $+ a_3$ x beginning presentation $+ a_4$ x after conversation $+$ After purchase decision $+$ Controls $+ e_i$ (1)

Table 2. Randomisation

Group	N	Age	Education	Purchase Numbers	Purchase in 30 days	Purchase in a year
After purchase decision	750	31.86	1.387	1.34	3214	12299
After sales presentation	750	31.87	1.388	1.36	3321	12311
Before sales presentation	750	31.94	1.389	1.38	3412	12344
Identity withheld	750	31.99	1.381	1.39	3211	12129
Experienced salesman	750	32.01	1.386	1.36	3110	12186
Inexperienced salesman	750	31.91	1.384	1.34	3127	12292

Table 3. Outcomes

Group	N	Call response in %	Call cut in % in sec	Call duration Rate.	Purchase
After purchase decision	750	95.74	6.53	82	0.324
After sales presentation	750	95.20	16.93	79	0.184
Before sales presentation	750	94.94	32.13	12	0.045
Identity withheld	750	94.20	0.00	81	0.327
Experienced salesman	750	93.07	0.00	72	0.323
Inexperienced salesman	750	94.20	0.00	36	0.047

N_i shows hidden use of making a purchase and the dependent variable of purchase is whether the customer has made a purchase. The independent variables are dummy variables with experienced salesmen comparison baseline. Control is a control variables vectors which represent the demography of customers who purchase and the purchase data such as the number of purchases and amount purchased. Feelings, pitch and frustration, was

noted by SoftMax Python software. Effects on purchase are incremental in nature. Columns 1 and 3 in Table 5 shows all the calls made in the logical regression model, probit model and OLS model. The outcomes prove that purchase decision is negative when the identity of the AI is revealed before the sales presentation (p<0.01). The extent of the impact is given in figure 2. When the AI identity is withheld condition is compared with the identity revealed before a sales presentation, the purchase rate reduces by 86%. (From 0.241 to 0.038).

Testing of Robustness: The AI used for the research is trained by the recorded conversations of the trained salesmen with over 5 years of experience with performance mapping.

Table 4. Effect of revealing AI identity on purchase decision

Purchase rate	Calls made			No response			Call cut		
	OLS	Logit	Probit	OLS	Logit	Probit	OLS	Logit	Probit
After Purchase Decision (1)	-0.024 (0.021)	-0.124 (0.121)	-0.052 (0.048)	-0.018 (0.016)	-0.127 (0.123)	-0.05 (0.054)	-0.022 (0.019)	-0.129 (0.118)	-0.058 (0.056)
After sales presentation (2)	-0.132*** (0.018)	-1.061*** (0.132)	-0.603*** (0.072)	-0.153*** (0.021)	-1.073*** (0.133)	-0.615*** (0.074)	-0.146*** (0.022)	-1.011*** (0.135)	-0.593*** (0.076)
Before sales presentation (3)	-0.218*** (0.018)	-2.321*** (0.196)	-1.151*** (0.091)	-0.161*** (0.052)	-1.794*** (0.401)	-0.911*** (0.197)	-0.172*** (0.057)	-1.695*** (0.412)	-0.889*** (0.202)
Identity Withheld (4)	-0.016 (0.018)	-0.091 (0.116)	-0.054 (0.062)	-0.019 (0.019)	-0.094 (0.118)	-0.055 (0.063)	-0.019 (0.018)	-0.095 (0.119)	-0.056 (0.063)
Experienced Salesman (5)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inexperienced Salesman (6)	-0.198*** (0.019)	-1.891*** (0.172)	-1.012*** (0.084)	-0.181*** (0.028)	-1.701*** (0.227)	-0.881*** (0.118)	-0.188*** (0.032)	-1.862*** (0.239)	-1.104*** (0.123)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.298*** (0.081)	-0.765 (0.562)	- 0.483 (0.322)	-0.027 4.231	-1.236 38.891	-1.702 20.012	0.572 4.801	2.123 36.112	0.902 19.882
Log	NA	-2446.021	-2.452.809	NA	- 2422.483	-2402.192	NA	-2236.912	-2241.792
R²	0.064	0.102	0.103	0.068	0.105	0.106	0.058	0.076	0.078
N	4746	4746	4746	4500	4500	4500	4083	4083	4083
F-value 2-3 1-2	21.011*** 67.181***	34.902*** 55.781***	37.887*** 57.087***	0.091 66.114***	4.022*** 56.614***	2.456 57.886	0.374 54.891***	2.941* 49.815***	2429 52.071

The effect of disclosing the identity of AI on purchase are shown above. Outcomes are based on 4746 calls, and 4500 calls received. Outcomes are 4,083 calls. ***p<0.01,**p<0.05,*p<0.10

The effect of disclosing the identity of AI on purchase are shown above. Outcomes are based on 4746 calls, and 4500 calls received. Outcomes are 4,083 calls. ***p<0.01, **p<0.05, *p<0.10

Effect of revealing AI identity on purchase decision

The table 4 above shows that the sales presentation by experienced salespeople and sales call by machines driven by AI with identity withheld has the same purchase rates (p>0.10). This gives no scope to the argument that sales lost by AI is because of poor quality rather than disclosure of identity. The salesmen with less experience have low sales closure rates 0.05 (p<0.01). This is mainly because of the low-quality salesmen who lack experience. The disclosure of identity after purchase decision has been taken is no different from that of experienced salespeople as the customers have already made the decision.

The insignificant coefficient after the customer has taken the decision is given in table 4 to check for its robustness.

Dealing with no response

Every customer in no response code was called again. The random sampling was limited to receiving the call but receiving was uncontrolled variable. So 2777 calls were not received as call were made during weekdays on working hours which could be the reason behind a large number of customers preferring to ignore the sales calls an add to that the number beyond coverage, numbers switched off and those which come under do not disturb numbers and those who cut the call on coming to know that it was a sales call. The figure shows that the center part, the number of no response is 2777, which had a response rate of 66.40% which is a good rate in the noisy towns of India. The rate of no reaction in six categories are in the range between 28.8% to 39.1% as shown in figure1 and table 2. The experiments are done after removing all the non-responses. The outcomes are shown in table 4, column 4 and 6 show that outcomes are tested against falsifications. So, selection effects from non-response cannot explain the results. The data about several people who cut the call with 2 seconds of informing that it was a sales call. The number of such calls was 241. The calls cut after disclosing the identity of the machines backed by AI was 127 and when disclosure was done after the conversation was 49. The rest of the conditions had no such call cuts. Then the models are run to further explain the purchase rate after cutting out all no responses. In table 4, 7 and 9 columns show that the outcomes are strong after excluding the calls which go cut. The strength is also tested by the seconds taken to cut the call after disclosure of the identity of the AI. On examining the calls that were cut because disclosure of the AI identity pushed the research towards examining the duration of the call.

Figure 2. Purchase rates

Examining the duration of the call

The Indian customers are unwilling to talk to a machine which leads to call being cut and reduces the purchase. If the above explanation holds truth, then the duration of the call revealing the identity of AI should be shorter than the calls were withholding of identity was done. The graph on call duration supports this assumption. The length of the call is taken as the dependent variable. Outcomes exhibited in table 5 with OLS models show a negative effect of disclosure at the beginning of the call, excluding non-received calls and calls that were cut. Further experiments are conducted ~~further~~ to understand the behaviours of the customers.

More experiments based on cancellation

Customers feel cheated when they come to know that they were talking to a machine and not a human. When the identity is revealed at the beginning of the call.

Table 5. Effect of disclosure of AI on call duration

	Calls made		No response		Call cut	
Call duration	OLS	Tobit	OLS	Tobit	OLS	Tobit
After purchase	-0.246 (0.588)	-0.264 (0.592)	-0.156 (0.289)	-0.158 (0.288)	-0.164*** (0.289)	0.164** (0.288)
After sales	-0.144 (0.588)	-0.154 (0.592)	-0.016 (0.289)	-0.017 (0.288)	0.664*** (0.298)	0.665** (0.291)
Before sales	-52.347*** (0.588)	-52.321*** (0.594)	-54.572*** (0.289)	-54.572*** (0.288)	-50.223*** (0.387)	-50.223*** (0.387)
Identity withheld	0.136 (0.587)	0.119 (0.593)	0.284 (0.289)	0.284 (0.288)	0.296 (0.289)	0.296 (0.288)

Experinced	NA	NA	NA	NA	NA	NA
Inexperinced salesman	-24.564*** (0.586)	-24.561*** (0.592)	-25.040*** (0.289)	-24.040*** (0.288)	-24.793*** (0.289)	-24.793*** (0.288)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	61.332*** (2.881)	-61.141*** (2.956)	-186.831** (78.996)	-186.831** (78.996)	-164.221** (81.181)	-164.221* (81.181)
Log	NA	-24352.377	NA	-21242.221	NA	-19542.181
R^2	0.772	0.142	0.964	0.311	0.906	0.262
N	4746	4746	4500	4500	4083	4083
F-value						
2-3	9,143.811***	8,872.973***	36,764.235***	36,346.967***	19,829.185***	19,834.644***
1-3	8,942.440***	8,893.675***	36,114.241***	35,745.681***	19,625.768***	19,542.579***

Impact of disclosure of AI on call duration is shown in the above table. Outcomes are based on 4746 calls made 4500 calls which were received and 4083 conversations. ***p<0.01, **p<0.05, p*,0.10

Psychology of customers in case of disclosure of AI

Subjective information from an analysis of calls along with objective voice data analysis from voice recorded during the call is used. The experiment includes all customers who receive and cut the calls and are asked to answer a questionnaire based on the sales acumen of the salesman. The outcomes of mediation with 3000 copies in bootstrapping (Preacher, Hayes 2004) is shown in figure 3. The outcomes suggest that non-disclosure of AI before sales presentation decreases the faith towards AI and its ability to understand human needs and thus reduces the call duration and purchase decisions (p<0.01). But voice mining of calls where identity was not withheld shows that AI is an as proficient salesman as an experienced human in the field of sales. So, the perception of Indian customers about AI is the reason for non-performance despite its abilities which are comparable to the best salesman in the job.

So, the perception in the conservative markets like India is against the AI is responsible for no purchase rather than the feeling of being cheated. Voice mining of the calls could not identify feelings that are negative across all six categories about the feeling of being cheated. Also, no complaints were received or orders that were cancelled by customers on revealing the identity of AI in sales calls.

Suggestions to negate the perceptions against AI

The first suggestion is that a comparison of coefficients show that purchase increases when identity is revealed after the purchase decision (p< 0.01). So, experimental learning on AI can overcome perceptions against revealing its identity. When the identity of the AI is revealed before during or after the call, the purchase rates drop. The rate of drop is slightly lesser when the identity is revealed at the end of the call. So, the result here is to win the trust of a conservative but educated Indian customer in the few initial discussions and overcome the negative perceptions. Next to the experience of the customers with AI if any before also impacts the perceptions about AI. The data also was collected about any AI apps that are used by the customer before. Table 6 shows that experience with AI makes customers purchase increase. Coefficient of interaction before AI x before a sales call is positive and significant (p<0.01) indicating that AI experience reduces the impact of revealing AI identity.

Table 6. Effect of disclosure of AI on call duration

Purchase rate	Calls made	No response	Call cut
After decision (1)	-0.005 (0.132)	-0.006 (0.132)	-0.006 (0.132)
After sales presentation (2)	-0.988*** (0.168)	-0.992*** (0.168)	-0.871*** (0.168)
Before sales presentation (3)	-2.829*** (0.291)	-2.189*** (0.436)	-2.246*** (0.521)
Identity withheld (4)	-0.059 (0.132)	-0.071 (0.133)	-0.071 (0.133)
Experienced salesman (5)	NA	NA	NA
Inexperienced salesman (6)	-1.812*** (0.198)	-1.582*** (0.252)	-1.675*** (0.254)
Previous experience	1.912*** (0.187)	1.915*** (0.187)	1.915*** (0.187)
Inexperienced and prior experience	-0.291 (0.392)	-0.281 (0.392)	-0.288 (0.392)
Identity withheld and prior experience	0.192 (0.272)	0.197 (0.272)	0.192 (0.272)
Before sales presentation and prior experience	0.942** (0.412)	0.912** (0.412)	1.268** (0.542)
After sales presentation and prior experience	-0.322 (0.313)	-0.321 (0.314)	-0.275 (0.316)
After purchase decision and prior experience	-0.158 (0.275)	-0.150 (0.275)	-0.151 (0.275)
Control variables	Yes	Yes	Yes
Constant	-0.994* (0.594)	-35.504 (36.996)	-30.012 (37,382)
N	4746	4500	4083
Log	-2,245.658	-2,118.005	-2,112.087
R^2	0.189	0.189	0.155

***$p<0.01$, **$p<0.05$, *$p<0.10$

Conclusion and further research

The study analyses the importance of AI, which is the future of business. The various conditions examined shows that disclosure of the identity of AI reduces purchase chances drastically. Analysing the data also shows that purchase rates dip and calls are disconnected when the identity of AI is revealed as Indians perceive AI as less capable and has less knowledge which cannot understand human feelings and requirements. One of the limitations of the research was the research being a two-way communication which may not always be interactive. This further allows researching in future. Differences in two-way communication among AI and customers with salesman and customers could be researched further. Also, the research could be extended to inbound calls. Researchers can also study various other methods of disclosure of AI. One such approach could be offering lower costs to customers as the benefits of having no labour cost could be passed on to the customers in India who prefer talking to machines backed by AI. AI will make business smooth and easy, and in some crunch situations,

humans in sales could be used. Also, customers interact with AI; differently, some are well behaved; some are not so nice (Thompson 2018). The difficulty level of sales tasks and the preference of the customers may give scope to future research on allowing customers to choose between salesman and AI, which could increase sales. Indians have accepted Google Alexa and Apples Siri, which makes us believe that they will also take AI in future for other more important aspects of daily decision making. The researchers strongly recommend more study in the area to identify various applications of AI for sales and marketing.

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DYNAMIC KNOWLEDGE MANAGEMENT CAPABILITY AND STRATEGIC INTUITION OF THAI ENTREPRENEURS*

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Abstract. The main objective of this research is to study the relationships in the causal influences of cognitive capability, absorptive capability, dynamic knowledge management capability and strategic intuition capability using the method of consistency testing on the structural equation models with empirical data. The research samples consisted of 342 SME provincial champions entrepreneurs under the office of small and medium enterprises promotion. The findings indicated that the hypothesized relationships between the independent and dependent variables fit the empirical data. Specifically, it reveals that cognitive capability, absorptive capability, dynamic knowledge management capability and strategic intuition capability well responded to the empirical data. However, on the development of dynamic knowledge management capability and strategic intuition, it was found out that a genuine wisdom development by systematic knowledge management through the state of awake mental concentration could lead to the next stage of strategic intuition.

Keywords: cognitive capability; absorptive capability; dynamic knowledge management; capability; strategic intuition capability; entrepreneur

1. Introduction

Thailand, at present, is in the process of changing the economic structure to an era of Value-Based Economy under the concept of Thailand 4.0 aimed to drive the country and making 3 dimensions change including 1) Changing from producing commodities to innovative products; 2) Changing from industrialization country to technological, creative and innovative country; 3) Changing from focusing on the product manufacturing to more services-oriented (Office of the National Economic and Social Development Council, 2017). With the government's emphasis on encouraging entrepreneurs to use technology and innovation to help driving business, it

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is found out that the trend of establishing a newly build business is of interest to a group of young entrepreneurs, which focuses on using creativity to create business opportunities and to make money grow faster (Export-Import Bank of Thailand, 2016). Therefore, it is very important for entrepreneurs to develop themselves to be capable to use information and knowledge, which are distributed in many places all over the world in order to develop their own learning process by integrating those knowledge together with the development of their own knowledge regularly.

Over the past 40 years, it is interesting that studies of business strategies of most entrepreneurs have focused on the strategic development to achieve long-term performance (Meers & Robertson, 2007; Miller & Cardinal, 1994; Venkatraman & Ramanujam, 1986) which is actually considered difficult in the context of a fluctuating business environment (Grant, 2003). Some academics suggest that changes in a fluctuating environment require a flexible and constructive plan (Hamel, 1996), as well as a proactive, continuous and diverse organizational management process (Brown & Eisenhardt, 1997). There are also discussions about the strategies that occur in organizations. Although there are planning efforts to change the environment, individual adjustments and actions, it is still necessary to learn more about the decisions and actions of individuals involved in organizational processes, specially the viewpoint about the feelings, instincts and intuition of people in the organization. As can be seen from the research trends since 2000, researchers have placed importance on the study of strategies under the concept of intuition, which is continuously increasing and can explain the changing of the concentration on the study of strategies in different ways (Teece, 2018)

2. Theoretical Background

Nowadays, organizations or businesses focus on using knowledge as the basis for business strategy (Knowledge-Based View) Therefore, the development of knowledge resources that are essential to the organization, paly the main role and must be carried out in accordance with the plan or target set to create a sustainable and long-term competitive advantage (Barney, 1991; Kogut & Zander, 1992). Haggie and Kingston (2003) discussed the strategy of knowledge management in each organization and formulated 3 different focus points: Knowledge Focus; Business Process Focus; and End Result Focus. The formulation of knowledge management strategies must be consistent with and unified in the formulation of business strategies in order to be successful (Zack, 1999; Greiner, Bohmann & Krcmar, 2007). As for determining a form and a focus point of knowledge management strategies, it depends on the environment, context and goals of the organization (Haggie & Kingston, 2003).

From the previous knowledge management concepts, it is found out that most of the researchers focus on the study of specific issues in a modular way, whether it is an individual context that is related to the process of knowledge management or the organizational context, which is a component of most factors that facilitate knowledge management. The choice of an appropriate knowledge strategy brings to its implementation through a process of knowledge management cycle, consisting of knowledge acquisition, sharing, development, preservation and application of it. (Raudeliūnienė, Davidavičienė & Jakubavičius, 2018). According to previous research, it is found out that entrepreneurs who value the integration of intellectual resources through knowledge management processes and conducting basic learning activities of the organization will be able to increase competitive advantage (Crossan, Lane & White, 1999). In this process, Gannon, Lynch and Harrington (2009) developed a Dynamic Knowledge Management capability model. Therefore, to be successful or fail in conducting business, top priority factors include perspectives, ideas and decision-making process of entrepreneurs in choosing strategies for organizational problems to eliminate defects and plan work in accordance with the organization's vision (Kouzes & Posner, 2012; Duggan, 2013). One of the key capabilities of successful business entrepreneurs is the ability to recognize future possibilities for conducting business toward its goal without having to rely on predictions or apply rational information to make decisions. It is however the use of feelings, instinct combined with one's own experience in making decisions about a particular matter (Teece, 2018). These

capabilities are referred to under the name of "wisdom" or "insight". For these reasons, the researcher is interested to study the important components and ways to develop such capabilities in order to increase the business potential for Thai entrepreneurs and enhance the business competitive advantage in Thailand to conform with the government policy in bringing the country to Thailand 4.0.

3. Conceptual Background and Hypothesis

3.1. Cognitive Capability

Davenport and Prusak (1998) said that knowledge would not be transferred entirely without support from the absorptive capability. Similarly, Szulanski (1996) shows that the transfer of knowledge in organizations becomes a big obstacle if it is not supported by the absorptive capability as well. Therefore, it can be seen that the sharing of knowledge and the knowledge absorptive capability are interconnected and cannot be separated. Zahra and George (2002) states that the absorptive capability is one of the necessary missions for the organizational to identify and use knowledge, which reflects the economic ability to use and absorb information.

H$_1$: *Cognitive capability directly and positively affects absorptive capability*.

In the current study, it is found out that most entrepreneurs emphasized on the integration of intellectual resources through knowledge management processes and carry out basic learning activities of the organization. The aim is to increase competitive advantage (Crossan, et al. 1999). Gannon et al. (2009) developed a dynamic knowledge management capability model by placing importance on 3 main components: Intellectual Resource Management; Knowledge Management; and Organizational Learning Management, which are one of the cognitive capability components.

H$_2$: *Cognitive capability directly and positively affects dynamic knowledge management capability*.

Gannon et al. (2009) emphasized on intellectual resource management, which consists of Human Capital, Structural Capital and Relational Capital. These can be seen as a group of resources that are unstable and cannot survive without helps from their components, both individuals and organizations (Daft & Weick, 1984). The development of dynamic knowledge management capabilities requires the integration of all three components by using the absorptive capability that combines knowledge from both inside and outside the organization.

H$_3$: *Cognitive capability directly and positively affects strategic intuition capability*.

3.2. Absorptive Capability

Aujirapongpan and Jutidharabongse (2017) mentioned that strategic intuition is linked to knowledge management concepts as a starting point for the intelligible skills development that requires knowledge and experience existing in human. It is used as a base for the development in which the definition of knowledge in person's related dimensions is a result of the wisdom and learning that exists in all people. It is considered an important element in making the organization successful. The knowledge and experience each person have are general knowledge and professional knowledge. Therefore, it can be seen that knowledge and experience are dynamic, arising from the interaction between individuals and individuals or individuals and organizations by exchanging various ways of Tacit Knowledge and Explicit Knowledge in organizations.

H$_4$: *Absorptive capability directly and positively affects dynamic knowledge management capability*.

Aujirapongpan and Jutidharabongse (2017) also discussed that in order to upgrade knowledge management to the development of Strategic Intuition Capability, aside from that person having such cognitive capabilities, it is important to have skills to understand what one has learned and what has happened and to capture important issues from the awareness effectively in order to use the information to synthesize techniques, strategies for implementing in accordance with the changing environment.

H$_5$: *Absorptive capability directly and positively affects strategic intuition capability*.

3.3. Dynamic Knowledge Management Capability

Gannon *et al*. (2009) says that the current strategic management theory has changed the concept of focusing on external environment to internal resources that can be controlled within the organization. It can be seen that the potential to create a competitive advantage comes from wisdom capital in the form of relational and structural human resources (Čirjevskis, 2015;Teece, 2018) . The ability of people in the organization to rethink, redo, proceed with synthesis, apply and develop knowledge constantly, is important to define an operational strategy that requires people with rational thinking and can result in the strategic intuition capability.

H$_6$: *Dynamic knowledge management capability directly and positively affects strategic intuition capability*.

3.4. Strategic Intuition Capability

Duggan (2013) gave a definition of strategic intuition: strategic intuition is a scientific phenomenon that occurs from the use of good ideas and reasoning through past experiences to solve problems in the future that have never been seen before (Ahangaran, Khooshebast, & Vahedi, 2016) . Dane and Pratt (2007) described the strategic intuition as a form of brain processing in an easy-to-use format. It happens beyond conscious thinking, holistic connection through environmental stimulation. Over the past decades, studies on intuition have stepped forward in behavioral sciences by expanding the scope of the study to the branch of social neurology. In this regard, Hodgkinson, Smith, Burke, Claxton and Sparrow (2009) studied the matter of and have identified the key elements for organization executives in enhancing intuition capability, namely 1) Acquiring Intuition Expertise; 2) Developing Self Awareness; 3) Managing Strategic Decision Making and; 4) Creative Situations.

However, basically a person who have intuition capability must initially have knowledge and expertise in the field well enough. This is one aspect of Knowledge Based Capability View, which is a factor that affects knowledge management capability as well. For example, those who have the smart knowledge and expertise are the ones who are capable of doing something well, which results from having unique knowledge and arising from experience, training and cooperation. People with expertise or people with knowledge and ability are considered people who have the Knowledge Champions and is important to the organization knowledge development. This will play a very important role in knowledge transfer or knowledge exchange (Hansen, Nohria & Tierney, 1 9 9 9 ; Jones, Herschel & Moesel, 2 0 0 3) . The organization should create a career path for those experts (Alavi & Leidner, 2001), because each expert can create a creative team (Tiwana & Mclean, 2005). They will always be those who need new knowledge from the outside (Dooley, Corman & McPhee, 2002; Figurska, 2014) and will increase Tacit Knowledge (Gurteen, 1998) including the ability to transfer knowledge which means the ability to transform from hidden knowledge to clear knowledge as well (Raudeliūnienė *et al*, 2018).

4. Methodology

4.1. Population and Sampling

The researcher determined entrepreneurs in Thailand as the population of the current research using the database of small and medium enterprises which participated the SME Provincial Champions 2018 project of the office of small and medium enterprises promotion. There are 450 cases (Export-Import Bank of Thailand, 2018). The researcher also specify the sample size equal to the population. The researcher sent the questionnaire to the population within the database-there are 450 cases and followed up every week in one month. However, at the end of the specified time, it was found out that 342 respondents were recorded, accounting for 76 percent of the total population. Regarding the business types, the entrepreneurs who responded to the questionnaire can be classified into subgroups as follow in Table 1:

Table 1. Business type of entrepreneur (n=342)

Business type	frequency	percent
Food and drink	203	62.1
Clothes	41	12.0
Tourism and accommodation	50	14.6
health and beauty	23	6.7
jewelry	16	4.7
appliance	8	2.3
electronics	1	0.3

4.2. Data analysis

A questionnaire was used as the tool to collect the data in the current research. The 5 level Likert scale was used to measure individual aspects of opinion. It was pretested with 30 businesses. Then, the data collected were analyzed to test the reliability of the questionnaire using Cronbach's alpha coefficient in Table 2. The results of the reliability test of each construct are between 0.895 and 0.793. The questionnaire has a high level of reliability, as Nunnally (1978) and Cortina (1993) pointed out that the reliability score should be more than 0.7. And the basic statistical values such as frequency, percentage, mean, standard deviation, Chi-Square, alpha coefficient Pearson's correlation coefficient, KMO statistics and Bartlett's Test statistics for finding out the characteristics of the respondents were analyzed using the SPSS program. In addition, the relationships between various components from the empirical data of entrepreneurs in Thailand based on the research hypothesis set were also analyzed using the structural equation modeling through reading the analysis from Pearson's correlation analysis and path analysis in the congeneric measurement model. The statistical value that will be used to check the consistency of the research model and the empirical data based on the research hypothesis are Chi-Square, Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index - AGFI).

Table 2. Result of reliability test

Variables	Construct	Cronbach's Alpha
Cognitive Capability	COG	0.795
Absorptive Capability	ABS	0.895
Dynamic Knowledge Management Capability	DKMC	0.863
Strategic Intuition Capability	SIC	0.793

5. Results

The analysis of the causal influence to study the relationship of the structural equations shows that the variables used in the analysis should have the characteristics of the normal distribution (normality). As for the significance test of skewness and kurtoris using LISREL program as in Table 3 it was found out that the cognitive capability variables (COG) , the absorptive capability variable (ABS) , the dynamic knowledge management capability (DKMC) with the influence on the strategic intuition capability (SIC) had an abnormal distribution with statistical significance at the level of 0.05. Regarding the data analysis to test the consistency of the model and the empirical data, the model analysis results were consistent with empirical data which is reliable in Table 3.

Table 3. Distribution for analyzing the relationships of variables

Variables	Skewness		Kurtosis		Skewness and Kurtosis	
	Z-Score	P-Value	Z-Score	P-Value	Chi-Square	P-Value
COG	-2.015	0.224	1.769	0.341	0.139	0.025
ABS	-3.938	0.013	1.962	0.003	1.872	0.933
DKMC	-2.269	0.008	-0.168	0.136	7.148	0.010
SIC	0.154	0.137	1.406	0.734	7.505	0.028

From the Pearson's correlation coefficient analysis of all variables used in the analysis, there is a statistically significant linear relationship at the level of 0.01 indicating that the variables used in the analysis has rectilinear relationship between variables. In addition, the researcher evaluated the effectiveness of the measurement model Considering the Relative Variance (ρC) and the Average Variance Extracted (ρv), and it shows that the variance of each variable in each component is relatively low (ρv> 0.50), as in Table 4.

Table 4. Discriminant validity analysis

Construct	Cross construct correlation				ρC	ρv
	COG	ABS	DKMC	SIC		
COG	1.00				0.6812	0.5616
ABS	0.76**	1.00			0.8892	0.6747
DKMC	0.54**	0.48**	1.00		0.7841	0.6457
SIC	0.52**	0.41**	0.46**	1.00	0.7671	0.6329

**P<0.01

When considering the basic terms for analyzing the causal influence of the structural equations as detailed above, the researcher then analyzed the data with LISREL program. From the analysis of causal influences with latent variables between cognitive capability, absorptive capability, dynamic knowledge management capability, and the strategic intuition capability, found that the model is not consistent with the empirical data at the first time of data analysis. The researcher then adjusted the model until the model was consistent with the empirical data by considering Chi-Square, P-Value, GFI, AGFI, RMSEA and RMR as in Table 5.

Table 5. Causal influences

Dependent Variables	R^2	influences	Independent Variables		
			COG	ABS	DKMS
ABS	0.57	DE	0.62**	-	-
		IE	-	-	-
		TE	0.62**	-	-
DKMS	0.57	DE	0.19**	0.48**	-
		IE	0.35**	-	-
		TE	0.54**	0.48**	-
SIC	0.57	DE	0.10*	0.15*	0.12*
		IE	0.13*	0.21*	-
		TE	0.23*	0.36*	0.12*

χ^2	df	P-value	χ^2/df	GFI	AGFI	RMSEA	RMR
35.71	25	0.07615	1.60	0.98	0.96	0.033	0.027

DE = Direct Effect, IE = Indirect Effect, TE = Total Effect, * (P<.05), ** (P<.01)

Tables 4 and 5 show that the hypothesis testing results using Pearson's correlation coefficient of all variables has a statistically significant positive value at the level of 0.01. In addition, when analyzing the causal relationship of all variables, it was found out that all variables had the level of causes with statistical significance at the level of 0.01 and 0.05 as in figure 1.
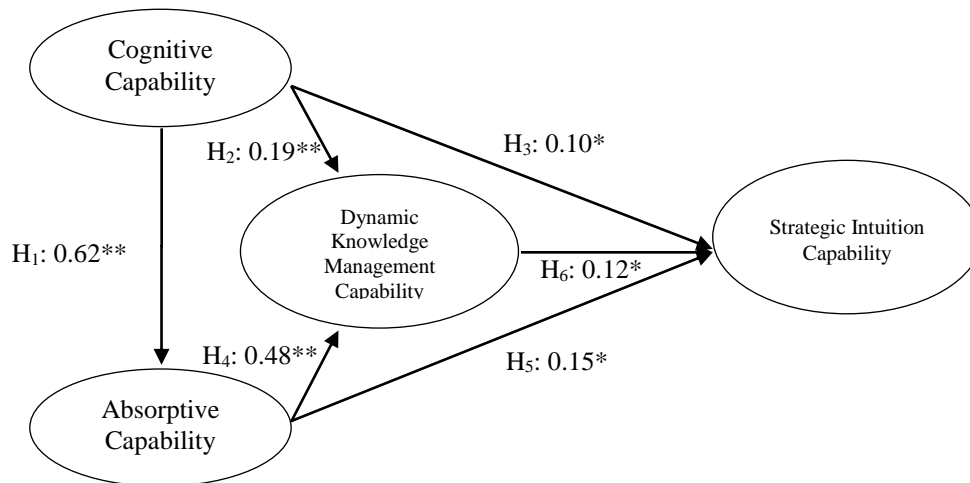
Chi-Square=35.71, df=25, P-value=0.07615, GFI=0.98, AGFI=0.96, RMSEA=0.033, RMR=0.027, *P<0.05, **P<0.01

Figure 1. The structural equation model

6. Conclusions and Discussion

When considering the results of the structural model analysis or the path coefficient of cognitive capability, absorptive capability, dynamic knowledge management capability and the strategic intuition capability, it was found out that every variable has a positive influence. cognitive capability variable has a causal influence on absorptive capability, dynamic knowledge management capability and strategic intuition capability, equal to 0.62 (SE = 0.08, t = 1.72), 0.19 (SE = 0.20, t = 3.67), 0.10 (SE = 0.10, t = 1.16). Absorptive capability has a causal influence on dynamic knowledge management and strategic intuition capability, equal to 0.48 (SE = 0.07, t = 4.11) and 0.15 (SE = 0.07, t = 0.63) respectively. Moreover, it was found that the dynamic knowledge management capability has a causal influence on the strategic intuition capability, equal to 0.12 (SE = 0.06, t = 2.22) with statistical significance at the confidence level of 0.05 and 0.01. From the hypothesis testing using Pearson's correlation coefficient analysis, all variables have a positive relationship with each other with statistical significance at the level of 0.01.

However, when analyzing the causal influence relationship of cognitive capability of entrepreneurs in Thailand, it was found out that the causal influence on absorptive capability with statistical significance at the level of 0.01 corresponds to the concept of Zahra and George (2002) which stated that absorption is one of the organizational tasks necessary to identify and use knowledge, which reflects the economic ability to use and absorb information. When analyzing the causal influence relationship of cognitive capability of entrepreneurs in Thailand, it was found out that there was a causal influence on the dynamic knowledge management capability with statistical significance at the level of 0.01. This is because most entrepreneurs give priority to the integration of intellectual resources through knowledge management processes and conduct basic learning activities of the organization with the aim of increasing competitive advantage (Crossan et al, 1999). Moreover, when analyzing the causal influence relationships in cognitive capability of entrepreneurs in Thailand, it was found out that there is a causal influence on the strategic intuition capability with statistical significance at the level of 0.05. This is in accordance with Aujirapongpan and Jutidharabongse (2017) which says that at the initial point for beginning the development of intuitive skills the knowledge and experience that a person has are required as a base for the development.

The definition of knowledge in the dimensions relating to person is a result of the wisdom and learning that exists in all people. In addition, when analyzing the causal influential relationship concerning with absorptive capability of entrepreneurs in Thailand, it was found out that there is a statistically significant influence on the dynamic knowledge management capability at the level of 0.01. This is in accordance with what Gannon et al. (2009), who place importance on the intellectual resources management, which consisting of human capital, structural capital and relational capital, suggested. It can be seen that a group of unstable resources that cannot survive without the help of individual and organizational elements (Daft & Weick, 1984). When analyzing the causal influential relationships concerning with the absorptive capability of entrepreneurs in Thailand, it was found out, in accordance with with Aujirapongpan and Jutidharabongse (2017), that there was a causal influence on the strategic intuition capability with statistical significance at the level of 0.05. It was also found that to enhance of knowledge management to the strategic intuition capability, apart from a person having the cognitive capability, there needs to be skills of learning comprehension and occurrence. However, in analyzing the causal influential relationship of the dynamic knowledge management capability of entrepreneurs in Thailand, it was found out that there is a causal influence on the strategic intuition capability with statistical significance at the level of 0.05, in accordance with Gannon et al. (2009)in that the current strategic management theory has changed the concept of focusing on the external environment to focusing on internal resources that can be controlled within the organization. This means that the ability to build competitive advantages is created by intellectual capital in the form of relational and structural human resources (Teece, 2018). The ability of people in an organization to innovate, to synthesize systemically, to apply and develop knowledge constantly are important to specify an operational strategy that requires people with rational thinking and can result in the strategic intuition capability.

7. Implications

This paper describes the relationships related to enhancing the dynamic knowledge management capability and the strategic intuition capability of entrepreneurs in Thailand to create a competitive advantage (Barney, 1991; Kogut & Zander, 1992). Regarding the development of the dynamic knowledge management capabilities, it is evident that entrepreneurs must give priority to the development of knowledge within the organization. The business operations conducted by most entrepreneurs in Thailand reflect the knowledge management capability in a knowledge-based perspective that will help develop the ability to manage knowledge of the organization and can lead to the creation of strategic intuition capability (Teece, 2018). In this regard, having the dynamic knowledge management capability will be the basis for the development of entrepreneurial intelligence to the core and then will enter a state beyond consciousness, having a mind that is concentrated, resulting in the work of the brain and body systems are more efficient, making it possible to fully utilize its potential whether in work, thinking, decision making or problem solving. Ready to enter the state of wisdom, develop into a strategic intuition capability.

8. Limitation

This research is a compilation of data from small and medium-sized enterprises. Over 60% of respondents were entrepreneurs in the food and beverage business. As a result, the analysis results may not be able to directly represent each business group Therefore, in the next study, there should be a study and a balanced proportion of the business groups or it possibly be extended to a group of entrepreneurs who have been promoted and developed their competitive potential along with the government's policies, such as start-up entrepreneurs.

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RELEVANCE AND SOCIAL RESPONSIBILITY OF SUSTAINABLE UNIVERSITY ORGANIZATIONS: ANALYSIS FROM THE PERSPECTIVE OF ENDOGENOUS CAPACITIES

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Abstract. The university social relevance is the effective management of the academic functions in a committed way, from which it analyzes, studies, and investigates the problems, needs, requirements of the social environment to identify, characterize, rank them. And a model social action to the research, teaching, extension, and training of professionals, consistent with social needs, linked to the realities of the various contexts of human performance that neo university organizations, rescuing sustainability with human development and socioeconomic, involving the creative potentials and indigenous innovations of society. To coexistence between community and university in favor of endogenous growth is required, conceived as the leverage from the social and organizational strengths of the human conglomerate in reference, which promote; quality of life and sustainable human progress. Consequently, the purpose of this dissertation is limited to carrying out an analysis of the relevance and social responsibility of sustainable university organizations from the endogenous perspective. From the qualitative, interpretive, and hermeneutical paradigm, the categories of analysis are reviewed, to conclude; that the university theoretically approaches endogenous development. However, it is necessary to generate links of structural- organizational configuration within the educational institutions that involve processes related to their sustainability over time and their impacts.

Keywords: University social relevance; university social responsibility; endogenous development; organization; sustainability

1. Introduction

The 21st century has been marked by multiple scenarios and accelerated transformations in the political, social, cultural, and technological development. The economy also has transmuted toward new forms of globalized production, exchange, and extra connection-borders of markets, as attempted regional blocs, such as in the case of Latin America and their experiences.

It is a century marked by great contradictions, where technology, informatics, the rearrangement socio-economic and political demand of human capital of large social formation in which the knowledge component is a development priority for any society, but in some countries of the region access to higher education is mediated by economic factors that limit the inclusion of broad sectors of the population.

Unfortunately, the development is not a similar mechanism, expeditious and equitable access for developing countries, continues to produce inequality, even in the same geographical spaces that have created a certain degree of progress, but without achieving the insertion of all human conglomerates, generating increasing economic differences, labor, even in priority areas such as health and education, increasing marginalization and the gap between rich and poor.

Moreover, in countries of most significant progress, such transformations does not escape of claims and conflicts that are identified among others by; an unfair distribution of educational opportunities, exclusion from the labor market a product of technological and organizational improvements, the production of knowledge in universities that are not transmitted to the productive apparatus, the curricular offerings that do not conform to the professional needs, and indiscriminate privatization of universities.

The product of these dynamics that inhibit an inclusive development have proposed specific operational guidelines for university institutions conform to these changes as are: expansion of tuition, diversification of funding sources, organizational restructuring, planning, controls and accountability, linking and responsibility with the social environment; updating of knowledge and renewal of skills, as well as the definitive establishment of the action shared between university, the productive apparatus at local, regional and national levels, with the centers of public and private decision.

Additionally, in the last decade, have proposed models of a university such as the university social relevance that are associated with its commitment to social responsibility and organizational and with its external linkage, as explained by Beltran-Llavador et al. (2014). The determination of the university requires its ability and effectiveness in responding to the needs of transformation of the society where it is immersed, and that the organization also feel and be part of that equal society.

That is to say, that the relevance and social responsibility are unavoidable in the face of the collective needs that must be met equitably, plural, and according to the requirements and human realities, rescuing sustainability, appropriating harmoniously of socio-economic development from natural resources, materials, technicians, as well as the creative potentialities, innovative, indigenous peoples, of society. By requiring a co-existence between Society and the University of endogenous development, but strictly sustainable.

Understanding by endogenous development; the leverage from the strengths and opportunities of economic, social, cultural, political, of the human conglomerate in reference, and conducive to quality of life, human progress, and sustainable development. In the specific case of the university organizations, it is the sum of the internal efforts to sustain in time their strengths and opportunities in the service of the externalities that interact in pro of progress, general well-being of even the organizational and social happiness.

In this order of ideas, from the qualitative paradigm based on the hermeneutic interpretive analysis-, review of these themes or categories related to the management within different organizations, in the understanding of an endogenous perspective for sustainable institutions of higher education as a social process, as Glaser (1992), applying a methodology for analysis, to generate an inductive theory on a substantive area, in this specific case, it is made a review of critical concepts that are interrelated to interpret as from the relevance and responsibility University is can boost sustainable educational organizations with endogenous perspective.

These categories of analysis emerge in the process of construction in the observation, because qualitative research is, searches for the ideographic concepts to understand social behavior. This concern is textually to describe and analyze the social fact from the features determinants (Guardian-Fernández, 2007; Bonilla-Castro and Rodriguez, 2005). As a result, the epistemological perspective of this dissertation is the interpretive paradigm, because the explanation of the social life and the world, related to the categories in reference, it is also of hermeneutic character from its position of theoretical reflection.

The categories analyzed has a meaning emerged from the literature review conducted, segmented for the study of the social relevance of the university organizations sustainable from the endogenous perspective, which makes it possible to interpret university social responsibility as a strategic process in conjunction with the organizational potential of the context and the persistence over time, which showcases the importance of the university as an organization with socio-economic ends and means for the development and general well-being.

2. Development. Reviewing and analyzing categories - relevance and university social responsibility

When you mention the significant transformations in which has been wrapped up the 21st century we are talking about both the universalization of democracy as the globalization of trade, the market, competence standards, human development, sustainability, quality of life, all of which are subjects that require personal knowledge, group and national to face its challenges, because of this, your comprehension, depends on the feasibility of economic, political, social, cultural, human, in many countries.

One of the critical elements to reinsert favorably in this new scenario and radical change is to raise the competitive level of educational systems and the preparation of high-level human resources, which also means improving the capacity of academic cooperation, scientific, technological development.

For Beltran-Llavador et al. (2014), the university has always developed his work from a social conscience, in an evolution of its orientations; has had moments oriented toward the production of knowledge exclusively, moving in time with the training of professionals tailored to the needs of society, up to the present with the resurgence of the debate about the social responsibility of the university institution to recognize that higher education, as a public good, it is the responsibility of all parties concerned.

Some researchers, such as García (2000), define a concept known as university college with social relevance, in which it analyzes, studies, and researches the priority problems of their social environment to identify, prioritize, propose and participate in the feasible solutions that are derived. In this sense, she remarks García; the university functions: teaching, research, and extension, must be integrated with the essential mission of the university: its social service. The sectors state political, socio-cultural, and economical.

This university-society relationship as regards the social relevance, there arises the need to insert the organization within a framework of globalization, competitive characteristic of today's world, but that does not imply leaving aside the local and regional levels, but combine the universal of knowledge and its application to the particular context of a community, society, and country.

These new phenomena, such as post-technological, are producing models of university, virtual university, corporate university entrepreneurial university, each with different kinds of linkages with the environment.

The relevance that is also referred to the social responsibility of the university, it is assumed as the kinks in this dissertation, in the search for solutions to social problems related to the world of work, production, citizens' associations, in general, in a linear perspective to the surroundings contextualizes and their needs, resources, potential, from historical dimensions and space, and foresight, the latter, in recurrence to the sustainability both human and organizational performance these educational institutions.

Inline, expresses Vallaeys (2018), "Therefore, there is an intrinsic relationship between ethics of responsibility, definition of social responsibility in terms of responsibility for the impacts and duty of vigilance and inter-organizational association to resolve the problems of justice and sustainability of social set." In general, corporate social responsibility is endeavoring to improve their immediate environment, and that of the community with which it relates when makes contributions for the benefit of her performs or participates in social activities (Palomino and Lopez, 2019; Paz Marcano, Sierra Daza & López Juvinao, 2019)

Therefore, the responsibility of universities necessarily refers to the treatment of its social function to the interest of a scenario defined. Must be the result of broad agreements within the university and beyond with the actors involved in its socio-economic environment, to consolidate the real development according to the realities and the resolution of the problems in the field in which is immersed, evidently from a perspective of endogenous (category also analysis).

However, university models in Latin America have not exceeded specific criteria which makes it difficult for them to take on the challenge of relevance, because it is defined by the demands of the political orientations of governments, the requirements from international agencies, exogenous macroeconomic policies, and the own dynamics of political subjection-participatory versus the power groups in each country.

In universities, in general, continues a tradition of training and research outside the environment and located in the methodological positivism, which produces and accumulates knowledge in a disjointed and utilitarian, preventing a contextualized approach to provide an overall perspective capable of linking the concrete projects with development problems, in such a way that explicitly assume its incidence in the local, regional and national levels.

As a result of the above Treaty, the university organizations should articulate with the State, government policies, and the productive sector, their science structures toward the new academic reality, to the era of globalization, the maintenance of democracy, and its commitment to sustainable social development. How to Express Chumaceiro, Hernandez, and Chirinos (2016: 58), education for sustainable development: "The latest studies on the development processes efficiently highlighted the importance of human and social capital in successful experiences. That is why the fundamental pillar for sustainable development lies in the training of professionals with social development approach. In this regard, the urgency for the formation centered on a humanist vision, social, economic, and politically sustainable is imminent"

It is coinciding with Vallaeys (2016) who proposes, a socially responsible university with a project of coexistence, anchored in its territory, or, on the contrary of the multinational model of the massive knowledge unanchored.

University Social Responsibility, involves the full commitment in the formation of competencies consistent from ethics, contribution to peace, the defense of social values, democratic and human rights (Martínez-Usarralde, 2017; Chen, Nasongkhla & Donaldson, 2015; Girdzijauskaite et al., 2019).

In summary and interpreting, the university has a fundamental role with the actors involved in strengthening the development and promote the general welfare, as organizations in its structure include such essential elements; the academic work, promotion, humanistic, community, environment, and sustainable development, from scientific approaches multi, inter and transdisciplinary, and where strategic alliances between civil society, State, private sector and academia, are essential to ensure a decent quality of life and autonomously growing for the majority of the population, all within the respect of cultural differences.

3. Sustainable organizations and approximation to endogenous development

Sustainable development in a first approximation generalist is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland, 1987, 41). However, its conceptualization and therefore its application evolved and continues to grow according to the historical dynamics and also from the various epistemological perspectives of their study, in that order of ideas, Sachs (2015) explained that with time, the definition of sustainable development evolved toward a more practical approach, with less emphasis on inter-generational needs and more holistic approach, with direct connections to economic growth, social inclusion, and sustainability.

Considering the economic development, are entered three fundamental dimensions; economic, social and environmental, which allows you to extrapolate from this point of view here raised, the intervention of actors and institutions that are made stewards of sustainable development and sustainability directly; The State, governments, the private sector, citizenship, the organizations with different objects and scope, including universities as critical organs of the development of competencies that contribute to the socio-economic well-being.

Bernal and Rivera (2011), since such a configuration, pose that education has become a strategy for the sustainable development of nations. As a result, humanity and the states recognize the role of the university; therefore, allow your activity generator and disseminator of scientific knowledge.

The university as an organization must strive to ensure sustainability, but understanding, according to Largacha, Pinzón, and León (2015), that the organizational sustainability, not only is subject to processes (efficiency, efficacy) but considers the social aspects that include equality, fair treatment, better opportunities for its employees and different partners to improve processes in search of sustainability.

Then, it is assumed that the university organizations have to focus on all aspects of economic, social, and sustainability of development. This development, according to Boisier (2004), depends on four large blocks of factors: economic growth, collective mentality, the endogenous potential latent in all territory, and the set of subsystems that define the complexity of the region and that under certain conditions allow for development.

It introduces the element of endogenous development, seen from the realization of growth and well-being according to the resources and human potential, environmental, techniques that are confined to the immediate sphere of action.

More specifically, for this dissertation, endogenous development is defined by Vázquez-Barquero (1999), as a strategy for action, to undertake the transformations and economic changes in the framework of globalization. Each community has its identity, its historical past, its way of exploiting the ecosystem, that is to say, has its

mechanisms of action, its mode of production. It is an authentic approach to development, which is characterized by a particular way of organizing their own space.

According to Marin, Atencio, and Hernández (2009: 75), The development it does no one from an outside space, makes it the man in their midst, from their individuality and in your sociability, that is to say from the same. The configuration of this alternative space with endogenous potential must be designed by the same agents involved. It is the participatory design as a critical element in the construction of a society inside. Therefore, to participate in the design, as an essential step, is to stimulate decision-making and respect for the values of each group.

The object of these autonomous spaces is a widespread habitat from a complex perspective and integral, historical, and social reality, addressing the different dimensions, which mentions Boisier (2001), individual, family, group, community, local, regional and global levels.

It is definitive that the endogenous development in a production context, implies sustainability as an ecological purpose and systemic approach, in the sense of the energy-saving and avoid excessive consumption, agreeing with Pereira (2016), from a dynamic sense, as the whole set of human activities aimed to prevent the affectation, alteration, or put at risk the existence of life itself.

Endogenous development rescues in its essence the reality, environment, experiences, abilities, the communities, to achieve progress and structural independence, as Vázquez Barquero (1999), would continue to the formation of a process of entrepreneurship and innovation, for which the territory is not a passive recipient of the strategies, interests, big companies, and external organizations, but from its plan that allows you to influence local economic dynamics.

In summary, as reviewed and analyzed, endogenous development assumed as leveraging strengths economic, social, cultural, political, of society, that additionally creates quality of life, human progress, sustainable development, and sustainability. The construction of a prosperous nation must be the result of joint efforts of citizens, State, businesses, communities, universities, with criteria of fairness, responsibility, sustainability, supported in the generation of knowledge, improvements, innovations, products of the ingenuity, creativity, originality, of the widespread knowledge.

3. Results

After the review and analysis of the categories, from the hermeneutic method responds to the formulation raised: How from the relevance and responsibility university is can boost sustainable educational organizations with an endogenous perspective?

The organizations or institutions of higher education have had to overcome various problems to improve its functioning, since its formation the socio-historical, political and economic dynamics that have been determined, the approach to the missional functions (teaching, research, extension-social projection, another), until the issue of financing for their sustenance have caused structural differences, even compared to emerging realities of the 21st century.

In Latin America and the Russian Federation, therefore, it is possible to establish an insufficient level of research on the business environment, the presence of unresolved scientific problems associated with the need to attract all forms of entrepreneurship in the educational system. Thus, it is possible to state an insufficient level of research on the business environment, the presence of unresolved scientific problems associated with the need to attract all forms of entrepreneurship in the education system. (Mutalimov, 2020).

Historically, the western influence and from other countries have slanted the generation of knowledge in Latin America, the methods driven by favoring the positivist paradigm as a way of doing science marked by the technique, market relations, utilitarianism.

Science and Method built to establish a pattern of consumption, as practice and rationale. A hegemony of broad international interests, with a single perspective, homogeneous, to develop and disseminate the knowledge from a unique vision it submits. The standardization of human life and the loss of the socio-diversity are equally remarkable results, though destructive, and undesirable. The everyday subverted tends to become unique and dependent on the high consumption of Nature, which increases their fragility. The accelerated loss of the socio-diversity appears a race in search of social states of homogeneity and balance. But in terms of life and society, homogenization and stability are equivalent to death. (Sotolongo and Delgado; 2006: 29)

The university organizations in the Region and the world, in response to the demands arising within the institutions, as well as by state regulatory imperatives, international agreements, supranational bodies, have led to the necessary changes, adjusting its management proactively, in the understanding of social responsibility, as expressed in Ketele (2008: 55): "For an institution of higher education, the relevance supposed to register their objectives within a project of society."

In this order of ideas, universities are transformed to achieve effectively play new roles, allowing it transcend its simple historical function of creation, transmission, and preservation of knowledge, toward new activities social, cultural and environmental, which must remain through time (Chumaceiro, Hernández & Chirinos, 2016).

It must be understood that national development, the generation of wealth and well-being common, is for the citizens in general, reachable from the wisdom and input from all that independence and domestic production drives the sustainable native production and sustainable, strengthens the acquis and inventive popular. Still, it is essential to systematize this knowledge, progress, and innovations. Accordingly, it is necessary to prioritize in fostering a culture to socialize, make visible the widespread consciousness, citizens, community, and the private sector.

As a result, from the universities, it is essential to begin; systematizing, disseminating, these experiences economic, social, contributing to the general development; to agglutinate the generation and creation of knowledge, scientific advances, a product of the particular contributions and collective that can be generated from the citizen spaces, community, society in general, for universities, academics, communities of formal researchers, and the country in general.

A necessary condition for these advances, try the independence of the scientific praxis through break hegemonic schemes, exogenous (of any nature and origin), building, driving theory, and methods arising from the dynamics of national, regional, and local levels.

In tune with Ahumada, Ravina, and Lopez (2018), this would also, one of the goals of the current social responsibility; cultivate an organizational culture where it fosters among its members the ideology and determination that their activity has direct effect in its spatial framework and influence in society.

Agrees with Sachs (2015), that sustainable development also implies a normative approach on the planet, in the sense that it recommends a series of objectives to which the world should aspire. Sustainable development suggests a holistic approach, in the sense that society must simultaneously pursue economic, social, and environmental goals.

The goals of sustainable development, involve a planetary approach since its creation in the year 2015, with Agenda 2030 sets the model for shared prosperity in a sustainable world so that all people can lead a productive life, vibrant and peaceful in a healthy planet. In the latest report of the objectives of sustainable development highlights the collaboration of actors and institutions such as the university, "a wide range of other actors - international organizations, companies, local authorities, the scientific community, and civil society - have become committed to the ODS in such a way that generate great optimism for the next decade." (United Nations, 2019:2). The scope and the ambitions of the new "Agenda 2030" of the global community have grown dramatically, as well with the Millennium Development Goals (SDGS) are duplicated in comparison with the Millennium Development Goals (2000-2015), because it contains almost ten times more objectives and five times more indicators (Voronkova, 2020).

In conclusion, the organizations became permanent to the extent that they adjust their organizational processes, both the productive, technological, and human resources, in a synergetic perspective of the purposes and shared values, in the growth, development, integration, and achieving the common good. In the harmony of interests and general, that make sustainable development in the organization, in this case, to universities in pro of endogenous growth from the philosophy of social responsibility.

Conclusions

From the universities, the social relevance implies to be recognized in your environment to interact effectively, at the same time that social responsibility requires him to be directly linked to its territoriality, environment, and frameworks for action. The social function of the autonomic educational organizations, in particular the universities, gives it its humanist character of formation for a professional, technical, that it be integrated into society in the fullness of its development, its realization socio-economic and their contributions to society as a whole.

Accordingly, the endogenous development is pushed from these constructions individuals citizens, who engage the local, national, with their contributions and innovations for diverse areas of knowledge and praxis, in perspective with the conservation and sustainability of the system of organizations and resources, both human, as natural, technological and economic. In the harmony of social and productive networks, where people are not another element for the creation but the very makers of inventiveness, of contribution, as subject and object of the realities that intervenes to improve and achieve welfare.

The endogenous development without prejudice against exogenous production, which is always necessary for diversification and scarce resources, it is a question of competitiveness on equal terms, and in the fair recognition of the abilities and skills of the local working population.

The categories treated theoretically, factual in your application in universities demand complex processes, and in the more specific spectrum of endogenous development is further complicated even more, because they require converge on a more inclusive society, equitable, environmentalist, with indicators of human, organizational management effectively in achieving responsible for social welfare and happiness.

Keep as far as possible from the multiple perspective the purpose of endogenous development and their potential in equal opportunities for citizens. Still, respecting the cognitive differences, cultural, training, requires that its structural configuration-organizational fit for the attainment of these purposes.

In this regard, universities as sustainable organizations and national governments in pro of endogenous development, have outstanding tasks, several actions would be in harmony with this paradigm to make relevant university:

- Promote and generate a public policy that prioritizes the revision of curricular offerings according to the potentialities of production, human socio-economic needs, and expertise, the context of insertion.
- Research an own epistemology and ontology, designed from the problematic socioeconomic, political, and cultural life of the country.
- Leverage the endogenous development from the various public policies of structural character that encourage States and from which the university can be linked properly.
- Take a philosophy of organization-structure-management-action consistent between university and endogenous development, human, sustainable, from the diversity and inclusion.

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SCORING METHOD AS APPLIED TO INNOVATION PROJECT EVALUATION FOR STARTUP SUPPORT

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Abstract. In this paper, we present the scoring tool for startup evaluation called the MDP method (Management of Developing Projects) for an academic discussion. The MDP method implies the application of qualitative and quantitative criteria with due considerations given to personality types of main economic entities. The method's aims are better evaluation, better business development and support to participants of the innovation infrastructure. We believe that this method is set to become a cross-functional assessment tool that facilitates the successful development of investment and innovation projects. In time of the method piloting, we applied the consistent approach to testing including 12 in-depth interviews at the qualitative phase of the research. The following empirical study included the evaluation of innovation-based cases and projects in Russian business incubators. Findings showed that a number of promising projects (calculated by business incubators themselves) substantially differs from the number that we got owing to the piloted MDP scoring method. According to the MDP method, 9 of 17 projects are only promising, while the incubators themselves decided that 14 projects met eligibility criteria. At the same time, 3 startups out of 9 were successful at the selection stage, whereas they did not meet incubator selection criteria. Anyway, they were found promising within the framework of the MDP method. An important outcome of the MDP method's application is that in further monitoring of the most successful projects it will be possible to identify managerial skills of startup initiators by their personality type and this will consequently make it possible to develop university-based educational programs that meet the market demand.

Keywords: business incubator performance; innovation project; business incubator; startup selection criteria

1. Introduction

Innovating is a focal point in the debate about economic issues. It is also a pressing issue in developed and developing economies. The concept of innovations has close associations with entrepreneurship and directly depends on the intensity of entrepreneurs' activism in economy (Toomsalu *et al*., 2019; Molina, Velilla & Ortega, 2016; Dellis, Karkalakos & Kottaridi, 2016; Lambert, 2018). Many national governments contribute to development of the system of measures to encourage entrepreneurship (Chernova, Degtereva, & Zobov, 2016). They do this both in research and education, and by providing the direct support to startup owners.

However, limited cost-efficiency of these measures has been a frequent issue in academic and public discussions, including in Russia (Yashin &Kovrizhin, 2013; Rodionov, Tsypkin, & Sinelnikova, 2012; Fourth annual… 2018). Birch discusses spendings of the USA taxpayers' funds for the support to unsustainable projects, as only 2-4 percent of them make a noticeable impact on national economy. The USA economist proposed the term *gazelles* to denote this group of enterprises. This term became frequent in the economic discourse and today refers to fast-developing dynamic companies (Birch, 1987; Birch & Medoff, 1994).

In 2006, the Organization for Economic Cooperation and Development (OECD) provided the following standardized definition of *gazelles,* "All enterprises, the average annualized employment growth rate of which is over 20% over a three-year period and which have ten or more employees in the first year of observations." Birch thought that *gazelles* also included the companies that met the following criterion: at least 20% revenue growth annually over a specified interval. The category of *gazelles* supposedly includes young companies only, established not more than five years ago (Oslo Manual, 2010).

Business incubation is one of the tools within the entrepreneurship encouragement policy aimed at providing the comprehensive support to entrepreneurs at the early stage of their business. To join business incubators, projects go through selection procedures by competition. Project selection approaches mostly include calculations and formal criteria, conventional in terms of the financial analysis, while return on investment and strategic planning are not indicators of the entrepreneurial creativity (Baum & Bird, 2010; Dimov, 2007; Baron, 2008; Batkovskiy *et al.*, 2017). The application of quantitative criteria to the evaluation of important economic entities does not make it possible for us to understand personalities of initiators of such projects. It is clear that entrepreneurship is a specific type of the economic activity that requires a corresponding capability. This capability, entrepreneurial creativity, is decisive for the startup success. This brings into questions the efforts (made in the modern society) of influencing the enterprise development, as only a small number of projects has the potential for development.

The main goal of this research is to find evidences for the availability of the entrepreneurial capability and identify its criteria so that to justify relevance of support and encouragement for competency of this type in time of startup evaluation. With this objective in mind, we stated the following research objectives: 1) develop the integrated model (for the evaluation of innovation projects) that would include a qualitative criteria framework for application selection in business incubators, 2) as applied to applications and startups in existing business incubators, pilot the developed assessment model and compare piloting results with the ratings that such applications and startups received under the valid approach approved by business incubators.

2. Literature review

Innovation facilities play a key role in expansion of entrepreneurship projects. Establishment of accelerators, technological parks, and business incubators require substantial investments (Smirnov, 2017). With due consideration to resource mobilization, it becomes a priority to understand whether the establishment of such facilities is cost-effective (Rodionov, Tsypkin, & Sinelnikova, 2012; Guidelines: Metrics…2013; Balashova & Alekseev, 2018).

High-quality selection of prospective incubatees is not only an important practice-oriented, but also a theoretical objective. There is close attention that general public pays to this issue, but there is still not enough conceptualization in this field of economic relations. The entrepreneurship theory needs the elaboration of its framework knowledge about the entrepreneurship phenomenon including its categorical framework. It is a basic assumption that entrepreneurship is a purely practice-oriented issue, whereas it would be more appropriate to treat it as an essential component of economics as a science. Therefore, the development of the project evaluation framework should be in terms of modern development of economics as a science at the level of concepts and

categories. I.e., we should take into consideration the achievements of cognitive science, including psychology based on the interdisciplinary approach to the methodology of academic sophistication.

There are numerous research papers on methods and models to evaluate business incubator performance. However, there is no common approach or list of criteria for such evaluation (Theodorakopoulos, Kakabdse, & McGowan, 2014; Torun, Peconick, Sobreiro, Kimura, & Pique, 2018). Transformation of approaches to evaluation of business incubator performance took place together with the development of business incubators themselves. If incubators of the 1st generation (1980-1990) looked like office space, the 2nd generation incubators (1991-2000) provided their residents with coaching and training sessions (Bruneel, Ratinho, Clarysse, & Groen, 2012; Mian, Lamine, & Fayoll, 2016). Finally, the 3rd generation incubators of nowadays are facilities, a primary competitive advantage of which is an expanded range of services that they provide together with networking opportunities (Theodorakopoulos, Kakabdse & McGowan, 2014; Bruneel, Ratinho, Clarysse, & Groen, 2012; Mian, Lamine, & Fayoll, 2016; Messenghem, Bakkali, Sammut, & Swalhi, 2017).

Some researchers are skeptical about the very idea of the common approach to evaluation of business incubator performance. They think that successful incubators are not similar, and it is impossible to find a one-fits-all formula to measure success of the business incubators that belong to different types (Theodorakopoulos, Kakabdse, & McGowan, 2014). On the other hand, results of the overview of numerous research on the development of approaches to performance evaluation of business incubator assume that there are several criteria that are regularly in use and recognized by everyone as indicators of the business incubator success (Theodorakopoulos, Kakabdse, & McGowan, 2014; Torun, Peconick, Sobreiro, Kimura, & Pique, 2018). Note that the list of success indicators is diverse. It includes the criteria that refer to incubator performance (number of incubatees, number of the applications processed annually, floor space, average number of the events held a year) and the criteria that refer to projects of business incubator residents (resident's survival rates, average incubation time, average number of jobs created by incubatee). Thus, business incubator performance also depends on its incubatees' success. Consequently, organizations that support startups should be extremely interested in successful development of their projects. It is possible to distinguish between several types of the well-accepted approaches: financial, multi-criteria, comparative (to compare projects with each other) and project portfolio approach (Shtefan & Elizarova, 2018; Grekul, Isaev, Korovkina, & Lisenkova, 2019).

Internationally, business incubators think that strict selection of applications is a condition of a project success as the strictness of the approach is directly proportional to the quality of the projects that will become incubatees. For example, in Europe, in 2012, the Central-European innovation center selected 28 startups out of 263 applications. In other words, it only accepted 9 percent of applications. For Russia-based business incubators, the same indicator is 37 percent (business incubators selected 363 startups out of 974 applications). At the same time, there are several most successful business incubators that are standout as their conversion rate is almost at the European level of 11 percent (Challenges and Solutions… 2013). In other words, Russian business incubators are not strict enough in project evaluation. Russian researchers have already discussed this issue. They have mentioned that the key weakness in existing approaches to project evaluation is that the projects with a priori poor chances for commercialization success can become incubatees (Yashin & Kovrizhin, 2013; Dytynenko, Chudinov, & Rojko, 2013). In the course of time, the approaches to project selection applied by business incubators to applications have remained unchanged. As before, a business plan quality is a primary selection criterion. At the same time, requirements to the business plan are vague and general. Suggesting the ways for improvement of the project selection approach, researchers focus on changes to the selection procedure (Yashin & Kovrizhin, 2013; Tsukerman & Shestakov, 2001).

Financial indicators of the project success usually serve as primary criteria for selection of innovation projects. However, this approach ignores relevant aspects of enterprise activities, e.g. product development, innovativeness, strategy, establishment of long-term customer relations. Stefan and Elizarova (2018) also point

out that it makes sense to include qualitative indicators in the list of evaluation criteria. Their integrated evaluation model includes three criteria of public significance: share of costs for innovations, establishment of social programs for project implementation, need in new staff (Stefan & Elizarova, 2018).

A key challenge associated with project selection at facilities of the innovation infrastructure is the lack of reliable data, as business plans of applicants often and beyond measure include optimistic values (Wachira, Ngugi, & Otieno, 2017). Keeping this in mind, some researchers have proposed the hypothesis that the success of an innovation-based project not in the last place depends on entrepreneur's personality traits. For instance, Civarella *et al*. (2004) identified a positive correlation between entrepreneur's personal integrity and long-term project survival. Other personality traits had either negative correlations in terms of the project survival rate or made no significant influence on it at all.

Later researchers found that business incubators tend to paying more attention to personalities of entrepreneurs in addition to the projects themselves. Having analyzed the approaches to project selection criteria applied by 16 Sweden-based business incubators, Bergek and Norrman (2008) identified two approaches to the evaluation procedure of applications: project idea-focused selection approach and entrepreneur-focused approach. Undoubtedly, an advantage of mentioned approaches to application selection is that they make it possible to identify both quantitative and qualitative characteristics of a project and take into account an existing level of uncertainty in terms of the project commercial success (Grekul, Isaev, Korovkina, & Lisenkova, 2019).

Now the application of the multi-factor evaluation to startup selection for business incubator residency is limited as there is no ready-made toolkit that would make it possible to have an integrated and automated evaluation of promising projects with measured indicators (Wulung, Takahashi, & Morikawa, 2014). Stakeholders have already tried to develop the toolkit. For instance, Wulung, Takahahi and Morikawa (2014) offered the multi-objective selection model for evaluation of innovation project. The model combines evaluation of technical strengths of a project and individual personality traits of an applicant (entrepreneur).

Nevertheless, the overview of cases has shown that for project evaluation there are mainly models in use that lie on formal criteria, primarily, financial indicators. At the same time, at the initial stage, the startup owner's personality is of the primary importance. That is why making a longer list of selection criteria for innovation projects is crucial in terms of improvements as applied to the project selection procedure at business incubators and other facilities of the innovation infrastructure.

3. Material and Methods

The existing framework of evaluation criteria and ratings used for selection of innovation-based projects at business incubators and other facilities of the innovation infrastructure requires qualitatively new approaches. In this paper, we will present the method, which we developed as a scoring tool for startup evaluation, called the Management of Developing Projects (MDP).

The MDP method is a framework of qualitative and quantitative indicators considering personality types (psychotypes) of main economic entities. The method developed aims at better evaluation, development and support to business of those who participate in the innovation infrastructure. We believe that the MDP method is set to become a cross-functional tool that facilitate the successful growth of investment and innovation-based projects. The multi-criteria MDP method will make it possible to evaluate projects with due consideration to particular goals of innovation infrastructure facilities. It will also be a flexible tool for an analysis of startup capacity (in terms of acceptable risk policy). The MDP method is an important component in the methodology of developing project management and serves for initial evaluation of business incubatees and other facilities of the innovation infrastructure, as well as their further monitoring (see Fig. 1 below).
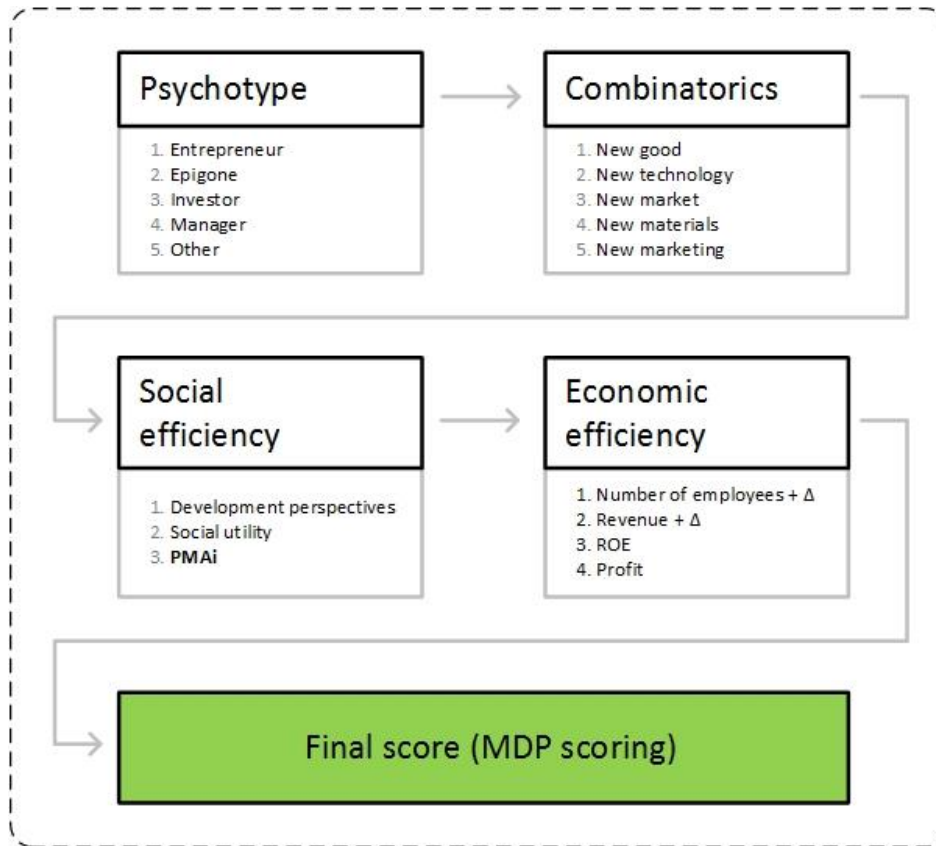
Fig. 1. The MDP method for innovation project evaluation

Economic Efficiency section includes quantitative evaluation components. Sections *Social Efficiency*, *Psychotype* (Personality Type) and *Combinatorics* include qualitative components of the evaluation. See more details on these components below.

3.1. Psychotype. Definition

Particular business entities are not equally significant for facilities in the innovation infrastructure. Therefore, it makes sense to classify main economic entities as market participants in accordance with their goal-setting specifics. For the purposes of the current research, it would be the most appropriate to distinguish between main personality types (psychotypes) of business actors (Litau, 2019).

Innovating entrepreneur. The person with a corresponding talent and capability that differ from the capabilities typical in logics, linguistics, and for other types of genius. Innovating entrepreneurs are committed to their ideas as they make their dreams true. As far as they get closer to the implementation, their dreams turn into objectives.

Manager. The qualified manager with measurable performance. As a rule, managers apply the systematic approach. They would rather avoid deciding in terms of total uncertainty and tend to adhere to the hierarchy of corporate values. The career advancement is their ultimate goal.

Investor. This type differs from *Entrepreneur* and *Manager* by fundamentally different goals, as profitability is his/her main interest. He/she is neither interested in a project idea, nor project implementation in terms or management. An investor's goal is to make maximum return on investment.

Epigone. Epigonism means an inclination to copying of someone else's ideas and following general trends. *Epigones* take an intermediary position between personality types of *Manager* and *Entrepreneur*. They are ready to take some risk and interested in idea implementation. They also want to be directly involved in project management. Epigones do not destroy established stereotypes, they prefer mainstreaming and benefit from proven investment opportunities only.

We used the idealization technique as a scientific method of inquiry, i. e. exaggeration of those traits that refer to the manifestation of basic specific properties of personality types, in order to identify their distinctive features in the clear and convincing way. Identification of qualitative characteristics of each of the presented personality types will make it possible to specify the creative component, so important for today's economy (classification of main economic entities creates wide opportunities for the development of tailored educational programs to train professionals, which is an urgent need in the current system of education. In spite of the high demand for entrepreneurship, in management training there is no due consideration given to personal inclinations to specific types of management. The lack of the differentiated approach to education and support inevitably leads to a poor quality of innovation-based entrepreneurial projects).

3.2. Combinatorics

The criteria covered in the *Combinatorics* section of the scoring tool make it possible to rank projects by innovation type in compliance with the PMAi model (Progressive Materialization of Anti-idea) and evaluate the novelty of a project idea.

The PMAi model serves as a basis for understanding of an innovation project relevance. This can be in use for further development of a set of criteria to evaluate a scale and utility in terms of prospective implementation of entrepreneurial creativity.

3.3. Economic efficiency

The MDP method assumes the following economic efficiency criteria:
Relative dynamics of staff number. The growing staff number is one of the main project indicators of a company's growth (Litau, 2013). Absolute values will be less indicative as they are sector-specific.

Relative dynamics of revenue. At the stage of project development, the revenue is the most appropriate criterion of the project progress compared to the profit for a number of reasons. Modern projects follow another development path as compared to a traditional one. The profit is no longer obligatory for project success. Startups grows at the cost of a value increase of equity instruments without any commercial justification in terms of the profit and classical financial analysis. The incremental loss is no longer an exclusively negative factor, as it is typical for the initial stage in the project development. In view of the above mentioned, ROE and ROI have the least weight as they directly correlate with the profit, and no profit does not mean no commercial potential of a project.

3.4. Social efficiency

Efficiency is ranked by social benefit. An existing good is destroyed as far as a new idea is implemented. This launches the economic development process. Therefore, we assume that the new good bears the benefit.

Ranking by scores goes from the evaluation of a project impact's scale on the market (above all, by distribution of the new product or service, i.e. sales level). We follow the Likert scale with 1-7 scale points as the best tool (Preston & Coleman, 2000).

3.5. Piloting of the MDP method

We piloted the MDP method in January-February 2020 using project applications submitted to business incubators in Saint Petersburg (Russia). In compliance with objectives of our research, we limited ourselves to those facilities of the innovation infrastructure that select residents by competitions. We collected primary data from 12 in-depth interviews and the questionnaire-based survey. An aim of interviewing was to identify the relevant managerial skills that are typical for each of the described psychological types and that influence their business practices.

Heads of business incubators gave us lists of the projects proposed by applicants and incubatees, on which we piloted the scoring tool.

We selected the projects using the following criteria as applied to responding initiators of projects:
1. Age: 21-40. At this age, inclination to entrepreneurship should manifest itself. At the same time, people of this age are still flexible.
2. Gender was irrelevant for the research.
3. Prior business experience of at least 3 years. We assume that for three years of business experience a person developed main thinking patterns typical for implementation of the economic activity and that are subject to observation.

The first piloting stage included preliminary tests of the questionnaire in order to: 1) identify concepts and fixed phrases with meanings ambiguously perceived by respondents, 2) evaluate respondents' perceptions in terms of to what extent concepts and questions differ from those definitions that serve as a theoretical basis of the research, 3) identify the questions that do not mirror the research objectives or significantly deviate from them, 4) identify the questions that are the best for measurements of respondents' attitudes and behavior patterns, 5) group respondents' answers by question wording.

Cognitive interviews took place with participants (incubatees) of a business incubator. Respondents varied by age, education level, prior business experience, and duration of their participation in a program of their business incubator. Based on results of interviewing, we revised wordings of several questions in the questionnaire and prepared the questionnaire for the next stage of piloting.

For the second piloting stage of the MDP method, we used the list of projects provided by business incubators *Politekh* and *Ingria*, and selected 17 projects for another survey round using the revised questionnaire. We processed the collected data and got integrated scores per project.

4. Results and Discussion

First Russia-based technological parks appeared in early 1990-ies. The year of 2006 was a start of a rapid growth in numbers of technological parks and business incubators, as well as other facilities of the innovation infrastructure. Since 2012, we have observed certain stagnation, "technological park development was inconsistent and episodic, with points of the strong growth followed by decline (Fourth annual overview …2018).
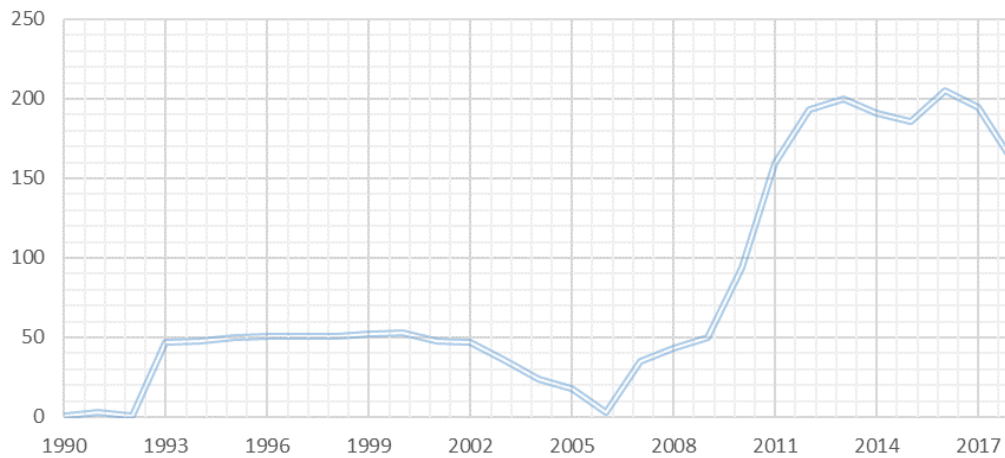
Fig. 2. Incorporation dynamics of Russia-based technological parks in 1990-2018

Source: Technological parks of Russia-2018.' Fourth annual overview

The clear decline in activities of innovation infrastructure facilities (Fig. 2) inevitably resulted in serious narrowing of the sample. However, having talked to heads of innovation infrastructure facilities, we concluded that the observed decline was due to principles in functioning of these facilities, rather than the overall economic situation. In some cases, (for example, ITMO University business incubator), respondents mentioned that a university was fundamentally not a proper place for establishment of business entities. In other cases, respondents referred to administrative constraints as a reason for poor performance of business incubators. For instance, government funding (which prevail in the innovation infrastructure) of innovation-based startups had been paralyzed as these are the projects with high commercialization uncertainty. Thus, there is a need in a new focus on the work system of the facilities that support and develop startups.

According to Expert Online, the innovation infrastructure of Saint Petersburg consists of various types of facilities: business incubator, technological park, science city, "Special Economic Zones" managing company, nanotechnology-based center, resource sharing center, engineering center, prototyping and technology transfer center, and innovation and technology center. Thus, the innovation infrastructure of Saint Petersburg and the Leningradskaya Oblast includes 34 facilities that include 9 technological parks (7 in Saint Petersburg and 2 in the Leningradskaya Oblast).

In 2016, three business incubators from Saint Petersburg were on the list of top innovation-based programs under three categories: university-based business incubators (the ITMO University business incubator), the business incubators with university affiliation (Ingria business incubator), and university-based accelerators (iDealMachine, ITMO University).

So far, iDealMachine accelerator has stopped operations.
Ingria business incubator provides startups with development support. It was established in 2008. Evaluating and inspecting of business ideas and projects is a core component in its activities.
Politekh center for development of technology projects and entrepreneurship was launched in 2011 to support techpreneurs to turn their innovation ideas in functioning production facilities.

Having applied the MDP scoring method, we found that the numbers of promising projects (as defined by the MDP method, on the one hand, and *Politekh* and *Ingria* business incubators, on the other hand) were substantially different.

The application of the MDP method shown that out of 17 evaluated projects only 9 are promising, whereas business incubators thought that 14 projects meet the eligibility criteria for business incubator residence. Besides, 9 selected startups included 3 projects that do not meet the incubator eligibility criteria, but that are promisingly successful in terms of the MDP. Finally, in spite of a significant decrease in numbers of promising projects as calculated by the MDP method, we identified that 3 promising projects had not been selected by quantitative criteria but had been the most interesting in terms of qualitative criteria.

The questionnaire-based survey showed that 9 selected projects (47 percent) were launched by *Epigones* with the entrepreneurial component and are promisingly interesting in terms of further entrepreneurial education and training (Fig. 3). Project distribution by criteria from the *Combinatorics* section demonstrated that the prevailing number of projects (62 percent) involve the application of novel materials (Fig. 4).
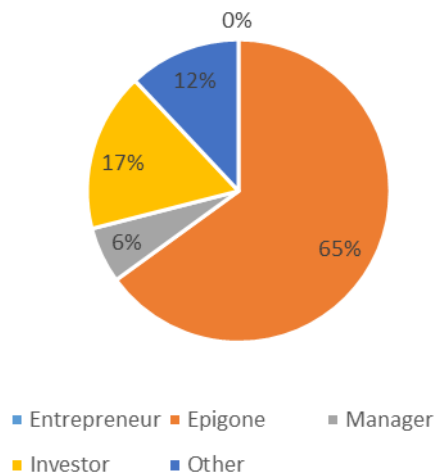
Fig. 3. Distribution of projects by initiator's psychotype   **Fig.4.** Distribution of projects by Combinatorics criteria
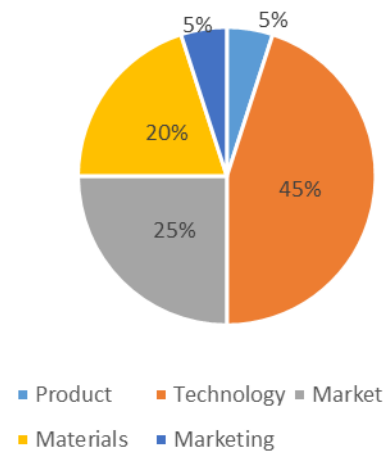
Fig. 5 shows that projects mostly have the trend line showing a link between cost-effectiveness and social benefit of projects. Only three projects out of 17 demonstrate significant economic indicators together with low scores for the social benefit and as low final score in Combinatorics section.
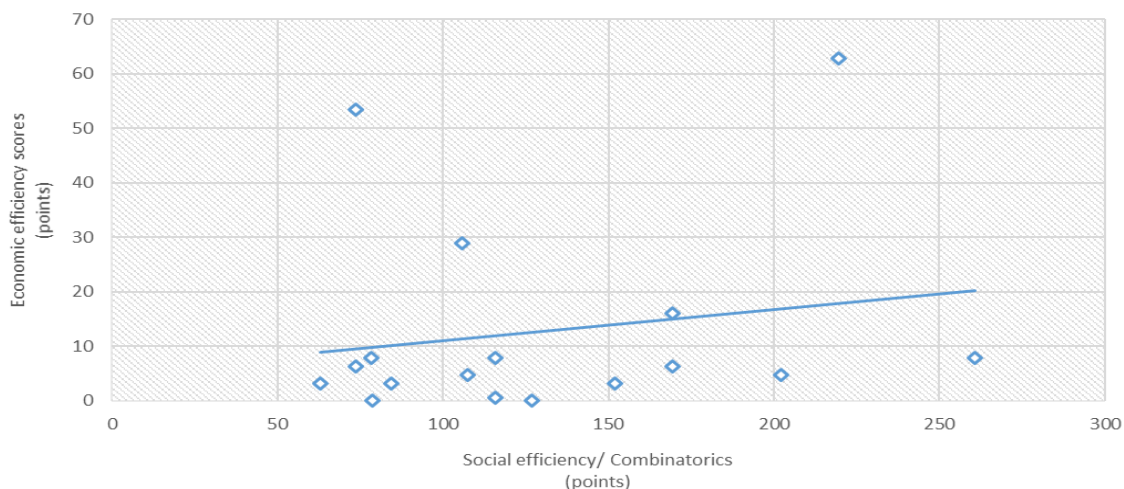
Fig. 5. Estimated distribution corridor of respondents

Final ranking of projects shows that projects No. 1, 7 and 10 have received highest MDP scores and are the most promising in terms of business development (Fig. 6).
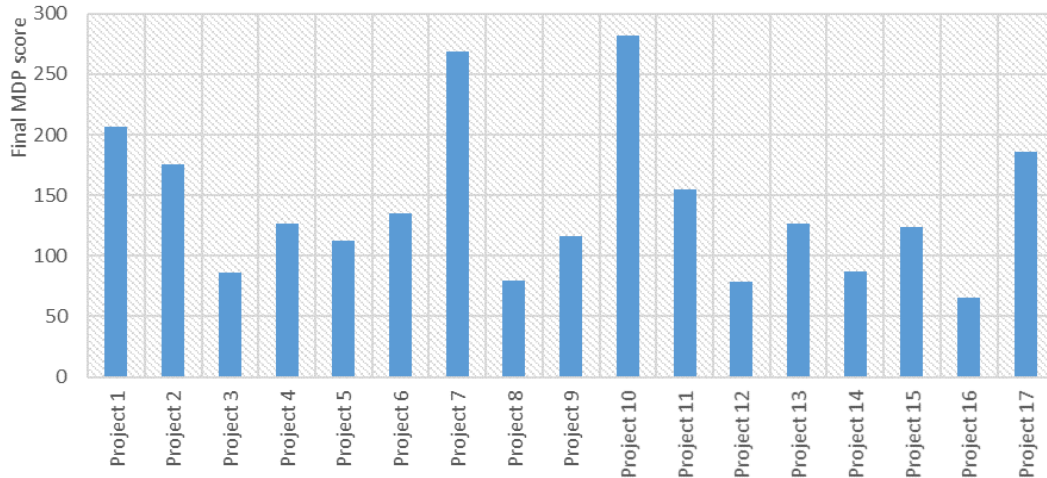
Fig. 6. Ranking of projects based on their final MDP scores

The model building principle, which is the basis of the MDP method, makes it possible to apply it to innovation infrastructure facilities with due consideration to their individual goals. For instance, the research showed that a number of entities including sector specific governmental agencies, in practice do not support projects with the innovative component due to their high investment risk. However, these projects are of greater interest in view of a particular group of investors. Moreover, initiators of projects from this group are the most promising in terms of development of their entrepreneurial skills in innovation-based project management. Consequently, exchange of such data between stakeholders can significantly increase their performance and create synergy between universities, private companies and governmental agencies that support the development of entrepreneurial initiatives.

Conclusions

The method we developed was successfully piloted at two prominent business incubators of St. Petersburg (Russia). Piloting of the MDP multi-criteria scoring method approbation clearly showed that the application of qualitative criteria essentially broadens opportunities of experts at business incubators when they decide on projects using the available information. Moreover, the MDP method makes it possible to evaluate projects considering individual goals of business incubators, i.e. go beyond the economic parameters (which are often not satisfactory but normal for project specifics) and take into account the personality types of their initiators as they play a key role in the future success of projects. This is to be necessarily considered in the approach to startup selection.

The important outcome from the MDP method application is that in further monitoring of the most successful projects, it will be possible to specify managerial skills of startup initiators based on their psychological types, which consequently will make it possible to develop university-based educational programs that will meet the market demand.

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EMPOWERMENT, HRM PRACTICES AND ORGANIZATIONAL PERFORMANCE: A CASE STUDY OF JORDANIAN COMMERCIAL BANKS

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Abstract. This study aimed to identify the role of empowerment and Human Resource Management (HRM) practices on Organizational Performance (OP) amongst 13 Jordanian commercial banks. The research adopted a descriptive and analytical approach to highlight the concepts of the study, and analyzed and extracted the results through a random sample of 180 managers and vice-managers. To achieve the objectives of the study a questionnaire was developed to gather the optimum information from the study sample, and based on that, the data was collected, analyzed and tested and the hypotheses were selected by using the smart PLS. The response rate was 74 percent. The results indicated that of all independent variables assessed, empowerment and HRM practices, have positive and significant influence on OP.

Keywords: Empowerment; HRM practices; New Public Management; organizational performance; Jordanian banks

1. Introduction

The success of a business depends on the performance of the organization, which means its capacity to implement effectively strategies to realize the institution's goals (Randeree & Al Youha, 2009). Some variables represent OP, such as business model effectiveness and efficiency (Almatrooshi et al., 2016; Boyatzis & Ratti, 2009).

The performance of any company or organization is dependent upon the skill set of its leaders in implementing the corporate strategy. Silva (2014) argues that the key to successful management rests with the conditional relationship, which exists between managers and their followers. Given that there are always a range of obstacles to achieving organizational goals and continuously improving performance, it is essential that the techniques and approaches adopted by management are flexible enough to accommodate and respond to change. In addition, organizational performance depends on employees, who are a work team to achieve organizational goals. The concepts of leadership and management are often put in the context of virtual teams. These teams are created to

overcome geographical and logistical barriers to achieve defined goals, and research has emphasized the importance of effective management in enabling these types of team to succeed. The cognitive competence of teams and managers is also thought to be important for improved OP (Mukherjee et al., 2012).

Organizational competence is related to managers with cognitive, social, and emotional intelligence (EI). Social intelligence can be defined as a leader's ability to focus on innovation and motivate team members. These are often referred to as management directives and are highly dependent on delegation, where managers understand how to delegate management to team members and empower them to test out new ideas. Cognitive competencies highlight creative and critical abilities that help improve decisions, solve problems, and learning (Sun & Hui, 2012). A manager who develops the vision and strategy to achieve that vision must effectively communicate these elements to the employee. The methods implemented by leaders include consultation, influence, problem solving, training, and motivation (Almatrooshi et al., 2016; Tomal & Jones, 2015; Ryan et al., 2012).

The variables identified in this study include empowerment (structural and psychological approaches) and HRM practices (training and development, performance appraisal and compensation) and their direct impact on OP. All these elements are combined to facilitate the sustainability and success of a given organization and to support relationship building with others in the organization (Miyake & Friedman, 2012).

A range of competencies combine to contribute towards the ability of managers to create dynamic organizations. In order to be successful in OP, managers must blend all competencies to influence and drive employee performance. Establishing a positive relationship between management and employees impacts on performance which subsequently contributes to the effectiveness of an organization (Yahyazadeh-Jeloudar & Lotfi-Goodarzi, 2012; Babcock-Roberson & Strickland, 2010).

2. Literature review

New public management (NPM) has emphasized the relevance of human empowerment to organizations as it promotes the development of more decentralized organizations. This decentralization has led to changes in how organizations manage their workforce by increasing the importance of human factors in delivering OP, and by focusing on employee empowerment as a mechanism to improve OP (García-Juan et al., 2019; Nicholson-Crotty et al., 2017; Stanton & Manning, 2013; Hansen & Høst, 2012; Bernardi, 2019; Girdzijauskaite et. al., 2019).

Although numerous studies have reported positive impacts from practices that promote employee empowerment on OP; this concept remains elusive. From a structural perspective, empowerment can be understood as a set of practices and structures that enable power and authority to be transferred from the higher levels of the organization to the lower levels, thereby increasing access to information and resources; this is referred to as a "macro" approach to empowerment. From a psychological perspective, however, empowerment is viewed as a psychological state – and employee's attitude in response to managerial practices. This perspective therefore considers empowerment at the individual worker level and is referred to as a "micro" approach to empowerment (García-Juan et al., 2019; Maynard et al., 2012; Dewettinck & Van Ameijde, 2011).

Although there is an increasing body of research on organizational empowerment and performance, which frequently indicates positive relationships, several studies have focused on the indirect impacts of job-related attitudes (Fernandez & Moldogaziev, 2013). In line with this, Boxall et al. (2011) argue that although the range of general HRM practices, including empowerment, has attracted much research attention, more investigation is required to further understanding of HRM practices and their relationship with OP. Furthermore, it could be argued that it is important to explore sub-dimensions of HRM practices, such as empowerment, since such dimensions can be associated with differing employee and organizational outcomes (Aryee et al., 2012; Van De Voorde et al., 2012; Jiang et al., 2012). Therefore, through examining employee empowerment specifically, its

impact can be measured more accurately (Van De Voorde et al., 2016). Within the empowerment field, many scholars advocate the integration of the structural and psychological approaches to gain a more in-depth understanding of the empowerment process (García-Juan et al., 2019; Boxall, 2014; Fernandez & Moldogaziev, 2013; Maynard et al., 2012).

Organizational performance depends on employee behavior and these behaviors can be a source of sustained competitive advantage. HRM practices influence OP through its impact on employee development and behavior (Alkhazali et al., 2017; Katou & Budhwar 2015; Almazari, 2014; Nigam et al., 2011). These practices influence which type of employees are selected, what skills and motivation these employees have, and the opportunities and incentives that these employees need to create new and improved ways of doing their jobs. This set of HRM practices (training and development, compensation, performance appraisal) which promote skill development, employee motivation and discretionary effort is often referred to as high-involvement HRM practices (Moideenkutty et al., 2012). Current research in the field of OP and HRM has gone beyond testing for the relationship between the two, to instead focusing on the mechanisms by which HRM practices influence OP (Moideenkutty et al., 2012; Collins & Smith, 2006). However, some commentators have questioned the methodological rigor of these studies (Alkhazali & Mohd, 2015; Katou & Budhwar 2015; Moideenkutty et al., 2012), and suggest that it is premature to assume an unequivocal positive relationship between HRM practices and OP, and supports the view that further research is needed using more rigorous research designs and approaches

Alkhazali et al., (2019) has proposed two different HR practices frameworks for acceptable OP. This is a development framework and an internal acquisition framework. These frameworks are in line with traditional HRM and HRM involvement or HR system commitment and control. The development framework emphasises the development of current employees to meet the skill requirements of the organisation. The acquisition framework focuses on buying in the skills needed from the external labor market. While internal development is linked to organizational human resource stability and commitment, there are significant costs associated with this. Revenue frameworks have lower cost advantages and offer more flexibility. From a contingency perspective, if contexts support acquisition strategies, then traditional human resource management practices may not have more impact than high-involvement human resource management practices with regard to their impact on OP.

Almazari (2014) and Nigam et al., (2011) propose that three different perspectives are associated with the high involvement approach to HRM. One is a universal perspective, which suggests that some HRM practices are always better than others and that these practices will have a positive relationship with OP. This perspective also suggests there is an "internal fit" between practices, which deliver more synergistic effects which are greater than the sum of each individual part. The second approach is a contingency perspective, which suggests that effective HRM practices must be aligned with other aspects of the organization. Finally, the third is the configuration perspective, which suggests that effective HRM practices comprise of internally consistent and congruent patterns of practice which are in line with the performance of other organizational characteristics. Nigam et al., (2011) have argued that these perspectives are not necessarily in conflict with each other and may simply just operate at different levels. As a study of HRM practices and OP in an Arab Gulf country, this paper adopts the universalistic perspective. It is acknowledged that while universal practices can add value to an organization, additional benefits can be gained by ensuring that these practices are internally consistent and externally congruent. From the universalistic perspective it is reasonable to anticipate that high-involvement HRM practices will be positively correlated with both subjective and quantitative measures of OP.

3. Research methodology

Based on an extensive review of the current literature, the study identified two independent variables (IVs); empowerment perspectives (EMP) and high involvement HRM practices (HRMP). The dependent

variable (DV) of the study is organizational performance (OP). Figure 1 below illustrates the schematic framework for this study and the proposed relationships, which exist amongst the variables:
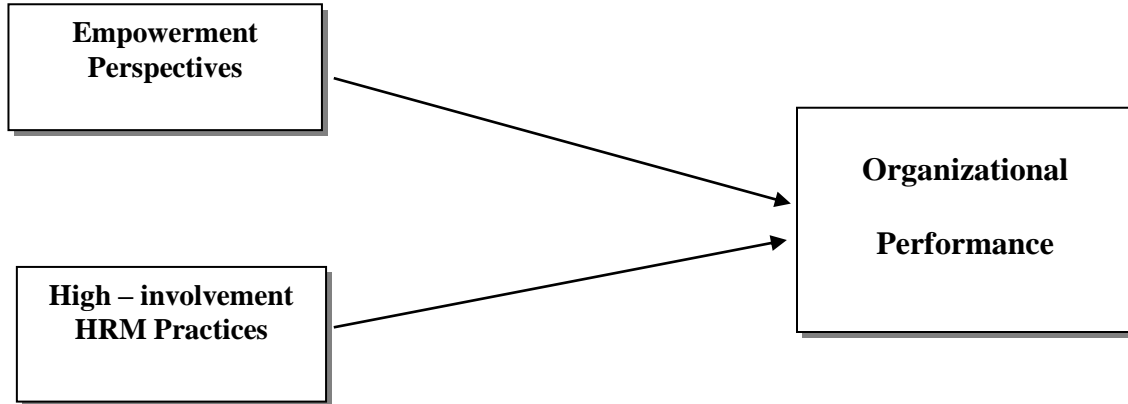
Figure 1. The Theoretical Framework of the Research

Research hypotheses
Based on the theoretical framework of the research, two main hypotheses were developed in order to reflect the relationships outlined in the framework which could be enhanced by testing alternative models. These alternative models are often referred to in the current literature as "relationships" which exist between empowerment, HRM practices and OP, as shown in Figure 2.
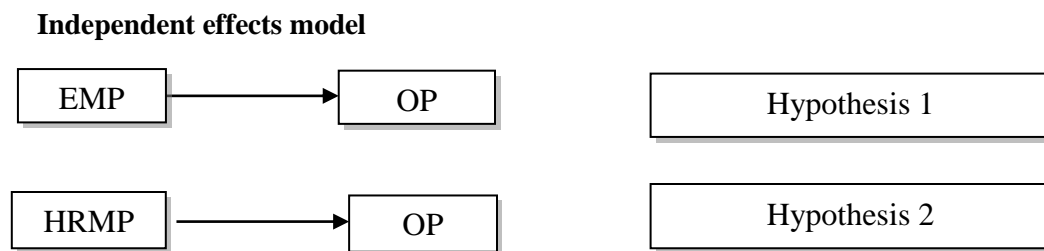
Figure 2. Model of Empowerment, HRM Practices and OP

H1:   There is a positive relationship between empowerment (structural and psychological approaches) and OP.
H2:   There is a positive relationship between HRM practices (training and development, compensation, performance appraisal) and OP.

This study used a survey research tool as its quantitative approach; which is recognised as a suitable data gathering instrument. Notably, each of the variables to be investigated in this study were continuous variables. These were empowerment (structural and psychological approaches), HRM practices (training and development, compensation and performance appraisal) and OP (Zikmund, Babin, Carr, & Griffin, 2010).

This methodology was justified because this study was interested in gathering the opinions and experiences of employees of the Jordanian commercial banks. It was assumed that the information gathered would be best derived from the individuals' reflections of the work place reality and its variation.

The population was all managers and vice-managers working in Jordanian commercial banks. The total number of employees from the Jordanian commercial banks was 22,886 at the time of the study. There were 255 managers and vice-managers, which was the population size for this study. Sampling was the technique used to determine the sample size and the subsequent administration of the survey methodology (Zikmund, et al., 2010). In this study, a proportionate random sampling method was (Pallant, 2011) so as to effectively cover all the 13 Jordanian commercial banks. This sampling method also improved the representativeness of the sample by reducing sampling error. Additional analyses provided an opportunity for data screening and cleansing and control for non-response data, and some other forms of data collection error (Krejcie & Morgan, 1970).

Moreover, the results that are derived from a large sample could be generalized to the whole population (Hair Jr, 2006). Sweidan mentioned that determining the appropriate sample size is an important element for a successful study because small samples may lead to inaccurate results and large samples may waste time, money, and resources (Sweidan, Al-Dmour, Al-Zu'bi, & Al-Dmour, 2012). Based on this evidence, this study aimed for 180 returns. Therefore, 255 questionnaires were distributed to managers and vice-managers working in Jordanian commercial banks, so that at least 180 responses could be achieved.

For this study, items addressing questions relating to empowerment (structural and psychological approaches), HRM practices (training and development, compensation, performance appraisal) and OP were integrated into parts of the questionnaire. The development of the survey instrument was guided by relevant literature, and the adaptation of related past items, where appropriate.

A standard 5-point Likert response rating scale was used to measure the dependent, independent, and moderating variables. The 5-point Likert scale is generally considered to be consistent with the original design of Liken (1932) and it has been argued that it measures more accurately than the 7-point scale which is popularly used in social science research (Dawes, 2008). Also, it was considered that this method would avoid the ambiguity frequently associated with the 7-point scale, which is usually consolidated in some studies before accuracy is achieved. The scale rating used was therefore as follows: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree.

Coefficient of determination (R^2)

Alongside the assessment of significance and relevance, another commonly used measure to evaluate the relationships in the PLS-SEM model is the coefficient of determination of the level of R-square (Hair et al., 2014, 2010; Henseler et al., 2009). R^2 is a measure of the predictive accuracy of a model, and is calculated as the squared correlation between the construct's actual and predicted value (Hair et al., 2014). The R^2 value is representative of the combined effects of the exogenous latent variables on the latent endogenous variable (Hair et al., 2010; Hair et al., 2006; Hair et al., 2014). This is illustrated in Table 1 below:

Table 1. Coefficient of Determination (R-Square)

Endogenous Variable	Coefficient of Determination (R-Square)
OP	0.69

Although it is difficult to identify a threshold for what could be considered an acceptable level of R^2 value as it heavily dependent on a model's complexity and the area of research, commentators have offered indicative values (Hair et al., 2014). For example, Chin (1998) proposed that the R^2 values of 0.67, 0.33, and 0.19, should be considered as substantial, moderate, and weak respectively in the PLS-SEM modeling.

As shown in Table 1 the exogenous latent constructs of this study (i.e., empowerment and HRM practices) explain a 0.69 percent variance in OP. Following Chin's (1998) recommendation, the R^2 value explained by the exogenous constructs on the endogenous construct in their direct relationships is equated to a substantial effect. It indicates that OP is 0.69 percent dependent on the eight predictors considered in this study.

Hypotheses testing for direct relationships
In order to test the hypotheses for any direct relationship, the first step was to run a PLS algorithm thereby enabling the researcher to generate path coefficients to examine the relationships between exogenous and endogenous constructs in this study. The second step involved 'bootstrapping' to calculate the t-value to test the significance of the relationship., Hair et al. (2013) propose that bootstrapping can be run with a 500 sub-sample while Hair et al. (2014) recommended 5,000. This study followed the recommendation of Hair et al. (2014) by using 5,000 as the sub-sample.

The results of the structural model are presented in Table 2 below. These results were interpreted using the coefficients (Beta) of the path relationship, the standard error, t-value (T Statistics) and P-value.

Table 2. Structural Model Output for Hypotheses Testing

Hypotheses	Hypothesized Relationships	Path Coefficient	Standard error	T statistics	P Value	Comments
H1	…	…	…	…	…	…
H1a	ESP -> OP	0.187	0.052	3.559	0.000	Accepted
H1b	EPP -> OP	0.195	0.050	3.584	0.000	Accepted
H2	…	…	…	…	…	…
H2a	TD -> OP	0.136	0.062	2.192	0.000	Accepted
H2b	PA -> OP	0.177	0.075	2.430	0.001	Accepted
H2c	COM -> OP	0.335	0.064	5.304	0.000	Accepted

4. Findings, discussion and conclusion

The relationship between empowerment and organizational performance
Empowerment as a variable was found to positively influence OP among managers and vice-managers in Jordanian commercial banks as proposed in hypothesis H1 (H1a and H1b). As predicted, the result supports the relationship as reported in Table 2, at the 0.001 level of significance, path coefficient is: (ESP is 0.187 and EPP is 0.195), T-statistics and P-value are: (ESP is t= 3.559 (P< 0.000) and EPP is t= 3.584 (P< 0.000)). This result indicates that empowerment amongst Jordanian commercial banks needs to be considered in any strategies to improve the level of OP. In summary, the tests suggest a statistically positive and significant relationship between empowerment and OP. This finding concurs with previous research studies which have also shown a positive relationship between empowerment and OP (García-Juan et al., 2019; Nicholson-Crotty et al., 2017; Maynard et al., 2012; Dewettinck & Van Ameijde, 2011).

The relationship between HRM practices and organizational performance
The study found that HRM practices positively influence OP from the perspective of managers and vice-managers in Jordanian commercial banks, as proposed in hypothesis H2 (H2a, H2b, and H2c). The result of this

relationship, as reported in Table 2, is at the 0.001 level of significance, with path coefficient (TD is 0.136, PA is 0.177 and COM is 0.335), T-statistics and P-value (TD is t= 2.192 (P< 0.000), PA is t= 2.430 (P< 0.001) and COM is t= 5.304 (P<0.000)). This result indicates that HRM practices are the most important determinant of OP. These results are in line with the findings of previous studies (Alkhazali et al., 2017; Katou & Budhwar 2015; Alkhazali & Mohd, 2015; Maruf & Raheem, 2014; Almazari, 2014; Nigam et al., 2011). This study demonstrates that it would be in the best interest of commercial sampled banks in particular, to apply a relationship management approach in the delivery of their services and workforce strategies in light of the employee performance challenges currently facing the sector. By using specific empowerment (structural and psychological perspectives) and HRM practices (training and development, compensation and performance appraisal), employees' participation at all levels of the banking sector may be able to be increased leading to an enhanced sense of belonging or recognition, which ultimately may contribute towards improved OP.

Apart from theoretical contributions, the findings of this study provide important managerial implications, particularly for the banking sector. In addition, the study identifies a number of areas for future research. In conclusion, this study provides a valuable theoretical and practical contribution to expand the body of knowledge in the field of OP, and can help the commercial banks in Jordan to increase employee performance. The study highlights the complexity of the management task and recommends that Jordan banks adopts empowerment based HRM practices. Resources can be provided by Universities, employees and banks, which require an interactive approach through which the parties can integrate these resources. Jordan stands to gain if the recommendations are implemented to become capable of attaining its vision in the future.

It is recommended that future studies consider: further enlarging the study population involving the whole banking sector, and take evidence from other industries, and over a longer period for data. The relationship between empowerment, HRM practices and OP can also be further explained, if future researchers conduct studies which include additional variables to cover other dimensions of empowerment in terms of banking perception and operations. Changing empowerment from an independent to moderating variable or even to a mediating variable may also change the results and relationships. Since commercial banks are still growing in Jordan, performance evaluation must be conducted from time to time in order to take any corrective actions, when needed.

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IMPACT OF INNOVATIVE ACTIVITY OF ORGANIZATIONS ON THE DEVELOMENT OF PHARMACEUTICAL INDUSTRY: A CASE STUDY

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Abstract. The article proposes a new methodological approach to the study and evaluation of external factors affecting innovation activity. External factors were estimated, a correlation model was built, and key factors affecting innovation activity and susceptibility to innovation of Russian companies were identified. A regression model reflecting the dependence of the level of innovation activity of Russian companies on changes in environmental factors in the dynamics from 2006 to 2016 was constructed. The study was conducted on the basis of statistical data on the development of the pharmaceutical industry as one of the high-tech industries of the Russian industry. The study confirmed and measured the relationship between the macro factors of development of the Russian pharmaceutical industry and the volume of its production. This study is an occasion to discuss and further study the development of sound recommendations to change or improve the state industrial policy. Directions of further researches are connected with a deeper study of the causes of interrelation of volume of output and macroeconomic factors, as well as with the assessment of the temporal distribution of the macroeconomic consequences of purposeful influence on the magnitude of the factors considered.

1. Introduction

Today in Russia there is a low innovative activity of enterprises and organizations. The diagram (fig. 1) shows the indicators of innovative activity of Russian companies in dynamics. Innovative activity of organizations is the share of organizations that carried out technological, organizational, marketing innovations in the reporting year, in the total number of organizations surveyed. Innovative activity in scientific works is determined by researchers

on the basis of unit R & d costs in relation to the volume of products sold and on the basis of the share of R & d costs in the revenue of companies (Smolina E.S. et al 2019, Brem A. 2016).
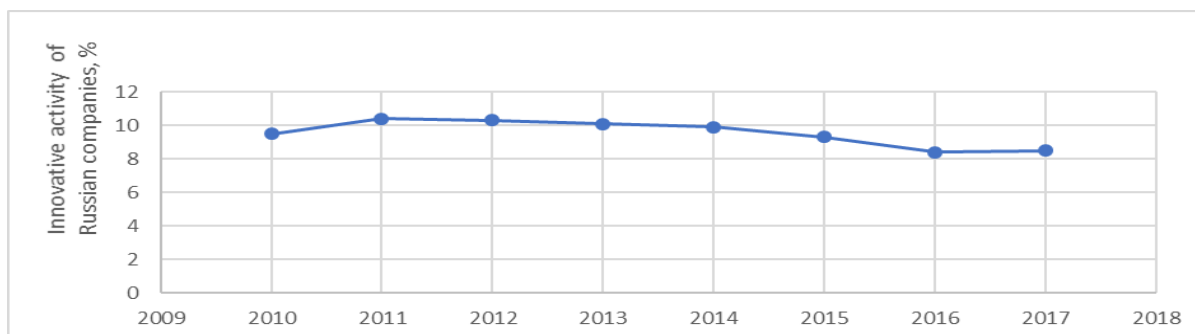
Fig.1. Innovative activity of Russian companies in dynamics from 2010 to 2017
Source: Russian Federal State Statistics Service

To increase innovation activity and susceptibility to innovation of Russian organizations, the authors of this study propose to assess the impact of external conditions, to determine the factors that have the greatest and least impact on innovative organizations. Using the data of the research "Global innovation index -2018", as well as the official data of the Federal state statistics service of the Russian Federation and the results of statistical surveys of innovation activities obtained by the research Institute "Higher school of Economics", the authors conducted their own study of the influence of external factors on the development of innovation in Russia. The study was conducted on the basis of statistical data of the pharmaceutical industry, which is one of the highly innovative sectors of the Russian economy.

It should be noted that this study has a number of limitations. Firstly, the collected data on external factors were obtained from various studies, the frequency of which varies, and some are completely single. Such a situation could create some distortion in the studied dependencies. Second, some of the measured variables, for example, the index of efficiency of activity of bodies of state power, corruption perception index, the index of political stability index of political rights, are subjective, and may not reflect the actual situation.

Today the Russian pharmaceutical industry is one of the high-tech industries of economy. The share of innovatively active pharmaceutical entities and organizations constitutes 31,3% (IFPMA 2017). The Russian pharmacotherapeutical market is one of the most dynamic and fast-growing markets in the world. The final sale price of pharmaceutical products increases annually. According to the forecasts shown in "The concept of long-term social and economic development of the Russian Federation for the period till 2020", the volume of the Russian pharmaceutical market by 2020 will reach 1,5 trillion rubles. However, today the pharmaceutical industry is characterized by a set of unresolved problems and draws more and more attention of experts and government officials. Production of the "branded" generics is common for the entities. Therefore, the final consumer overpays for trade names of the medicines often obsolete and having lost their clinical efficiency. Product portfolios of domestic pharmaceutical producers for the most part consist of low-profitable generics that does not allow producers to allocate more than 1-2% of the revenue for scientific researches and developments, wherein currently, domestic producers provide only 20% of necessary substances for pharmaceutical industry. Today the Russian pharmaceutical industry is unable to provide the Russian market with main nomenclature of modern medicines produced entirely on the Russian territory.

The world's largest pharmaceutical market by total sales for more than 20 years remains the United States Sales of medicines per capita in this country more than twice the average sales for the countries of the Organization for

economic cooperation and development (OECD, OECD) (Health at a Glance 2015). (Pharmaceutical spending 2016). In 2015, the per capita cost of the industry's products in the United States amounted to $ 1,162 (OECD average — $ 515) (Pharmaceutical spending 2016). Compared to other countries, the United States prescribes and sells much more medicines in terms of both the number of packages and per capita costs. Moreover, in the United States, the total cost of health care is far ahead of all other developed countries, what explains the large size of the US pharmaceutical market, and determines the opportunities, including innovative, companies from the United States (Niu, J. et al.2019).

The cost of pharmaceutical innovation has reached gigantic proportions — for example, the launch of one new drug on the market in 2014-15 was costing more than 1.3 billion us dollars (direct costs), and the amount of capitalized costs per drug reached 2.5 billion dollars (whereas in the mid-1990s it was about 360 million dollars, and in the 1970s — less than $ 200 million) (Ding M. et al. 2014), (DiMasi J. et al. 2003), (DiMasi J. et al. 2016). However, the direct costs of developing one drug are significantly lower and, according to various estimates, not more than half of the indicated cost (DiMasi J. et al. 2016). Since only one of the many drugs being developed and undergoing clinical trials is successful, the total cost of one drug that has become successful consists of the costs of all other studies. The most important place in pharmaceutical innovative developments is occupied by the US Share of the US in the total volume of world innovative developments for 2016 is 26.4%, and in the total volume of pharmaceutical (including biotechnology) — more than 43% (Global R&D Funding Forecast 2016).

2. Materials and methods

The external environment provides opportunities for any company to organize its successful activities, as well as the necessary resources to maintain the company's potential. The management of the enterprise needs to control the relationship with external factors, as the company is in close interaction with the external environment, both in the production process and in the process of implementation. There are four main characteristics of the external environment.

First, it is a difficulty. The complexity is due to the number of factors affecting the company. Complexity is an element that characterizes the number of environmental factors and the relationship between these factors. The external environment in terms of complexity can be classified as: homogeneous (simple environment) in which there is not a large number (3-4) similar elements of the external environment affecting the organization, and heterogeneous (complex environment), which contains a large number of heterogeneous elements of the external environment of the company, affecting the organization, and are in close interaction with the company.

A homogeneous environment is more predictable for the manager, which simplifies the process of development and management decision-making. The multiplicity and uniqueness of the factors influencing the activities of the organization is the number of significant objects, as well as their close connection with the activities of the organization. The difficulty lies in the fact that the company has to deal with a wide range of factors, the close connection with the activities of which is not always certain, but is of great importance.

Secondly, it is the interconnectedness. The content of the element of interconnectedness is that the impact of some factors has an impact on the changes of others, and there is a degree of these changes. Interconnectedness of factors is the basic characteristic that determines the relationship between the company's activities and the impact of the external environment. Dependence or independence shows the density of the relationship of the company's activities with the external environment. Isolation is also an indicator of the relationship between structures in the external environment. An isolated environment is peculiar by an unstable structure of communication with the subjects, or their absolute absence.

The company in its activities, as a rule, is always in interaction with customers, partners, suppliers, consumers, competitors. At the same time, any company in its activities strives for maximum independence.

Third, uncertainty. The essence of the uncertainty element is the degree of ownership of information about changes in the environment, as well as the degree of confidence in the reliability and accuracy of the information received. A situation in which the company does not have sufficient information on the status and trends of external factors increases the risk of unsatisfactory performance of the company as a whole.

Fourth, variability. By its nature, the element of variability is to determine the mobility of environmental factors. For the successful functioning of any company, the most important thing is the stability of relations with the external environment. In situations where there is a high level of complexity and mobility of the environment, then to solve these problems, management needs to rely on information obtained from different sources, as well as be able to change their own priorities. In some cases, to make successful decisions, it is important to be able to revise the formed system of values and culture of the company.

In the context of dynamic changes in environmental factors, it is necessary to carry out regular monitoring and analysis of new strategies and approaches. This knowledge will allow to make adequate and balanced decisions.
It should be marked that today there is no single established classification of factors affecting the innovation of staff. Today, there are several opinions about what factors have an impact on work motivation.

Several specialists classify factors only on the basis of classification on the basis of belonging to external and internal, direct and indirect. Factors with indirect effects are more complex than those with direct effects. For our research, indirect impact factors are of greater scientific interest.

Factors of indirect influence of the external environment are classified into five groups, while external factors experts include: political and legal (changes in the regulatory framework and the political situation in the country), economic (general state of the economy, the state of the labor market, capital, changes in working conditions), technological (changes in technological standards, the development of technologies in the field of production and business processes), social (social standards, ethnic norms, social values, social and psychological factors), international (international migration, etc.).

The impact of political factors on the innovation activities of the company and on the efficiency of the use of labor resources is manifested in the following: the definition of rules and norms of profit taxation, the establishment of tax benefits, the establishment of subsidized trade duties, requirements for the practice of hiring labor, control of tariffs, the establishment of wage rates, etc.

For companies operating internationally, political stability plays an important role. The indicators characterizing this type of factors include: government performance index, corruption perception index, political stability index, political rights index, number of Federal targeted programs to support innovation, infrastructure for innovation development (special economic zones). The political rights index applies to assess categories such as electoral process, political pluralism, government participation and functioning.

The presence of Federal targeted programs to support innovation characterizes the government's interest in the development of innovation, which in turn allows us to give an answer about the need and the possibility of investing in this area. Increasingly, this indicator (the presence of Federal targeted programs to support innovation) is important for assessing the development of education in R & D. Since the dynamics of this indicator allows us to estimate the potential demand for it.

The dynamics of the infrastructure indicator for the development of innovations also indicates the demand from the state and government for activities in the field of innovation, including in the pharmaceutical market.

The lack of funds in the pharmaceutical market inevitably affects all sectors, including the amount of spending on R & D and social support. In turn, all these factors, due to their close relationship with economic entities, have a negative impact on the development of these entities.

In our article, as a working hypothesis, we assume that if the interest of the state and public spending increases, then the innovative activity of the pharmaceutical market subjects will stabilize at a certain acceptable level, which will allow starting the innovative activity of the industry.
This hypothesis is confirmed by Fig. 1 and Fig. 2, as these figures show, with the growth of budget expenditures, innovation activity stabilizes at a certain acceptable level, this level can become a starting position, some potential for future growth of innovation activity.

In our paper we assume, that that external factors can have both positive and negative impact on innovation activity. The indicators that characterize these type of factors (economic factors) include: the global competitiveness index, investment in intellectual property, investment in fixed capital, R & D costs, the share of organizations that used global information networks from the total number of surveyed.

The global competitiveness index includes 12 components of competitiveness: infrastructure, macroeconomic stability, health care, primary education, higher education, vocational training, product market efficiency, labor market efficiency, financial market complexity, technological readiness, business complexity, innovation (The Global Competitiveness Report 2018)

Investment in intellectual property is one of the key factors of the investment market. For effective development modern production requires a developed market of intellectual goods, in other words, investment in intellectual capital.

Investments in intellectual property are called intellectual investments. Intellectual investments are made in the form of acquisition:
- Exclusive property rights through the purchase of patents, licenses, industrial designs, trademarks;
- Information services: one-time (consulting, expertise, recommendations, etc.) and permanent (use of knowledge and experience of scientists and practitioners from the contractual system of cooperation);
- Scientific and technical products (design and estimate documentation, programs, techniques, know-how) on various material media (printed materials, video), as well as the implementation of research activities.
Investments in the human factor, that is, the cost of education, training and retraining, training, health protection of employees at the expense of state enterprises are considered intellectual investments. The state carries out intellectual investments in order to increase the intellectual potential of society. Consumers of intellectual investment of the state are citizens. Private intellectual investments are made in the publication of scientific, reference books, research works, popular science and art works.

Investments in fixed capital are investments aimed at the acquisition, development or expansion of fixed assets, which are indispensable and one of the most expensive tools in the production of innovative products. The impact of this factor on the development of human resources is of great value, because the sphere of innovation cannot function without high-quality perfect equipment. The effectiveness of the staff of an innovative organization depends on the capital intensity, and the capital intensity on the volume of investments in fixed assets.
R & D expenditure is a comprehensive indicator of the total expenditure incurred on research and development work.

The degree of involvement of organizations in global information networks indirectly indicates the level of information development, the level of access to modern software and the possibility of obtaining relevant data in the field of scientific knowledge, in the field of factors affecting the innovative activity of the company. The indicator of expenditure on education at all levels, and especially its dynamics, shows the government's interest in improving the level of education and training of highly qualified personnel necessary for the development of innovation (Voloshin A. et al.2018, Kayl I.I. 2018, Bogoviz A. 2018, Bogoviz A. 2019, Bogoviz A. 2020, Chashchin V.V. 2013, Crespi G. 2018).
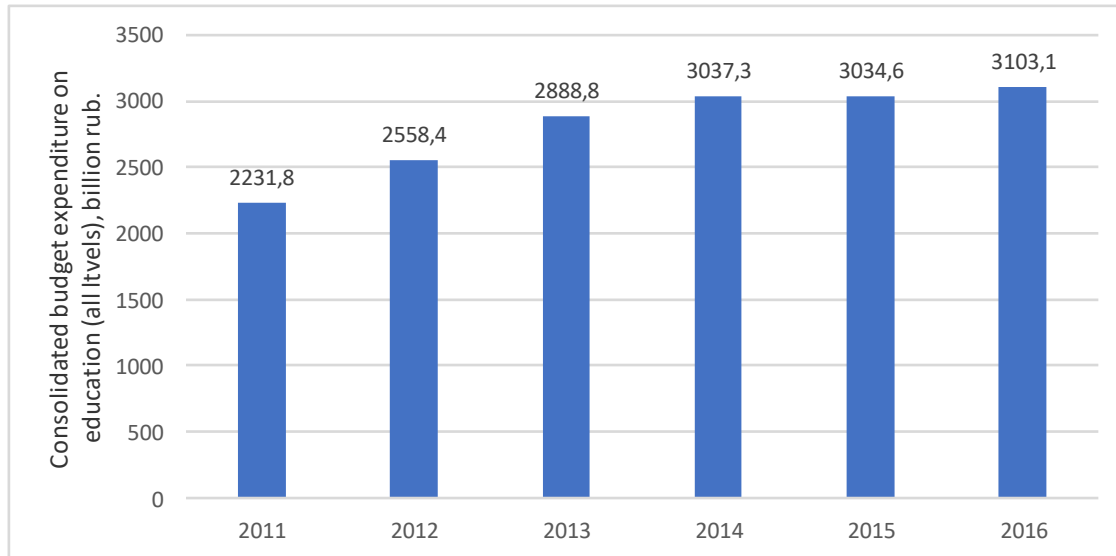
Fig.2. Expenditures of the consolidated budget of the Russian Federation for education (all levels)
Source: Russian Federal State Statistics Service

The indicator of public expenditure on education complements the previous indicator and shows the share of expenditure on education in the GDP structure and, accordingly, shows the trend of state policy in training and development of the economy as a whole.

Technological factors are also of great importance. It is important to take into account the interpretation of the term "technology", since its meaning is too broad, including processes of production activities, methods of production activities and techniques of production activities. The introduction of technological innovations has an impact on the efficiency of innovative production, as well as on the speed and methods of collecting and processing information.

Currently, the speed of technology change is very high. Among the main major innovations of the technological field, which have received mass distribution, we can distinguish computer technology, laser development, microwave technology, semiconductor technology, integrated communication lines, robotics, satellite communications, nuclear power, synthetic fuel, as well as food, genetic engineering, etc.

For the effective development of an innovative enterprise, it is necessary to provide a rapid response to the development of a new generation. The indicators characterizing this type of factors include: global innovation index, innovative activity of organizations, the share of organizations engaged in technological innovation in the total number of surveyed organizations, the share of organizations engaged in management innovation, the cost of

technological innovation, the number of patents granted for industrial designs, the number of shipped innovative products of its own production, developed advanced production technologies.

The index of innovative activity of the organizations is the characteristic of innovative activity in a complex containing information on susceptibility to innovations, degree of intensity of the realized actions directed on transformation of innovations, ability to providing the applied methods, rationality of technological process of innovations. Innovative activity demonstrates readiness to modernize the main components of the innovation system: knowledge, technological equipment, informatively and communication technologies. In addition, innovation activity shows susceptibility to innovation.

The share of organizations engaged in technological innovations in the total number of surveyed organizations shows the degree of development of innovative activity in the total volume of the business community. The indicator of the number of granted patents for industrial designs characterizes the development of the sphere of innovation and the level of availability and involvement of research personnel, as well as this indicator indirectly indicates the capital intensity of the innovation process. The indicator of the developed advanced production technologies allows to estimate efficiency of the organization of innovative production in a complex. And also is an indirect indicator that characterizes the efficiency of the use of labor resources in innovation.

Each organization operates in at least one cultural environment. As a result, the company is affected by various sociocultural factors, as well as customs, values and attitudes.

Socio-demographic factors have a special impact on the staff of innovative organizations. Such factors include: the level of employment, level of unemployment, the number of personnel involved in R & d, business units in organizations engaged in technological innovations, the release from postgraduate study with thesis, the level of economic activity of the population, the size of the minimum wage, the population with incomes below the subsistence minimum, morbidity of population occupational injuries, the duration of life of the population, distribution of total cash income and characteristics of differentiation of cash income of the population (including 20 percent of the population), population change (increase/decrease) for the year, the human development index, etc. (Atatsi E.A. 2016, Barney, J.B 1998).

The level of employment characterizes the activity of the population in the economic environment. Also, this indicator is an indicator of the level of economically active population in terms of age. In other words, in the study of environmental factors affecting the personnel of an innovative enterprise, this indicator can be estimate as an indicator of labor potential.

The unemployment rate indicates the level of economic development in the country, high unemployment is characterized by a slump. Accordingly, in this case, the volume of investment in innovation can also be abridged, which will subsequently affect the efficiency of innovation in General.

The number of personnel engaged in R & D indicates the involvement of staff in research activities. The study of this indicator was performed in the dynamics, as well as in relation to the indicators of production of R & D, indicators of R & d costs and education costs. The indicator of graduation from graduate school with thesis defense characterizes the dynamics of the personnel market required for the development of innovation. The size of the minimum wage characterizes the provision of the population with money, and, consequently, purchasing power.

The indicator of morbidity is important in the study of the labor potential of innovation.

Life expectancy is important not only to determine the work potential, but also to determine the need and appropriateness of investment in staff education.

Enterprises operating in the international market face a higher level of complexity. This fact is due to the unique factors that characterize each country individually: culture, economy, quality and quantity of labor resources, regulatory framework, political stability, level of education, level of technological development, etc.

The international factors influencing the labor resources of the innovative company include: international migration, participation of organizations in joint international innovation projects, the share of national presence in the international market of high-tech products (export of high-tech products from Russia) in % of the world volume of exports of high-tech products, technical achievements (rights to patents, R & D results, know-how, technology transfer agreements, purchase of innovative equipment) acquired abroad by Russian organizations, carrying out technological innovations, new Russian technologies (technical achievements), transferred to foreign organizations, the volume of exports of innovative goods and services, changes in the ruble to the dollar at the end of the year.

The factor of international migration characterizes the mobility of the population, enhancement or decrease due to migration. Undoubtedly, the inflow of highly qualified and educated people is positive for R & D purposes.

The index of participation of organizations in joint international innovation projects) shows the level of activity of enterprises in the field of R & D, and accordingly the level of training of domestic staff and their readiness to work in joint research projects.

The share of the national presence in the international market of high-tech products demonstrates the level of innovative development of the country's economy in general.

Technical achievements acquired abroad by Russian organizations engaged in technological innovation, shows the degree of interest of Russian organizations in the development of innovation and the use of experience of foreign partners.

The number of new Russian technologies (technical achievements) transferred to foreign organizations characterizes the success and efficiency of domestic R & D enterprises. It should be noted that the value of this indicator should exceed the value of the indicator demonstrating the acquisition of foreign technical achievements. In this case, it will be possible to talk about the effectiveness of the innovation process in the economy in general.

Changes in the ruble exchange rate to the dollar at the end of the year-this indicator in the crisis situation in the economy is one of the most relevant. Since in recent years, the ruble against world currencies has undergone significant changes. Currently, the currency still has an occasional character that has a strong influence on innovation activities of relevance to international contracts.

The analysis of external factors needs conduct on an ongoing basis, as it accumulates information that allows an assessment of the current situation. Analysis of the external environment is the process by which the developers of strategic innovation direction in the company keep under control external to the organization moments to qualify threats and opportunities.

The analysis of the external environment contains:
- economic impact study,
- study of the impact of legal regulation and management,

- study of political processes,
- study of the natural environment and resources,
- research of social and cultural component of society,
- research of scientific and technological development of society, infrastructure, etc.

Qualitative analysis of the external environment can help to obtain meaningful results. Eventually of timely carrying out of such analysis the organization receives:
- time to predict probabilities,
- time to draw up an intention in case of unexpected events,
- time to develop an early warning system for probable hazards,
- time to develop strategies that have all the chances to turn the former dangers into all sorts of profitable opportunities.

Research scheme:
 1. The external factors influencing the innovative activity of pharmaceutical organizations are determined.
 2. Selected parameters for evaluation of external factors on sotsialno demographic. economic. political, international. technological direction and the resulting indicator.
3. The key external factors are revealed with the help of correlation matrix.
4. The regression model is constructed on the indicators evaluating external factors. The model was checked for adequacy using Fisher's criterion.
5. A possible scenario affecting the innovative activity of organizations of the pharmaceutical industry of changing external factors has been developed.

3. Results and discussion

The objective of this research is identification of external environment factors influencing development of the entities of pharmaceutical industry for the evolvement of strategic directions for further development. Detection of the external factors influencing the development of the pharmaceutical entities is an important problem, as questions of import substitution under the conditions of trade and financial restrictions and high volatility of imported items in light of ruble exchange rate fluctuations require short-term prioritization of directions. Correlation and regression analysis has been applied to determine key macro factors influencing development of the entities in pharmaceutical industry under macroeconomic environment. Its task consisted in estimating the extent of influence of external environment factors to increase the production of major pharmaceutical groups. In the course of this research, the political, economic, social and demographic, technology, international factors influencing the development of pharmaceutical production were identified.

 On the whole, about 82 macro-factors have been counted.

The correlation analysis revealed the closest relationship of the resulting indicator (Production of medicines on the major pharmaceutical group) with three external factors (x1, x2, x3). presented in table 1. During the correlation analysis, a large number of external factors (82 factors) were used in the dynamics from 2006 to 2016. *(The following is an explanation: The greatest pair correlation between them and a resultant indicator criterion was defined for selection of macro-factors for further research).*

The indicator "Production of medicines on major pharmacotherapeutic groups" characterizing the size of the Russian pharmaceutical market has been chosen as resultants. During execution of analysis, some methodological assumptions significant for interpretation were considered. So, the correlation and regression analysis was carried out at the undisplaced level because of the short duration of temporary ranks and due to the need of empirical confirmation of a hypothesis of availability of interrelation between factors and a resultant indicator for further researches. The greatest pair correlation between them and a resultant indicator criterion was defined for selection

of macro-factors for further research. The constructed correlation model has revealed close connection of a resultant indicator with such factors as "Costs for technological, marketing and organizational innovations" (coefficient of correlation of r = 0,89), "An average monthly nominal accrued payroll on an industry" (r = 0,97), "Share of the pharmaceutical entities and organizations participating in joint (including foreign) projects on accomplishment of research and development " (r =-0,87). Statistical data for creation of the regression model shown in table 1 (Gorodnikova, N. et al. 2017), (Healthcare in Russia 2017).

Comments to the table are presented below the table 1.

Table 1. Statistical data for creation of regression model

S. No	Time period	Production of medicines on the major pharmacotherapeutic groups, billion rub (y)	Costs for technological, marketing and organization innovations, mln rub., (x1)	An average monthly nominal accrued payroll in an industry, thousand rub., (x2)	Share of pharmaceutical entities and organizations participating in joint (including foreign) projects on accomplishment of research and development, % (x3)
1	2006	57,86	870,90	10,23	17,80
2	2007	63,12	1024,20	13,80	17,60
3	2008	74,785	1084,6	17,02	17,70
4	2009	95,193	1228	18,651	17,50
5	2010	130,065	1784	21,563	16,00
6	2011	144,327	2381	25,62	10,60
7	2012	169,230	5025,5	30,436	10,60
8	2013	188,690	4345,7	35,046	12,80
9	2014	195,065	4640	39,087	12,60
10	2015	237,626	5312,3	42,348	8,5
11	2016	298,823	5411,6	46,609	8,2
12	Coefficient of correlation (R)		0,89	0,97	-0,87

Source: Russian Federal State Statistics Service

With the help of correlation analysis, we check the assumptions that external factors have a great influence on the development of the pharmaceutical industry in Russia.

As the next hypothesis, we assume that with the growth of average wages in the industry, which is usually associated with attracting highly qualified personnel, and with the growth of marketing, technological and organizational costs, which are mainly due to the introduction of new production technologies and management technologies, the production of medicines increases, therefore, the highly innovative pharmaceutical industry develops. Since the access of budget funds to joint and foreign pharmaceutical organizations is limited, with the growth of joint participation and participation in foreign projects, the production of medicines is reduced.

This hypothesis is confirmed by correlation analysis. the positive correlation of " Y " for " X1 " and " X2 " is generally natural and high – 0.97 and does not require additional comments. The causal relationship between the growth of pharmaceutical products in the case of an increase in the wage Fund and marketing, organizational and technological costs follows from experience, is noticeable empirically, and the high correlation coefficient demonstrates the significant role of this factor.

The negative relationship between production volumes and the share of producers participating in NIR (and the correlation coefficient is also high, -0.87, can be interpreted in several other ways:

- research and development costs contributed to the diversion of working capital through a production or marketing program;
- research and development costs have replaced the costs of innovation and productivity, which have a positive impact on production;
- patents as the results of joint research and development are registered abroad, where the corresponding production is carried out, without the introduction of appropriate production technologies in Russia.

To confirm our assumption about the positive influence of two factors x1, x2 and the negative influence of factor X3, a regression model was constructed. The analysis of environmental factors that affect the development of pharmaceutical production in the resulting regression model allowed us to identify trends in key factors and describe the real model in the form of a formula:

$$y = 55{,}0405 + 0{,}0097x2 + 6{,}6404x3 - 4{,}3029x3 \quad (1)$$

where:
x1 – expenses for technological, marketing and organizational innovations, mln rubles;
x2 – monthly average employees compensation within the organizations occupied in the production of pharmaceutical products, one thousand rubles;
x3 – share of the pharmaceutical organizations participating in joint (including foreign) projects on R&D, %.

As the scenario determines a strategy of the industry where external environment factors change, the realistic scenario is constructed in this research. Values of factors of the external environment according to the realistic scenario were predicted by means of extrapolation, proceeding from the assumption of consistency of the tendencies of a stage of a macroeconomic cycle designated below, and the purposes of the state industrial policy and objectives of the state industrial policy.

The approximation coefficient (R^2) became a criterion of the choice of the result. The factor for x1, x2, x3 trend lines is constructed by means of a polynomial method since it is having a higher value of the coefficient of approximation in comparison with a logarithmic and linear method (Fig. 3, Fig. 4, Fig. 5).
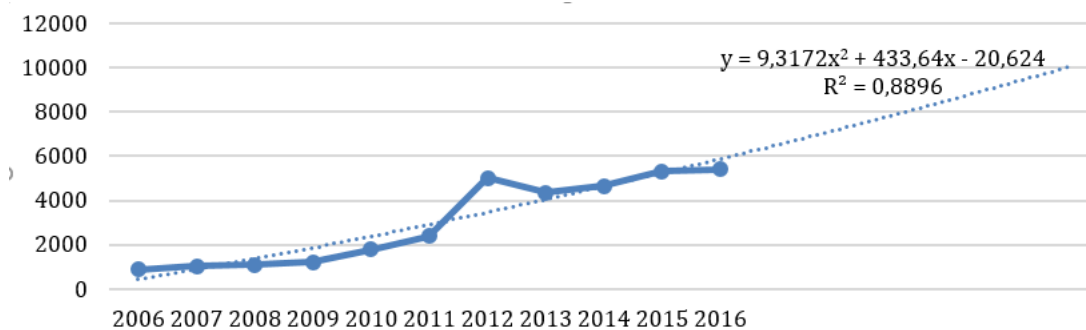
Fig. 3. Creation of a polynomial trend line for a factor of "Costs for technological, marketing and organizational innovations of the pharmaceutical entities and organizations (mln rubles)"
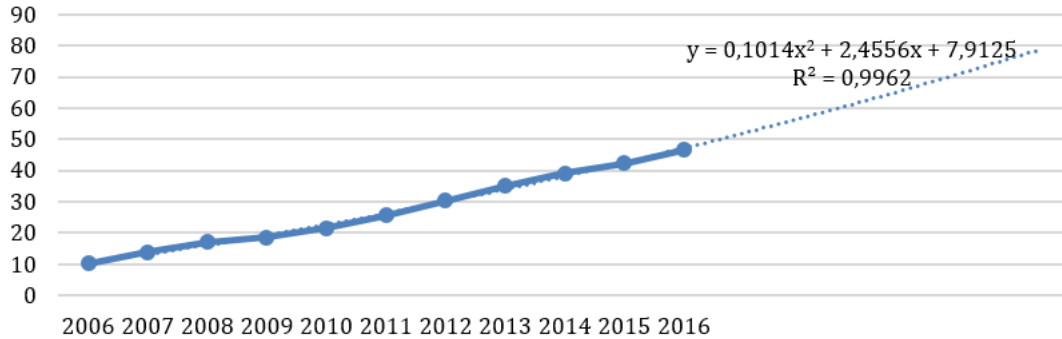
Fig. 4. Creation of a polynomial trend line for a factor "An average nominal wage of employees of the pharmaceutical organizations" (thousand rubles)
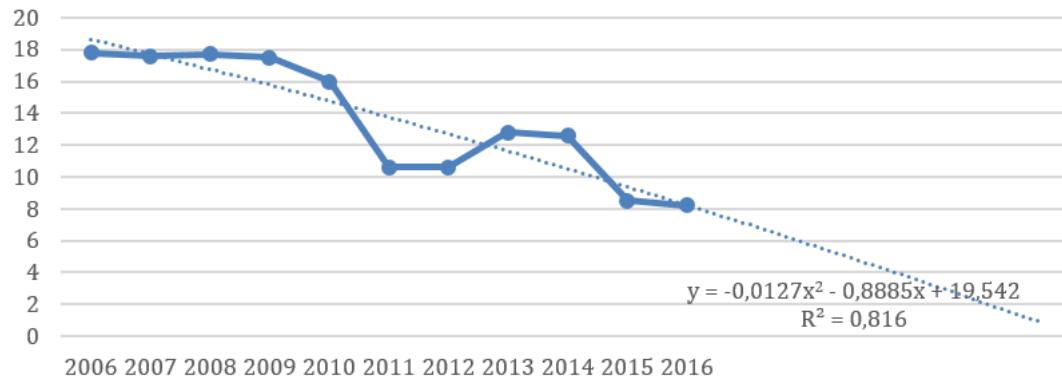
Fig. 5. Creation of a polynomial trend line for a factor "Specific weight of the pharmaceutical organizations participating in joint projects on accomplishment of research and development"(%)

The results of calculations of forecast values of strategic factors received by means of creations of trend lines are provided in Table 2 (Gorodnikova et.al 2017), (Healthcare in Russia 2017).

Table 2. The forecast of values of the strategic factors influencing production volume of medicines

S.No	Forecast	Costs for technological, marketing and organizational innovations, mln rub. (x1)	An average monthly nominal accrued payroll in an industry, thousand rub. (x2)	Share of pharmaceutical entities and organizations participating in joint (including foreign) projects on accomplishment of research and development, % (x3)
1	2019	7187,900	56,972	5,84
2	2020	7872,600	62,165	4,61
3	2021	8575,900	67,562	3,36
4	2022	9297,800	73,161	2,07

Source: Russian Federal State Statistics Service

Determination of the production of medicines in the major pharmacotherapeutic groups according to the realistic scenario was performed by the substitution of the received values of key factors in the real (regression) model (1). The obtained data are provided in Fig. 6.
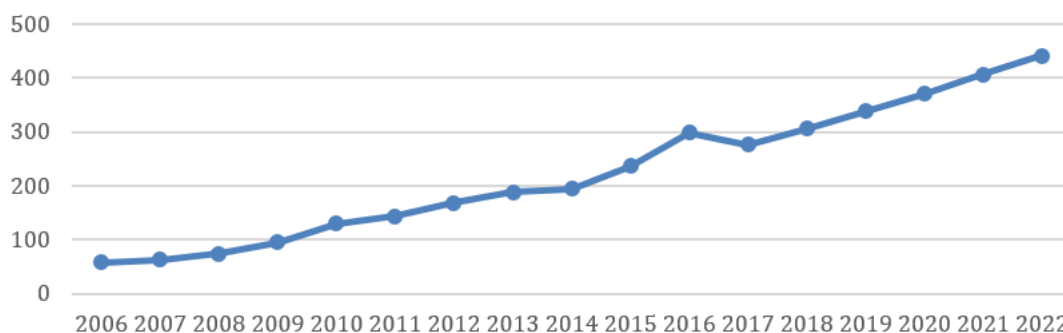
Fig. 6. The realistic production forecast of medicines at the major pharmacotherapeutic groups (billion rubles) taking into account the influence of the revealed actual strategic factors

According to the obtained results, it is possible to draw a conclusion that if the tendency of development of the considered indicators will continue, then by 2022, the production volume of medicines in the major pharmacotherapeutic groups increases to 441 billion rubles. In spite of this fact, data of the forecast of specific weight of the pharmaceutical organizations participating in joint projects on performance of a scientific research show negative dynamics.

If the tendency remains the same, then by 2022, the share of the organizations participating in joint R&D projects decreases to 2,07 %. One more revealed factor, which is positively influencing pharmaceutical production, is a compensation level of workers. In final calculations values, the growth of this indicator is observed. Costs for technological, marketing, organizational innovations also grow that demonstrates creation of conditions for innovative development of an industry.

Conclusions

The tools of an initial assessment of the external environment factors influencing the development of pharmaceutical production in Russia are tested. The actual external factors influencing the development of the pharmaceutical entities are revealed. The realistic production forecast by major pharmaceutical groups, considering the influence of the revealed actual strategic factors, is constructed.

The interrelation between macrofactors of the Russian pharmaceutical industry development and the amounts of its production are confirmed and measured in the research. This research is a reason for discussion and further studying of development of reasonable recommendations in order to change or refine the state industrial policy.
The directions of further researches are connected with deeper studying of causes of relationships between production volumes and macrofactors, as well as with the assessment of time distribution of macroeconomic consequences of purposeful impact on a size of the considered factors.

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THE IMPACT OF ACCESS TO ELECTRICITY ON EDUCATION AND HEALTH SECTORS IN NIGERIA'S RURAL COMMUNITIES[*]

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Abstract. This study examines the impact of access to electricity on health and education measured by increased number of hours to study and reduced indoor air pollution of rural communities in Nigeria. Primary data from twelve (12) rural communities that have benefited from rural electrification since 1997 in Oyo State, southwest, Nigeria was collected. Key empirical findings revealed that children study hour reduces with household access to grid electricity, it decreases by 8 percent. Expenditure on electricity significantly decreases children study hour by 12 percent. Electrification decreases the rate at which indoor air pollution reduces by 1.1 percent. Household electricity expenditure increases with reduction in indoor air pollution, it decreases the rate of air pollution by 1.6 percent. Better illumination due from access to modern electricity reduces indoor pollution by 1.2 percent. To enhance the electrification benefits, the adoption of the mini-grid option is inevitable, which requires government commitment for sustainability. The off-grid solution, which is usually renewable solution, with strong supporting legislation is equally required for rural electrification strategy. The efficiency of the existing electricity system entails the implementation of the gas master plan, which is crucial in paving way for increasing supply reliability, coverage, and then higher social benefits.

Keywords: education; health; electrification; Nigeria

JEL Classifications: C22, D21, G12, G22

Additional disciplines: Electricity, Education

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1. Introduction

The provision of electricity is meant to facilitate inclusive growth and development by increasing spread and coverage (Zhang, Shi, Zhang & Xiao, 2019; Phadke, Park & Abhyankar 2019; Lawal, Somoye, & Babajide,2017; Mazur, Hoegerie, Brucoli, Dam, Guo, Markides & Shah, 2019; Dahunsi, Adesulu-Dahunsi, Osueke, Lawal, Olayanju, Ojediran, & Izebere, 2019). The development impacts of electrifying rural communities enhance greater output for household members engaged in income-generating activities, such as sewing, knitting, and other handcrafts activities (World Bank, 2002; Silva, Soares & Pinho, 2018; Bairoliya, Canning, Miller & Saxena 2018; Lawal, Babajide, Nwanji, & Eluyela, 2018; Enslev, Mirsal & Winthereik 2018; Dang & Lan 2019; Dahunsi, Osueke, Olayanju & Lawal 2019; Diao, Magalhaes & Silver, 2019; He, 2019; Palit & Bandgopadhyay, 2017).

From the social point of view, modern electricity decreases health hazard by reducing exposure to indoor air pollution from the use of dangerous, expensive fuels such as wood, coal and paraffin, a situation that also leads to improved lighting that can benefit education (Jin et. al., 2006). This role of electrification amongst others birthed the National Nigerian Rural Electrification (RE) Programme in 1981, but fully and formally became operative in 1989.

In further recognition of the importance of RE at ensuring inclusive development, the Federal Government of Nigeria (FGN) came up with the first RE policy which was encapsulated in the 2001 National Electric Power Policy (NEPP), and the 2003 National Energy Policy and; with the objective of rapidly expanding rural electrification access, at an affordable and cost-effective manner. In the same vein, the FGN adopts RE policy in 2009 meant to facilitate the extension of electricity services to all Nigerians, irrespective of where they live and work. And, to facilitate the promotion of private sector participation in providing electricity to the rural communities, either through the on-grid, off-grid solution, or the combination of both.

Some of the specific objective of the program as relating to social outcomes include:
- Raise the living standards of rural populations through the improved water supply, lighting, and security;
- Promote cheaper, more convenient and more environmentally friendly alternatives to the prevalent kerosene, candle, and vegetable oil lamps and fossil fuel-powered generating sets;
- Protect the nation's health and the environment by reducing indoor pollution and other energy-related environmental problems.

Nonetheless, the electrification rate in rural Nigeria has remained low to the rate of urban electrification. Between 2007 and 2016, the average rate of rural electrification was about 33.1 percent, while 84 percent of the urban population are electrified (WDI, 2017). The implication is that the majority of the rural dwellers (66.9 percent) without access to electricity far greater than the electrified (Lawal, Oye, Toro & Fashina, 2018; Lawal, Asaleye, IseOlorunkanmi & Popoola, 2018; Asaleye, Popoola, Lawal, Ogundipe & Ezenwoke, 2018). At the root of this problem that has bedevilled Nigeria's electricity sector is the huge infrastructural gap. At nominal, the country's electricity capacity stands little above 12,000 Mega Watts (MW), but the availing provision, for consumption after accounting for distributional and transmission losses, hovers around 3500MW to 4000MW. The electricity needs of developing country was estimated at about 1,000MW per million people (www.financialnigeria.com, 13 Jan 2016), as such, Nigeria will require about 180,000MW electricity generation for its population of over 180 million (Lawal, Olayanju, Ayeni, & Olaniru, 2019).

This indicates that supply has remained grossly inadequate to meet up with the required demand, a situation that has implication on the level of electricity consumption for the rural population that constitutes more than 50 percent of the Nigerian population WDI, 2016; Fashina, Asaleye, Ogunjobi & Lawal 2018; Lawal, Nwanji, Adama and Otekunrin, 2017). With the existing electricity infrastructure in Nigeria, educational indicators like adult and youth literacy rates stood at about 55 and 69 percent, evident that the country's illiteracy rate is high. This has implication on the level of individual's productivity and the societies. The country's life expectancy is put at 52 years, ranking 178th in 2016 (WHO, 2017). Among the fifty leading causes of death in the country is lung disease, which is usually associated with residential, commercial and public pollution.

Furthermore, investment on electric infrastructure in Nigeria has been biased towards the urban areas, leaving the rural areas with little or no opportunity for development (Asaleye, Isoha, Asamu, Inegbedion, Arisukwu & Popoola, 2018; Ayopo, Isola, & Olukayode, 2016b; Ayopo, Isola & Olukayode 2015; Lawal, Nwanji, Asaleye & Ahmed 2016). Statistics from the Federal Ministry of Power and Steel (2010) show that over a ten-year period (1989-1998), N2.5 billion (US$1.4 million) was expended on RE projects. In 2001-2009, a total of N5.6 billion (US$ 437 million) was equally expended on 189 projects. Spending between the periods of 2001-2009 translates to about N557million (US$ 4.4million) per year or N15million (US$ 0.12million) per each federating state in a year. This amount is considered inadequate given the huge infrastructural deficit mirrored by less than 50 percent rural electrification rate in the country. Additionally, a large number of projects were abandoned across rural communities for more than five years due to poor funding, poor planning amongst other factors (REA, August 2017; Ayopo, Isola, & Olukayode, 2016a; Lawal, Olayanju, Salisu, Asaleye, Dahunsi, Dada, Omoju, & Popoola, 2019).

One of the targets of Sustainable Development Goal (SDG)-7 is to ensure universal access to affordable and reliable modern energy by 2030. This target is subsumed into Nigeria's recent RE strategies as outlined in the Power Sector Recovery Programme (PSRP), Isola, Frank, & Leke, 2015. This, among other things, is to facilitate inclusive growth and development for over 50 percent of the rural population (Rural population data in Nigeria sourced from the World Bank estimates of the United Nations World Urbanisation prospects, 2017). As such, access to electricity is expected to impact on rural development, as well as improve household social welfare outcomes such as school performance, health among others (Khandker et. al. 2008, 2012 and 2013). Studies on this thematic are few and mostly in favoured of the economic impact of electrification strategy. This study seeks to investigate the effects of RE on health and education indicators of rural household in Oyo state. All states, Oyo state inclusive, were incorporated into the national grid rural electrification scheme. The Oyo State RE scheme, which began in 1997, covers all the thirty (33) local government areas (LGAs) of the state. Thus, for the purpose of this analysis, primary data collected from a household survey in the twelve (12) rural communities within six (6) LGAs of the state will be adopted for the analysis.

Foreshadowing our results, it can be deduced that children study time-educational outcome - increases with the educational level of the household head by 21%. Children study time reduces with household access to grid electricity, it decreases by 8%. A better explanation for this relationship was established by the alteration of electricity benefits due to frequent outages. In addition, the effect of electrification on reduction in air pollution turns out perverse. A 1 percent increase in electricity access reduces the rate at which indoor air pollution decreases. Specifically, increase electrification rate decreases the rate at which indoor air pollution reduces by 1.1 percent. This could infer from the frequent non-availability of electricity supply in spite of the access. Better illumination due from access to modern electricity brings about a reduction in indoor pollution by 1.2 percent since households do not have to rely solely on traditional sources of energy which are more detrimental to health. The remaining part of the study is structured as follows: Section two presents the literature review; section three deals with data and methodology; section four presents the results; while section five concludes the study.

2. Literature Review

Several empirical literatures have been put forward to discuss the relationship among health infrastructure, access to electricity and rural development. Some of these studies are briefly reviewed in this section.

Empirical note:

To understand the barriers to access affordable but adequate healthcare facilities in rural South Africa, Neely & Ponhunmugam (2019) employed a chain of documentary analysis, household survey and in-depth interview to examine the dichotomy of treatments available to the urban vis-à-vis rural dwellers in South Africa. The study noted that socio-political traits that characterizes South African' cultural life such as resource scarcity, transportation, kinship networks, social segregation among others impact on access to healthcare facilities.

Titus, Adebisola & Adeniji (2015) examined health care access and utilization among rural households in Nigeria based on primary data sourced from 200 rural households in the rural part of Ogun state, Nigeria. The study employed a combination of descriptive statistics and health care accessibility indexes to analyse its data and observed that the accessibility indices in the study area shows existence of unequal access to modern health facilities. The study thus suggests that rural development policies should promote equitable access to health care facilities by rural dwellers.

Benedict (2010) investigated the Nigeria poverty index with a focus on human capital component. The study noted that though health play critical role in economic development, little attention has been paid to the health sector with a consequential effect on life expectancy and labour productivity. The study stressed that an unhealthy work force is key to enhanced productivity sector. The study therefore suggests a comprehensive reform of the health sector with the intension of strengthening the national health system within affordable cost to Nigerians.

Dang & La (2019) employed a three-round panel data set comprises of over 3,000 households in rural Vet Nam to examine the impacts of electricity reliability improvement on welfare and economic decisions. The study observed that household income as well as changes in income composition as demonstrated by ownership improved electrical devices response positively to higher electricity quality. The study also noted that improved electricity supply promotes household investment in land and farming activities; and provokes upward shift in demand for bank credit for farming activities.

Riva, Ahlborg, Hartvigsson, Pachauri & Colmbo (2018) examine the linkages between electricity access and development on rural economies and observed that the nexus between electricity and development in the studied rural economies are characterized by dynamic and endogenous complexities; and that the nature of the relationship between the two could be represented by a causal loop diagram. The study noted that for electricity to impact on development, other infrastructural facilities are essential.

Kennedy, Mahajan & Urpelainen (2019) focused on the factors that influences willingness by electricity consumers in rural areas to pay for electricity consumed in rural India. The study employed a Heckman selection approach and noted that the quality of service delivery is key to willingness to pay. The study also noted that electricity has positive impact on growth in the rural communities of India.

Zou & Luo (2019) examined the characteristics and determinants of rural household's energy consumption in China based on data from 1472 rural households drawn from the Chinese General Social Survey of 2015. The study employed Tobit model and observed that age and health status of the household head tends to have reduced share of coal consumption. The size of the household also affects consumption as large households tends to consume higher electricity than households with little population size.

Enslev, Mirsal & Winthereik (2018) employed an ethnographic research technique to examine the impact of expansive electricity grid to rural villages in Kenya exerts on households energy consumption practices. The study noted that impact of anticipatory participation is key in the study of electricity access and consumption in rural economies.

Ohiare (2015) identified lack of cogent electrification plan as the main challenge to access to electricity for both urban and rural dwellers in Nigeria. The study noted that a master plan with least cost electrification model is key to sustainable electrification of both the rural and urban sectors of the Nigeria economy. The study also submitted that every stakeholder in the energy sector should be involved in drafting a sustainable master plan for the electricity industry.

Oyedepo (2012) reviewed the existing interventions in the energy sector with a focus on the electricity sub-sector. The study noted that more than 60% of Nigerians are cut off from electricity supply. Thus, there is urgent need for the government to diversify the energy sector to accommodate the domestic, commercial and industrial demand. The study further stressed the need to adopt technologies that tends to reduce wastage and are cost effective.

3. Methodology and Data

3.1 Methodology

The ADB (2009) describes a clear framework for evaluating the overall households' welfare effects of electrification. This is modified in Figure 1.

Access to electricity is explained to have impact on education through lighting that can be used for reading, leisure, and entertainment while providing access to information that leads to non-formal education. Access to electricity also increases the chances of knowledge build up, arising from the video/sounds, about health and hygiene, especially among women.

In some cases, the productivity of teachers is enhanced through the use of electronic teaching media while teachers are encouraged to reduce absenteeism (Nepal & Paija, 2019) and hold night classes with better space lighting.
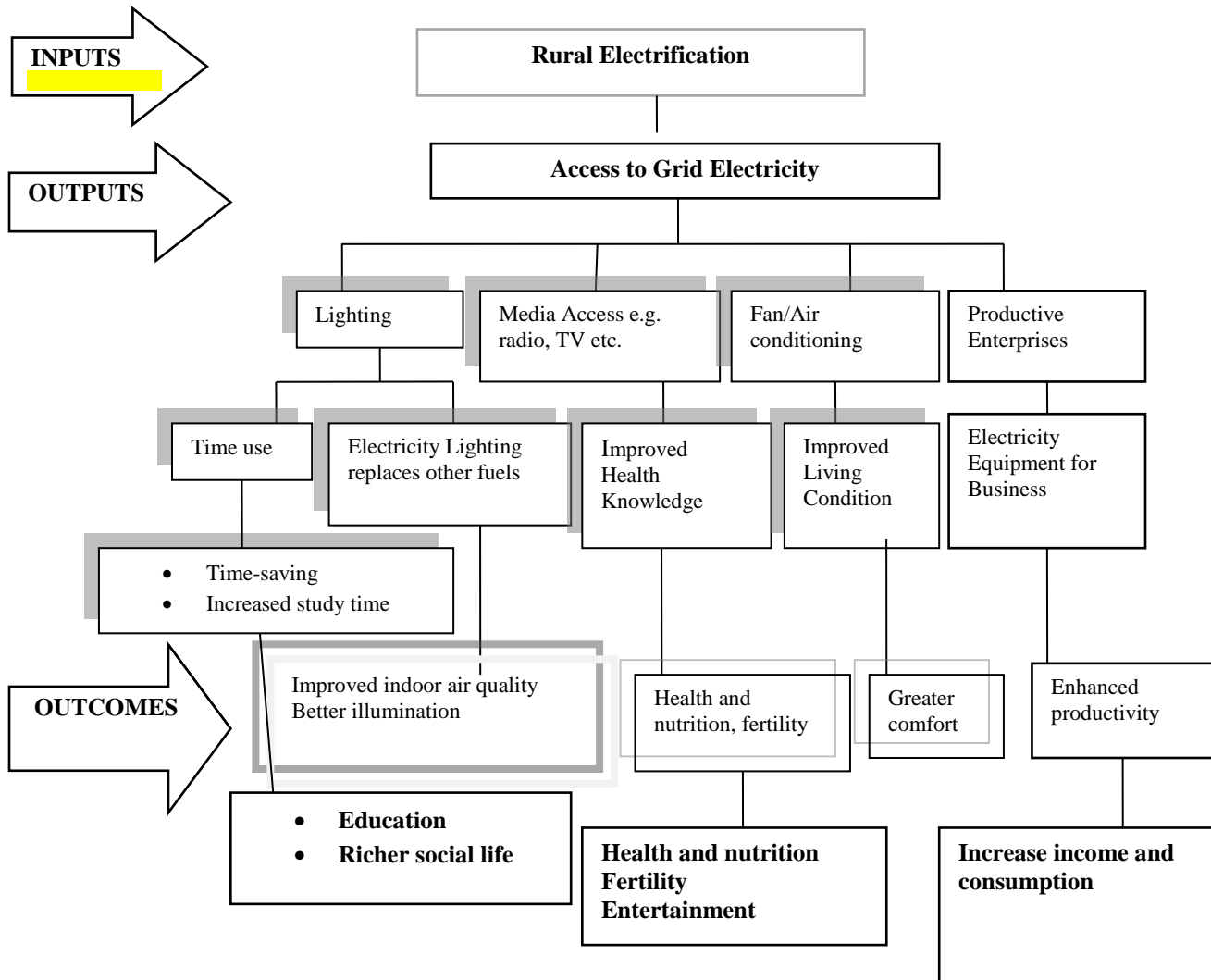
Figure 1. Conceptual Framework
Source: Author's depiction with modifications based on ADB's (2009) Framework.

The use of electric stoves for cooking substitute the use of fuelwood. Thus, improve indoor air quality. The productivity of medical staff is improved with the use of electronic medical equipment while working hours are extended with better space lighting (Bairoliya *et al*, 2019). Electrification increases the chances of modern water supply facilities that enhance health and hygiene, decreases the time for water collection especially among children and women resulting in better education (i.e., lower absenteeism, longer study time) then productivity.

Our model specification follows the input, output and outcome conceptual framework in figure 3. In this case, the input is the community's rural electrification, while the households' access to on-grid electricity is the output. The outcomes are the social welfare indicators, like education and health- that are impacted as a result of electrification.

First, based on the conceptual framework the following dependent variables were selected: increase study hours (education) and decrease indoor air pollution (health), while the main independent variable is the electrification indicator measured by access to rural electrification. Second, the choice of education and health indicator is informed by the relevant objectives of Nigeria's rural electrification programme. Specifically, the choice of education indicator is anchored on the objective designed to raise the living standards of rural populations through improved lighting. In the same vein, the health indicator adopted herein is selected to assess the role of electrification in reducing indoor pollution and other energy-related environmental problems as encapsulated in the Nigerian RE strategy.

Other explanatory variables were also included to control for household and community characteristics. This is because households' characteristics influence access to infrastructure services, while community characteristics also influences access to resources. According to Ahmad (2012) and Ahmad et al. (2013) marginalized sections of the society (communities living without access to infrastructure; such as access to good roads) often have fewer physical capital and, hence, are able to realize lower levels of human well-being.

The estimable model is a micro-econometric model articulated by Khandker et al (2014). The model is specified as;

$$Y_{ij} = \beta_i + \beta_2 X_{ij} + \beta_3 V_j + \beta_4\ E_{ij}\ + \mu_{ij} \qquad (3.1)$$

Where Y_{ij} denotes the outcome variables of interest, such as; log of increase educational performance of children measured by increase study hour (IEG, 2008), improved health condition due to decreased indoor air pollution in household i from community j; X_{ij} is a vector of household level observed characteristics (e.g. age of households head, education level, sex, and others as may apply to specific equation); V_j is the observed level community characteristics (access to infrastructure proxy by access to paved roads). The major determinant in the model E_{ij}, is electrification measured by access to electricity (Barnes, 2014). E_{ij}, is access to electricity by household i living in community j proxy by grid connection, and μ_{ij} is the disturbance term. The core variable of interest is denoted by the coefficient β_4 and this measures the effect of rural electrification on household social welfare indicators.
To analyse equation (3.1) a logistic regression technique is employed. The logistic regression constraints estimate probabilities to values that lie between 0 and 1. A typical Logit function is specified as:

$$ln\left[{}^{p}/_{(1-p)}\right] = a + \beta x + e \qquad (3.2)$$

Where *ln* is the natural log, *e* is exponential that carries the value of 2.71828, *p* is the probability that an event occurs, and *p/(1-p)* is the odd ratio.

The logit function is used to specify two (3.2) estimable equations based on equation (3.1) above. These equations are model used in determining the effect of electricity access on the selected household social welfare indicators. These are specified accordingly.

$$logit(P(IST) = 0,1) = \delta + \beta_1\, HHS + \beta_2 HEDL + \beta_3\, CARD + \beta_4 HGEC + \beta_5 HEOE + \beta_6 HEED + \varepsilon$$
(3.3)

In equation (3.3) *IST* is increased children study hour. *HHS* household head sex, *HEDL*, household head educational level, *CARD*, community access to good road, *HGEC*, household grid electricity connection, *HEOE*, household expenditure on electricity, and *HEED*, is household expenditure on education. All for $i = 1, \dots, n,$ where n is the number of households from community *j*. The $\beta_i's$ are the parameter estimates. It is also expected that *β2, β3, β4, β5, β6* exert a positive effect on children educational performance by increasing study time, while *β1*, a positive or negative effect.

$$logit(P(DAP) = 0,1) = \delta + \beta_1\, HHS + \beta_2 HEDL + \beta_3\, CARD + \beta_4 HGEC + \beta_5 HEOE + \varepsilon$$
(3.4)

All definition in equation (3.4) remained the same as obtained in (3.3), except for *DAP* which is decrease air pollution. *β2, β4, β5* are expected to have a positive relationship with expenditure, *β3* negative relationship, and *β1*, a positive or negative relationship

Equations (3.3) and (3.4) were used to analyse the welfare effect of electricity access on rural households as outlined in the objective. Charts and tables were used to describe the general characteristics of the data employed, while Ordinary Least Square (Logistic) regression technique was equally used for the estimation.

3.2 Data
Primary data are employed for the analysis and were collected through administered structured questionnaires. Through purposive sampling method, twelve *(12)* rural communities, across six *(6)* Local Government Areas in Ibadan (Akinyele, Iddo, Egbeda, Ona-Ara, Lagelu, & Oluyole), which benefitted from rural electrification in Oyo state, were selected (A list of communities that benefited from the RE programme was provided by the Oyo state RE Board).

In each of these communities, the average number of households is hundred *(100)* making a total of 1200 households in all the 12 communities; hence, a simple random sampling technique was used to select 35 households per community, thus, giving us a total of 420 samples (This sample size was scientifically determined based on 90% confidence interval at 2.5% margin of error).

The distribution of the sample size of the respondents are presented in Table 1. Semi-Structured questionnaires were administered in the selected households to elicit information on the effect of RE on the key welfare indicators. Questions relating to educational performance, reduction in health hazard were asked.

Table 1. Distribution of sample size of respondents

S/N	LGA	Rural Community	Sample size
1	Egbeda	Alaaka	35
		Oko-Taapa	35
2	Oluyole	Aba Epo	35
		Akano	35
TFN 3	Iddo	Alapaa	35
		Aba kasumu	35
		OtunAbese	35
4	Ona- Ara	Alapafon	35
		AsigiElebolo	35
5	Lagelu	Aliri/LadunniBalogun	35
		GbanguduOtunOlode	35
6	Akinyele	Omonigbehin	35
Total	**6**	**12**	**420**

4. Empirical Results

This section discusses the findings of the analyses, which include the descriptive statistics of the data as well as, findings from the micro-econometric model based on Logit regression analysis.

4.1 Characteristics of Households in Oyo State Rural Communities
This section describes some fundamental characteristics of rural households in the selected communities, as well as the community characteristics. Information on households' energy usage is also discussed.

Table 2 shows the distribution of household membership within the sampled community. Twenty-four (24) percent of the respondents have a total of four (4) people in the household, 20 percent has six (6) members in a household, 2 percent has twenty (20) member household, while 1 percent has eleven (11).

Only six (six) percent of the household has a least family member of two (2). Overall, sixty-four (64) percent of the respondents have household membership of more than 4 people. This suggests that family composition is large in rural Nigeria communities, a situation that could lead to indoor congestion with serious health implication if reliance is more on traditional energy type.

Table 2. Distribution of Household Membership in the Selected Rural Communities

Household Members	Frequency	Percentage
2	22	5.6
3	27	6.8
4	93	23.5
5	58	14.7
6	78	19.7
7	16	4.1
8	28	7.1
9	12	3
10	10	2.5
11	5	1.3
12	13	3.3
15	20	5.1
16	7	1.8
20	6	1.5
Total	395	100

The incident of rural poverty is reflected in the proportion of rural communities with household ownership. Of the 395 households surveyed (The rate of questionnaires retrievals was 94 percent, which is considered high for household survey), 57 percent owned the house they occupied, while 43 percent live in a rented apartment (Figure 1). Indicating a low level of well-being, as over 40 percent household's lacks control over basic amenities such as shelter, a situation that also reflects the high incidence of poverty in rural communities (World Bank estimates of the United Nations World Urbanisation prospects, 2017)
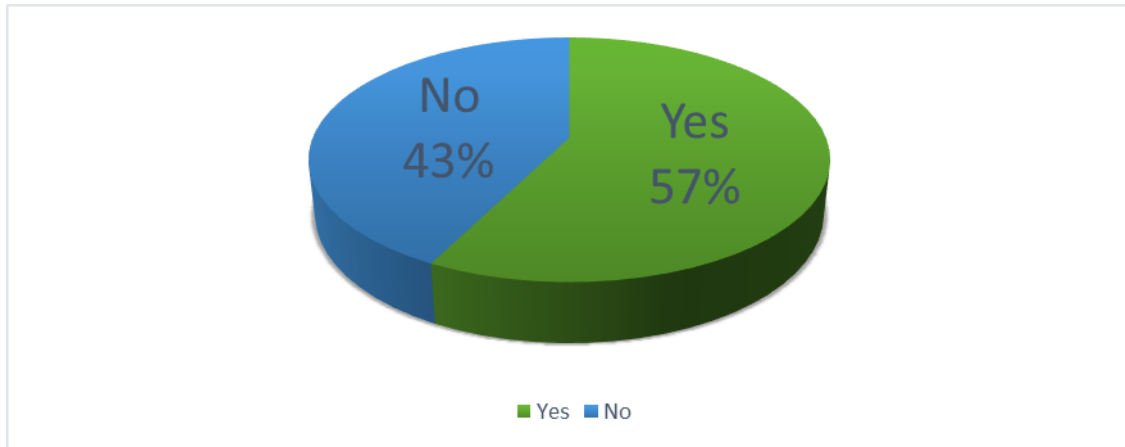
Figure 1. Proportion of Household Ownership
Source: Author's Depiction from Field Survey, 2017

In the rural communities, most of the household head respondents are youth as 39 percent fell within the age bracket of 20-40, followed by age group of 41-60 years, which also constitute about 34 percent. Of the total, 24 percent of the respondents are within the age of 61 above (Figure 2). Since most of the respondents are in their active age (20-60years), electrification is expected to be essential for increased social and economic activities, therefore, better welfare. About 93 percent are fully engaged in different types of jobs (Figure 3). Of the total, 37 percent are involved in commercial activities either as a business/trader, 37 percent are professionals, and 12

percent are farmers with another 12 percent working as artisans. The remaining 7 percent are unemployed. But the concern here is if those engaged are fully employed based on the International Labour Organisation (ILO) standard that could earn them a decent living.
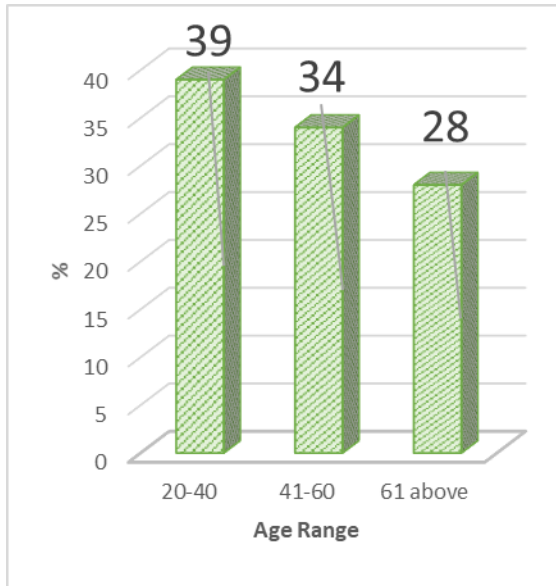
Figure 2. Age of Household Head   **Figure 3.** Household Head Occupation
Source: Author's Depiction from Field Survey, 2017
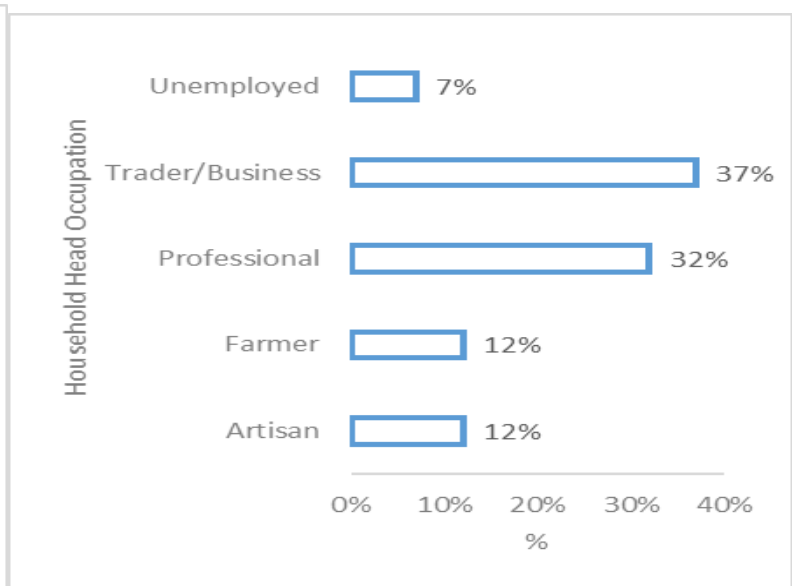
The communities can be characterised as literate since the vast majority of the respondents had some form of formal education (Figure 4). 50 percent and above of the respondents had education beyond basic primary school certificate.

Seven (7) percent had a junior secondary school, 12 percent got a senior secondary school, 12 percent went to a college of education, 20 percent to Polytechnic, 2 percent had bachelors and 2 percent had postgraduate education.

16 percent of the respondents are without any form of education while 15 percent went to vocational and technical schools. This result suggests that physical infrastructure will be widely adopted to increase better living standard.
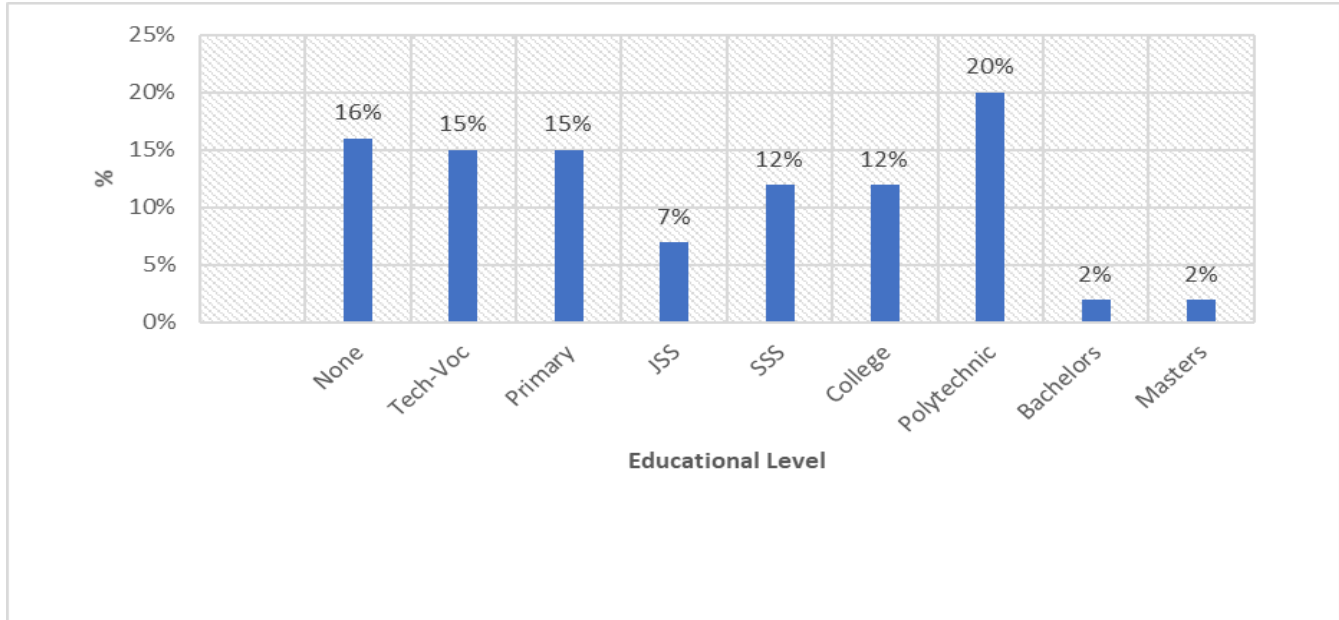
Figure 4. Household Head Educational Level
Source: Author's Depiction from Field Survey, 2017

In all the surveyed rural communities that benefited from RE programme, 76 percent of households are connected to the national grid, while 24 percent remained unconnected (Figure 5). However, availability of power supply has remained a major challenge for the majority as 71 percent of the respondents confirmed lack of frequent supply (Figure 6).
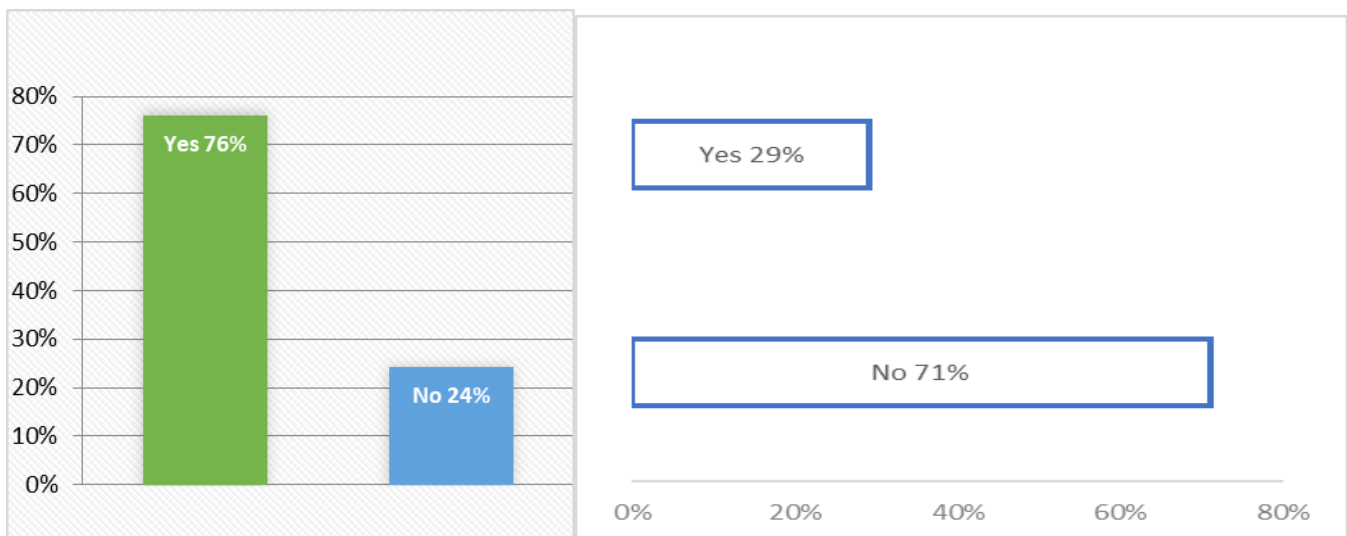
Figure 5. Household Connected to Grid   Figure 6: Frequent Electric Supply
Source: Author's Depiction from Field Survey, 2017

Having benefited from the rural electrification scheme, 34 percent of the respondents get connected to the national grid less than 5 years ago, while 30 percent were connected between 10-14 years (Figure 6). This indicates a wide acceptance of the programme as more than half (50 percent) of the respondents are connected to electrification more than 10 years into the programme that just turned 21 years in Oyo State. Since electrification could be through on- grid or off-grid solutions as outlined in the Nigerian National Rural electrification scheme, 67% of the respondents are not connected to any off-grid technology, while only 33% of the sampled respondents have access (Figure 7). The available off-grid technology in rural Oyo State is solar energy. With these outcomes, electricity consumption in rural Oyo state is majorly from the national grid.
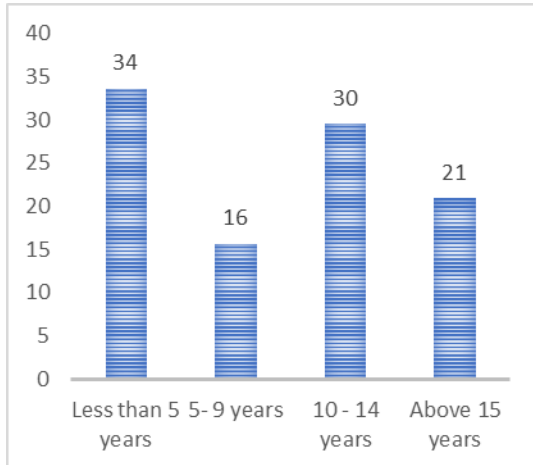
Figure 7. When Connected to National Grid   **Figure 8.** Access to Off Grid
Source: Author's Depiction from Field Survey, 2017
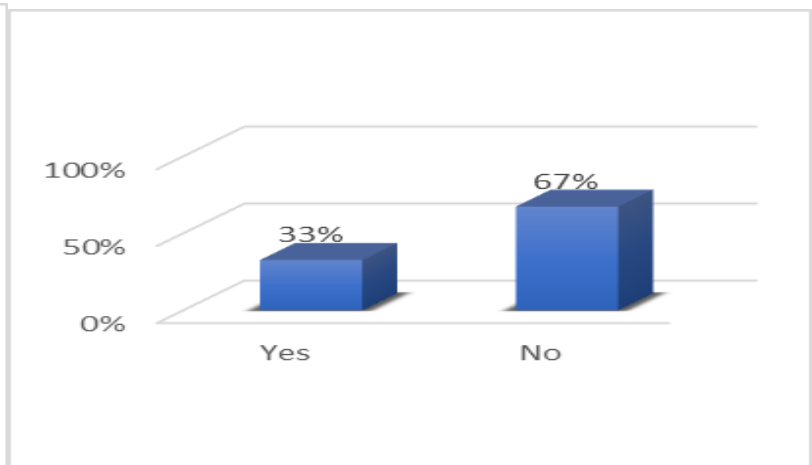
Considering the household energy options, it is clearly shown that 46 percent has the option of using grid electricity, as also shown by high rate of households connected, while 3 percent supplement grid electricity with Liquid Petroleum Gas (LPG) and 19 percent with Kerosene.

4 percent rely on biomass for energy, 9 percent uses fuelwood, 18 percent uses Premium Motor Spirit (PMS) otherwise known as gasoline. Overall, 2 percent of all the respondents use all the energy type listed (Figure 9).

Although a large chunk of the respondents agreed on having grid electricity option, 39 percent of the households asserted they use PMS for day to day activities (The frequent outage in electricity supply explains the high proportion of PMS and kerosene), 17 percent uses electricity, 24 percent uses Kerosene, 16 percent uses fuelwood, 2 percent uses LPG, with another 2 percent using Biomass (Figure 10).
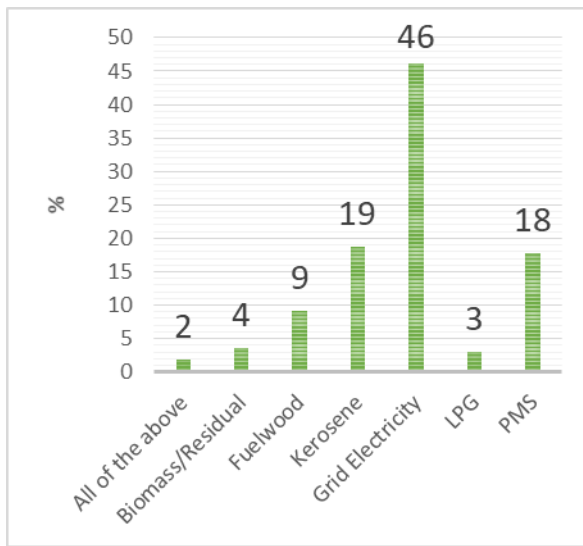
Figure 9. Energy Options
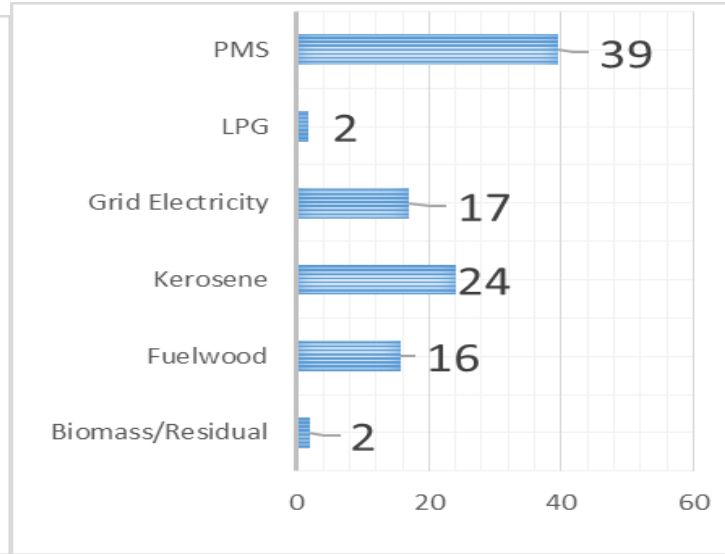
Figure 10. Most Used Energy Type

Source: Author's Depiction from Field Survey, 2017

4.2 Effects of Rural Electrification on Household Social Welfare Indicators

This section presents the logistic regression of the welfare effects of RE. Two welfare outcomes from non-monetary social indicators were estimated. The outcomes are: Increase in children Study Time *(IST)* and Decrease Air Pollution *(DAP)*

In analysing the results, the following were considered: the odd ratio which shows the effect of the independent variable on the dependent variable, Chi-Square which shows if the equation is significantly better, P-Value which also shows the significance of the variables, and the Pseudo R^2 which shows the overall significance of the equation

4.2.1 Estimation of Education Effect of Rural Electrification

As evident in Table 3, a positive relationship exists between an increase in Children Study Time (IST) and the sex of the household head (HHS). Also, IST increases with the educational level of the household head (HHED) and age of the household head (HHA). Children study hour increases by 21% with an increase in the educational level of the household head. Access to the road has a negative relationship with children study hour (it decreases by 27%), Children study hour reduces with household access to grid electricity (HGEC), it decreases by 8%, contradicting the findings of empirical study like IEG (2008) and Khander (2009). A better explanation for this relationship could be established by the alteration of electricity benefits due to frequent outages. Expenditure on electricity (HEOE) significantly decreases children study hour by 12% probably as a result of a high preference for watching television thereby engendering an inverse relationship between education expenditure and children study time. Thus, expenditure on education decreases children study hour by 65%.

Also, this equation is significantly better with the chi-square value (217.05> -159.689), the probability value is less than 0.05 which shows that the equation is significant while the R^2 is 0.4046.

Table 3. Logistic Regression Result of Education Effect of Rural Electrification

Variable	Coef.	S. E	Sig	Exp (β)
HHS	1.198	0.364	0.001	3.314
HHA	1.902	0.240	0.000	6.702
HLED	0.197	0.069	0.005	1.218
CARD	-1.308	0.355	0.000	0.270
HGEC	-2.483	0.534	0.000	0.084
HEOE	-2.519	0.286	0.000	12.422
HEED	-0.439	0.221	0.048	0.645
CONSTANT	-7.367	0.934	0.000	2.021
chi square value (217.05> -159.689)				
p-value 0.0000				
Pseudo R2 0.4046				

4.2.2 Estimation of Health Effects of Rural Electrification

The odd ratio shows that there is a positive relationship between decrease indoor pollution and the sex of the household head. The relationship is equally positive between household-head age, educational level and decrease air pollution. Implying that age of the household head, Household head educational level has a positive relationship with reduction in indoor pollution. Reduction in indoor pollution decreases, as access to good road increases, which turns out counterintuitive, because increase road access signifies proximity to development that should reduce household health and related hazard. The effect of electrification on a reduction in air pollution equally turns out perverse. A 1 percent increase in electricity access slowed down the rate at which indoor air pollution reduces. Specifically, electrification decreases the rate at which indoor air pollution reduces by 1.1 percent. This could infer from the frequent non-availability of electricity supply in spite the access. While the household electricity expenditure increases with reduction in indoor air pollution, it decreases the rate of air pollution by 1.6 percent. This implies that more spending on modern electricity reduces the rate of indoor air pollution. Better illumination due from access to modern electricity brings about reduction in indoor pollution by 1.2 percent since households do not have to rely solely on traditional sources of energy which are more detrimental to health. Usage of modern and traditional energy brings about complementarity in the adoption of energy choice, thereby reducing the health danger of air pollution.

Overall, this equation is significantly better with the chi-square value (172.32 > -179.910), the probability value is less than 0.05 which shows that the equation is significant while the R^2 is 0.3238.

Table 4. Estimation of Health Effect of Rural Electrification

Variable	Coef.	S. E	Sig	Exp (β)
HHS	0.925	0.338	0.006	2.521
HHA	0.469	0.201	0.020	1.599
HLED	0.126	0.063	0.0045	1.134
CARD	-0.763	0.311	0.014	0.466
HGEC	-1.087	0.398	0.006	0.337
HEOE	1.618	0.213	0.000	5.041
ABI	1.247	0.313	0.000	3.478
CONSTANT	-5.194	0.773	0.000	2.021
chi square value (172.32> -179.911)				
p-value 0.0000				
Pseudo R2 0.3238				

Policy Implications

The Nigerian rural electrification strategy was set up with numerous objectives. From the social point of view, it is meant to promote cheaper, more convenient and more environmental friendly alternatives to the prevalent kerosene, candle, and vegetable oil lamps and fossil fuel-powered generating sets; protect the nation's health and environment by reducing indoor pollution and other energy-related environmental problems, as well as increase individual's living standard. In view of this, access to rural electrification in the twelve (12) rural communities has not brought about the desired impact on education and health. Children study time-educational outcome - increases with the educational level of the household head by 21%. Children study time reduces with household access to grid electricity, it decreases by 8%. A better explanation for this relationship was established by the alteration of electricity benefits due to frequent outages. In addition, the effect of electrification on reduction in air pollution turns out perverse. A 1 percent increase in electricity access reduces the rate at which indoor air pollution decreases. Specifically, increase electrification rate decreases the rate at which indoor air pollution reduces by 1.1 percent. This could infer from the frequent non-availability of electricity supply in spite of the access. Better illumination due from access to modern electricity brings about a reduction in indoor pollution by 1.2 percent since households do not have to rely solely on traditional sources of energy which are more detrimental to health.

Apparent from the findings, the effects of electrification are offset by the frequent non-availability of electricity supply. To worsen the situation is the fact that centralized grid electrification remains the main source of electrification in Nigeria. In this present form, the system is overwhelmed and cannot provide adequate and reliable services when expanded, hence the non-impact of electrification on social outcomes. To surmount this challenge, the mini-grid option is required. There is need to reemphasise this due to a rapid decline in cost arising from technological improvements and growing markets (World Bank, 2017). Long-term sustainability requires government commitment, and if possible, provision of financial assistance (e.g. capital expenditure subsidy for construction assets or, operational-based subsidy such as reimbursement on each new connection etc.). In addition to the mini-grid option the off-grid solution such as renewable option should be pursued vigorously. Although the Nigerian government in 2015 launched the renewable energy policy; like Ghana, Kenya, and South Africa, Nigeria should have a strong supporting legislation to support its position on rural electrification strategy. Promoting renewable energy efforts through direct policy efforts and incentives, private participation should be encouraged through transparent and simple procedures to enables greater reliability. To facilitate the optimal performance of the existing electricity system, implementation of the gas master plan is crucial, paving way for sustainable gas supply. This in a way will also increase supply reliability, coverage, and then higher social benefits.

Conclusion

The Nigerian rural electrification (RE) programme is meant to increase electricity access by extending centralized distribution lines to rural communities as part of strategies to facilitate inclusive growth and development. Hence, the study analysed the effects of rural electrification on household welfare indicators such as education and health in Oyo State, while suggesting strategies for enhancing benefits. Using a logistic regression model, key empirical findings revealed that children study hour reduces with household access to grid electricity, it decreases by 8 percent. Expenditure on electricity significantly decreases children study hour by 12 percent.

A 1 percent increase in electricity access increases the rate of indoor air pollution. Specifically, electrification decreases the rate at which indoor air pollution reduces by 1.1 percent. Household electricity expenditure increases with reduction in indoor air pollution, and it decreases the rate of air pollution by 1.6 percent. Better illumination due to access to modern electricity reduces indoor pollution by 1.2 percent.

Hence, to increase benefits, the adoption of mini-grid option is inevitable, which requires government commitment to sustainable development. Another option is the off-grid solution such as renewable option, which should be promoted by strong supporting legislation that is incentive-based for rural electrification strategy. The efficiency of the existing electricity system entails the implementation of the gas master plan, which is crucial in paving way for sustainable gas supply for the major source of electricity generation in Nigeria. This in a way will also increase supply reliability, coverage, and then higher social benefits.

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THE INFLUENCE OF SOCIAL MEDIA ON FEMALE ENTREPRENEURS: A PRISMA COMPLIANT EXPLORATION

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Abstract. Pursuing businesses through social media platforms has become an interesting trend for female entrepreneurs in the last few years and in modern society. It appears as a beneficial online tool to promote new entrepreneurial ideas and a key factor for innovation, poverty reduction, employment, and economic growth in many global rising economies, as well as a way of life among disadvantaged families. The aim of this study henceforth is to systematically review the existing literature with a final purpose of closing the current gaps in knowledge regarding the effects of social media on female entrepreneurs and how the utilization of such a platform assists in promoting their economic welfare and their social well-being. We have adopted an extensive key search strategy on different databases, including Scopus, EBSCO Academic Search Premier and ProQuest. Our findings confirm that social media has a direct contribution to empowering females in many countries to pursue business through such platforms. Our review further provides practical implementations and future recommendations as regards to the current existing gaps in knowledge and supports conducing systematic research leading to more extensive inclusion of social media studies and their relation to female empowerment as entrepreneurs.

Keywords: social media; social capital; female entrepreneurs; female empowerment

1. Introduction

The correlation between females' entrepreneurship activities and the rising trend of having access to multiple social media platforms is one of the key factors for innovation, poverty reduction, employment, and economic growth in many rising global economies. Competitiveness is hence indispensable for achieving inclusive development and economic welfare, and the advancements of these female entrepreneurial skills is critically pivotal, not only in promoting financial stability but in further reducing gender disparities in those countries. Although several studies confirm that females in both developed and less developed nations often do not reach their full work potential, other studies present novel works that describe how a large fraction of those females who

rely on social media for running their own established enterprises serve as an important means of support to both the economic empowerment of these females and the national economy of their countries. A principal contributor in this process of venturing into a business startup or any entrepreneurial-based ideas emerges from identifying potential opportunities in different market segments.

However, this process is often daunting for many emerging female entrepreneurs since they are not only facing restricted opportunities, but also, they challenge themselves with insufficient resources that are critically needed to achieve both social welfare and financial security. Supporting female entrepreneurs, therefore, is essential in stimulating economic growth.   A growing number of social researchers examined how and when frequently newly established enterprise institutions perceive these opportunities through utilizing accessible resources and how the capacity of achievement has been clarified in various settings, ranging from a single individual perspective to the creation of social capital opportunities and the effects of social media platform interactions (Li et al. 2015; Corbett 2007; Nieto & González-Álvarez 2014).

Since structuring a solid relationship through social media platforms is critically important for success, business entrepreneurs will often tend to utilize these social communications to share information or create better business opportunities. Social networking provides a set of tools that allow people or companies to create and share information or allow professional interests and different ideas to be presented in such virtual community networks. They certainly make substantial and extensive changes in the relationships between corporations, institutions, and individual societies (Ang 2011). In recent entrepreneurial-based studies, several researchers have strongly suggested that the use of the internet and its affiliated social media helps in facilitating the process of finding different business ideas, which encourage individuals, in turn, to be entrepreneurs (De Carolis & Saparito 2006).

These network tools further assist in identifying many business opportunities through establishing long-term communications and interactions with peers on the media that help reach potential consumers through their close peers, consumers, and marketers (Della Corte et al. 2015; Felix et al. 2017). Apart from the core issue of female entrepreneurship and based on our extensive literature searches, there has been less previous evidence in research that justified the ability of female entrepreneurs to identify business opportunities through social media and whether these online platforms have a feasible influence on the stages of business creation. It is also not clear that the utilization of social media as a source for newly established running business really works in a practical sense for females in the corporate world.

Therefore, our main objective of this review is to add to the current knowledge of this topic through a systematic review of the literature on the effects of social media on female entrepreneurs and to understand whether the studies that have been conducted in the last few years have investigated the major effects of social media platforms on female entrepreneurs. We have investigated how social media effects, social capital in the creation of entrepreneurial opportunities, and social media and its relationship with female empowerment are all correlated. By providing and implementing a comprehensive review of emerging entrepreneurs, we will provide findings that show how social media is used in empowering entrepreneurial opportunities for females in modern society.

2. Research questions

Different issues and topics have been addressed previously and need to be further elaborated in detail. As such, we have worked to develop a framework of three structured questions to be used as a guideline for our work and to also facilitate the process of presenting the findings. Our review is mainly based on three different yet correlated topics: The social media effect on female entrepreneurship, the social media and the creation of social capital, and the social media and its relationship with female empowerment. These three topics have been grouped into three main questions as follows:

- RQ. 2.1. What are the major effects of social media on female entrepreneurs?
- RQ. 2.2. How can social capital be obtained from access to social media platforms?
- RQ. 2.3. How does social media assist in empowering female entrepreneurs?

3. Related work

3.1 The social media effect on entrepreneurship

The internet is the primary current method used by many people to communicate between themselves and other individuals who share their interests (Amichai-Hamburger & Hayat 2011). It provides pivotal benefits they might have through easy access to one of its available social media platforms which can be created among individuals, group members or even business organizations of different levels. Social media for entrepreneurs can be an open source to access multiple resources, such as sensible and non-sensible information, financial information, skills, knowledge, and advice. Also, a way to deliver information to many parties who may share common interests. These kinds of online interactions positively affect and strengthen these virtual correlations by promoting online relationships with unknown people (Haythornthwaite 2005), which then contributes to enhancing the ties between communicating pairs, both online and also through their actual real-life relationships As the number of social media users grow, the communication among users also increases. This feature subsequently opens a door of opportunities to regular people to become entrepreneurs, which is something that can, in turn, increase their social capital and social welfare; an important benefit for many rising entrepreneurs with limited opportunities or less access to the business world.

3.2 Social media and the creation of social capital

Social capital has been described as the opportunities that individuals or groups of people may have by accessing resources and information on their social sites (Ellison et al. 2014), as well as the idea of useful opportunities that internet users benefit from in their social interactions through social media platforms, which in return lead to greater access to companionship, exchange of information, and financial gain (Ellison et al. 2011). Theses social platforms make it simple to maintain communication through solid relationships with close relatives and colleagues, and frequently with individuals they have just met once. This type of personal interaction between individuals through social media platforms is one of the approaches to empower the establishment of new business opportunities for less economically advantaged females. Their interactions via engagement with individuals on social media platforms can positively lead to increasingly high levels of bridging social capital by having many rising entrepreneurs with sufficient knowledge to run their own business through these platforms.

3.3 Social media and female empowerment

In the field of sociology, the definition of social media is divided into two main parts: the "Social" which is a part of the communication means in our current society and "Media", which are channels that transform those communications in online-based platforms such as Facebook and Twitter or as sociologists refer to, the new social media. In our new modern, emerging society, the term "social media" has been constantly linked to female empowerment, which is a term defined by the World Bank as a key component of the elements of poverty reduction and one of the major assistances for human development. It can also be simplified to be a way of female improvement in order to become financially and socially stable. Social media that has been utilized by females has contributed to their social capital and self-efficiency, thus, increasing their success via the feelings of satisfaction and empowerment and often encouraging them to emerge as rising entrepreneurs (Beninger et al. 2016).

For females beginning their own start-ups or small and medium enterprises (SMEs), social media can facilitate an easy and low- cost method of promoting connections and relationships with stakeholders. It further influences

their personal and professional life and can be used for female self-expression. This emphasizes a point on how social media has a positive impact on influencing female activities in their business via increasing their publicity, reaching customers, suppliers, and accessing information. Thus, improving the efficiency of their reputation in both informal and professional marketplaces.

4. Methodology

4.1 Eligibility criteria

For the purpose of conducting this systematic review, we have included peer-reviewed full-text studies published in international academic journals that report the role of internet and social media on the creation of social capital and entrepreneurial opportunities for disadvantaged females. No restrictions concerning the demographic characteristics of the included papers were imposed. In addition, no restrictions were placed on the ethnicity, race or socioeconomic status of the included samples. Studies with insufficient available full-texts were excluded during the full-text screening only. Papers that are considered editorials, conference abstracts, annual meetings, thesis dissertations, secondary studies (reviews & secondary analyses) or reports were also excluded. Studies that didn't provide sufficient data during the extraction stage or overlapped data were also excluded.

4.2 Literature search

A systematic literature search was performed in the following databases: Scopus, EBSCO (Academic Search Premier), and ProQuest. The multidisciplinary database, Google Scholar, was also searched with the purpose of retrieving multiple academic articles that are produced on all academic and organizational levels. In general, we performed keyword searches using the terms in the title of the included databases: "Social Media" AND "Influence" OR "Impact" OR "Effect", in a combination with potential terms such as "Facebook" OR "Twitter" OR "Instagram" OR "LinkedIn" OR "YouTube" AND "Women Entrepreneurs" OR "Female Entrepreneurs" AND "Women Empowerment", in addition to other possible terms, including "Business" OR "Startup" OR "Small business enterprise". We further intend to have studies that describe single topics, such as "Social Media" only or "Entrepreneurship" only, in an attempt to be added for the purpose of supporting a clear description for our framework related questions and the related work portion.

4.3 Screening

The articles were retrieved using EndNote (version x.8.) and assessed against duplicates. The remaining papers were then extracted to a normal Excel sheet and extensively assessed for the title and abstracts, using our eligibility criteria. The articles of the included titles and abstracts were then viewed for the full-text screening, and those that didn't have full-text were excluded. The included articles were then extracted using a normal Excel sheet and then organized into two tables.

4.4 Data extraction and quality assessment

For the selected papers, source details with respect to the identification of the first author name, year of publication, country of the first author, country of the participants, study aim, study characteristics, and a brief description of the methodology used, were extracted and then obtained and organized in two tables that assess three different themes, according to our framework related questions. Quality assessments were conducted by each author individually, using PRISMA guidelines, which is a statement that consists of a 27-item checklist and a 4-phase flow diagram. It is our opinion that having a study which follows this itemized checklist will be helpful for potential readers to assess the quality of the included papers and evaluate weakness and strength points of the review.

5. Findings

Our systematic literature searches resulted in a total of 126 potentially relevant titles and abstracts [Figure1]. After duplicates were removed using EndNote software and after applying the first screening process for both the titles and abstracts, a total of 45 studies remained and were selected for full-text screening. Thereafter, a total of 33 citations were removed, with the highest number of studies that depict either narrative reviews (n = 7) or thesis dissertations (n = 6). The selected studies in this paper were carefully analyzed and systemically supported our three research questions, showing a strong correlation between three main categories of research: [1] studies that assess the social media effect on female entrepreneurship, [2] studies that support the creation of social capital from online entrepreneurial opportunities by females, and [3] studies that present the influences of social media on the creation of empowerment in rising female entrepreneurs.
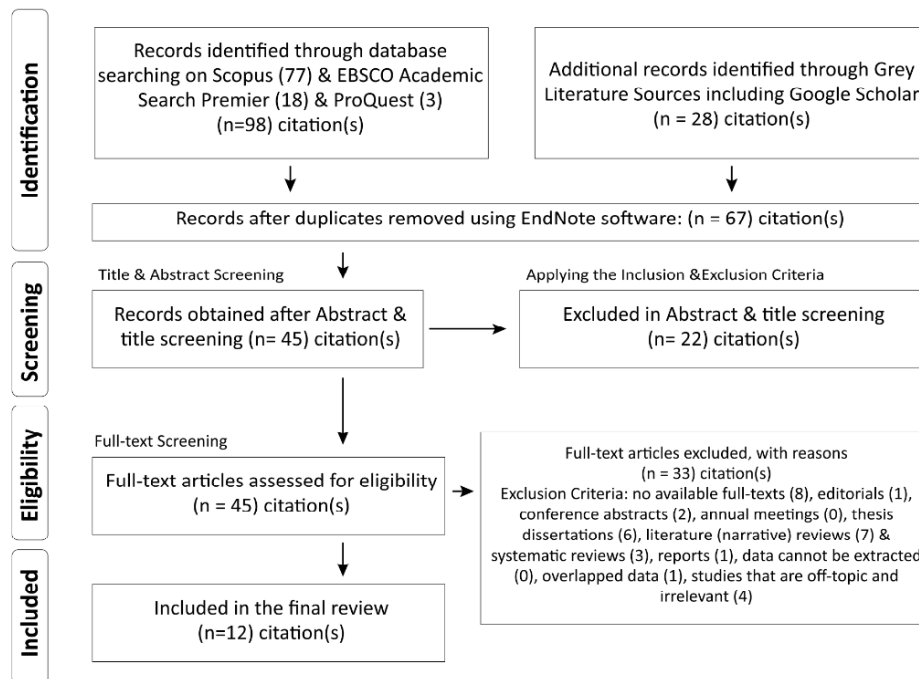
Fig. 1. PRISMA flow chart of included studies

Source: authors

According to our findings, a total of 8 studies presented the effects of social media on female entrepreneurs in developing and emerging economy countries (Table1), which emphasizes a point on how social media, as an online tool, can substitute an expensive external tool and be used toward enhancing the social and economic welfare of those females. Furthermore, another promising finding was that the most widely used social media platform between 2011 and 2016, in the included studies, was Facebook. However, our results on this point showed that although Facebook has been used as a pivotal platform for female entrepreneurs, other studies showed how it began to become less of a priority for them nowadays, instead with Instagram and Twitter taking its place; with YouTube, WhatsApp, and LinkedIn being of particular interest to some of them. Regardless of this contradiction, the combined findings confirm a positive aspect to their utilization since they have provided more effective opportunities for building relationships, due to their widespread efficiency and low cost of use.

Table 1. Characteristics of the included studies

Reference ID	Publication Year	Journal	Country of the participants	Social Media Source
AL Mutairi. (2015).Kuwait	2015	The Journal of Applied Management and Entrepreneurship	Kuwait	Instagram & WhatsApp
Alkhowaiter. (2016). Saudi Arabia	2016	Springer International Publishing Switzerland	Saudi Arabia	Instagram
Constantinidis. (2011). Luxembourg	2011	Entrepreneurship and Innovation	Belgium	Facebook
Duffy. (2015). USA	2015	Social Media + Society	USA	Instagram
Duffy. (2017). USA	2017	Information, Communication & Society	USA	Facebook, Instagram, Twitter, Pinterest & LinkedIn
Genç. (2015). Turkey	2015	Procedia - Social and Behavioral Sciences	Turkey	Facebook & Instagram
Indrupati et al. (2012)	2012	Education, Business and Society: Contemporary Middle Eastern Issues	Bahrain, Kuwait, Saudi Arabia, United Arab Emirates, Qatar, Oman	Facebook
Ming Yen Teoh et al. (2014). Malaysia	2014	Gender in Management: An International Journal	Malaysia	Facebook & Twitter
Odine. (2013). Kuwait & UAE	2013	Global Media Journal Spring	Tunisia, Egypt, Libya, Bahrain, Kuwait, United Arab Emirates, Saudi Arabia	Facebook, Twitter & YouTube
Ogunnaike et al. (2013). Nigeria	2013	Journal of Business Administration and Management Sciences	Nigeria	Facebook, Twitter, LinkedIn & MySpace
Wally et al. (2014). UAE	2014	International Business Research Conference	UAE	Instagram
Ukpere et al. (2014). South Africa	2014	Mediterranean Journal of Social Sciences	South Africa	Facebook

Source: authors

Our main findings on the effects of social media on the creation of social capital have stated that social media has affected rising female entrepreneurs in many aspects of their lives as it has enabled them to achieve self-promotion through their affiliate social media platforms by building a highly regarded reputation among their customers (Table 2). This is an important finding in the understanding of how they can create more opportunities, contacts, and business partnerships for themselves – that is, building up customer relationships and multiple beneficial contacts with people in the same field helps them become more open to many entrepreneurial opportunities and hence can establish an important profitable source of income in their lives.

This comes as a point of support to many studies that relate the creation of social capital to individual interactions between people through social media platforms, and moreover, emphasizes how it can be used as one of the ways to empower the foundation of new entrepreneurial opportunities for less financially advantaged females. However, it has been observed in only one study that social media itself does not aid diversity of contacts or partnerships that an entrepreneur can achieve, but instead increases the chance of entrepreneurs to have the same information and same contacts. Which, we confirm, can be considered as a limitation, although for how it is only restricted to a small category of individuals.

The social media sources used by females have contributed to increasing their social capital and self-efficacy, increasing their success through a sense of empowerment and often encouraging them to emerge as rising entrepreneurs. A further novel finding we have concluded and confirmed is that social media is playing a central role in the success of a business run by an entrepreneur, and can be very helpful in empowering many less-economically advantaged females in developing countries, as well as to assist them in selecting the correct form of social media according to the needed income, targeted information, and resources. This gives clearly better results that support our related work on how social media can be a key element in poverty reduction and one of the major assistances for human development. This point leads to good results and future recommendations for extensive research on the relationship between social media and economic development.

Table 2. Summaries of the key findings

Reference ID	Emerging Topic	Study Purpose	Study Characteristics	Summary	Key Findings
Al Mutairi (2015). Kuwait	Female Empowerment, Entrepreneurship & Social Capital	The aim of this study is to identify the challenges and motivations faced by Kuwaiti female entrepreneurs in starting businesses, types of economic activities and marketing strategies.	Questionnaire Survey	To examine this, a questionnaire survey has been conducted with 500 Kuwaiti businesswomen from different business backgrounds, in 6 different governances in the State of Kuwait.	The most popular social media platforms used to promote Kuwaiti female business are Instagram and WhatsApp, due to their low cost and high access availability.
Alkhowaiter (2016). Saudi Arabia	Female Empowerment, Social Media Usage & Small Businesses	The purpose of this study is to provide evidence on how the use of Instagram as a selling platform, by Saudi businesswomen, has a noticeable impact on running their businesses.	Case Studies	Several one-on-one interviews were conducted with Saudi businesswomen about their success stories using Instagram, and how it can be effectively used to attract major customers in all interests to purchase products online.	Findings of this study show that Saudi females choose Instagram as a social media tool for three reasons: [1] it is free, [2] open access to reach local & international customers, [3] the accessibility to run their business from home. This supports the point of how Instagram has a far reaching impact on the entire country's female employment.
Constantinidis (2011). Luxembourg	Female Entrepreneurship, Virtual Networks & Genders	The purpose of this study is to assesses the influence behind the use of Facebook's virtual social network by female entrepreneurs.	Questionnaire Survey	The study was conducted using a quantitative based questionnaire on 228 Belgium females who depend on Facebook for their	The findings showed that there are two perspectives regarding the use of Facebook. One of which

				business activities. In addition, the Analysis of Covariance (ANCOVA) was conducted to discover the correlation of activities of female entrepreneurs in both male and female sectors.	emphasizes how businesswomen tend to use Facebook to support other self-employed businesswomen; the other being the activity perspective that supports how females are encouraged to use such a platform for creating a highly regarded business reputation.
Duffy et al. (2015). USA	Fashion Blogging, Self-Branding, Post-Feminism & Social Media	The objective in this study is to discuss social media use in multiple feminine areas of fashion and beauty, with a focus on fashion blogging through social media platforms.	Interviews & Qualitative Analysis	The authors have established their study through qualitative analysis of the textual (n=38 author narratives) and visual (n=760 Instagram images) produced by fashion bloggers, alongside structured telephonic interviews (45-60 min) with 8 full-time fashion/beauty bloggers.	Female bloggers use their social media contents to bind commercial needs and at the same time, deliver ideas of femininity.
Duffy et al. (2017). USA	Social Media, Gender, Employment, Self-Branding & Entrepreneurship	This paper discusses gender differences in the contemporary discourses of online entrepreneurship and assesses the importance of social media on entrepreneurial activities.	Interviews	In-depth interviews were conducted with 22 employed female professionals, the majority of whom worked in digital media fields, as a point of understanding how social media plays a role in their self-starter careers.	Digitally enabled meritocracy, we are largely superficial.
Genç (2015). Turkey	Social Media, Female Entrepreneurs & Empowerment & Social Capital	The aim of this paper is to understand if and to what extent social media provides small micro-scale female entrepreneurs a level of opportunity to support digital tools in running business, instead of traditional tools.	Interviews	Qualitative, semi-structured interviews were conducted with 4 self-employed females. These interviews were found to be the most appropriate tool since it dealt with the female entrepreneur's	The social media platform, Instagram, appeared to be a very interesting trend in marketing communications. Also, the data supports the

				own feelings regarding their self-perception and the effects of social media.	advantageous benefits of social media for business due to its capability of transferring low-cost information.
Indrupati et al. (2012). Bahrain	Social Capital, Empowerment, Social Media & Entrepreneurship	The primary aim of this study is to examine how effective social media networks, created by entrepreneurs, help to reach customers and market their ventures.	Questionnaires	The authors circulated a questionnaire via email among 150 entrepreneurs in the Gulf region, asking about their professional backgrounds and their feedback of using social media for their business work and how it affects them.	The findings showed that 87% of the participants agreed on social media being a positive influence on their low business costs.
Ming Yen Teoh et al. (2014). Malaysia	Entrepreneurship, SMEs, Female Entrepreneurs & Social Media	The authors' primary aim is to provide an in-depth analysis of businesswomen in the SME sector in Malaysia and how they can promote the economic welfare of the country.	Overview Analysis	Authors provided an analysis of the primary challenges arising from their society, cultural backgrounds or support provided through government laws that may face Malaysian female entrepreneurs.	The disparities resulting from gender inequality in Malaysia is a reason behind the use of social media amongst females as a factor enabling a more stable life.
Odine (2013). Kuwait	Female Empowerment, Social Capital & Social Media	The aim of this study is to prove how the use of social media can promote the female's position within their society.	Overview Analysis	Three major topics regarding the use of social media were assesses, based on Arab nations, and were discussed via a theoretical framework.	The author has concluded that a step toward solving the problem through engagement via different social media sources is highly recommended.
Ogunnaike et al. (2013). Nigeria	Social Media, Female and Social Capital Empowerment & Entrepreneurship	The specific objectives of the study are to ascertain the extent to which female entrepreneurs use social media, to determine the exact purpose of visiting such platforms, and to determine their impact on creating entrepreneurial opportunities.	Questionnaire Survey	The questionnaire technique was adopted to obtain the relevant information for this study from entrepreneurs (i.e. SMEs). A particular emphasis is placed on the impact of social media effects on business performance.	The results of the study revealed that Facebook and Twitter are the social networks visited by entrepreneurs for commercial purposes.

Wally et al. (2014). UAE	Social Media & Female Empowerment	This exploratory study is aimed at understanding the experiences of Emirati businesswomen who chose Instagram to market their small businesses.	Interviews	Primary data collection was conducted by means of in-depth interviews with 9 Emirati female entrepreneurs who consented to participate in the study.	The study found that Instagram is effectively used by female Emirati entrepreneurs, especially for home-based business. The entrepreneurs found Instagram to be an inexpensive and user friendly platform, since it provides a high level of exposure to their products.
Ukpere et al. (2014). South Africa	Social Media & Female Empowerment	The author's purpose of this research is to address the potential benefits behind the usage of social media in business activities by female entrepreneurs.	An Overview	The study of social media's impact on the financial issues faced by female entrepreneurs.	The use of social media by female entrepreneurs has a positive impact, in terms of negotiating different business activities.

Source: authors

Limitations

This study does have some limitations. Firstly, this study was restricted to peer-reviewed based articles, thus excluding a large number of studies (n = 33) that may have produced a different level of knowledge. Secondly, our search was limited to the last 10 years as this kind of research is considered rising trend, particularly on the topic of the connection between female entrepreneurs and the effect of social media use. Thirdly, we were restricted to databases that have a focus on business and social studies, therefore, we do confirm that we may have overlooked some studies providing data on different databases. Finally, only peer-reviewed articles written in the English language were included in this SLR. Social media and female entrepreneurship are gaining global interest, and studies carried out in languages other than English could have been used to further strengthen the discussion.

Conclusion and future research

The findings of this research confirm that social media platforms have the potential effect to support female entrepreneurs worldwide, especially females in developing countries, by allowing them easy access to open different business ventures from their homes and to have several interactions and contacts with many individuals. These findings provide practical implementations and potential mechanisms that ought to be considered as a solution to some issues faced by women in dealing with balancing their professional lives and their family duties. Therefore, the creation of female empowerment and social capital as a result of working online and running a business through social media need to be carefully understood as a whole process, rather than in individual cases. The findings of this systematic review are very helpful to be sought for future exploratory research investigations

that provide a diagram and an extensive background of female related internet-based life. This review supports a current level of knowledge by examining how such social media platforms affect the lives of women. It further recommends additional research to be conducted in the areas of gender disparities and the use of social media platforms, which is something that can be used to support the rising trend behind the use of social media among female entrepreneurs. As per our current understanding of this work and based on our extensive searches, little data was available regarding the participation of females in such activities and even less about gender gaps were presented. Therefore, we do hereby emphasize the need for future researchers to objectively evaluate the gender gaps in literature concerning the effect of social media and female entrepreneurship.

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A BUSINESS MODEL ANALYSIS OF BLOCKCHAIN TECHNOLOGY-BASED STARTUP[*]

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Abstract. Blockchain is drawing attention as rising technology with the advantages of security, transparency, and immutability by a decentralized network structure. However, blockchain technology is still an immature technology and lacks common standards. The researches on blockchain technology have been mainly focused on the financial sector but rarely applied to the supply chain in industry sectors. Especially, the blockchain technologies developed by technology entrepreneurs are still challenging to apply to an actual business due to a lack of understanding of the possibility of creating value. Therefore, it is necessary to provide technological entrepreneurs with an understanding of the business model and the feasibility of creating value with the new technology like blockchain. To address the issue, this study investigates how blockchain technology is effectively applicable and what value can be achieved from it. The purpose of this study is to analyze a livestock traceability system using blockchain technology and investigate its business model in terms of the value proposition, value delivery, and value creation. This study would provide insights into the business value creation of blockchain technology.

Keywords: Business model; blockchain technology; technology entrepreneurs; value proposition value delivery; value creation

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[*] *This business model analysis of blockchain technology is based on the Korean government project performed by a startup company, the Let's Combine.*

1. Introduction

Newly emerging IT technologies such as the Internet of Things (IoT), artificial intelligence (AI), and blockchain technology are becoming momentum to drive innovation and change in business models. Among them, blockchain technology is drawing attention as rising technology, referring to it as one of the top 10 strategic technology trends in multiple economic forums, including Davos, Gartner, and the World Economic Forum (Carson et al. 2018). Blockchain technology has the advantages of security, transparency, and immutability by providing Distributed Ledger function with a decentralized network structure. However, because blockchain is still an immature technology in its early stages and lacks common standards, blockchain technology has been rarely applied to the supply chain in industry sectors (Iansiti and Lakhani 2017). The blockchain technology seems to be concentrated in the financial industry at present, but many experts predict that it will revolutionize the present central structure system not only in the financial sector but also in the non-financial sector (Galvez et al. 2018; Tapscott and Tapscott 2017).

In particular, the blockchain technologies developed by technology entrepreneurs are challenging to apply to actual businesses due to the concerns over the possibility of creating value for companies and customers. It tends to be that many technology entrepreneurs often fail to fully understand the processes by which their technology can be applied to real business to create value and profit. Therefore, it is necessary to provide technological entrepreneurs with an understanding of the business model and the feasibility of creating value with the new technology. However, most of the blockchain research focuses on technical aspects while ignoring the managerial aspects of the application, value delivery, and value creation. Especially, there is a lack of analysis on how the blockchain technology could deliver value to the customers and suppliers of new technology companies or startups by the business model analysis. Moreover, studies focusing on application-oriented business analysis to blockchain are scarce (Risius and Spohrer 2017).

To address the issues, this study investigates how blockchain technology is effectively applicable and what value can be achieved from it. The purpose of this study is to analyze the livestock traceability system used blockchain technology from a business model perspective. This study provides an analysis of the blockchain-based traceability system along the lines of a business model in terms of the value proposition, value delivery, and value creation. This study would provide insights into the business value creation of blockchain technology.

2. Related Studies

2.1. Traceability system for livestock products.

There has been an increased risk of public health threats in livestock farms over the past two decades as severe diseases such as foot and mouth disease (FMD), and avian influenza (AI) has occurred. Therefore, many countries are building a framework for food traceability to reduce the risk of animal disease proliferation and to control imported animal products (Bai et al. 2017; Zhao et al. 2013). Many developed countries have implemented a mandatory traceability system in livestock industries for animals and their products to trace animal identification and manage breed records (Tonsor and Schroeder 2004). The Korean government announced the Act on Livestock Products on December 27, 2016 and established and operated a system called the Livestock Traceability System since then. It has replaced the previous livestock trend survey and food labeling system so that animals can be safely raised, deported, and consumed. The traceability system for livestock products ensures the safety of animal products and to strengthen the trust of consumers. The goal of the traceability system is to rigorously collect all information related to the movement of other products along the supply chain. This information is essential when faced with a food safety crisis and is vital for effective management of product recovery (Dabbene and Gay 2011). Especially, as food trade becomes globalization, the effective protection for

fraud related to counterfeit products is important for the health and safety of global consumers (Aung and Chang 2014).

However, there still have been reported various problems for the traceability management systems in terms of data handwriting, data transparency, data consistency, and deterioration in the distribution process. Also, errors will likely occur due to the dependency of reports from implementation entities, and there is a limit to rapid back-tracking if a problem is raised (Lee et al. 2017). The blockchain-based livestock traceability system has been proposed to solve these issues by collecting the history information from the object internet sensor in real-time and linking them to the blockchain (You 2018). Likewise, blockchain introduces a common technical language in the food chain, enabling product traceability through a complex supply chain from distribution to farm. The blockchain technology has been applied relatively to food chains such as food traceability systems. However, there is a lack of conventional techniques and standards for connecting different blockchains (Ciaian 2018).

2.2. Business Model Navigator

The concept of business model has been used in various disciplines and contexts (Zott et al. 2011; Osterwalder et al. 2005; Gassmann et al. 2014). The business model refers to a methodology that examines the possibility of creating a financial and social value of a business with the consideration of the customer's position and social environment. It undertakes to identify business failures and success factors and analyses to describe how the business of a company works (Zott et al. 2011; Osterwalder and Pigneur 2011).

Rapid changes in the environment and technology development have made significantly reduced the life cycle of companies, and companies must consider more complex social phenomena and numerous variables than in the past. In demand for changes in these business environments, the previous literature on business models has yet to establish precisely what common elements make up the business model (Gassmann et al. 2014). Moreover, many scholars recently emphasize the need to move beyond the conceptualization of business models to implementation (Al-Debei and Avison 2010; Teece 2010), because a conceptual business model is often impossible to respond quickly and actively to changes in the market.

Therefore, a business model requires to reflect the changes in the environment adequately and properly modify the relevant component. Gassmann et al. (2014) suggested a new business model called the Business Model Navigator with reducing components of business model to make it easy of use while providing a clear understanding of value proposition, delivery, and creation.

Table 1. describes the four components of the business model. The elements (What and Who) focus more on external aspects such as target customers and customer value, while the elements (Value and How) describe internal factors that distinguish a firm. In this study, we use the business model navigator to analyze the traceability systems applied with blockchain technology. Specifically, we intend to analyze the traceability system for livestock products using blockchain technology into three dimensions as the value proposition (what and who), value delivery (how) and value creation (value) based on this business model.

Table 1. Components of the business model navigator

Components	Question	Description
Who	Who are the target Customers?	- A clear definition of the target customers - A problem customer possesses - Classification of target customers
What	What value to provide to the customers?	- A description of products or solutions - How to solve a customers' problem through the products or solutions. - Profit or value to the customers - Creativity or differences toward competitors
How	How to deliver the value proposition?	- A description of the various resources or capabilities associated with the business. - How resources or competencies align with the company's value chain. - Critical core partners (including suppliers) to create value.
Value	How to generate revenue?	- The purpose of doing business. - The cost structure for business - Profit mechanism considering the cost structure for a business. - A comprehensive description to achieve profit generation.

3. Methodology

3.1. Design of livestock traceability system using blockchain technology

The livestock traceability system using blockchain technology consists of three different modes. Fig.1 shows the first mode is the transfer system. This system extracts historical information accumulated in the public data system and transfers it to the blockchain system. The second mode is a blockchain system. This system is based on the Hyperledger Fabric algorithm, which stores and manages the livestock history data in a blockchain and processes requests from other systems. The third system is the mobile app system. It is a system that handles the request of the user in mobile and receives the request from the blockchain system and relays it. Figure 1 describes the system configuration of the traceability system for livestock products.
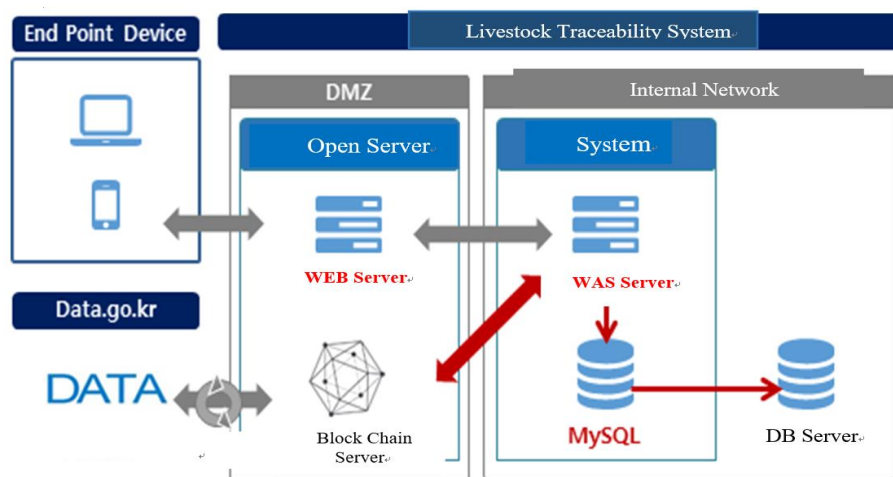
Figure 1. System configuration for Livestock Traceability System

In using blockchain technology, a server system built on Hyperledger Fabric Algorithm developed by IBM (Table 2). Hyperledger Fabric is a block-chain software developed by the Hyperledger Project. It is an open-source project to develop a distributed framework for enterprise use. It is not a stand-alone project but a collaborative project that the Linux Foundation supports organizations, promotions, and technology infrastructures (Morris et al. 2018).

Table 2. Blockchain server configuration

Division	Description
Web Server	• Apache HTTPD
WAS	• Tomcat 8.5
	• Java 8
DB	• MySQL
Blockchain	• Hyperledger Fabric
	• Docker
	• Node.js
	• MySQL
UI/UX	• Nexacro
OS	• Ubuntu
Mobile	• Android 4.4 above
BLE Beacon	• BlueTooth 4.0 above

The data that constitutes the chain is registered in the chain as the key of the animal identification number of the livestock product, the farm identification number, and the time point when the history occurs (YYYYMMDDHHMMSS), and the generated hash value is inserted into the table as a key to respond to the encryption and decryption quickly. Figure 2 depicts data of chain configuration to be registered in the blockchain data.
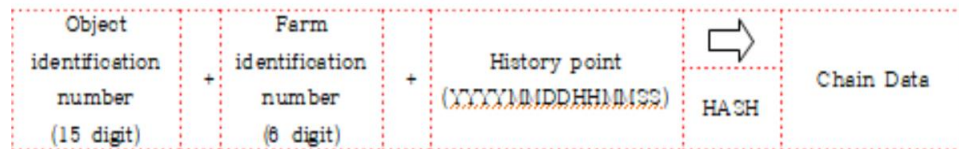
Figure 2. Chain configuration data to register in the blockchain data

The quality assessment system for livestock products is the base system to adopt the blockchain technology into the system. The livestock product quality system manages information and data about livestock products. It is public data provided by National Information Association (NIA, 2019). It should utilize the accumulated data in the process of converting the existing livestock traceability system into the blockchain-based system. Therefore, there is a need to take charge of extracting collected data and registering them in the blockchain server. In this study, the data is fetched once an hour by using the open API of livestock products registry, which is provided by the public data portal, and the registration operation is performed on the blockchain server.

The mobile application system queries historical data stored on blockchain servers and allows users with registration rights to register changes into blockchain servers. It communicates with blockchain servers through REST APIs provided by its servers. The mobile operating system is Android in this system. The system configuration is shown in Table 3.

Table 3. Mobile App. Operation environment.

Configuration	Description
Mobile	Samsung Galaxy Note 8
OS	Android 8.0 above
Development	Hybrid App
Server communication	REST API

3.2. Implementation

It is implemented through flow as Figure 3 to display historical data of livestock products through the mobile application. Data is extracted via the Open API of the public data portal, and REST APIs created for blockchain servers are registered based on the data required by the blockchain under the rules proposed by the Open API. To communicate with blockchain servers, users must first authenticate themselves. The authentication key is issued according to the results and used to communicate with the server. Finally, mobile applications visualize and expose results to users using the REST API provided by the blockchain server.
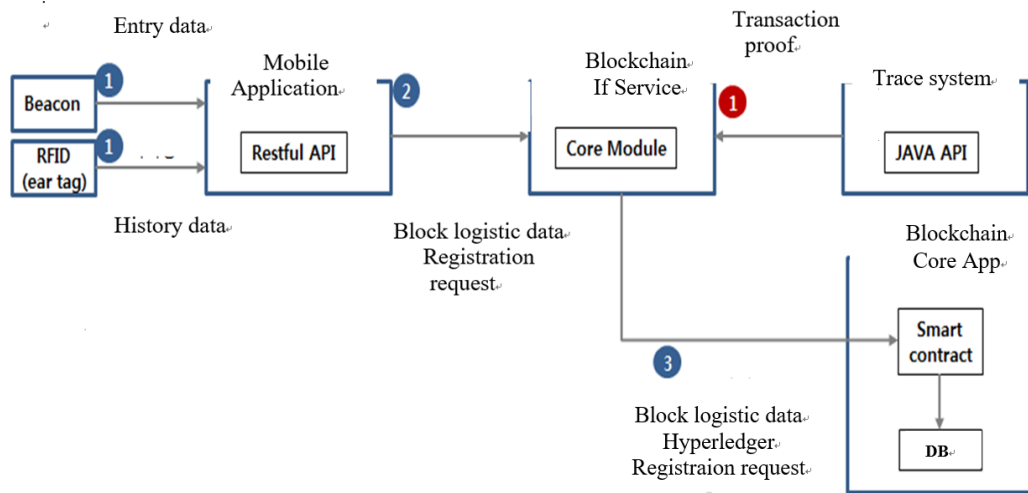
Figure 3. Implementation of Livestock Traceability System

The livestock history data provided by the public data portal is fetched once an hour and registered in the blockchain server. It is necessary to extract the corresponding data to the livestock traceability system from the public data portal through Open API. Moreover, communication with the blockchain server requires user authentication. The scope of use of search or data editing is determined according to the results of the authentication, and the corresponding authentication key is issued. This authentication key is used to

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communicate with the server. If a device has undergone the authentication process, it can receive a variety of data that is provided by blockchain servers depending on the level of authentication.

4. Findings

4.1. Value proposition

The livestock traceability system is a system necessary to prevent infection of farmers by recording and managing transactions of production, movement, and shipment of livestock farms. It enhances transparency in the distribution of livestock products by preventing them from selling, such as the false indication of origin and thus contributes to the development of livestock industry and related businesses. It is a system necessary to contribute to the healthy development of the food industry and associating business by preventing the sale of false signs. The Livestock Products Quality Assurance Agency has invested a considerable amount of money each year to maintain and improve the livestock traceability system and monitor the well-maintained system. However, the current livestock product traceability system used in this case study possesses the numbers of issues related to data transparency and deterioration in the supply-chain process. It needs to reinforce the consistency by the management agencies, and the entire system should be improved to be collectively managed and coordinated. Moreover, as shown in the supply chain for livestock products (Figure 4), the following improvements are required in the production and distribution phases:

☐ Livestock: Dissuade large-scale, factory-style meat and introduce automatic meat.
☐ Slaughtering process: the establishment of an organic safety management system by managing the transfer process of livestock and livestock products in the form of a chain
☐ Distribution sales: Improvement of unsanitary distribution practices. Establishing a partial meat and refrigeration distribution system and securing data reliability according to quantification.

In responding to this issue, this case study reveals that the blockchain livestock traceability system has shown that it is not lagging in performance and function. Also, historical data accumulated in blockchain proved that it is impossible to correct under any circumstances, thus improving problems such as handwritten errors and redundancy.

The blockchain-based traceability system enhances security and is a low-cost way of managing and tracing for livestock products transactions. It also demonstrates a more transparent and, at the same time, a more secure way of tracking flows of products in livestock products supply chain than the existing DBMS based system. Notably, the blockchain-based traceability system enables distrust customers in the product information to make participating in business models.

Breeding	Slaughter	Packing Process
✓ Birth notification ✓ Attaching a stamp ✓ Transfer report ✓ Death report	✓ Slaughter report ✓ Attaching Hysteresis Label ✓ Slaughtering process report ✓ DNA sampling	✓ Display of partial meat or wrapping paper history number ✓ Packaging, sales and export performance management and computer report

Sale
✓ Hysteresis number displayed on packing paper or meat sales sign ✓ Record and manage transaction details

Figure 4. The supply chain for livestock products

4.2. Value delivery

The system structure of the traceability system for livestock products was built with a database management system (DBMS). The DBMS can edit data only by an administrator with permission to access the data. The problem of the livestock product traceability system is as Table 4.

Table 4. The problems of DBMS based traceability system

Problems	Description
Manual data management	At the farm site, there is still a lack of a computerized system for raising livestock and reporting immediately. Manual bookkeeping and vaccination certificate Data input due to handover notification requires repetitive verification work and work efficiency is reduced. There is a high possibility of data error due to handwriting input.
Ensure data transparency	Current Livestock Resident Registration Data is data that is processed by processing the occurrence data, and it is challenging to trace original data, and data distortion due to processing is possible. It is also necessary to verify data on small-sized workplaces with 5 or fewer employees.
Verifying data consistency	Although the present Livestock Traceability System focuses on data collection, it has accomplished the achievement of data infrastructure construction, but it needs analytical functions such as food tracking based on the collected data.
Expansion of management targets such as deterioration in the distribution process	Due to the improper performance of temperature and humidity control, it is difficult to determine whether the product has deteriorated during the distribution process.

The fundamental problem is that since the livestock product traceability system is operated based on reporting, some farmers are experiencing difficulties in their data collection due to delayed reports, neglected land management, the omission of information, and modification of data. This problem may lead to abnormalities in the number of digits due to the direct input and edit by farmers regarding their livestock breeding information.

This chronic problem of the livestock traceability system has been confirmed through several examples using blockchain technology to collect and manage data, to secure the confidence, and to build an efficient management system. Therefore, these problems with the livestock traceability system can be solved by utilizing the various security issues of blockchain technology, and by enabling the establishment of a reliable and efficient management system. In this case study, we replaced the existing livestock traceability system using DBMS with blockchain and proved that the system based on the blockchain could improve problems with current systems such as editing errors, security, and transparency. Table 5 describes the benefits we have revealed in the blockchain-based traceability for livestock products and these are consistent with the advantages shown in the previous research (Olsen et al. 2019; Anonymous 2017).

Table 5. The characteristics of blockchain

Characteristic	Description
Suitability of database	It records transactions and is well suited for recording transformations.
Disintermediary	Since the notarization of the third party disappears, it is economical without a broker or unnecessary commission.
Transparency	Since all participants share information; basically, all transactions are developed and transparent. The level of integrity is high.
Scalability	It is easy to build and extend by open source, which can save IT costs.
Data quality	The frequency of fraud is low, and the risk of getting caught is high.
Robustness	Duplication of data is built into the system.
Trust	Higher trust due to the higher degree of data integrity and transparency.

As shown, blockchain may be appropriate to record certain kinds of information, but there may be information that is more appropriate to use existing databases. Therefore, before any organization adopts any method, it is essential to understand what needs for its database and to identify the advantages and disadvantages of each technique.

4.3. Value creation

Having this case study of the blockchain technology applied in the existing traceability system, we have identified several values and feasibility regarding customer satisfaction and fulfillment. The main customer of this case study is the Korea Institute for animal products quality evaluation where implements a livestock product history system. The institute aims to provide a safe environment for consumers to eat with confidence by ensuring the safety of livestock products. With this blockchain-based livestock traceability system, all related data are able to be efficiently and accurately manage, thus providing the right food environment and consumer satisfaction. From the view of a technology startup that delivers this blockchain-based livestock traceability system, not only the financial gain from the contractors but a good relationship with public institutions based on the performance of delivery or procurement of this system can be established. Moreover, further value can be expected in the future such as acquiring qualified workforce and improving technology development.

In responding to the customer value with blockching technology system, cost reduction, and the improvement of customer perception on the quality are often the major goals to deal with (Kshetri 2019). The blockchain-based livestock traceability system could provide these requirements. First, it brings customers' trust and engagement in data and systems. The food industry is becoming more customer-oriented to response fast to the needs of

customer demand. However, having struggled with food scandals and incidents, consumers have been extremely distrustful to rely on the accumulated data on livestock products that have raised various diseases. The blockchain technology provides high-quality data from birth to death of livestock products, production method, packing data, and sales information that most customers require to see in the traceability systems. The data fraud that can cause serious disease is detected and deterred effectively through the use of blockchain, and though customers will be able to rely on the information of the traceability system (Jin and Zhou 2014). Second, blockchain makes it possible to share all information with all participants, which means all transactions on the process are transparent. This transparency of the supply chain for livestock products could result in a consistent operation and the cross-management. Especially it could be effective in the context of cross-border food transactions (Barnard 2017).

Thus, the blockchain deployed in the food supply chain can handle the crisis, such as food scandal more efficiently (Kshetri and Loukoianova 2019). Third, blockchain can be the key to maintain a cost-effective method and enhance the usability of the system. With a blockchain system, companies can reduce or eliminate transaction costs and easily use external resources as rich as internal resources. Also, blockchain can be effective in managing the food crisis, and it will ultimately result in lower costs for creating and providing higher value. In addition, having such benefits and efficiencies that blockchain could provide, it would be able to change the way a business organizes and manage (Tapscott and Tapscott 2017). Therefore, blockchain technology in traceability systems could result in the interest of various companies and consumers in other industry sectors as well. As showing in this case study, using blockchain will also trigger companies to develop into new business models and improve valuable services to create other beneficial services.

Conclusions

Although blockchain technology becomes the most trending technology and receives a lot of attention, the knowledge of blockchain on how it is applicable and how the value can be created has not been explored in a great deal. In responding to the research demand in question, this study identifies the blockchain-based traceability system for livestock products from the business model perspective. Having analyzed the business model with a case study, we suggest the feasibility and value creation of the livestock traceability system using blockchains. As implementing blockchain technology into an existing traceability system, it also provides an insight into the reliability of blockchain technology and possibilities of blockchain-based system in the market. We have identified that using blockchain technology to collect and manage data and establish an efficient management system can solve the chronic problems of existing animal tracking systems. In short, while blockchains are still considered as a new technology, this study suggests that the blockchain is contributing to value creation by providing practical applications where many technology entrepreneurs can gain credibility.

From this analysis, we have recognized that the blockchain technology can be applied in various fields. However, there are few actual applications in financial sectors and food sectors, and there are no best practices for leading markets so far. Moreover, there is a still lack of a study on analyzing the business feasibility for value creation and revenue generation from the eyes of a technology entrepreneur. Ultimate business value can be reached with interactive consequences of other constitutive factors. However, as presented in this study, the individual characteristics of blockchain applied for each application domain will facilitate mechanisms for adjusting blockchain to suit the application's actual needs and utilization of appropriate blockchain (Casino et al. 2019). Companies interested in designing blockchains, they should set the goal and ask themselves questions such as what value to capture with it, who to serve the value and how to deliver it (Felin and Lakhani 2018). Companies can use various methodologies to analysis such questions in a strategic way, and, especially startup companies with expertise in high technology should carefully consider value creation for associated stakeholders with examining business model analysis.

This study is meant to encourage new technology entrepreneurs to provide business feasibility of technology as applying new blockchain technology into the traceability system. However, this study has limitations to be considered in future research. The blockchain technology has great potential to be extended in various industrial sectors, but it is hard to generalize the outcome of its advantages since the common standards and language is the lack at this point. Moreover, the business model analysis should be considered not only for the technology benefit itself but to view various complicated factors in a digitally networked environment. This study brings in simplifying to showing the advantages of blockchain technology. In future research, the business factors in different industries also need to be counted to generalize the feasibility of the new technology into the business model.

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GREEN PRODUCT COMPETITIVENESS AND GREEN PRODUCT SUCCESS. WHY AND HOW DOES MEDIATING AFFECT GREEN INNOVATION PERFORMANCE?*

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Abstract. Among the global warming issue and production process using machinery and modern technology, these Batik SMEs still strongly exist. This research aims at empirically proving the influence of green product competitiveness and green product success on green product innovation performance through green product competitiveness and green product success as the mediating variable. This research employs a survey approach and questionnaire to collect information related to the research samples. The quantitative approach in this research is conducted by testing the research hypotheses. 223 respondents consisting of Batik SMEs' owners/ managers in Yogyakarta, Indonesia are taken as the samples with a purposive sampling method. The hypotheses test results show positive and significant correlation between green product innovation and green product competitiveness and green product success. Green process innovation positively, significantly influences green product competitiveness and green product success. Green product competitiveness positively, significantly influences green innovation performance. Green process success positively, significantly influences green innovation performance.

Keywords: green product competitiveness; green product success; green product innovation performance; green product competitiveness

1. Introduction

Issues of business sustainability oriented to environmentally friendly operational activity become an interesting topic of research discussion among the business dynamics and escalating competitive advantage (Wang 2019; Soewarno et al. 2019; Huang and Li 2018). Some other research issues also explain that the use of materials which may directly affect global warming (Dougherty and Dunne 2011), use of carbon and utilization of non-environmentally friendly technology (Shane and Ulrich 2004) also become an interesting research study which needs further study. From customers' perspective, customers currently tend to prefer natural and environmentally friendly products, so that such products will have a good image to the customers' satisfaction (Chen 2010).

Corporate role becomes very important in creating innovative products which respond to customers' expectation by creating peculiar, excellent and environmentally friendly products (green product innovation), so that they become company's distinctive identity (Lee et al. 2013).

Researches on green innovation have also become an interesting subject matter in measurement of green innovation performance (Chang and Chen 2013; Cao and Chen 2018; Zhang and Zheng 2018; Soewarno et al. 2019). Green product innovation performance becomes corporate strategy to attract customers by adopting the issue of environmentally friendly production material utilization. Chang's study (2011) explains how important a business organization's corporate environmental priority in achieving competitive advantage through green innovation process is. Moreover, some literatures and other empirical studies have recorded the correlation between innovation and environmental issue (Lin et al. 2014), economic activity and environmental sustainability (Lavrinenko et al. 2019).

Other literature states that the correlation between green innovation and green performance presents research results which remain a debate among researchers. Some previous study results find the importance of green innovation in improving corporate profitability and reducing risk, like the study conducted by (Lin et al. 2013; Soewarno et al. 2019; Tariq et al. 2019). However, some other studies find that green product innovation does not affect performance (Testa and D'Amato 2017; Trumpp and Guenther 2015). Based on the findings, the correlation between green innovation and corporate performance remains a debate and requires further research. This study attempts to give an answer to the inconsistent findings of the results of previous studies on the effect of green innovation on business performance by building an empirical research model through mediating role of green product competitiveness and green product success in improving of green innovation performance.

Some other studies state that green innovation may be implemented through three green innovation activities, which are green product innovation, green process innovation and green technological innovation (Lin et al. 2013; Chen et al. 2006a; Norberg-Bohm 1999). This research attempts to empirically prove the role of green product innovation and green process innovation in improvement of product innovation performance, particularly with SMEs. The role of green innovation in improving product innovation performance in this research is tested to the scope of SMEs. Another research also explains that creation of product advantage and improvement of SMEs networking and green marketing activity need to be developed to improve innovation performance (Chahal et al. 2014; Mellett and Kelliher 2018). Moreover, another study states that the existence of SMEs may make an important contribution to economy advancement (Buzavaitė et al. 2019).

Factors which may affect green product innovation performance are, among others, green product competitiveness and green product success (Wong 2012a). Moreover, the study conducted by (Wong 2012a) finds that it is important for a company to create green product competitive advantage and green product success. Green innovation activity may be performed in corporate environment through innovation policy implemented (Foreman-Peck 2013).

This research focuses on Batik SMEs in Indonesia that uses natural materials in their production process. Among the global warming issue and production processing using machinery and modern technology, these Batik SMEs still strongly exist.

This research makes an important contribution to the body of knowledge of how SMEs optimize their internal resources capabilities and through empirical testing of important mediating role aiming for green product competitiveness and green product success in completing the gap research of the role green innovation in green product innovation performance that remains a debate to previous researchers. Green product competitiveness and green product success in this study serve as the construct of consequence of green product innovation and green process innovation which serve as the mediating variable of correlation between green product innovation and green process innovation in green innovation performance. This study used a quantitative approach. Statistical

testing using the SEM structural equation modeling method tested the effect of green product innovation and green process innovation on green product competitiveness, green product success, and green innovation performance.

2. Literature Review and Hypotheses Development

2.1. Green Product Innovation and Green Product Competitiveness

Green product innovation becomes an important factor of business in innovation collaborative activity (Chen and Hung 2014), green organizational identity (Chang and Chen 2013), achieving SMEs' competitive advantage and performance (Lin et al. 2013). Green product innovation may be defined as organization's effort to develop its business by maintaining environmental function and response to market demand which may affect corporate long-term strategic orientation in realizing corporate performance (Lin et al. 2013). Meanwhile, Ar (2012) states that green innovation as related business activity focuses on eco-innovation concept and various areas related to business environment. Furthermore, it is explained that the green concept has three dimensions, which are green product innovation, green process innovation and green managerial innovation. This study emphasizes green product innovation and green process innovation.

Dangelico and Pujari (2010) state that green product innovation is acknowledged as an important factor to achieve business growth, environmental sustainability, and better quality of life from utilizing business environmental elements. Furthermore, it is stated that company must understand green product innovation as part of business interaction in maintaining sustainability and make it corporate strategy. Meanwhile, another study developed by Huang et al. (2016) finds that adoption of green product innovation developed by company is determined by internal green capabilities, R&D intensity and company size factors. This requires a thorough understanding of internal factor in developing green product innovation. It is also important for organization to build green product innovation and green process innovation in achieving their product advantage and success in market competition (Kam and Wong 2012).

Other researchers also state that green innovation becomes an important strategy for organization to create their unique product in customers' market (Dangelico and Pujari 2010; Lin et al. 2013). Product with certain unique value and environmentally friendly product advantage (green product innovation) becomes company's special bargaining value to customers, thus it has advantage over competitor's product. There is even a close correlation between the market orientation of a company which develops green environment and company's strategy in adopting environmental issue in environmental product quality advantage (Chen et al. 2015). Another study developed by Nuryakin and Ardyan (2018) explaint that SMEs had an essential role in developing market expansion and marketing performance. Hence, the hypothesized model in this study will be:
H1a. Green Product Innovation has a positive effect on green product competitiveness.

2.2. Green Product Innovation and Green Product Success

SMEs need to strengthen their product lines in order to survive in competitive market through innovation creation in encountering rapid and unavoidable change process (Simpson 2004). SMEs also has potential to develop product pursuant to market potential by building product differentiation through market resources allocation strategy in view of product creation potential for customers (Bradley and Sean 2001). One of the strategies in creating product differentiation for customers is to build green innovation which is able to respond market demand. The study conducted by Zhang and Zheng (2018) emphasizes green innovation activity consisting of input process in product creation with proportionally degradable material, and also a small material fraction benefitting the business.

Another study states that market demand of green product is business's important key to achieve the degree of strongly green product innovation (Lin et al. 2014). It is further explained that market demand of green product becomes corporate power to perform a strategy of and adaptation response to environmental changes and issues. Chen and Hung (2014) even state that organization, in the process of creating green product innovation, needs to build their relational social capital with their business network, so that a product with added value in customers' domain may be created, thus their competitive advantage will be realized through networking collaboration (Nuryakin et al., 2018).

The study conducted by Chang and Chen (2013) explains that green organizational identity may also determine SMEs' green innovation success. Moreover, it is stated that green organizational identity makes positive contribution to encouraging green innovation directly through organization's real commitment to protecting SMEs' environment. Other researchers also find that it is important for organization to build long-term business by prioritizing environmental factor and green product success (Wong 2012b; Ar 2012; Dangelico and Pujari 2010). Organization's concern about environmental aspect will affect company's reputation and, thus, maintain its performance in customers' market (Chen 2008a). Hence, the hypothesized model in this study will be:
H1b. Green Product Innovation has a positive effect on green product success.

2.3. Green Process Innovation and Green Product Competitiveness
Competitive advantage refers to company's superior position in the market to competitors (Porter 1985). It is important for company to build unique strategy in business competition among environmental uncertainty and competitive pressure. Company needs to strengthen and have resources based view as reflected in their internal capabilities in order to have higher advantage over competitors (Clulow et al. 2003). Other researchers explain that resources based view emphasizes the importance of internal resources optimization to achieve competitive advantage in controlling market aspects (Barney 1991; Caldeira and Ward 2003; Fahy and Smithee 1999). The resources are deemed rare, difficult to imitate and irreplaceable, thus they will achieve competitive advantage for the organization. This study empirically proves the role of green process innovation in achieving competitive advantage. Green process innovation is part of corporate internal capabilities in achieving competitive advantage, making the organization hardly imitated and replaced.

The research conducted by Chew et al. (2008) emphasizes the importance of core capabilities for SMEs to achieve their performance and competitive strategy advantage. Core capability is the key for SMEs to achieve their uniqueness by utilizing internal resources through innovation capability, market capability and production capability activities. Meanwhile, Chen (2008c) in his study finds that the three forms of green intellectual capitals - green human capital, green structural capital, and green relational capital - affect corporate competitive advantage. The result of the same research conducted by Pujari (2006) finds that greening process innovation needs to be performed by organization to achieve the degree of new product development and product success in the market. Organization will have their competitive advantage and reputation if they perform greening process innovation activity. Competitive advantage in the scope of SMEs is also determined with product launching (Ledwith and O'Dwyer 2008). Furthermore, it is also explained that product launching affects new product performance. Hence, the hypothesized model in this study will be:
H2a. Green Process Innovation has a positive effect on green product competitiveness.

2.4. Green Process Innovation and Green Product Success
Innovation, marketing focus and organizational learning developed by company determine their success in product creation (Lertpachin et al. 2013). It is further explained that a company which focuses on and invests in innovation activity will achieve competitive advantage in the market which gets more open and fuller of competition dynamics. Meanwhile, open innovation in some companies is the duty of R & D department, thus it requires coordination between lines in organization (Suh and Kim 2012). The success of green product launch is company's activity in view of green product potential developed by the company in their operational process.

Company even needs to design their innovation so that the product created will achieve success in the market (Fernández-Mesa et al. 2013).

Green manufacturing positively affects green product success (Sezen and Çankaya 2013). It is further explained that organization's production processes is the influence of green manufacturing on corporate sustainability performance (economic, environmental, and social). It is through eco-process innovation that company achieves corporate sustainability as reflected with product success in the market. Meanwhile, Soewarno et al. (2019) prove and build green innovation strategy reflected in the form of green organizational identity in achieving environmental organization legitimacy and achieving a better green innovation performance degree and improvement. Organization which builds green innovation strategy will find it easy to achieve its identity by handling environmental issue which leads to long-term business strategy success. Value creation process in green innovation activity may also be performed through supply chain developed by company's managers (Shamah 2012).

This study focuses on green process innovation as in the previous literature reviews conducted by (Chen et al. 2006b; Wong 2012). This study is conducted with SMEs which develop Green process innovation concept in creation of company's product. The study conducted by Enzing et al. (2011) finds that innovation affects product success in the market. Moreover, other literature reviews also state that innovation is very helpful for organization to achieve product position against competitors (Bakar and Ahmad 2010; Chen 2008b; Salavou and Avlonitis 2008). Hence, the hypothesized model in this study will be:
H2b. Green Process Innovation has a positive effect on green product success

2.5. Green Product Competitiveness and Green Product Innovation Performance
Strategy at business level in creation of competitive advantage among business competition is highly affected by business environment and competition dynamics (Nandakumar et al. 2010). Organization which adapts to business environment will find it easy to hold down its operational costs and create product differentiation. Meanwhile, Jamsa et al. (2011) state that in the scope of SMEs, organization sustainability is also determined with utilization of networks as a source of opportunities and utilization of resources and their networks. Organization also needs to provide services and respond to customers for change towards sustainability (Buzavaitė et al. 2019).

Research on SMEs' constraints in developing competitive advantage among industry competition is likely to remain an interesting discussion (Simpson 2004; Singh and Garg 2008; Jamsa et al. 2011). SMEs need to build their uniqueness through creation of product which may attract their customers and, thus, improve their product success in customers' market. One of which is to create environmentally friendly product (Karlsson and Olsson 1998). It is even clearly stated that green product innovation makes an important contribution in improvement of competitive advantage SMEs and product creation success. Hence, the hypothesized model in this study will be:
H3:   Green product competitiveness has a positive effect on green product innovation performance

2.6. Green Product success and Green Product Innovation Performance
Product success in acquiring market share is influenced by how successful the product launch is (Ledwith and O'Dwyer 2008). Moreover, it is stated that product launch is one characteristic of product advantage developed by a company in performing innovation process. The success of new product or new service is an important concern to organization since innovation activity is performed by company, thus it significantly encourages organization to adapt to changes in the market, technology and competition, including through creation of green product (Simpson 2004). Meanwhile, Nuryakin (2018) in his study finds that product innovation makes an important contribution to company in achieving competitive advantage.

In line with the opinion, Yu et al. (2018) in his study emphasizes how important organization's operational capability and productivity in achieving performance through response to the increasingly dynamic environment is. A business organization also needs to focus on its organizational culture in achieving green innovation process and green performance (Wang 2019; Bombiak 2019). It is even explained that organizational green culture formation makes a big contribution to achieving green performance and competitive advantage. Moreover, the study explains that green innovation has completely positive effect on green performance and competitiveness under environmental pressure.

Green product innovation is also determined by how successful a company in developing its innovation, response to market demand, achieving potential market and product innovation launch timing is, particularly for SMEs and medium industries (Lin et al. 2013; Sezen and Çankaya 2013; The green tinge of success: How green innovation can give micro-firms a competitive edge 2019; Tariq et al. 2019). Hence, the hypothesized model in this study will be:

H4: Green product success has a positive effect on green product innovation performance

This study investigates the influence of green innovation (green product innovation, green process innovation) on green product innovation performance relationship. This research also investigates the mediating effect of green product competitiveness and green product success. This study contributes to the body of knowledge of resource-based view theory and explores how green innovation's effect on green product innovation performance is when it is subject to the mediating role of green product competitiveness and green product success in the scope of SMEs. Based on literature review and previous studies, we have developed the research model in Figure 1. Figure 1 shows the empirical research framework below.
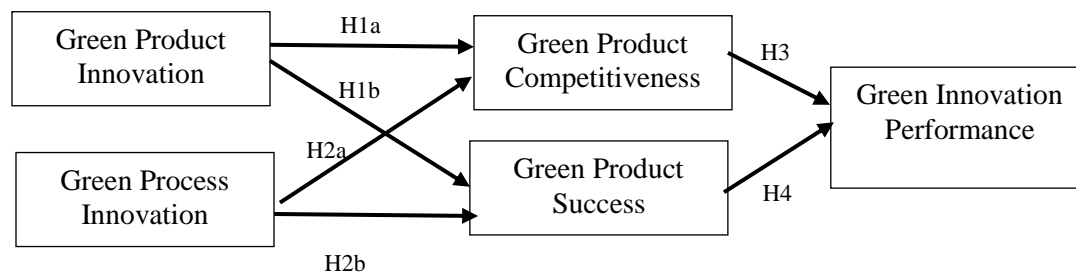
Figure 1. Empirical Research Model

3. Methodology

3.1. Research Design

To test this research's four hypotheses, the data are collected through a survey conducted with Batik SMEs in Yogyakarta, Indonesia which use natural materials. The reasons to choose Yogyakarta are, first, in the Region, there are business players of Batik SMEs that use natural production process using local raw materials. Second, the region has very good economy growth as reflected with increasing growth of Batik SMEs with natural materials. Third, regional government's support to developing SMEs developing zone drives the economy growth of its surrounding. This research employs a survey approach with questionnaire to collect information of research samples. The quantitative approach is employed in this research to test the hypotheses.

3.2. Sample and Data Collection

This research aims at empirically proving the effect of independent variable on dependent variable. This study also tests the mediating role in the relationship between research variables. This research takes SMEs which operate in Batik manufacturing with natural materials and develop a production system using environmentally friendly materials as its samples. There are 223 respondents consisting of Batik SMEs owners/ managers in

Yogyakarta, Indonesia. The sample of 223 respondents in this study was part of 638 populations of natural-based batik industry owners in Yogyakarta and surrounding areas. The sample used in this study was 223 samples with the reason that the number had met the criteria for the number of sample adequacy recommended for the maximum likelihood estimation (MLE). Average variance extracted of indicator (AVE) standards with a minimum sample size of up to 150 with the standardized loading requirement was estimated to be less than 0.7, and the value of communality was 0.5 (Hair et al., 2006). The data are collected by distributing questionnaires to the samples. The samples are taken with a purposive sampling method in consideration of the scope of SMEs which use natural materials in their production process.

3.3. Measurement of Construct
This study employs a quantitative research design to test the hypotheses and empirical model. It generally lacks of methodology to analyze the mediating role of variables in this study on the topic of green product innovation and green process innovation. A literature review is conducted to identify the validity and reliability of and measure the five related constructs, such as green product innovation, green process innovation, green product competitiveness, green product success and green innovation performance as described below with SME samples. The five constructs are measured with a seven-point Likert scale (1 strongly disagree – 7 strongly agree).

3.4. Dependent Variable
There are two endogenous constructs in this research: green product innovation and green process innovation. Although the two constructs are of the dimension of green innovation, but each has different definition. Green product innovation in this research is defined as environmental utilization and management in product innovation activity while protecting the environment (Chen et al. 2006a) and measured with 5 enquiring items, which are: (1) Utilization of environmentally friendly material in production process, (2) utilization of environmentally friendly packaging, (3) Utilization of degradable material, (4) Concern for environmental sustainability, and (5) Utilization of natural materials in new product.

Green process innovation is environmental utilization and management in innovation process activity with a concern for long-term oriented protection and utilization of environmental elements (Chen et al. 2006a). Green process innovation in this study is measured with 4 enquiring items, which are: (1) Utilization of human capital in production, (2) Use of degradable materials in production, (3) Utilization of environmentally friendly natural technology, and (4) Concern for energy saving in production process.

3.5. Independent Variable
Green innovation performance refers to the study conducted by Chang and Chen (2013) which explains green innovation performance as the result of green innovation activity by utilizing materials which do not lead to air pollution, is energy saving, is effective to reduce emission, and uses degradable materials. Green product innovation in this study is developed with 5 enquiring items, which are: (1) Advantageous performance in creation of new product with unique value, (2) Attempt to create something new with local unique materials in creation of product which may attract customers, (3) Creation of new product with unique design fancied by customers, (4) Product motive to be adapted to local value, and (5) Continuous development for new product.

3.6. Mediating Variable
Green product competitiveness is product's uniqueness developed by company hardly imitated by competitor (Chang 2011). Green product competitiveness in this research is measured using 5 enquiring items, which are: (1) Unique (different) product design compared to that of competitor, (2) High product quality, (3) Product created is superior to that of competitor, (4) Product has added value compared to that of competitor, and (5) Advantageous method of production process compared to that of competitor.

Green product success is defined as company's focus in developing environmentally friendly product which leads to financial and environmental success (Wong 2012a). Green product success in this research is measured using 5 enquiring items, which are: (1) New product satisfies customers'/market expectation, (2) Product conforms to customers' current trend/desire, (3) Product results in more income, (4) New product provides higher profit than that of competitor, and (5) Product success in the market.

4. Result

4.1. Screening and trimming data
Data screening and trimming in the research is conducted before thorough advanced analysis to ensure data feasibility. The data are screened by testing the consistency of each respondent's answer by observing extreme standard deviation, and are trimmed by observing the consistency of respondent's closed answer to open answer. From the results of data screening and trimming with 223 samples, only 193 respondents are ready for further data analysis. The questionnaires are distributed with letter cover to 223 business players of Batik SMEs that use natural materials for 3 months.

4.2. Descriptive statistics and correlations
Table 3 explains the descriptive statistics and matrix correlation of all research variables. Table III also shows the mean value, standard deviation and correlation in support of testing of models H1 to H4. The statistic test in this research does not find any multicollinearity symptom in the research model testing. The results of calculation of each of mean value, standard deviation, and matrix correlation are given in Table 1. Table 1 explains positive correlation between green product innovation, green process innovation, green product competitiveness, green product success, and green innovation performance.

Table 1. Mean, Standard Deviation and Correlation of the Construct

Construct	Mean	Standard Deviation	1	2	3	4	5
Green product innovation	5.449	.587	1.000				
Green process innovation	5.156	.598	.632**	1.000			
Green product competitiveness	5.111	.555	.564**	.518**	1.000		
Green product success	5.273	.532	.561**	.504**	.528**	1.000	
Green innovation performance	5.090	.628	.585**	.650**	.571**	.559**	1.000

*p <0.05, **p<0.01.

4.3. Validity and Reliability Tests
We employ the confirmatory factor analysis to test the validity and reliability of the research instruments and prove the empirical models. The construct reliability is tested by observing the Critical Ratio (CR) value. Further test is conducted to determine the Construct Reliability (CR), Average Variance Extract (AVE) and Discriminant Validity (DV) values of the exogenous and endogenous constructs. The CR value of all constructs ranges from 0.809 to 0.897, thus the test is statistically valid and reliable (Wang 2019).

The calculation results of construct validity, average variance extract, and discriminant validity are presented in Table 1. Based on Table 1, we may conclude that the constructs of green process innovation, green product innovation, green product competitiveness, green product success and green product innovation performance fulfill the criteria, that construct reliability value is higher than 0.7, average variance extract value is higher than 0.5, and discriminant validity value is higher than 0.7. Below is the calculation results conducted using AMOS Program of the validity and reliability using the confirmatory factor analysis (CFA) in figure 2 and figure 3.
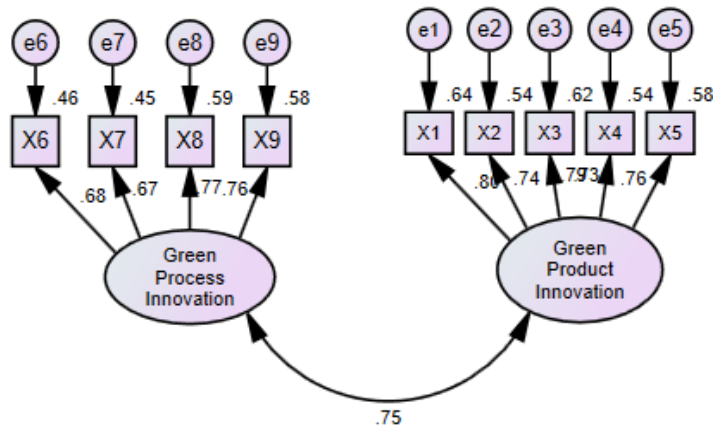
Chi-square=41.663;Probability=.027;DF=26;CMIN/DF=1.602;GFI=.955;AGFI=.921;CFI=.980;TLI=.973;RMSEA=.056

Figure 2. Confirmatory faktor analisis Eksogen Construct
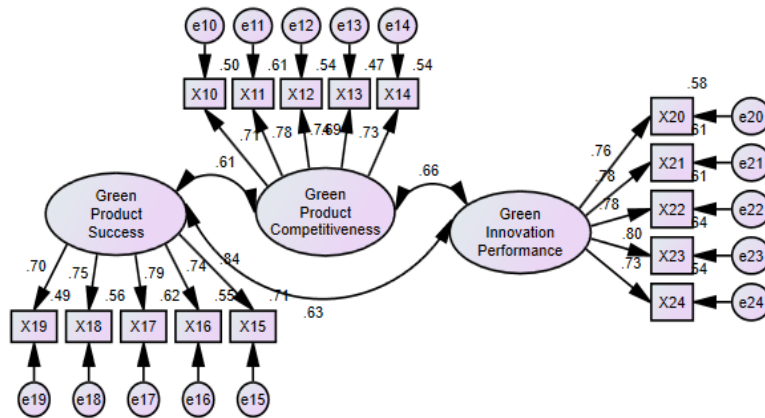
Chi-square=100.147;Probability=.159;DF=87;CMIN/DF=1.151;GFI=.939;AGFI=.916;CFI=.991;TLI=.989;RMSEA=.028

Figure 3. Confirmatory faktor analysis Endogen Construct

In brief, the results of validity and reliability tests in figure 1 and figure 2 explaining the loading factor value of exogenous construct and endogenous construct are presented in table 2.

Tabel 2. Construct Reliability, Variance Extract, and Discriminant Validity Construct

Construct	Label	*Loading Factor*	CR	VE	DV
Green Product Innovation	X1	0.797	0.875	0.567	0.753
	X2	0.738			
	X3	0.785			
	X4	0.733			
	X5	0.763			
Green Process Innovation	X6	0.676	0.812	0.580	0.762
	X7	0.672			
	X8	0.769			
	X9	0.762			
Green product competitiveness	X10	0.708	0.851	0.578	0.760
	X11	0.782			
	X12	0.736			
	X13	0.689			
	X14	0.733			
Green product success	X15	0.843	0.875	0.566	0.752
	X16	0.743			
	X17	0.786			
	X18	0.746			
	X19	0.699			
Green Innovation Performance	X20	0.762	0.880	0.564	0.751
	X21	0.783			
	X22	0.782			
	X23	0.798			
	X24	0.733			

According to the calculation results of construct validity in Table 1 above, we may conclude that the constructs of green product innovation, green process innovation, green product competitiveness, green product success and green innovation performance fulfill the criteria, that the loading factor value is higher than 0.6, thus the five constructs are statistically valid (Hair et al, 2006).

4.4. Hypotheses Test

This research utilizes Structural Equation Modeling to analyze the research design and test the hypotheses using AMOS 21.0. The Structural Equation Modeling of this research examines the two categories of data analysis, the measurement research model and the structure research model. The results of this study are given below. Table 2 shows the results of structural model test in this research. Overall, model fit measurement with structural equation modeling indicates that the model fit values are good, which are (GFI = 0.873, AGFI = 0.844, RMSEA = 0.046, CFI = 0.958, TLI = 0.953). Overall, the paths estimated test shows that all the hypotheses significantly show results which support the hypotheses test. The results of the path analysis test in this test show >1,980 and the significance value for each path <0.05, so the results are statistically significant.

The results of full model test in this research are shown in figure 4. The four hypotheses developed in this research, after the test, show positive and significant results, that green product innovation positively,

significantly influences green product competitiveness and green product success. Green process innovation positively, significantly influences green product competitiveness and green product success. Green product competitiveness positively, significantly influences green innovation performance. Green process success positively, significantly influences green innovation performance.

The results of each hypothesis test are explained in the table 3 below.

Table 3. The testing of Hypothesis Model

Hyphotesis	Proposed effect	Path Coefficient	Sig	Result
h1a	Positive	3.446**	0.000	h1a is supported
h1b	Positive	3.688**	0.000	h1b is supported
h2a	Positive	2.961**	0.003	h2a is supported
h2b	Positive	2.335*	0.020	h2b is supported
h3	Positive	5.461**	0.000	h3 is supported
h4	Positive	4.812**	0.000	h4 is supported

*p <0.05, **p<0.01.

Table 2 explains the standardized path coefficient value in the test of each exogenous construct with the endogenous construct. The test results empirically prove what forms the 4 hypotheses. The hypotheses developed in this research are the correlation between green product innovation, green process innovation, green product competitiveness, green product success and green innovation performance.

The statistic test h1a finds the path coefficient value of 3.446 and significance value of 0.000, showing that green product innovation positively, significantly influences green product competitiveness. The statistic test h1b finds the path coefficient value of 3.688 and significance value of 0.000, showing that green product innovation positively, significantly influences green product success.

The statistic test h2a finds the path coefficient value of 2.961 and significance value of 0.003, showing that green process innovation positively, significantly influences green product competitiveness. The statistic test h2b finds the path coefficient value of 2.335 and significance value of 0.000, showing that green process innovation positively, significantly influences green product success.

The statistic test h3 finds the path coefficient value of 5.461 and significance value of 0.000, showing that green product competitiveness positively, significantly influences green innovation performance. The statistic test h4 finds the path coefficient value of 4.812 and significance value of 0.000, showing that green product success positively, significantly influences green innovation performance. The results of each hypothesis model test are given in figure 4 below.
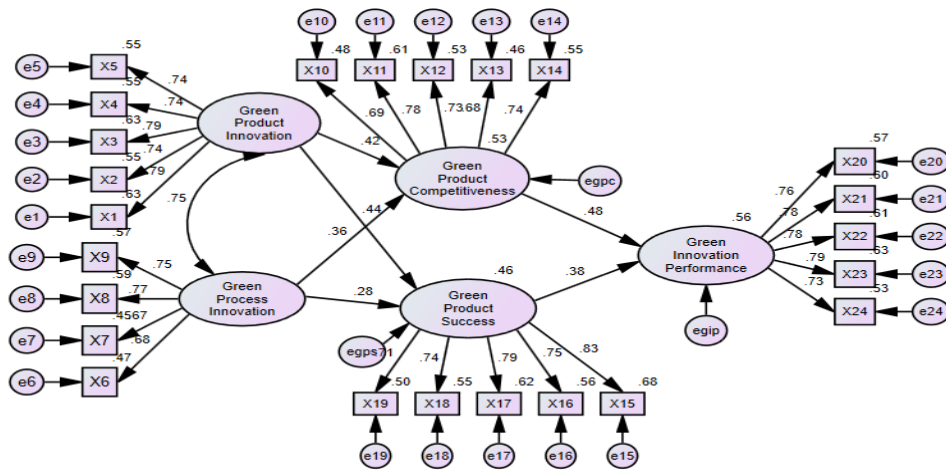
Chi-square=346.831;Probability=.000;DF=245;CMIN/DF=1.416;GFI=.873;AGFI=.844;CFI=.958;TLI=.953;RMSEA=.046

Figure 4. Full Model of the relationship between green product innovation, green process innovation, green product competitiveness, green product success and green innovation performance

5. Discussion

The interesting findings in this research empirically prove that all hypotheses tested are evidently significant. This indicates that, empirically, the studies conducted by previous researchers support the results of this research. This study seeks to prove the influence of green product innovation and green process innovation on green product competitiveness, green product success, and green innovation performance empirically.

The test of hypothesis which explains that green product innovation positively influences green product competitiveness is significantly proven. This research result conforms to previous study conducted by Dangelico and Pujari (2010) which finds that green product innovation is an important factor to achieve business growth, environmental sustainability, and better quality of life from utilizing business environmental elements. Another study which conforms to this study is conducted by Huang et al. (2016), which finds that adoption of green product innovation developed by company is determined with internal green capabilities, R&D intensity and company size factors. Green innovation is also important for organization in building green product innovation and green process innovation to achieve product advantage and success in market competition (Kam and Wong 2012).

The test of green product innovation's influence on green product success shows positive influence. This research result conforms to previous research's finding that market demand for green product is business's important key to achieving strong green product innovation (Lin et al. 2014). Chen and Hung (2014) in their study also state that in green product innovation creation process, social relational capital needs to be built with business networks in order to create product with added value in customers' domain, so as to realize competitive advantage. This study result also supports the finding of study conducted by Chang and Chen (2013) on green organizational identity which may determine SMEs' green innovation success.

Green process innovation positively, significantly influences green product competitiveness. This study result conforms to previous research conducted by Pujari (2006) that organization needs to make greening process innovation to achieve new product development and product success in the market. Another study also explains how important competitive advantage in the scope of SMEs is, which is also influenced by product launch (Ledwith and O'Dwyer 2008).

Green process innovation positively, significantly influences green product success. This study result support previous study's finding which explains that company needs to design their innovation so for their created product's success in the market (Fernández-Mesa et al. 2013). Another study also support this research result, which finds that green manufacturing positively influences green product success (Sezen and Çankaya 2013). This finding also supports the study conducted by Soewarno et al. (2019) which explains that organization needs to build green innovation strategy reflected in the form of green organizational identity in achieving environmental organization legitimacy and achieving a better degree and improvement of green innovation performance.

Green product competitiveness positively, significantly influences green innovation performance. This study result supports the previous research conducted by Jamsa et al. (2011) which finds that organization sustainability is determined by utilization of networks as a source of opportunities and utilization of resources and their networks to provide service and respond customers for change towards sustainability. Another research also supports this study, stating that company's uniqueness through product creation may improve product success in customers' market through creation of environmentally friendly product (Karlsson and Olsson 1998).
Green product success positively, significantly influences green innovation performance. This study also supports previous research which finds that product success in acquiring market share is influenced by product launch success (Ledwith and O'Dwyer 2008). The success of a new product or a new service becomes organization's important concern since the innovation activity that company performs, so as to encourage organization to adapt to market change, including through creating green product (Simpson 2004). In line with this finding, the study conducted by Yu et al. (2018) emphasizes organization's operational capability and productivity in achieving performance through response to increasingly dynamic environment.

The results of this study also found that green product compatibility and green product success mediate the relationship between green product innovation and green process innovation on green innovation performance. The findings of this study supported previous research by Sezen and Çankaya (2013). They explain the green process manufacturing effect on the success of green products. The results of other studies also reveal that green innovation strategy in the form of a green organizational identity can achieve the legitimacy of environmental organizations and achieve the degree and increase in green innovation performance (Soewarno et al. 2019). Other studies also support the findings of this study, which explain the process of value creation in green innovation capable of achieving innovation performance (Shamah 2012).

6. Implication and Limitation

Environmental research issue remains an interesting research topic which rises in early 1990s, stimulated by customers' awareness to choose environmentally friendly product. Consequently, green innovation becomes an important strategy for company to reach its customers. Green innovation also becomes an important strategy when a company develops new product innovation and is going through production process. Moreover, green innovation is believed, by some researchers, to be company's new long-term breakthrough while maintaining competitive advantage and environmental sustainability (Li et al. 2018; Pujari 2006; Ar 2012). To enhance reputation and access to customers and more wider new market, green innovation is developed in corporate strategy, particularly by adopting environmentally friendly technology and resources (Low and Shang Gao 2015). Although the green innovation study remains a debate among previous researchers, but this issue is an interesting study in this research, where we develop and order to fill this research gap of green innovation. This study proposes two constructs of mediating variable: green product competitiveness and green product success to be solution to the research gap. This research also develops a research framework and empirical research model to discuss further their relationship.

This paper summarizes the literature review on green product innovation and green process innovation into a new implication research. The empirical research shows the effect of green product innovation, green process innovation, green product competitiveness, green product success and green innovation performance. All of the hypotheses are supported in this study. Therefore, this study suggests that an organization should allocate more internal resource capability in enhancing green product innovation, green process innovation, green product competitiveness, green product success and green innovation performance.

7. Contribution to the Body of knowledge

This research makes at least three important contributions to the body of knowledge. The first contribution is the method to optimize SMEs' internal resource capability, particularly with regard to innovation capability. The second contribution is, through empirical test, making a mediating role to empirically prove that green product competitiveness and green product success fill the gap of green innovation's role in green product innovation performance which remains a debate to previous researchers. Third, green product competitiveness and green product success in this study serve to be the mediating variable for the relationship between green product innovation and green process innovation in green innovation performance.

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HOW MACRO LEVEL FOUNDATIONS INFLUENCE EMERGING MICRO ENTREPRENEURIAL ACTIVITIES: THE CASE OF SOUTH AFRICA

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Abstract. The importance of macro conditions for creating an environment conducive for startups to establish themselves and grow is emphasised. This paper considers the influence of two sets of macro foundations, domestic ecosystems and entrepreneurial networks as well as entrepreneurship education and research, on perceived emerging micro entrepreneurial activity. We show that the domestic ecosystem affects entrepreneurial networks, and together with entrepreneurship education, they have an impact on emerging entrepreneurial activity. Macro entrepreneurial factors also drive emerging entrepreneurial activity directly, and these relationships call for more research.

Keywords: entrepreneurship; startups; domestic ecosystem; entrepreneurial network; innovation

1. Introduction

According to the recent Global Competitive Report 2016/2017, South Africa's economy is nearly at a standstill with GDP growth forecast at just 1.0% for 2017 and 1.2% for 2018. There is persistent weak international demand for its goods and the unemployment rate is higher than 25% (Schwab 2018, 34).

The situation in South African is made worse when the weak macroeconomic and institutional environments combine with extreme poverty and poor distribution of the economic benefit. According to the "Poverty Trends in South Africa" report, more than 50% of the population in 2015 is considered poor and earns under the estimated R992 per person per month (pppm) at 2015 prices (Stats SA, 2017:8b). Adding to the lack of economic resources, there is increased business-related crime which has severely affected business in the country (Mbalula, 2017).

Taken together, this anaemic macro socio-economic scenario affects the markets and ultimately the micro-environment in which entrepreneurs need to operate (Acs et al. 2017).

According to GEM (2018, 2010), the factors influencing the micro entrepreneurial environment can be grouped into the following four categories: (a) the domestic ecosystem that concerns, for example, aspects such as government policy and market entry regulations; (b) entrepreneurial networks that typically concern aspects associated with partnerships and cooperation; (c) early entrepreneurship development, which primarily emphasises the importance of entrepreneurship education; and (d) entrepreneurship research which predictably concerns innovation and Africa-specific data challenges.

Although South African emerging entrepreneurial activity has declined by 26% since 2015 and is at its lowest since 2011, South African startups have increased by around 20%, because of the rapid advances in technology and digital media (GEM 2018, 7). Such startups concentrate on testing new ideas, products, or services as one type of early-stage entrepreneurial activity (Bosma et al. 2009). They are focused on the life-cycle of an enterprise, where the entrepreneur moves from the idea stage to securing financing, laying down the basic structure of the business, and initiating operations or trading (Smith & Miner 1983).

South Africa, therefore, deserves our research attention for two reasons. First, as an emerging African economy, South Africa has experienced an increased economic growth after the post-colonial period, yet it remains unable to cope with the socio-economic challenges it faces (Global Entrepreneurship Monitor 2016, 2017). Second, South Africa exhibits comparatively low levels of entrepreneurial activity and this continues to weaken entrepreneurial opportunities and perceptions of entrepreneurial capabilities (GEM 2018). It appears that the rate of entrepreneurial activity in South African (Fairlie 2009) has dropped since 2015. In fact, South Africa is ranked 55th out of 62 economies surveyed with respect to this indicator (GEM 2018, 7). As a result, the business rate is disturbingly low.

Macro business factors in emerging business activity not only are driven by sensitive factors such as; changes in the level of internal political, economic landscape and international economic environment and macroeconomic factors such as market´s economic volatility (Naik & Padhi 2012). Developing economies usually portrays themselves as vulnerable to external investments and prices takers in commodity market. In this scenario, macroeconomic volatility strongly drives the emerging business through fluctuations in the prices of the commodity goods in the export and import relationships.

That fluctuation can cause a financial shock amplifying the effects on the emerging economies (Fernández & Gulan 2015) through the impact of macro news on exchange rate on emerging economies (Beckmann et al. 2011). Then, existing studies on the relationship between macro factor in emerging business activity should delve into those opposing effect to tackle their negatives consequences in emerging economie (Goldberg 2011; Wongswan 2006).

In the last two decades, wide number of scholars have separately researched about the individual effect of macro and micro factors on startup activity in emerging markets (Duchesneau & Gartner 2010; Maune 2017; Quinones et al. 1990). However, following the Global Entrepreneurship Monitor´s methodology, macro and micro factors are deeply related. The relation between those factors have scarcely studied through causal predictive models.

Structural Equitation Modelling relationship supports oriented goals by explaining and predicting the macro and micro factors on startup activity by maximizing the explained variance of the dependent latent construct. PLS-SEM also provides parameters that estimate that maximize the explained variance (R^2 values) of the dependent constructs. It allows us not only to state the significance of the model and his explained capacity.

To our knowledge this is the first study that study the relation between macro and micro factors following the GEM´s methodologies. The model also gives recommendations to decision-makers to better understand the causal relationships macro and micro factors on startup activity in South Africa.

That is why the contribution of the current paper is two-fold. First, it aims to gain a better understanding of what start-ups see as the macro and micro factors that are influencing them in developing their new businesses. Second, it considers the mediating effect of domestic ecosystems and entrepreneurship education on start-ups entrepreneurial activities.

The structure of the manuscript is unfolded in four sections. First. It is observed several aspects of the literature review such as; the South Africa macro factors, South African domestic entrepreneurial ecosystem, entrepreneurial network, educational challenges in South Africa, entrepreneurship research: Innovation and data research. Second.The paper delved into the methodology. In the third and fourth section are Results and Conclusions.

2. Literature review

2.1. South Africa macro factors

In South Africa, since the "Bill of Rights" was approved, the constitution has focused on the most disadvantaged sectors of the population and laid the foundation for restructuring the welfare system according to principles of justice and equity (Patel 2015). To achieve both economic growth and social redistribution, social and economic policies were a priority (Van Niekerk 2013). Thus, a subsequent macro-economic policy, the Growth, Employment and Redistribution programme (GEAR) adopted in 1997, was an attempt to attract foreign investment, regenerate economic growth, liberalise the economy, and reduce the country's debt that was inherited from the apartheid era (Ho 2019). However, economic growth declined sharply after the global economic crisis of 2009, and between 1993 and 2017 South Africa recorded on average GDP growth rate of 2.3% (Trading Economics, 2018).

The country's constitution has served to create an expectation of solidarity among the citizenry that their needs should be met by the state (Murray Li 2016). The reality is that the unemployment rate is 35% of the labour force in South Africa (Stats SA 2017a), and social and economic policy has resulted in a relatively jobless growth path characterised by high labour costs (Webster 2013). From a macro perspective, South African entrepreneurs not only have to deal with economically disadvantageous conditions (Du Toit 2004) but also social ones such as poverty (Rogerson 2018) and violence (Crush & Peberdy 2018) that influence emerging micro entrepreneurial activities.

Such social and economic policies have shaped entrepreneurial framework conditions (EFCs) (GEM, 2018, 10). They affect key aspects such as entrepreneurial finance, entrepreneurship programmes, taxes and bureaucracy, cultural and social norms, commercial and legal infrastructure, and internal market dynamics. Institutional factors such as an independent judiciary system and an adequate national security system were also found to have a positive and significant influence on entrepreneurs in emerging markets (Urban & Hwindingwi 2016).

What is needed is a favourable environment that combines political, social, economic, and educational factors (Timmons 1994). Prosperous countries that developed their business cultures in the late twentieth century have had in common strong attitudes toward micro entrepreneurial activities based on innovation, technology, and products (Bateman 1997).

Micro entrepreneurial activities, as part of the entrepreneurial ecosystem, have gained prominence during the last five years, but their definition is not yet widely shared (Stam 2015). Whereas, being "entrepreneurial" refers to

creating unexplored goods and services (Shane & Venkataraman 2000), and "entrepreneurial ecosystem" narrows down the agglomeration to the interactions between players in a certain region (Freiling & Baron 2017). This approach implies that individuals (actors) and organisations (firms and institutions) interact and new start-ups are developed in the process (Stam 2014). Thus, the ecosystem is orientated toward entrepreneurial endeavours (Henrekson & Sanandaji 2014) and innovative start-ups (Baumol 1993). In this system, entrepreneurs are the key pins that bring together the domains of policy-makers, finance, cultural support, human capital, and network interaction (Isenberg 2010).

The entrepreneurial activities associated with the emergence of start-ups are known to follow a relatively predictable pattern that seems to start with an early entrepreneurial idea, and this evolves into the more formalized activities of setting up a business (Stam et al. 2012). During the early stage, entrepreneurial activity is initially very concerned with developing and testing products rather than making a profit. It is argued that during this stage, the entrepreneur's high need for achievement (Rauch & Frese 2000) and risk-taking propensity (Timmons et al. 1985) combine with entrepreneur personality characteristics such as proactivity (Becherer & Maurer 1999) and personal initiative (Frese 1998). The latter phenomenon benefits from a profound body of knowledge developed during the last three decades, and it is still expanding. More relevant to the current study is that early-stage entrepreneurs and startups need standardised institutional support and a stable economy to grow and establish their business (North 1990).

In the case of South Africa, the data from the 2017 Global Entrepreneurship Monitor (GEM 2017, 6) survey seems to suggest that policy reforms are needed if the institutional support hopes to reverse the weak South African business environment. This is particularly relevant for small and medium-sized enterprises that are often expected to make more substantial contributions to the country's dire employment situation. To confirm the perceived situation, we hypothesise the following:

2.2. South African domestic entrepreneurial ecosystem

According to the World Economic Forum (2013), the entrepreneurial ecosystem is organised according to three key factors: resources (finance and human capital), formal institutions (government, education and market), and informal institutions (cultural support). It is reported that the effect of the entrepreneurial ecosystem is largely dependent on entrepreneurship education and new opportunities for innovation through emerging networks (GEM 2018). Similarly, the literature also suggests that the availability of market data (Debortoli et al. 2014), and the level of strategic partnering and cooperation (Klueter & Rosenkopf, 2013) exhibit similar influences on the entrepreneurial ecosystem.

In the domestic ecosystem, micro entrepreneurs have to deal with government policies which can influence new businesses depending on the institutional culture orientation toward entrepreneurship (La Porta et al. 2008). Regulations in developing and developed countries are built by democratic political institutions (Klasing 2013). When those policies are taken over by oligarch politicians, then the foundations of the rules of law and other norms of governance can be negatively affected (Acemoglu 2008) – as well as the expansion of entrepreneurship opportunities (Munemo, 2012). Essentially, three institutional factors make it more difficult: limited access to local credit, complex tax laws, and corruption (Schwab 2018, 34).

As part of the entrepreneurial domestic ecosystem, commercial credit, equity financing or supplier financing have become serious issues for keeping startups going (Upstart Business Strategies 2006). Basic infrastructure such as reliable and cost-efficient electricity and water are also essential factors for entrepreneurs (Winkler et al. 2011), and both factors are impeding the emerging entrepreneur in South Africa (Olawale, Garwe 2010).

In the case of South Africa, regulations have also severely hampered new, proactive business startups (Estrin & Prevezer 2010). Unfortunately, the lack of competence in South African companies ends up in business conflicts affecting the quality and cost of the products and services (Ahlquist & Prakash 2010). The South African government has encouraged some strategies to promote entrepreneurs and small businesses. In January 2006, the South African government launched the Joint Initiative on Priority Skill Acquisition (JIPSA) for entrepreneurs (Mlambo-Ngcuka 2006, 5) that was led by the Deputy President. Public service delivery and developing better infrastructure, information, communication, and technologies have been the mission of the programme. After being completed, JIPSA was unsuccessful for entrepreneurs because of the inefficient regulatory ecosystem (Upstart Business Strategies 2006).

The startup entrepreneurial ecosystem in South Africa have not adequately benefitted from research that adopted a macro view of the entire system. That ecosystem includes the so-called domestic ecosystem, the entrepreneurial network, and educational and research interface to promote entrepreneurship. Therefore, our study aims to understand how the South African ecosystem works as a key factor for developing emerging entrepreneur activities (Acs et al. 2017). Therefore, the following is hypothesised:
Hypothesis 1 (H$_1$): The South African Domestic Ecosystem (DE) negatively influences Emerging Micro Entrepreneurial Activities (EEA).

2.3. Entrepreneurial network

South Africa benefits from diverse human cultures allowing the country to internationalise businesses through cooperation and strategic partnerships among entrepreneurs (GEM 2018). The evidence suggests that this networking and partnering notion has recently pushed startups to expand internationally. This is commonly the style of management among startups (Weiblen & Chesbrough, 2015).
This international governance role is addressed by framing the political agenda and prioritising key issues in countries (Jones & Baumgartner 2005). Political actors and scientific and professional experts interact with local entrepreneurs to promote cooperation and strategic partnerships (Béland 2005). These organisations lead the elite, who facilitate the knowledge and drivers to guide domestic entrepreneurs, to promote international partnership and cooperation among networks and organisations.

However, South African international partnership and cooperation have made the network very challenging for entrepreneurs because of the lack of trust in international competition, low competitiveness, and state protectionism (Moodley 2003). This is not surprising because other emerging markets show similar conditions as Sánchez & Lehnert (2018) demonstrated for Mexico and Peru.

To improve the South African entrepreneurship network, the government needs to train the entrepreneurial ambitious people to evolve their skills and knowledge by being an active part of entrepreneurial projects undertaken based on the entrepreneurial endeavour (Murdock & Varnes 2018). Entrepreneurs need to actively and skilfully engage in the rapidly internationalising business environment by promoting strategic partnerships and cooperation in terms of subsidiaries, joint ventures, outsourcing, import-and-export links, technology transfer, and business sharing, among others (Tesfayohannes 2012).

Business interaction can be enhanced by rewarding a cooperative policies network such as by reducing the import barriers or taxes to enable African entrepreneurs to expand the impact of their business beyond domestic domains. Prospective scholarly research needs to improve the citizens´ understanding about the effects of network evolution on the entrepreneurial trajectory toward business internationalization (Zengyu Huang et al. 2013).

This process of internationalisation through social-tech startups appears to follow three distinct stages: (1) learning, (2) emulation, and (3) competition. First, the learning stage provides full or limited information or

experience from other countries (Meseguer 2005). Second, emulation adopts successful policies to build a transnational social-tech network led by competitive professionals (Hass 1992). And third, competition addresses how cooperation and strategic partnerships manage the pressure from equal or asymmetric economies (Damro 2012).

Unfortunately, those three social-tech networks are very limited in South Africa, because of the low level of technological and science skills in the vast majority of the population (Olawale & Garwe 2010). The high cost of new technology, which is beyond the means of many small businesses, also has a negative effect on entrepreneurs (Walker & Mkwananzi 2015). According to GEM (2018), just over half (55%) of early-stage entrepreneurs in South Africa use the latest or new technology, compared to an average of 45% for the Africa region. A quarter of South African entrepreneurs use the very latest technology, which does not compare favourably with other countries (GEM 2018). Therefore, the following are hypothesised:

Hypothesis 2 (H_2): The South African Domestic Ecosystem (DE) negatively influences the South African Entrepreneurial Network (NE).

Hypothesis 3 (H_3): The South African Entrepreneurial Network (NE) negatively influences Emerging Micro Entrepreneurial Activities (EEA).

2.4. Educational challenges in South Africa

Education strategy and programmes are key factors for improving an economy as well as self-employment (Sullivan 2000). According to Gouws (2002), the key to success in establishing a culture of entrepreneurship in South Africa is education, through which government can promote the establishment and growth of entrepreneurs (Luiz 2002).

The education system must enable in-school youth to develop entrepreneurial characteristics and competencies as early as possible. This will equip more young people with the competencies and skills to become job creators rather than just be job seekers.

According to the Youth Enterprise Development Strategy (2013-2023), the South African government intends to foster youth economic participation by deliberately enhancing and accelerating youth entrepreneurship that is capable of contributing to the gross domestic product (GDP) growth rate (Department of Trade and Industry 2013). However, according to Von Broembsen et al. (2005:36), most South African youth do not believe they have the skills to start a business, and this may be attributed to the low proportion of South Africans that have completed secondary education. In South Africa, entrepreneurship education to set up new business as startups is still one of the prime factors limiting its economic growth (Ikebuaku & Dinbabo, 2018) due to weak training in primary and secondary schools, and post-school entrepreneurship has declined since 2015 (GEM 2018, 10).

Despite the large number of entrepreneurship training programmes offered in South Africa, very few have well designed monitoring and evaluation programmes to assess their impact (Isaacs et al. 2007). Despite these good intentions, we focus on the current situation in South Africa and hypothesise the following:

Hypothesis 4 (H_4): South African Entrepreneurship Education (EE) negatively influences Emerging Micro Entrepreneurial Activities (EEA).

Hypothesis 5 (H_5): South African Entrepreneurship Education (EE) negatively influences South African Entrepreneurship Research (ER).

2.5. Entrepreneurship research: Innovation and data research

Data research, as a relatively recent phenomenon, can assist entrepreneurs to find answers to many questions. Until now, studies that attempt to measure entrepreneurship and innovation were based on subjective measures of perceptions that cover attitudes and activities of entrepreneurs (Wong & Autio, 2005).

Data research can be used to gain insights into social networks and understand the underlying trends observed in the interaction that takes place in the network. It is even argued that such data-processing capabilities can explain phenomena beyond what any human can currently predict (Pentland 2014).
New insights and findings from analytics have proven very useful for making predictions on consumer attitudes (Agrawal et al. 2016). Moreover, technology is shaping the new trends to change the rules of management and supply chain management. Not surprisingly, some suggest that traditional models of production and distribution will become obsolete as additive technologies and digitisation will better predict outcomes (Waller & Fawcett, 2013).

According to George et al. (2014), entrepreneurs can get advantages from five types of data: (1) public data provided by governmental institutions that can be used for management applications; (2) private data that belong to private firms, such as consumer transactions and mobile phone usage; (3) non-core data that are passively collected to be recombined with other data sources to create new value for entrepreneurs; (4) community data for capturing social trends through unstructured data – such as Twitter or online purchases (Kennedy, 2008); and (5) self-quantification data, which are revealed by entrepreneurs through quantifying personal behaviours. These mechanisms of value creation provide a new business model and new governance tools (Robina-Ramirez et al. 2019). Data analytics is currently offering commercial services to identify business patterns in new markets and product categories.

In the case of the African countries, there are currently very limited data on African entrepreneurs and firm ownership (Lepoutre et al. 2013). The lack of appropriate entrepreneurial ecosystems has led to very limited data about African entrepreneurs and firm ownership. This information will be useful for the government to formulate improved policies to nurture entrepreneurs and businesses and to track the performance of the small business sector from an African perspective. Thus, it can capture exponential value not only for governments but also for businesses and communities (McKinsey Global Institute 2011). These observations in the extant literature facilitate the construction of the following hypothesis:

Hypothesis 6 (H_6): South African Entrepreneurship Research (ER) negatively influences Emerging Micro Entrepreneurial Activities (EEA).

These hypotheses allowed for the construction of a theoretical framework, which is depicted in Figure 1. The underlying notion of the framework is that perceptions of startup activity are influenced by perceptions regarding the favourability of general macroeconomic conditions, the domestic business ecosystem, and the entrepreneurial network on the one hand and the perception of entrepreneurship education and research in the country on the other hand.
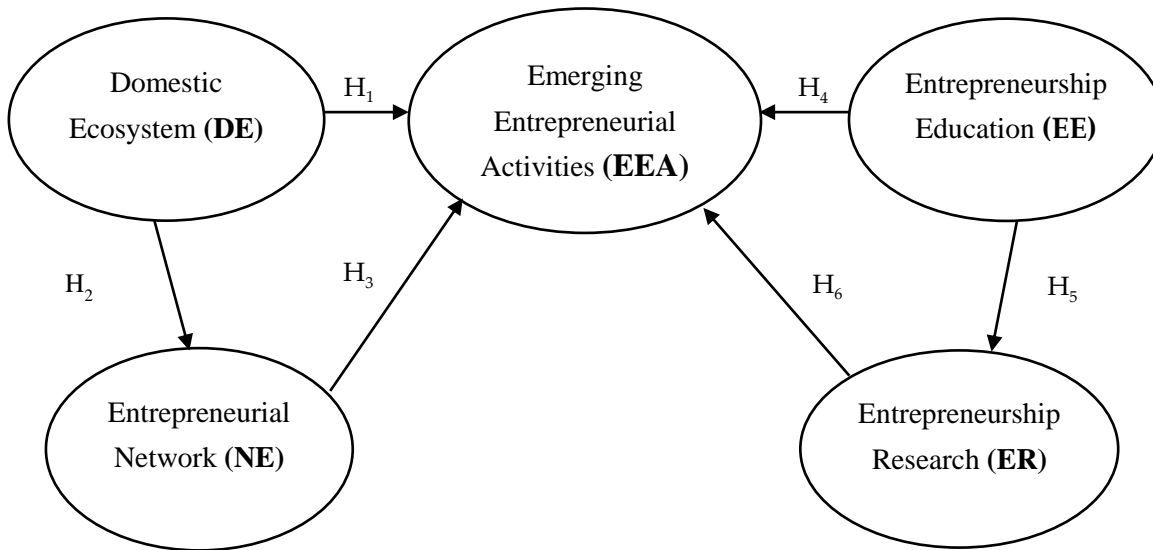
Figure 1. South African emerging entrepreneurial activities.

Own source

3. Methodology

Consistent with key authors (Morris et al. 2010; Zhao et al. 2013) we used existing published scales to compile a 34 items scale that measures the contructs in the theoretical model. In order to improve the measurement instrument, we have pre-tested all 34 indicator items for face validity in five startup companies in South Africa. The five firms were very diverse and included high tech startups like biomedical engineering, a media technology company, a rural solar power company, an occupational health company, and an environmentally friendly construction firm that installs and designs PVC fences that are highly durable and environmentally friendly.

The pretested firms were asked to respond to the original 34-item scale and to discuss their answers and the statement questions with the interviewers. This approach ensured that any unclear items were rephrased, while others were removed. We eliminated 10 items across 4 of the latent variables, thus leaving a final scale consisting of 24 items. The interviews also revealed that time is a serious issue for startups, and therefore the final questionnaire should be as short as possible. This finding is consistent with the notion of respondent fatigue (Rodgers et al. 2018), which is often cited in emerging market contexts. The pre-test also provided valuable insights in terms of entrepreneur familiarity with business language, and therefore it was decided to keep the language used in the questionnaire as simple as possible, while representing a South African tongue. Therefore, statements were formulated in simple language (Table 1), and a 10-point Likert type scale was used to measure the respondents' level of agreement.

Prior to administering the survey and starting data collection, the questions were submitted to other South African entrepreneurship scientists to solicit their comments on the appropriateness of the items. This process yielded only minor changes and led to activation of the data-collection process. Thus, data collection was done via an online survey based on a 10-point scale of 24 items, along with other descriptive questions. Between November 2018 and March 2019, the research team contacted the startups included in the original list twice a week by email,

sending the questionnaire in Google Docs. The final survey (Table 1) consisted of 24 items: *Emerging Micro Entrepreneurial Activities* (EEA) = 5 items (based on Watson et al. 1998; Van Gelderen et al. 2005); *General Macro Entrepreneurial Factors* (GMEF) = 3 items (based on GEM, 2018; Shane, Venkataraman, 2000; Isenberg, 2010); *Domestic Ecosystems* (DE) = 7 items (based on Scott & Meyer, 1984; Klasing, 2013); *Entrepreneurial Networks* (NE) = 3 items (based on Weiblen, Chesbrough 2015); *Entrepreneurship Education* (EE) = 3 items (based on Gouws 2002; Luiz 2002, 68); and *Entrepreneurship Research* (ER) = 3 items (based on George et al. 2014; Lepoutre, 2013). Based on information from web sources, government sources, and business associations, the research team developed a non-probability database of 211 potential startups. Thus, consistent with the methodological recommendations by Malhotra (2019) and Uprichard (2013) we employed a non-probability sampling approach based on the database of startups that the authors were able to construct. Thereafter data was collected using an electronic version of the measurement instrument. Once the data were collected and cleaned by removing incomplete responses, a total of 118 (56%) useable responses were available for analysis. Given the claimed suitability of variance-based structural equation modelling for smaller and skewed sample distributions (Chin 1998; Chin et al. 2003; Hair et al. 2019), it was decided to subject the data to a latent variable modelling procedure using SmartPLS 3.0 (Ringle et al. 2015), because this remains a prominent procedure in leading journals (Sarstedt et al. 2016).

Table 1. Research Instrument and Measurement Model

Latent Variable	Indicators	CODE
Emerging Micro Entrepreneurial Activities (EEA)	Accessing the regulatory stakeholder network such as governments, trade, or labour organisations that will be important for establishing the new venture	EEA1
	Developing the business model to identify sources of revenue, the intended customer base, products, and details of financing	EEA2
	Securing financial backing for the new venture	EEA3
	Acquiring the necessary knowledge and skills to establish the new venture	EEA4
	Establishing a new market or gaining access to an existing market	EEA5
Domestic Ecosystem (DE)	The challenge to get access to capital is a major limitation to emerging entrepreneurship in South Africa	DE1
	Government and political corruption is a major threat to emerging entrepreneurship in South Africa	DE2
	Private sector and economic corruption is a major threat to emerging entrepreneurship in South Africa	DE3
	Inadequate infrastructure (electricity, roads, water sanitation) is a major threat to emerging entrepreneurship in South Africa	DE4
	The poor condition of infrastructure (electricity, roads, water sanitation) is a major threat to emerging entrepreneurship in South Africa.	DE5
	Labour market regulation is a major threat to emerging entrepreneurship in South Africa	DE6
	Labour market instability is a major threat to emerging entrepreneurship in South Africa	DE7
Entrepreneurial Network (NE)	The extent of cooperation between private sector companies	NE1
	The competitiveness of South African companies	NE4
	The status of technological development in the country	NE5
Entrepreneurship Education (EE)	The state of the educational system in general	EE1
	The extent to which entrepreneurial competencies are developed in the current educational system	EE2
	The extent to which entrepreneurship is part of the school curriculum	EE3
Entrepreneurship Research (ER)	The level of research that leads to new innovations in South Africa	ER1
	The level of access that entrepreneurs have to research capabilities, data, and results in educational institutions	ER2
	The willingness of companies to share research and development information with entrepreneurs	ER3

Own source

4. Results

This study focused particularly on startup firms in South Africa. All (100%) the respondents classified themselves as startup firms, and 92% of the respondents indicated that their startup business was located inside the borders of South Africa. Respondents that indicated that although they may be South African citizens, their businesses were located outside South Africa, were removed from the data set. Most (60%) of respondents indicated that they operate in information technology and telecommunications-related industries. Other industries included agriculture, biotechnology, entertainment, security services, travel and leisure, and waste management. Also, not surprisingly, the products developed by these companies mostly relate to financial services and digital solutions which represented 55% of respondents. Most of the startup companies included in the survey were based in Cape Town (45%) and Johannesburg (43%); while the other respondents were located in other larger metropolitan areas, including Pretoria, Durban, and Port Elizabeth. It is also worth noting that 28% of the startup companies in the survey are currently part of an incubator. In addition, most respondents were male (94%), 32% were aged 26 - 35 years, 26% 46 - 55 years, and 23% 36 - 45 years. In total, 94% of respondents were less than 55 years of age.

It was encouraging to note that 36% of the respondents held honours degrees (the equivalent of a four-year bachelor's degree in other countries), while 34% had master's degrees. Therefore, the sample is considered to be well educated. Another aspect that may play an important role in participant responses is their experience. As much as 53% indicated that they had prior startup experience, and 13% indicated that the current startup was either their third or fourth attempt. In addition, 71% of the respondents reported that they were formerly employed in the private sector, thereby further enhancing their experience in business. The measurement model, employing only reflective measures, yielded satisfactory results as all items loaded as expected (Table 2) and were significant at the $p < 0.05$ level:

Table 2. Measurement model

	DE	EE	ER	EEA	NE
DE1	**0.926**	0.608	0.310	0.481	0.653
DE2	**0.875**	0.532	0.409	0.604	0.611
DE3	**0.806**	0.526	0.263	0.483	0.616
DE4	**0.836**	0.527	0.362	0.500	0.555
DE5	**0.907**	0.491	0.341	0.508	0.594
DE6	**0.769**	0.508	0.257	0.477	0.522
DE7	**0.832**	0.481	0.425	0.543	0.583
EE1	0.538	**0.902**	0.359	0.540	0.640
EE2	0.553	**0.895**	0.478	0.678	0.578
EE3	0.567	**0.896**	0.424	0.625	0.667
ER1	0.369	0.446	**0.914**	0.648	0.344
ER2	0.361	0.418	**0.959**	0.558	0.355
ER3	0.385	0.457	**0.920**	0.534	0.370
EEA1	0.494	0.537	0.584	**0.890**	0.449
EEA2	0.588	0.643	0.612	**0.898**	0.634
EEA3	0.532	0.620	0.513	**0.891**	0.562
EEA4	0.459	0.526	0.567	**0.847**	0.487
EEA5	0.566	0.691	0.456	**0.844**	0.652
NE1	0.647	0.579	0.314	0.540	**0.924**
NE4	0.544	0.688	0.331	0.586	**0.902**
NE5	0.668	0.609	0.379	0.586	**0.861**

Own source

In addition, the measurement also exhibits satisfactory reliability (Table 3) with Cronbach's alpha coefficient and composite reliability exceeding the 0.7 benchmark (Hair et al. 2017). Discriminant validity is also supported by the AVE scores that are all above the 0.5 (Bagozzi, Yi, 1988) benchmark.

Table 3. Measurement reliability and validity diagnostics

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Domestic Ecosystem (DE)	0.936	0.949	0.726
Entrepreneurship Education (EE)	0.881	0.926	0.806
Entrepreneurship Research (ER)	0.923	0.951	0.867
Emerging Micro Economic Activities (EEA)	0.923	0.942	0.764
Entrepreneurial Networks (NE)	0.877	0.924	0.803

Own source

Discriminant validity was further confirmed by the Fornell and Larcker (1981) method and the Heterotrait-Monotrait (Henseler et al. 2014) method. The Fornell and Larcker method (Fornell, Larcker, 1981) compares the square root of the AVE in the diagonal with the correlation coefficients in the same row and column for each construct. Table 4 (below) shows that the square root of AVE scores exceeds all row and column values, thus suggesting discriminant validity. The HTMT method employs a comparison of the heterotrait-heteromethod correlations and monotrait-monomethod correlations.

Table 4. Fornell and Larcker assessment of Discriminant validity

Constructs	DE	EE	ER	EEA	NE
DE	**0.852**				
EE	0.616	**0.898**			
ER	0.399	0.474	**0.931**		
EEA	0.605	0.691	0.626	**0.874**	
NE	0.695	0.697	0.383	0.638	**0.896**

Note: Square root of AVE on diagonal
Own source

When the HTMT value is below 0.90 (Teo et al. 2008) or 0.85 (Kline 2011) – then discriminant validity is established between two constructs. Therefore, as shown in Table 5 (below), our measure exhibits satisfactory discriminant validity.

Table 5. HTMT assessment of discriminant validity

	DE	**EE**	**ER**	**EEA**
EE	0.678			
ER	0.427	0.518		
EEA	0.649	0.758	0.674	
NE	0.763	0.797	0.424	0.707

Own source

The satisfactory performance of the measurement model allowed for consideration of the structural model and the hypothesised relationships between constructs. Consistent with the recommendations of Hair et al. (2019) we first consider collinearity. All constructs exhibit VIF values less than 3 (table 6); thus, suggesting that our data does not suffer from collinearity issues. Second, the combined effect of domestic ecosystems (DE), entrepreneurial networks (EN), entrepreneurship education (EE), and research in entrepreneurship (ER) explain 75% (adjusted R^2 = 0.748) of the emerging entrepreneurial activities (EEA). According to Hair et al. (2019) this can be considered "substantial" statistical power. The results also showed that entrepreneurship education (EE) is a "weak" contributor (22% - adjusted R^2 = 0.224) to the variance ER, while almost 50% (adjusted R^2 = 0.482) of the variance in entrepreneurial networks (EN) is explained by the perceived state of the domestic ecosystem (DE). The latter 50% is considered a "moderate" contribution (Hair et al. 2019).

Table 6. Collinearity statistics*

	EEA	ER	NE
DE	2.106		1.000
EE	2.254	1.000	
ER	1.321		
NE	2.499		

*VIF values

Own source

Thirdly, a clearer picture of predictive accuracy emerges from inspecting the Q^2 values in the PLSpredict procedure in Table 7. The Q^2 values (table 7) ranges between 0.149 and 0.468, suggesting medium predictive accuracy of the model. Fourthly, the PLSpredict procedure also generates Root Mean Squared Error (RMSE) as well as Mean Absolute Error (MAE) statistics for dependent contruct indicators, applied to the theorised PLS model and a system generated simple linear model. According to Hair, et al. (2019) researchers can then compare the RMSE and MAE values between the two models as a further assessment of predictive power of the model. From Table 7 it is clear that in the minority of the cases the RMSE and MAE values are higher in the linear model, thus suggesting the model exhibits meduim predictive power.

Table 7. Predictive accuracy

Dependent contruct indicators	Q²_predict	PLS Model		Linear Model	
		RMSE	MAE	RMSE	MAE
EEA1	0.306	1.373	1.112	1.430	0.959
EEA2	0.444	1.184	0.952	1.189	0.968
EEA3	0.396	1.315	1.110	1.225	1.201
EEA4	0.281	1.464	1.143	1.297	0.962
EEA5	0.468	1.407	1.098	1.471	1.181
ER1	0.172	1.491	1.189	1.511	1.190
ER2	0.149	1.620	1.297	1.607	1.267
ER3	0.185	1.639	1.307	1.666	1.308
NE1	0.407	1.578	1.100	1.607	1.140
NE4	0.274	1.738	1.309	1.618	1.219
NE5	0.430	1.417	1.062	1.425	1.073

Own source

The satisfactory results of the fours analisis above facilitates the final consideration of the hypothesis hypothesis. Our results (Table 8, below) showed that a single hypothesis, H1, which proposed that the South African Domestic Ecosystem (DE) negatively influences South African Emerging Entrepreneurial Activities (EEA), could not be supported.

Table 8. Structural model and hypothesis testing

Hypothesis	Relationship	Standardised Coefficients (β)	t-statistic	Results
H1	DE -> EEA	-0.049	0.548	Not supported
H2	DE -> NE	0.695	14.368	Supported
H3	NE -> EEA	0.152	2.275	Supported
H4	EE -> EEA	0.306	3.442	Supported
H5	EE -> ER	0.474	6.751	Supported
H6	ER -> EEA	0.162	2.330	Supported

Own source

The results for the remaining hypotheses (H2 – H6) were all supported at the $p<0.05$ confidence level. Thus, our results confirm that, as perceived by owners of startup businesses, the macro economic factors in South Africa negatively influence Emerging Entrepreneurial Activities (EEA) in the country.

These micro-level entrepreneurial activities (EEA) are also perceived to be negatively influenced by the country's entrepreneurial networks (EN), the perceived state of entrepreneurship education (EE), and the perceived state of entrepreneurship research (ER). Moreover, the results also showed that the respondents' perception of the South African Domestic Ecosystem (DE) negatively influences their perception of the country's Entrepreneurial

Networks (NE) and that the perceived state of Entrepreneurship Education (EE) negatively influences perceived Entrepreneurship Research (ER) in South African institutions.

Discussion

According to international organizations as World Economic Forum, Wold Band and United Nations stable and fundamental conditions such as; macro-economic stability, labour market, education, infrastructure, market efficiency is required for the well-functioning business environment (Schwab 2018). Those fundamental conditions were shaken the emerging economies since the last financial crisis in US 2007/2008. The global downturn (2008-2012) effectively dragged South Africa economy behind most of the African countries (OCDE 2014).

Data seem to suggest that macro factors do remain an important driver in how emerging entrepreneurial activities are perceived, start-ups´ perceptions of South African Macro Entrepreneurial Factors negatively impact perceptions about the ease of micro entrepreneurial activities EEA.
Especially dramatic in the rate of youth unemployment, over 65% are living in under-employment conditions, situation that has been described as a "tiching tie bomb" (Herrington et al. 2014).

The South Africa macroeconomic–institutional environment combines the alarming extreme poverty (Stats SA 2017:8b), increased business-related crime (Mbalula 2017) and high level of corruption (Estrin et al. 2013) with a high unemployment rate. It can be as high as 45% (depending on the method of measurement) (Schwab 2018).

With this appalling scenario, jobs have been structured around large governamental corporations. However, the South Africa government can no longer become the only main source of job creation. The emphasis should be shifted towards small and medium enterprises by moving from the idea of seeking employment to one to creating employment for oneself and others (GEM 2015).

New socio-economic conditions need to be proposed by developing strategies to positively influence business and academic research through policy makers at local and state levels Smilor et al. (1989), which has been visible in startups´ geographically concentrated areas (Butler, 2010).

Studies have shown that well-developed regions have evolved an efficient institutional support for emerging entrepreneurial activities (Stephens, et al. 2019). It explains how macro features have been played a key role in those well-off regions (Gibson & Butler 2013). al. Contrarily, South African regulation not only has severely hampered startups (Estrin & Prevezer, 2010) but also has raised socio-economic conflicts which have been severely affecting the quality of the product and services (Ahlquist & Prakash, 2010).

Moving from the macro factors influence to the domestic ecosystem´s entrepreneurial activity, our results do not support the direct effect of the domestic ecosystem on emerging entrepreneurial activity (H1: DE → EEA, β=-0.049, t=0.548). Rather, the results suggest that the effect of the domestic ecosystem on entrepreneurial activity is mediated by the presence of entrepreneurial networks. Hence, domestic ecosystems are more likely to affect entrepreneurial networks, which then drive the effect on emerging entrepreneurial activity. This observation is a result of the rejection of H1 and the support of H2 (DE → NE, β=0.695, t=14.368) and H3 (NE → EEA, β=0.152, t=2.275). Then, entrepreneurs engage in a domestic ecosystem their evolving networks (Perry-Smith, Mannucci 2017) in response to changing resource needs (Slotte-Kock, Coviello 2010). That network is based on developing relational strategies to gain others influence to maximise their own abilities and interests (Hassenteufel 2008). Their supporting elements interact in an environment which should foster the start-ups´ growth (Mäkinen, Dedehayir 2012). However, mediation analysis revealed that the mediation effect (0.107) is not significant at

p<0.05, as the bias corrected confidence interval does include zero (-0.005; 0.201). Nevertheless, the significant relationship between domestic ecosystems and entrepreneurial networks remains important and offers fertile ground for further investigation.

Then, efficient startups depend on effective nodes of collaborations and associated proceeds (Steier & Greenwood, 2000). That collaboration represents a set of inter-depende actors or components to undertake new business through start-ups in a specific geographical area (Simsek 2003)

It is precisely a key factor in developing countries where social connection is a big asset in the take-off of a new business among entrepreneurs (Dahl & Sorenson 2010), enabling them to use their existing previous contacts (Romanelli & Feldman 2004). In other words, the main challenge for entrepreneurs does not lie in the novelty of a product or service but rather in the relevant social network which supports the new business (La Rocca & Snehota 2014). Those social network ties decisively influence the personal decision to start a new tech business, especially among young people (White & Green 2010). This is especially relevant in the domestic system in developing countries (Williams & Hovorka, 2013).

Regarding the influence of entrepreneurship education on emerging entrepreneurial activities, the results support the positive relationship among those variables (H4: EE → EEA, β=0.306, t=3.442). The relevance of entrepreneurship education toward entrepreneurial orientation is widely manifested in the literature review (Sullivan 2000). That orientation implies risk taking and proactive behaviour which decisively depend on the national culture (Kreiser et al. 2010). This challenge is even more needed in the South African economy as a tool to contribute to the creation of start-ups companies, especially among young people (Luiz, 2002).

That is precisely the main objective of the Youth Enterprise Development Strategy (2013-2023) implemented by the South African government. According to Herrington et al. (2014) South African private and public sectors have failed to absorb the growing number of job seekers. As a result, the South African Entrepreneurial Activity rate decreased from 9.1% in 2011 to 7.3% in 2012. South Africa's TEA is significantly below the average of efficiency-driven countries (14.3%). Then, strategies need to be settled to increase the attention on entrepreneurship for contributing to economic growth and job creation.

Nevertheless, the lack of South African entrepreneurial skills (Von Broembsen et al. 2005:36) become one of the prime factors which is limiting its economic growth and the creation of emerging business activities. In other words, the level of young people who have dropped out from the education system has been increased in the last years. That factor enlarges the main problem which is the failure to provide relevant occupational skills to the future employees.

In addition, the results show that entrepreneurship education positively influences the emerging start-ups (H6: ER → EEA, β=0.162, t=2.330) through entrepreneurship research (H5: EE → ER, β=0.474, t=6.751). In other words, the path between entrepreneurship and emerging micro entrepreneurial activities is mediated by entrepreneurship research. In this case, mediation analysis revealed a significant (p<0.05) interaction effect (0.077) with zero not included in the bias corrected confidence interval (0.019; 0.159). This notion is supported in the current study by the rejection of the null hypothesis in favour of the alternative hypothesis that argues for the impact of entrepreneurship education on entrepreneurship research. It explains that data research not only assists entrepreneurs to improve their entrepreneurial activity and find answers to many unexplored questions (Aparicio et al. 2019) but also can be used to gain insights into social networks and understanding the underlying trends in order to efficiently develop their emerging activities (Pentland 2014).

This positive effect of entrepreneurship research on emerging micro entrepreneurial activity is visible in cities with a high level of investment in innovation and technology. These cities end up with a considerable the level of patent activity that affects their productivity (Rothwell et al. 2013).

Conclusions

The conclusions are organized in two sections. First is the impact of general macro entrepreneurial factors in South African emerging entrepreneurial activities. Second is the role that the domestic ecosystem and network plays in that new business. Third is the key aspect of education and research in entrepreneurship in improving the start-ups efficiency in emerging economies.

First: Emerging activities are spawned, developed, and grow within a larger context of socio-economic conditions. Much too often, policymakers that attempt to enhance entrepreneurial activity are confronted with a paradox situation where the key to economic development is linked to the creation of start-ups firms, and yet the economic conditions within which the start-ups need to be created are not conducive for emerging entrepreneurial activities.

From that view, macro reforms are needed to reverse the weak South African business environment, particularly for small and medium-sized enterprises (GEM 2017, 6), and to turn political, social, and economic factors into a favourable environment (Timmons 1994) for developing entrepreneurial attitudes (Bateman 1997) among South African entrepreneurs.

Studies have shown that the surveillance of corruption is highly and positive aligned with individual trust in entrepreneurial activities and innovation (Anokhin & Schulze 2009). Similarly, according to Bowen and De Clerq (2008) entrepreneurial resources allocated in financing and education decisively reduce the level of corruption.

Second: In South Africa, a favourable domestic ecosystem based on government policy and market entry regulations, such as reduction of transaction costs and economies of scale (Krugman& Obstfeld, 1997), should be addressed to improve entrepreneurial networks. As a crucial entrepreneurial feature, networking (Reynolds 1997) not only explains the entrepreneur´s failure or success (Honin et al. 2005) but also is the bridge to link the organizational and social features in emerging business (La Rocca et al. 2016) between individuals, companies, and society (Westhead & Wright, 2011).

Third: An entrepreneurship agenda has become a targeted tool for universities, government, and international institutions in order to reduce the African high rate of unemployment (UN 2013). However, the challenge of efficiently raising the occupation level in South Africa remains partially unanswered. Several methodologies have recently come out in technological countries through problem-based learning (Greenberg et al. 2011), the knowledge acquisition model (Ratten 2017), etc. It is crucial to develop critical thinking based on creative logic and knowledge-transformation in young and new entrepreneurs as relevant skills for living life (Leong 2013).

Fouth: Based on the high significance of the model (adjusted $R^2 = 0.748$) (Hair et al. 2019) the model shows a combined effect of domestic ecosystems (DE), entrepreneurial networks (EN), entrepreneurship education (EE), and research in entrepreneurship (ER) on the emerging entrepreneurial activities (EEA). According to the results, recommendations to decision-makers can be drawn to better understand the causal relationships between macro and micro factors on startup activity in South Africa

Some limitations of the study have to be arisen. The results of the study are context-specific and based on a limited sample. Furthermore, we have selected a rather narrow set of macro indicators and therefore no parsimony

is claimed. To this end we recommend that future studies can identify more accurate indicators by using the procedure suggested by Saura et al. (2019) employing a Latent Dirichlet Allocation (LDA) model to analyse user generated content (UGC). However, the results show that emerging markets, in particular, have to consider economic and political initiatives that promote the growth of micro-level entrepreneurial activity. Such an approach will result in more startups and ultimately stimulate economic development.

The current study shows that by nurturing entrepreneurship education and research, while also seeking to develop domestic ecosystems and growing entrepreneurial network capabilities, such a feat might just be possible. The challenge to create more start-ups companies remains paradoxical, and therefore policy instruments need to aim both at creating favourable economic conditions for startups to emerge and at the same time supporting individual start-up businesses. Thus, the solution is to be found in both influencing the environment and individual behaviour.

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INNOVATION IN AFRICAN-AMERICAN HIGH-TECH ENTERPRISES: A MULTI-AGENT MODELING AND SIMULATION APPROACH

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Abstract. African-American-owned high-tech enterprises and innovations are underrepresented in industry in comparison to non-African-American-owned ones. Various complex and intertwined socio-economic factors hinder the innovation capability of African-American-owned high-tech enterprises leading to underrepresentation of these businesses. Understanding the causal relationship between firm's interactions with internal and external entities and its ability to innovate can foster the efforts of a high-tech enterprise in increasing and sustaining innovation capabilities. Agent-based modeling (ABM) emerges as one of the popular approaches to the study of complex socio-technological systems. Characterizing the organizational behavior of African-American-owned high-tech enterprises through the ABM perspective may provide a better understanding of the drivers, processes, and outcomes of this industry segment. By analyzing interview data among African-American entrepreneurs, this study proposes an ABM framework to represent and analyze the innovation capabilities of African-American-owned technology enterprises in comparison to other types of ownership. The ABM model illustrates the key involved agents, their attributes, actions, and the complex interactions amongst them. Simulation results indicate that African American population is underrepresented in the high-tech industry due to two significant factors of social and economic standings implying that the simulation trajectory is in the right direction. Model calibration, verification using real data and implementation plans related to policy development discussions and factors impacting African-American enterprises are also discussed in the study.

1. Introduction

African-American-owned enterprises and innovations are underrepresented in the high-tech industry as compared to their counterparts (Adhikari et al. 2014; DiTomaso and Farris 1992; Liu 2016; Conrad 2006; Gatchair 2013; Marcus). High-tech enterprises fuel the economy and enable economic growth (Fallah, Partridge, and Rickman 2013; Linden, Dedrick, and Kraemer 2011; Mohr, Sengupta, and Slater 2009). However, there is a lack of diversity in the high-tech industry (Commission 2016). The high-tech sector has a disproportionately higher percentage of White enterprise owners; they represented 68.5% of all high-tech enterprises in 2014. Meanwhile, African Americans only accounted for 7.4% comparing to the 14.4% overall private-sector African Americans employment rate. Furthermore, only 2% of the executives and 11% of the technicians were African Americans. Despite the technological advancements over the past decades, the lack of diversity and underrepresentation of African Americans is still apparent in the industry, with no signs of improvement (Foundation 2016; R.W. Fairlie and Chatterji 2013). This lack of representation for African-American high-tech entrepreneurship hinders wealth creation for the African-American community and society overall. It is essential to investigate the reason for the extremely low rate of African-American high-tech entrepreneurship considering its significant influence on the economy and social equality (Bradley 2016). Investigating the causes of the underrepresentation of African-American high-tech enterprises may reveal potential solutions that may enhance their representation in this industry (Simard 2009).

Technological innovation entails recognizing new technological possibilities, organizing the human and financial resources needed to transform ideas into useful products or processes. Technological innovation projects involve uncertainty in decision making and complexity in conjunction with dynamic interactions (Wu et al. 2010; Sie, Bitter-Rijpkema, and Sloep 2011; Van Zee and Spinler 2014; Aparicio, Urbano, and Gómez 2016). The relationship between actors in an innovation system is changing constantly (Junior and Lakemond 2017; Macal and North 2010; Tayaran 2011). The complex nature of the evolving innovation process makes it extremely difficult to study and analyze the problems in innovation through traditional, static statistical approaches (Hekkert et al. 2007).With the progress in computer technology development, modeling and simulation emerge as one of the best ways to solve complex problems (Gilbert and Doran 2018; Gilbert and Troitzsch 2005; Helbing 2012). Models are commonly defined to study and explain observed phenomena or to foresee future phenomena (Abar et al. 2017b). Computer modeling and simulation describes the manipulation of a computational model to increase the analysis of systems' behavior and to evaluate strategies for its functioning in the predictive or descriptive modes. An advantage of computer simulation is that it allows the system to be broken down into parts, making the study of system behavior possible (Brodsky and Tokarev 2009). The theory or model becomes more verifiable because an executed computer program can quickly identify problems, inconsistencies, and the incompleteness of the theory or model. Simulations also permit the discovery of new predictions that can be derived from theory and support the search for new empirical data to verify these predictions (Cangelosi and Parisi 2002). Computer modeling is widely used in socio-technical model studies. A significant amount of previous work has concentrated on the analyses of risk-based decision making and technological innovation processes (Ma and Nakamori 2005; Wu et al. 2010; Pyka et al. 2007; Korber 2011).

To address the low representation of African-American enterprises (AAEs) in the high-tech industry, evaluate the scenarios that lead to new products, and create entrepreneurial strategies that increase the level of representation, the study focused on the socio-economic aspects of innovation with the representation of the framework. Through qualitative data collection and analysis, the paper conceptualized an agent-based modeling (ABM) framework for the complex African-American innovation system. The proposed framework integrates the well-illustrated knowledge-driven technology innovations and computer modeling and simulation approaches (Pyka, Gilbert, and Ahrweiler 2007; Pyka, Gilbert, and Ahrweiler 2002; Korber 2011). It entails the socio-economic elements that hinder the development of African-American groups through a computer modeling framework, providing a new perspective on race equality in high-tech industries.

In this regard, the contributions of this study are bifold. Firstly, a thorough analysis of current state of the art of high-tech African-American enterprises is provided. Based on the literature gaps identified as a result of this review, an ABM framework is also developed to construct a detailed model of the business environment of these enterprises. The ABM framework, in addition to providing a holistic view of the high-tech industry also provides a novel systematic approach that would benefit organizations which are underrepresented in highly competitive markets.

The paper is organized as follows. The complexity of technology innovation system, innovation systems, ABM, and socio-economic factors that affect African-American innovation are provided in the following section. The third section details the agents, actions, and decision-making components of an agent-based model while the fourth section illustrates agent interactions and performance measurements. The model's implementation and simulation test are presented in the fifth section, followed by the conclusion and discussion.

2. Literature Review

The literature review of this study addresses the key components of the African-American technical innovation system by detailing studies on technology innovation system theory, computer modeling and simulation technology and the socio-economic factors impacting the African-American entrepreneurship (Fig. **1**). Extensive literature review indicates that there is lack of research addressing African-American owned high-tech entrepreneurship through computer modeling and simulation. This study focuses on the intersection of these three areas to gain insight to prior research and gaps as indicated in (Figure 1).
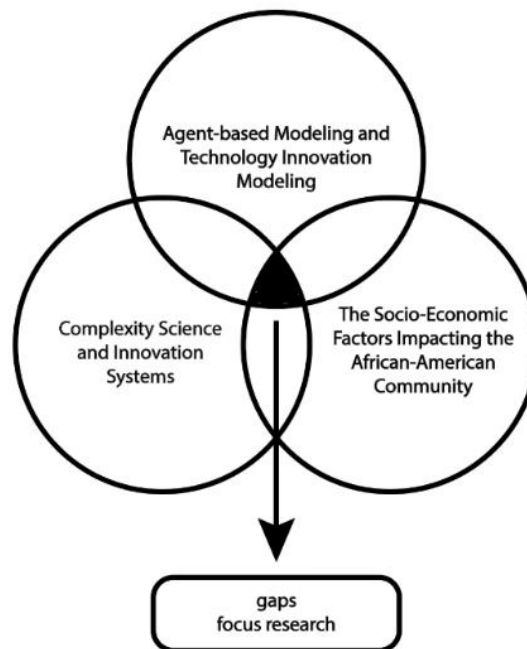
Fig. 1. Scope of literature review. Source: developed by the authors

A. Complexity Science and Innovation Systems

Complexity science is the study of complex systems that consist of several components that interact with each other to produce non-trivial phenomena that cannot be explained by analyzing the individual constituent elements (Holland 2006; N. Johnson 2009; Mitchell 2009). There are two core concepts of almost all areas of complex systems: emergence and self-organization. Emergence and self-organization each highlight the diverse characteristics of a system's behavior. Emergence includes the unexpected behavior that results from interactions among the components of an application in conjunction with the environment (Easterling and Kok 2002; C.W. Johnson 2006; De Wolf and Holvoet 2004). How the order and structures are formed in nature can be easily described by the dynamics and attractors of complex systems (Mainzer 2004). Self-organization is a dynamic and adaptive process by which systems acquire and maintain their structures without external control (De Wolf and Holvoet 2004). The essence of self-organization is adjustable behavior that autonomously acquires and preserves an increased order formed from a disordered system (Ashby 1991; De Wolf and Holvoet 2004).

The innovation process is a complex system (Muller, Héraud, and Zenker 2017; Katz 2016). Like other complex systems, it contains many components with multiple evolving interactions (Zeng et al. 2017). In the global economy, enterprises rarely innovate alone; they usually rely on partners for successful innovation (Muller, Héraud, and Zenker 2017). Enterprises and universities share knowledge and collaborate to improve innovation. Research universities are an invaluable source of intellectual capital for high-tech enterprises (Motohashi 2005; Tether and Tajar 2008). Thus, enterprises collaborate with research universities to enhance their innovative capabilities, leading to new high-tech products and methodologies (Giannopoulou, Barlatier, and Pénin 2019). However, due to the limitation of resources, enterprises must compete with other enterprises for partnerships with research institutes. Innovation enterprises often require support from the government as well to obtain a platform to enhance their technological innovations (Berteau and Swan 2018; Joshi, Inouye, and Robinson 2018; Wallsten 2000). Banks and angel investors also provide funding to many small high-tech entrepreneurs for their enterprises (Shane 2012; Colombo and Grilli 2007).

B. Agent-based Modeling and Technology Innovation Modeling

Agent-based modeling has been identified as one of the best tools to solve complex problems (Gilbert and Doran 2018; Gilbert and Troitzsch 2005; Helbing 2012). It is one of the most popular modeling and simulation tools for analyzing systems with a large number of interacting agents and emergent system properties that cannot be deduced via aggregating methods (Macal and North 2010; Axelrod and Tesfatsion 2006; Wilensky and Rand 2015; North and Macal 2007). Agent-based models comprise of a set of agents characterized by attributes that interact with each other based on a set of rules defined for a given environment. These models can be beneficial for reproducing systems related to social sciences and economics through a network-based design (Barbati, Bruno, and Genovese 2012).

With the fast development of computer technology, researchers have modeled innovation systems using ABMs in various capacities. For example, Ma and Nakamori (2005) created an agent-based model of technological innovation and described it as an evolutionary process that's both constructional and environmentally selective. Their results demonstrated that ABM and simulation are instrumental in guiding intuitions about technological innovations. Ma and Nakamori (2005); Wu et al. (2010) modeled technological innovations using the ABM framework. Pyka et al. (2007) developed the Simulating Knowledge Dynamics in Innovation Networks (SKIN) model, a knowledge-driven model; i.e., changes in the level of knowledge directly lead to product innovation. The agents consisted of innovative firms aiming to optimize their innovations by selling them to other agents and end-users. Later, Korber (2011) extended the model to simulate the biotech innovation system in Vienna. The study modeled differentiated between agents representing companies, research universities, and research organizations. In this model, all the agents had different degrees of knowledge endowments. Varying degrees of knowledge among the agents allowed for incorporating a knowledge attribute into the system. The model introduced public

institutes and other agents into the system as well, but they were treated as innovation entities, and the impact of the agents was brought into the model externally.

C. The Socio-Economic Factors Impacting the African-American Community

Socio-economic factors like personal wealth, matriculation in physical science and engineering programs, and other historically conditioned cultural factors lead to significant shortages of African-American high-tech entrepreneurial identities, causing this community to lag behind mainstream innovation (Herring 2009; Hurtado et al. 2010; Beasley and Fischer 2012; Liu 2016; Robb, Marin Consulting, and San Rafael 2013). Although significant progress has been made over the past century, enormous gaps remain between the income, employment, occupational attainment, and poverty levels of African Americans and White Americans (Thomas et al. 2018). African-American enterprises (AAEs) still encounter many barriers to entry due to ethnic inequalities (R.W. Fairlie, Robb, and Hinson 2010; Bates 2011; Robb, Marin Consulting, and San Rafael 2013; Dorsey 2016).

The 2014 Annual Survey of Entrepreneurs reveals that African-Americans and Hispanics remain underrepresented in business ownership. Minority-owned businesses display larger support on family savings as well as personal savings as a means of startup capital. Hispanics and African-Americans did not have business bank loans as compared to Whites. African-Americans rely more of using their credit cards as a mean of financing for debt which is much higher than bank loans from financial institutions. African-Americans, in general, had inadequate capital when starting their businesses. When launching their businesses, they had less than $10,000 in financial capital, compared with Asians and Whites. The high cost of securing capital impacted their profitability, compared with White-owned businesses. Research illustrates that African-Americans, as well as Hispanics, had a higher percentage of pursuing new financing relationships utilizing a range of sources, including banks compared with their White counterparts. This likely indicates the higher rejected rates when compared with Whites (Robb and Niwot 2018; R.W. Fairlie, Robb, and Hinson 2010; R. Fairlie, Robb, and Robinson 2016).

In general, racial discrimination, cultural family background differences, and the overall socio-economic environment are contributing factors in the underrepresentation of AAEs. Therefore, the present study included interviews with AAEs to identify the socio-economic barriers they encountered during the innovation processes. The next section illustrates the methodology and summarizes the identified entities, actions, and decision-making processes in an ABM framework.

3. African-American Agent-Based Innovation Modeling Framework

To theorize the African-American innovation process, the study conducted interviews among African-American entrepreneurs, universities, government, and funding institutes and identified them as internal entities within the complex innovation system. The figure below demonstrates the process to build the framework with input from the African-American entrepreneurs validating the model (Fig. 2).
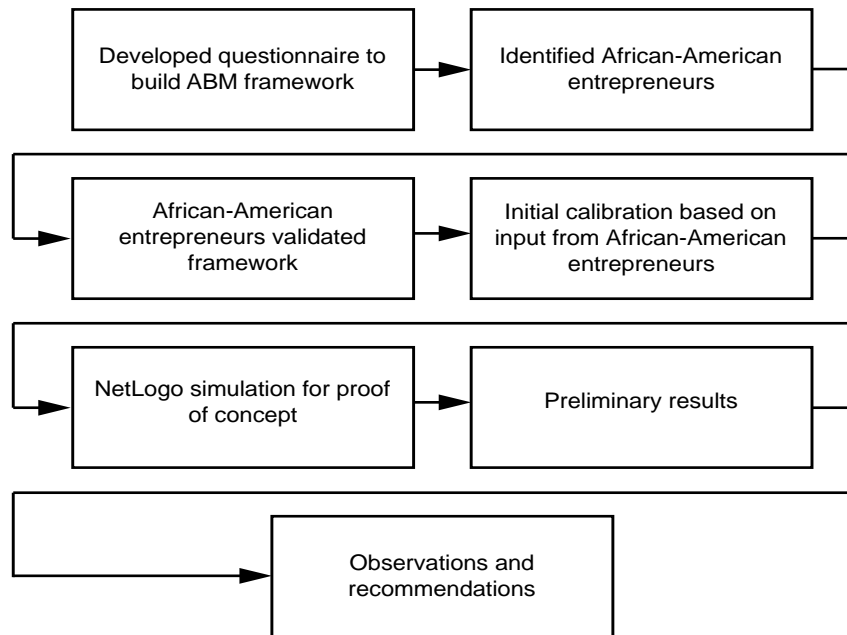
Fig. 2. Framework development methodology. Source: developed by the authors

In total, over 200 African-American enterprise executives and employees were surveyed through questionnaires and interviews in 2019. The questionnaires were sent out by using Google Form and the interviews were recorded and transcribed to text context, which was then used as inputs for NVivo thematical analysis. A selection of respondents is represented in the following Table 1.

Table 1. Selection of respondents. Source: developed by the authors

Age Range	Company Size	Sector	Respondent Profile (Background)
36 -55	Small	Aerospace Engineering (NASA)	President & CEO (Aerospace Engineering)
56 plus	Mid	Cybersecurity (Defense industry)	President & CEO (Computer Engineering)
36 -55	mid	Telecommunication	CEO (Electrical Engineering)
56 plus	mid	Software engineering (Defense industry)	CEO (Aerospace Engineering)
36-55	small	Telecommunication (Commercial)	R&D Director (Computer Engineering)
36-55	mid	Pharmaceutical (manufacturing)	CEO (Biomedical Engineering)
36-55	mid	Information Technology (Defense Industry)	CEO (Information Technology)
36-55	small	Computer systems design (Defense Industry)	President & CEO (Computer Engineering)
…	…	…	…

Five types of entities—i.e., African-American enterprise, funding institute, non-African-American enterprise, government R&D department, and university research institute were identified in the African-American innovation process (Fig. **3**). These entities take actions, interactions with each other and the built-up social network environment.
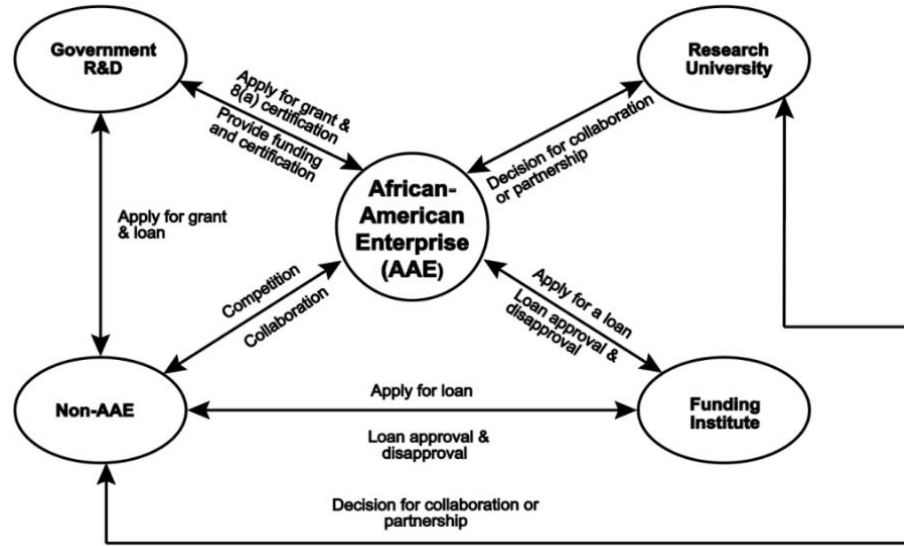
Fig. 3. Schematic representation of African-American innovation and ABM framework. Source: developed by the authors

Building on the knowledge-driven approach (Korber 2011; Pyka et al. 2007), the involved entities are treated as agents and each agent has certain attributes and skills. They can be represented by a set of kenes. A kene is defined as the knowledge based of the agents with at least three elements: capability, ability, and expertise level (Gilbert 1997). In the proposed African-American agent-based innovation model, enterprise agents are capable to perform research and development activities, and commercialize the products. Their ability would be research and development talent coupled with business acumen. And their expertise level would consist of a team of experienced developers and business leaders. The following section entails the agents and their actions obtained from the series of interviews. First, the agent attributes and kenes are illustrated in detail. Each agent's actions are then defined as functions of the identified socio-economic factors. The rules defined for each agent are presented by the agent's action pseudocode.

A. African-American Enterprises and Non-African-American Enterprise Agents

African-American enterprises (AAE) and non-African-American enterprise agents (non-AAE) represent the African-American high-tech enterprises and non-African-American (mainly White) agents, respectively. AAE and non-AAE agents are the core entities of the complex innovation system. They initiate innovations and develop products based on inputs from the knowledge base. The data analysis identified the socio-economic factors that determine the result of innovation as race, education, age, start-up, research and development (R&D) investment, risk tolerance, level of partnership, partner search strategy, minority enterprise 8(a) set-aside, product future, and product maturity level (Table 2).

Table 2. The socio-economic factors of the African-American innovation enterprise agents*

Attribute	Definition
Age	Age of the entrepreneur when the venture was started
Education	Level or obtained degree
Personal start-up	Personal capital invested in the venture
Race	Ethnographic classification
R&D investment	Amount of money the entrepreneur has to invest in R&D (e.g., the demand for R&D and the long-run payoff for the firm's R&D investment)
Risk tolerance	Amount of tolerance for which the entrepreneur is willing to invest their time and money
Level of partnership	Whether the agent decides to pursue a go-it-alone strategy or looks for partners
Partner search strategy	Partner preference
Minority firm 8(a) set-a-side	In defense contracting, a Certified 8(a) Firm is a firm that is eligible to receive federal contracts under the Small Business Administration's 8(a) Business Development Program because it is owned and operated by socially and economically disadvantaged individuals (Zhu 2017).
Product future	Whether the product has a good future
Product maturity level	Whether the product has reached a certain maturity level and is ready to be sold in the market

* The attributes were summarized from interview results among stakeholders. Source: developed by the authors

Age is an important attribute of AAE agents. Three stages of maturity in the age attribute were identified through the conducted interviews. Innovation entrepreneurs of different age groups had different innovation strategies. For instance, recent university graduates endowed with fresh and creative ideas chose to start their own businesses upon graduation. The second stage of maturity included people who decided to pursue an opportunity after working for several years. At this stage, these entrepreneurs had already been exposed to working in a high-tech industry and were ready to embark on their innovation journeys. They were inspired by their work experiences and had accumulated social resources to turn into their first customers. The final stage of maturity included a group of people who began the innovation process after retirement. They were inspired by their work or their own life interests and usually had plenty of financial and social resources to start their own businesses.

In addition to the age factor, innovation and R&D are major components that lead to new high-tech products, methods, and services; therefore, education is vital to this process. It is a major factor related to the entrepreneur's ability to be more innovative when creating high-tech products and services.

To start their own enterprises, both AAEs and non-AAEs require investment capital to make key decisions about how to grow their businesses. Both AAEs and non-AAEs also require R&D investments (i.e., the amount of money the enterprise must invest in R&D). This includes understanding not only the demand for R&D but the long-run payoff for the enterprise's R&D undertaking.

The interviews indicated that every entrepreneur is exposed to a certain degree of risk. The proposed framework defines risk tolerance as the amount of tolerance for which the AAE/non-AAE is willing to invest their time and money. For the AAE/non-AAE to be more competitive, the agent evaluates whether to pursue joint ventures with

other high-tech enterprises or research universities. This is called the level of partnership. The level of partnership allows the AAE/non-AAE to increase its competitive edge by leveraging the talent pool via partnering and R&D investment capital.

The interviews revealed that enterprise agents could elect to pursue a government certification that will allow them to compete for individual federal contracts. This is a disadvantaged minority certification known as the 8(a) certification under the Small Businesses Administration, which remains valid for a total of nine years. Commercialization driven by innovation is the key to product development; it is imperative to generate products that can be sold on the market.

Each innovation enterprise agent a_i (i = 1, …, N) owns a set of kenes ak_i. The kenes ak_i of a_i are elements of the following set:
$$ak_i \in \{(S_i, c_i, b_i) | i = 1, …, N\} \text{ where } S_i = [r_i, g_i, u_i, t_i, d_i, y_i, v_i]$$
S_i is the socio-economic factor vector of a_i, r is race, $r = 0$ represents African-American enterprises, and $r = 1$ represents non-African-American (White) enterprises. g represents the innovator's years of work experience, and v_i is the start-up initial of enterprise agent a_i. y represents the annual income, and d is the credit rating of the agent.

According to the interviewees, the core competency c of the innovation entity i is a function of the innovator's work experience (in years), annual income, credit rating, personal startup amount, and R&D investment amount.
$$c_i = f(g_i, d_i, y_i, v_i)$$

The business plan quality b of the innovation entity i was determined using the corresponding work experience, education, social networking with innovators, and university R&D entities. Generally, the innovation entities obtained business plan writing skills from school and previous workplaces as well as aid from other innovators.
$$b_i = f(g_i, u_i, t_i)$$

The AAE/non-AAE agent initiates the enterprise through startup innovation. During the innovation process, AAE agents may choose to work with other AAE or non-AAE innovation agents. Innovation agents also have opportunities to collaborate with university agents and funding institution agents to obtain support. In addition, they compete for resources such as funding and government projects. Innovation agents have the freedom to join other innovation projects as employees or university researchers. The agents' unique attributes and actions enable them to operate and make decisions accordingly.

Non-African-American enterprises compete with AAEs for funding, research university access, and small business innovation research (SBIR) grants. Non-AAE agents can also partner with AAE agents and leverage their network and talents to help AAE agents enhance the innovation process. Non-AAE agents have the same characteristics as the AAE agents; race is the only difference. Most non-AAE agents are White Americans. Therefore, the non-AAE agents in the present study represent White entrepreneurs. Race was selected as the key variable because most successful high-tech enterprises consist of only White entrepreneurs. In the proposed model, AAE and non-AAE agents compete for opportunities or decide to start a partnership and compete as a joint venture.

B. Funding Agents

The funding agent is the institution responsible for providing AAE/non-AAEs with the necessary funding to support their enterprises (e.g., angel investors and banks). The funding agent's attributes include the loan size, loan history based on race, loan history of supporting startups, and maximum loan amount the bank or venture capitalist can provide. The loan size may be small, medium or large, depending on the existing market. Different

financial institutions have different strategies. Another attribute of the funding agent is their history of providing loans to AAEs. This is vital information to determine the likelihood of the AAEs getting loan approvals. The credit rating of a start-up is crucial for the funding agent to evaluate the start-up's ability to make the loan payment if approved. The agent considers the start-up's loan history to evaluate whether there is a history of the AAE defaulting on loan payments. There is also a maximum loan amount that this agent can provide.

Funding institute agents f_j, (j = 1, …, N) own a set of kenes fk_j. The kenes fk_j of f_j are elements of the following set:

$$fk_j \in \left\{ \left(ls_j, lh_j, lm_j \right) | j = 1, \dots, N \right\}$$

The ls represents the maximum loan the funding institute agent f_j can provide, and lh is the loan history based on race. The lm represents the total funding limit of the institute.

The amount of money agent a_i needs to borrow from funding f_j is denoted by $al_{i,j}$. It is the total start-up amount required T_i minus the agent's initial start-up amount v_i.

$$al_{i,j} = T_i - v_i$$

The funding institute f_j makes financing decisions based on the evaluation of the applied funding $al_{i,j}$, the credit rating d_i of agent a_i, and the business plan b_i.

$$fd_{j,i} = f(al_{i,j}, d_i, b_i)$$

Agent action pseudocode:

IF loan amount <= Funding institute agent loan size/threshold

IF credit score >= credit bureau agency threshold

IF the AAE business plan meets the minimum standard of acceptable quality score

THEN approve loan amount according to company's size, small, medium, large [group history + 1, agent credit score + 1]

ELSE deny loan, [agent credit score – 1, group history – 1]

C. Government Research Agent

Government research agents represent the local to global level administration authorizations that make innovation policies and guarantee funding. As indicated in the interviews, the government institute of the U.S. government provides SBIR grants. According to the interviewees, the U.S. government R&D agents interact with the AAE and non-AAE agents to determine whether an enterprise can provide R&D expertise to support SBIRs. The government agent also provides enterprises with a small business/R&D loan. The government research agent has attributes and actions that present opportunities for the high-tech enterprises to compete for SBIRs and research funding backed by the government. The government research agent can also provide small disadvantaged business certifications to minority-owned companies. This certification allows the AAEs to compete for federal contracts that are only for certified disadvantaged enterprises. We included this type of agent in our study because the government plays a significant role in implementing policies that help AAE high-tech enterprises. In the proposed model, the government agent provides the AAE or non-AAE agents with the opportunity to compete for SBIRs as well as R&D funding backed by the government. The kene can be denoted as follows:

$$gk_l = \left\{ \left(ha_l, hf_l, SBIR_l, \right) | l = 1, \dots, N \right\}$$

The gk represents the government R&D agent l kenes, ha represents the government's project sponsorship history, hf represents government-guaranteed R&D funding for the AAE, and $SBIR$ represents the SBIR project. The government agent approves the funding support based on the company's 8(a) certification (ec) and project proposal (b):

$$SBIR_{l,i} = f(r_i, ec_i, b_i)$$

$$\text{where } ec_i = \begin{cases} 1 \text{ if } os_i > 50\% \\ 0 \text{ if } os_i < 50\% \end{cases}$$

The os represents the firm agent ownership of the company.
Agent action pseudocode:
IF firm owner race = African-American
Then grant 8(a) certifications
If ownership > 50%
If business plan meets the threshold
Then award grant, business credit score + 1, experience + 1
Else denied

D. Research university agent

The research university agent is the research university or institution with which the AAE/non-AAE fosters a relationship that can lead to new opportunities and strategic locations to increase the AAE/non-AAE's recognition and knowledge base. The research university agent's primary role is to be a resource for high-tech enterprises to leverage institutions for their research expertise, talent pool, and grant opportunities. The AAE and non-AAE compete for collaboration opportunities with this agent. This agent is a vital resource for creating innovations that make AAEs more competitive.

The research university plays a vital role in increasing the innovations of high-tech enterprises. Enterprises must collaborate with research universities to increase their knowledge base and enhance their innovation capacity. Universities are often the primary source of knowledge transfers (Scandura 2016). In the proposed model, the research university is an invaluable knowledge base for high-tech enterprises seeking to collaborate and compete for university expertise. The AAE/non-AAE submit their proposal for university collaboration. The approval action for this agent is defined by the following equation:

$$rk_m = \{(hr_m, tp_m, ra_{m,i})|m = 1, \ldots, N\}$$

The rk represents the research university agent's kenes, hr represents the agent's work history with AAEs, tp represents the talent pool, and ra represents the research assistance.

The approval of a collaboration with the research university agent can be expressed as follows:
$$ua_{m,i} = f(ra_m, hr_m, b_i)$$

The $ua_{m,i}$ is the final decision of research university agent m to collaborate with applicant i, ra_m is the collaboration capacity, and b_i is the application's proposal quality.

Agent action pseudocode:
IF collaboration criteria met
Then proposal quality + 1, project experience + 1
The key agents' variables are summarized in Table 3.

Table 3. Summary of the agents' kenes. Source: developed by the authors

Agents	Variables	Definition
AAE/non-AAE (a_i)	ak_i	Kene of AAE/non-AAE agent a_i
	S_i	Socio-economic factor vector of a_i
	c_i	Core competency of AAE/non-AAE agent a_i
	b_i	Business plan quality of AAE/non-AAE agent a_i
Funding Institute (f_j)	fk_j	Funding institute kene of f_j
	ls_j	Maximum loan size of the funding institute agent f_j
	lh_j	Loan history for the race group
	lm_j	The total funding limit of the institute
Government (g_l)	gk_l	Kene of government agent g_l
	ha_l	Government project sponsorship history
	hf_l,	Government-guaranteed R&D funding
	$SBIR_l$	SBIR project
University (r_m)	rk_m	University agent's kenes
	hr_m	History of work with AAEs
	tp_m	Talent pool
	$ra_{m,i}$	Research assistance to a_i

E. Interaction among Agents and Performance Measurement

In the proposed innovation framework, AAE agents, non-AAE agents, funding institute agents, university agents, and government agents are endowed with defined social-economic factors (Fig. **5**). They can interact with each other to network and develop partnerships. The complex interactions among the agents create a virtual social environment. This allows AAE agents to share knowledge and resources that may lead to innovative ideas.
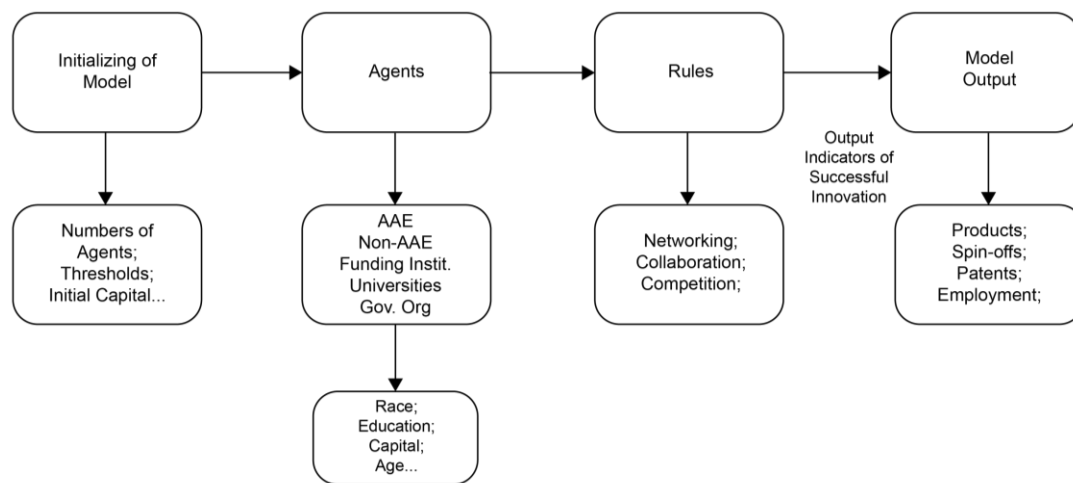
Fig. 4. African-American innovation agent-based model flow. Source: developed by the authors

In the model, each agent has an attribute called individual power. Agents can initiate networking with other high-tech enterprises. Whenever two agents (i, j) interact, they establish a partnership that gives them the opportunity to share knowledge and resources. The model design was formulated with an on/off option to trigger networking with other innovative agents. In turn, the total sum of the links' energy represents the overall networking power. This can be denoted as follows:

$$N_t = \sum_{i,j} En_{i,j} \text{ with } i \neq j$$

N is the number of connections between the agents i and j. The agents obtain new experiences through communication and knowledge sharing. The higher the N, level of expertise, and proposal quality, the higher the AAE's level of expertise.

Innovation in research and development consists of basic and applied research to create knowledge in a product development environment. Both innovation and research enhance the knowledge base of a firm (Henard and McFadyen 2005; Herrera and Sánchez-González 2013). Basic research and development (i.e., fundamental research) focus on journal publications and patent applications that result in R&D growth (Quélin and Mothe 1997). The R&D group gets repaid through improved academic reputations or patent charging fees. Applied R&D focuses on new or improved products or processes and creations. This type of R&D gets rewarded through product sales (Quélin and Mothe 1997). A group of innovators commercialize the newly developed knowledge and build their own businesses through entrepreneurial start-ups or major organization spin-offs. Therefore, the success of R&D output O of the innovations generated by the AAE/non-AAE can be measured in various forms.

$$O_i = \begin{cases} 1 = basic\ RD: patent, journal\ publishment \\ 2 = applied\ RD: new\ product, new\ process \\ 3 = commercialized\ RD: start-up, spin-off \end{cases}$$

The primary purpose of the proposed model is to examine various scenarios for successful innovation among African-American high-tech enterprises and determine the factors that influence innovation outcomes. In the Biotech Innovation System model developed by Korber, Paier, and Fischer (2009), the spin-off companies determined a certain knowledge flow that connects academia with the industry. The university scholars held stocks in companies or became entrepreneurs themselves. In the African-American Enterprise Innovation Model (AAEIM) for African-American high-tech enterprises, spin-off companies provide a way to measure success for the AAE, thereby linking knowledge flow to collaborations with universities. There is a success threshold that triggers new spin-off enterprises based on the current level of success. The present model uses the number of spin-offs as the measure of innovation success.

4. Simulation and Scenario Comparison

The proposed agent-based enterprise innovation concept was implemented using NetLogo (Tisue and Wilensky 2004). NetLogo is a practical software environment that is easy to use and is applicable to interdisciplinary work. NetLogo consists of a variety of ready-to-use programs and libraries through which a user can focus on model design rather than complex computer programming tasks (Abar et al. 2017a; Allan 2010; Crooks and Castle 2012; Robertson 2005). NetLogo is widely recognized as the ideal software tool for creating agent-based models (Alden, Timmis, and Coles 2014). It is a powerful tool for people new to modeling or scientists with minimal software development expertise (Lytinen and Railsback 2012; Wilensky and Rand 2015).

Fig. 5 shows the interface for the African-American enterprise innovation's NetLogo model. The left side of the model interface displays a list of the initial parameter settings, including the total initial number of simulating agents, initial funding, input–output ratio, partnership strategy, and firm success thresholds. Next to them, the

switches for research strategies and networking partnerships as well as start-up controls are provided. These are the additional functions available to test the results of different innovation environments. The view window in the middle shows the number of agents. For instance, a green-colored person symbol represents the AAE agent, a yellow-colored person symbol represents the non-AAE agent, a single house symbol represents the university agent, stacked house symbol represents the government agent, and bird symbol represents the funding institute agent. During a simulation, underperforming firms may die out while the over-performing firms have a chance to grow and produce spin-offs. The number of AAE/non-AAE agents can directly represent the results of the simulation. The plots on the right-side monitor the performance of each of the key variables.
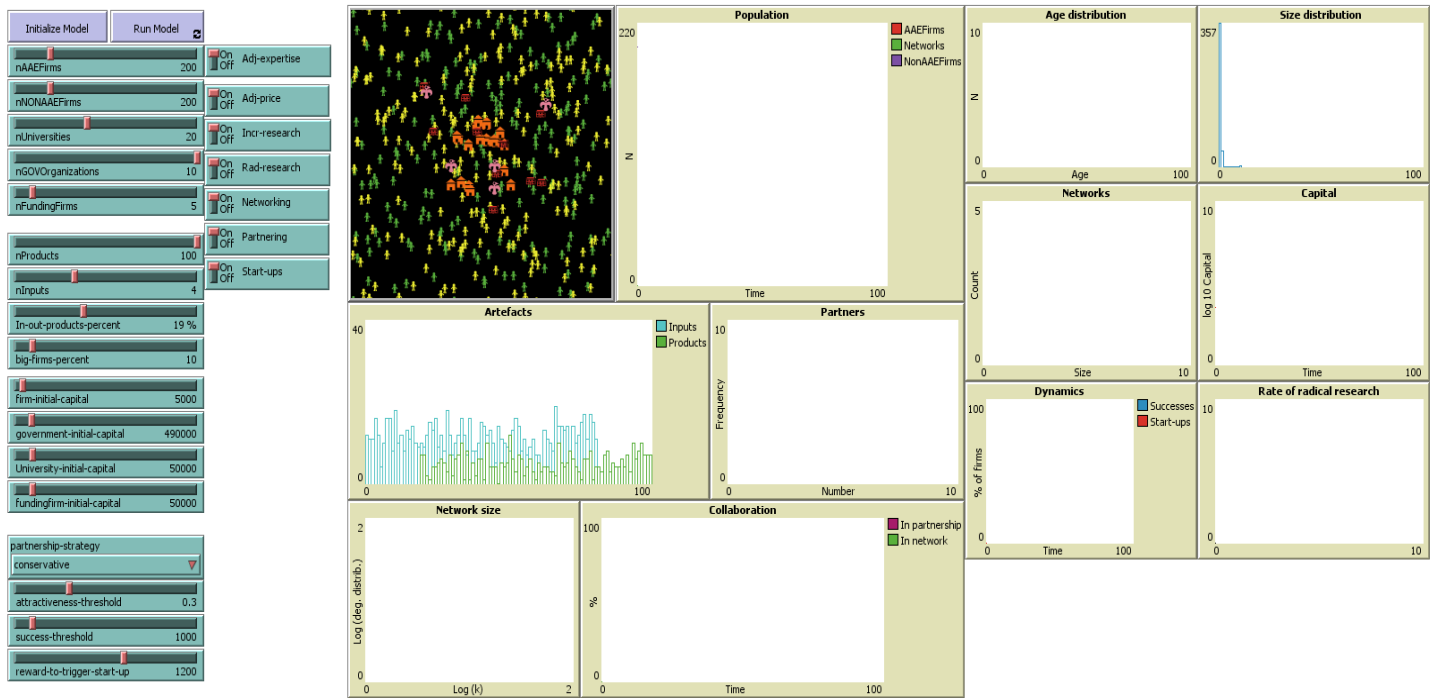
Fig. 5. The African-American Enterprise Agent-based Model on NetLogo. Source: developed by the authors

A. The Analysis of the System Performance and Simulation Results

According to the knowledge-driven approach, there is no knowledge or other creative difference between the AAE and non-AAE agents; the same innovation results would be obtained for both the agent types with the same input factors. However, our preliminary data collection and literature review suggested that African-Americans usually have less initial capital than non-African-American entrepreneurs. This study created a scenario in which the AAE and non-AAE agents had different initial capitals.

The model results depicted in Fig. **6** shows that African-American agents lag behind non-African-American agents in start-up spin-offs. As shown in the top-right line plotting window, the number of non-AAE-owned firms (purple line) consistently increased in this scenario. On the contrary, the AAE-owned firms (red line) showed a fast decline before an increase. This gap between the non-AAE and AAE agents grew over time. The "yellow person" (non-AAE agent) outgrew the "green person" (AAE agent). During the simulation period, non-African-American agents dominated the African-American agents even when they had the same initial enterprise counts.

This corroborated the literature that suggested that African-American enterprises are underrepresented due to socio-economic factors (Lofstrom and Bates 2013).
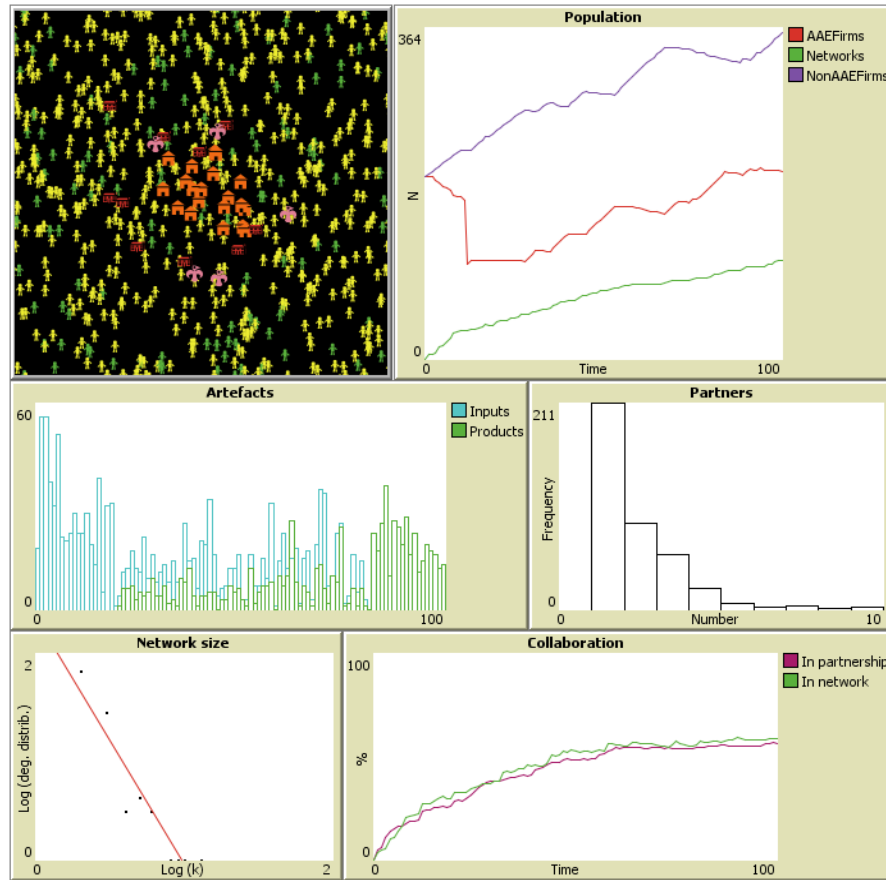
Fig. 6. Model simulation results. Source: developed by the authors

Model simulation results: In the top-left visual window, the yellow "persons" represent the non-AAE agents, and the green "persons" represent the AAE agents. Initially, there were equal numbers of yellow and green "persons." After the simulation of multiple generations', the number of yellow "persons" dominated the number of green "persons." This is shown in the top-right graph; the number of AAE firms (red line) is way lower than the non-AAE firms (purple line), while the other graphs demonstrate that all the other conditions were equal.

5. Discussion and Conclusions

This paper presented a conceptual framework of an African-American enterprise innovation model for addressing the underrepresentation of African-American high-tech enterprises based on interviews and questionnaires conducted with African-American entrepreneurs. The proposed innovation-based model consists of five autonomous agents in a dynamic, complex innovation system that employs an agent-based modeling approach. Thematic qualitative data analysis was conducted, and the attributes and actions for each type of agent were defined. The proposed framework was then implemented into a computer model on NetLogo platform. The simulation results corroborated the results from existing literature that African-Americans are underrepresented

because of their socio-economic status (Adhikari et al. 2014; DiTomaso and Farris 1992; Liu 2016; Conrad 2006; Gatchair 2013; Marcus). It indicates that the model is successful in depicting the true characteristics of market participants.

To the best of our knowledge, this work is unique with its introduction of factors that constitute the African-American high-tech industry business environment. This approach fills literature gap on the lack of causal-relationship investigation in African-American entrepreneurship study (Gatchair 2013). The proposed framework constructs a dual virtual environment including socio-economic factors and involving entity networks. The created entrepreneur agents adopt knowledge-driven approach innovating and creating startups in the created virtual environment. Successful businesses will grow, thrive and spin off new business over time. Constrained businesses may lose competition and die out. This replicates the innovation reality.

Furthermore, the study also contributes to the literature by introducing a novel ABM approach for the systematic evaluation of this industry segment. The proposed model first introduces peer agents, non-African-American entrepreneur agents, to the framework simulating the competition/collaboration relationships among them. The performance of each ethnicity group is reflected by their numbers directly. Second, instead of treating educational, governmental and financial institutes as external forces as similar studies (2007; 2011), the proposed framework internalized these entities and treated them as parts of the complex system. The various agents compete/collaborate with each other through an evolutionary dynamic approach. Knowledge, resources and historical paths accumulate and feedback to the environment over time.

Therefore, the proposed framework not only provides a holistic model for African-American high-tech enterprises but also maps the partners in industry differentiating their internal and external collaborators. In addition, introducing a multi-layer classification of an otherwise complex system, the model also allows similar underrepresented industries to decide on the level of information technology and capital investment required to foster and grow individual relations in the marketplace. This model can be used by technology managers to determine how different scenarios can be more competitive. The technology managers can also measure the effectiveness of various innovations by using the computer simulation outcomes. Thus, technology managers initializing such models can gain higher recognition and have greater impact in research and development.

Diversity is not only a crucial element of sustainability but is also proven to be a key driver of innovation. Similarly, lack of representation of all groups that vary by gender, race, ethnicity and other status irrefutably hinders the progress of any industry. This study focuses on addressing the factors that contribute to the low representation of African-American owned high-tech enterprises. In this regard, the research significantly contributes to the related literature by providing a data-driven assessment tool to evaluate the potential success of innovation projects prior to their launch. The simulation-based model is easily applicable to other high-tech products and processes. The study further contributes to the related body of work underscoring the importance of empowering minorities and ensuring diversity in all dimensions in Science, Technology, Engineering, Math (STEM) fields. Increasing the representation of African-American high-tech enterprises would not only benefit the African-American community but society as a whole. On a broader scope, the study establishes a platform for facilitating a policy discussion regarding the unique challenges African-American high-tech entrepreneurship is facing.

Even though the simulation results demonstrated the success of the framework and modeling approach, the proposed model requires further calibration and verification before it can be used for policy analysis and formalization. Given that ABM approach allow great flexibility, the platform can easily be adjusted to industries with varying levels of agents and model components. Due to its versatile nature, additional agents can also be seamlessly integrated in to the model environment to widen the scope and the robustness of the framework.

Additional data needs to be collected to structure the socio-economic factors for the proposed model. This study defined agent interactions as linear relationships to simplify the modeling approach. However, the causal relationships between the influencing factors and agent interactions are far more complicated. Future work might benefit from creating what-if scenarios to examine emergent behaviors and the use of sensitivity analyses to predict the probability of successful innovations. Further, incorporate real-world data inputs from questionnaires into the model would improve the performance of simulation runs and model calibration.

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EDUCATION OF ENTREPRENEURSHIP BY PARTICIPATION IN A BUSINESS SIMULATION ENTERPRISE ACTIVITIES: CONDITIONS OF EFFECTIVENESS AND OPPORTUNITIES FOR IMPROVEMENT

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Abstract. The article deals with the theoretical aspects of entrepreneurship education and participation in a business simulation enterprise conditions and opportunities. *Aim of the research*: to investigate the efficiency conditions and possibilities of entrepreneurship education of students participating in the activities of the business simulation enterprises in Lithuanian higher education institutions. *Analytical descriptive, quantitative and statistical* research methods were applied. The results of the quantitative research showed that a business simulation enterprise is a suitable form of teaching/learning for the development of students' entrepreneurial abilities and personal entrepreneurial qualities. It was found that by participating in the activities of business simulation enterprise, the students became more aware of the business, self-assessed and improved their business management skills and developed their personal entrepreneurial qualities. The results of the research will have a lasting value in the scientific discussion about the possibilities of students' entrepreneurship education in higher education studies when participating in the business simulation enterprise activities and also will have practical value in providing opportunities for quality improvement in the organization of the study process in business simulation enterprise by developing students' entrepreneurial skills.

Keywords: entrepreneurship education; business simulation enterprise; student

1. Introduction

Entrepreneurship is one of the main drivers of the country's economy. Entrepreneurship is the source of GDP growth, employment and unemployment (Baltgailis, 2019; Chehabeddine, Tvaronavičienė, 2020; Vigliarolo, 2020). Many Lithuanian, European and world scientists are currently exploring the issue of entrepreneurship. Dudaitė et al. (2015) analysed "a specific scientific problem - how entrepreneurship is developed in the current Lithuanian general education school, empirical research was carried out in 2013–2014, which revealed the state of entrepreneurship education." Based on the analysis of legal acts and various literature sources, the concept of entrepreneurship, competence, educational goals, models, etc. has been summarized, as well as the trends and perspectives of entrepreneurship education in the European Union are presented. When analysing the Lithuanian context, the main focus was on formal and non-formal education programmes, specific training tools, teacher competencies and their pedagogical experience in developing entrepreneurship in different subjects. Entrepreneurship education has been analysed by researchers from Lithuania and abroad in various aspects, both theoretically and empirically. Most researchers emphasize the entrepreneurial qualities and traits that characterize an entrepreneurial personality (Robinson et al., 1991; Caird, 1991; Utsch, Rauch, 200; Cromie, 2000), highlighting the skills needed to start a business or work in an organization (Gibb, Nelson, 1996; Rea et al., 1997; Galloway et al., 2005, all authors cit. by Strazdienė, 2009). It is stated that the development of entrepreneurial skills requires the creation of a learning environment that is consistent with the modern business world. Most scholars admit that unconventional teaching / learning methods such as business simulation, teamwork and other innovative teaching / learning strategies can help to achieve this goal (Rea, Craswell, 2000; McMarthy, 2006, cit. by Strazdienė, 2009), which enables students to practice a variety of entrepreneurial tasks. Particular attention has recently been paid to business simulation technologies (Faria, 2001; Summers, 2004, cit. by Strazdienė, 2009), which not only enable students to achieve good results at minimal time by observing and engaging in business creation processes in simulated real business environments and situations, but also a prerequisite for acquiring practical entrepreneurial skills, increases student motivation (Taylor, Wolford, 1972; Wolfe, Crookall, 1998; Goosen et al., 2001; Feinstein, 2001; Faria, Wellington, 2004, cit. by Strazdienė, 2009). According to the researchers, for motivated students it is easier to make decisions, perform roles and gain the experience necessary to operate independently in market conditions. On the other hand, participating and acting in simulated real business environment work situations improves the application of theoretical knowledge and realistically reflects the business enterprise environment.

Relevant discussions about entrepreneurship education in higher education initiate various research. Most often Lithuanian scientists analyse the characteristics, traits and abilities of an entrepreneur. Valuckienė, Ruškus, Balčiūnas (2004) analyse peculiarities of entrepreneurship as a personality trait expression, Garalis (2007) discusses the role of entrepreneurship education in a learning process and learners' acquired skills. Strazdienė (2009), while summarizing the research results, foresee students' entrepreneurship education possibilities and effectiveness in applying a business simulation model. According to the researcher, entrepreneurship education while simulating in Lithuania and abroad is carried out using the simulated business enterprise model, which is described as a model of entrepreneurship practical training, simulating real business activities in human resource management, accounting, purchasing, sales and marketing management activities. This form of education integrates knowledge of economics, management, foreign languages, finance, law and other study subjects, and promotes student's independence, creativity, problem-based thinking, and develops teamwork skills and other entrepreneurial qualities.

Recently, both in Lithuania and abroad, attention has been growing to investigate the problem of student entrepreneurship education. However, as Strazdienė (2009) observes, entrepreneurship education through simulation is not yet theoretically grounded and has not been thoroughly empirically studied. In particular, there is a lack of research analysing student's entrepreneurship education through participation in business simulation enterprise activities and grounding the effectiveness of these activities for student entrepreneurship education

from their own point of view. Having determined the content and expression of students' entrepreneurial qualities and abilities by applying the activities of a business simulation enterprise, the empirically evaluated effectiveness of entrepreneurship education creates preconditions for anticipation of improvement opportunities and perspectives.

Having evaluated the importance of entrepreneurial competence in professional activities, this article reveals the opportunities of entrepreneurship education in higher education studies by participating in business simulation enterprise activities, and explores the ways in which the development of students' entrepreneurial abilities and skills is organized. Having assessed the relevance of the topic under discussion, the following **problematic questions** arise: What are the students' entrepreneurial abilities and skills being developed through their participation in a business simulation enterprise activity? What are the opportunities for students to improve their entrepreneurship education by organizing a business simulation enterprise activity?

The aim of the research is to investigate the efficiency of conditions and possibilities of Lithuanian higher education institutions students' entrepreneurship education while participating in the activities of a business simulation enterprise.

Objectives of the research:
1. After the analysis of scientific literature and research related topic, theoretically ground the conditions and possibilities of entrepreneurship education in the business simulation enterprise.
2. To determine the expression of entrepreneurial qualities and abilities of Lithuanian higher education institutions students participating in the activity of business simulation enterprise.
3. To determine the efficiency of entrepreneurship education by participating in the business simulation enterprise activities, based on Lithuanian higher education institutions students' assessment, according to the following criteria:
   • reaction to the learning process in a business simulation enterprise;
   • organization of the study process in a business simulation enterprise while modelling business-oriented activities;
   • changes in entrepreneurial abilities, skills and attributes through the involvement of students in the operation of business simulation enterprise.
4. On the basis of the research results, provide opportunities for the improvement of entrepreneurship education of Lithuanian higher education institutions by participating in the activities of business simulation enterprise.

The results of this study will have a lasting value in the scientific discussion on student entrepreneurship education opportunities in higher education studies through their participation in the business simulation enterprise activities, as well as practical implications for the study process organization quality improvement opportunities in developing entrepreneurial skills.

In the future, it would be meaningful to conduct a re-examination of the research subjects' characteristics, to make a distinction between genders and other sociodemographic indicators, to include more variables, and to compare the views of students in different forms of study (full-time, part-time, and session studies). Also, in the future, it would be meaningful to evaluate the change and expression of entrepreneurial skills, abilities and attributes of students involved in the business simulation enterprise activities by applying experiment (initial - before training, and final - after training) and opportunities for improvement.

2. Discussion

Economic, social and cultural change determines the need for those with entrepreneurial skills. Therefore, developing the entrepreneurial skills of young people, educational institutions need to respond to the ongoing change, to implement new teaching technologies, strategies and models, to seek innovative teaching / learning methods, to bring business studies closer to the real world of business. The implementation of entrepreneurship education in Lithuania is based on the application of business simulation technologies, integrating knowledge of economics, management, foreign languages, finance, law and other subjects and creating a learning environment that simulates the real business activities in accounting, purchasing, sales and marketing management activities. Recently, both in Lithuania and abroad, more attention is paid to study the problem of student entrepreneurship education. However, there is still a lack of research analysing student entrepreneurship education through participation in a business simulation enterprise activities and justifying its effectiveness. Taking into account the relevance of the topic, the research object was the efficiency of entrepreneurship education in Lithuanian higher education institutions by participating in the activities of a business simulation enterprise. The research carried out helped to understand what students' entrepreneurial abilities and qualities are developed by participating in the business simulation enterprise and to identify opportunities for the improvement of entrepreneurship education by organizing activities in the business simulation enterprises.

Analysing the theoretical potential of entrepreneurship education in educational institutions, many scholars focus on organizing activities that fit the modern business world (Hartshorn, 2005; McMarthy, 2006; Jahnson, Spicer, 2006, cited by Strazdiene, 2009; Girdzijauskaite et al., 2019). The results of our study also revealed the role of the educational institution, in developing students' entrepreneurial abilities, and personal qualities through their participation in a business simulation enterprise, closer to the real business world. Discussing the results of our research, it was found that purposefully organized activities in the business simulation enterprise had a positive influence on the expression of students' entrepreneurial abilities. According to the majority of students, business simulation enterprise is a suitable form of teaching/learning to get acquainted with business enterprise activities, develop business management skills and personal entrepreneurial qualities, as well as apply students' practical skills and theoretical knowledge acquired during lectures to practical situations. However, based on the students' assessment, it should be acknowledged that activities organized in a business simulation enterprise cannot replace practice in a real company, and in order to achieve entrepreneurship education, it is necessary to strengthen the material base by moving the simulation business closer to a real company.

On the basis of scientific literature summary and research related to the research topic it can be stated that in order to achieve the efficiency of entrepreneurship education in higher education and expression of students' entrepreneurial abilities and skills, it is necessary to create such an environment where some business environments are being simulated in working situations and business environment is presented realistically (Hartshorn, 2005; Jahnson, Spicer, 2006, cited by Strazdienė, 2009; Garalis, 2007). On the other hand, it is believed that the application of innovative teaching / learning methods, such as collaborative learning, teamwork, promotes student engagement in communication, problem solving and decision making, and develops skills to plan work, organize activities, and maintain contact with others. Other researchers (Rea, Craswel, 2000; McMarthy, 2006, cit. by Strazdienė, 2009) believe that bringing business studies closer to the real business world and applying the business simulation enterprise model enables students to practice a variety of entrepreneurial tasks and improve their business leadership skills. Based on previous research results related to the topic, it is evident that the applied innovative teaching and learning methods are important in the process of entrepreneurship education and that a business-friendly environment is created. By analysing entrepreneurial skills through participation in a business simulation enterprise activities, our study revealed that students had the opportunity to develop teamwork skills, learn to trust and share experiences with teammates, saw opportunities to start their own business and got acquainted with the activities of different departments of the company.

On the other hand, from the students' point of view, participating in a business simulation enterprise activities, they had the opportunity to see business-related problems and decisions, learnt how to analyse and summarize accounting data, prepare annual reports, recognize and develop managerial skills, develop skills necessary for managing a department, and planning activities while fulfilling the tasks. Recent results confirm that students' entrepreneurial skills have been developed in a positive way through purposeful selection of educational methods and by creating an environment closer to the business world. The obtained results are in line with the importance of the environment emphasized in the scientific literature for bringing business studies closer to the real business world which enables students to apply theory into practice, they are encouraged to be more involved into the study process, have more possibilities to acquire entrepreneurship skills which are essential for working in a real company. Thus, when evaluating the business model of a business simulation enterprise which is applied for the development of students' entrepreneurship, the results published in other scientific works can be interpreted as corresponding to our research data.

As the scientific literature often emphasizes the pedagogical work of the educator and its importance in organizing the educational process, the analysis was carried out by discussing the role of the teacher in the development of students' entrepreneurial abilities in a business simulation enterprise. The analysis of our research results revealed the strengths: teachers provide students with the necessary support, encourage them to plan and organize various activities, share experiences, raise new ideas, solve problematic situations and make decisions, positively evaluate students' initiative and resourcefulness. However, from the point of view of the study participants, the variety of tasks and the rational allocation of time for their execution, the possibility of carrying out the work are fully identified as areas for improvement.

In the scientific literature, entrepreneurship as a personality trait is perhaps the most widely studied field. Analysing entrepreneurial personality traits, scientific sources present a set of traits including curiosity, initiative, self-confidence, critical thinking, willingness to take risks and control situations, wish to achieve the goals, creativity and innovation, perseverance, determination, autonomy, and entrepreneurship qualities, which could be improved in the educational institution (Robinson et al., 1991; Caird, 1991; Crome, 2000; Henry et al., 2003, all authors cited by Strazdienė, 2009). Strazdienė (2009) also confirms that entrepreneurship qualities can be developed by creating the right environment and applying learning methods. According to the scientist, personal entrepreneurial qualities are developed by creating conditions for independent activities, self-knowledge, responsibility, initiative, self-confidence. Our research has complemented the findings of other researchers and has helped to understand what entrepreneurial qualities were developed through the involvement of students in a business simulation enterprise. When discussing the expression of entrepreneurial traits, it became clear that students in the business simulation enterprise were given opportunities to reveal such personality traits as being active and proactive in completing tasks, providing problem-solving techniques, and persevering in pursuing their goals. Furthermore, in the business simulation enterprise students were encouraged to take time before making decisions and perform tasks responsibly. However, despite the fact that many researchers (McCarthy, 2000, Cromie, 2000, Kirby, 2004, Strazdienė, 2009) highlight the qualities of an entrepreneurial personality, emphasize the importance of creativity and innovation in the business environment, students' creativity (innovation) had fewer opportunities to manifest. According to the students' evaluations, it appeared that they were less motivated to look for new ideas and creatively complete tasks when participating in a business simulation enterprise. On the other hand, despite the fact that entrepreneurship is associated with risk taking (Kuratko, Hodgetts, 2001) and challenges (Rivetti, Migliaccio, 2015), our research showed that participating in a business simulation enterprise activities did not promote students' risk taking, and when faced with challenges, make business decisions that are appropriate for the situation, analyse their mistakes and correct them. Also, knowing that self-confidence is an important attribute in business environments for activities, decision-making and goals, the results of the study showed that training in a business simulation enterprise encouraged students' confidence in challenging tasks only partially. Therefore, there is a need to organize activities in a business simulation enterprise, which encourage students' perseverance in achieving their goals, creativity in generating new ideas and tasks, self-reliance in risky

business practices and complex work. While discussing the results of the research, it should be acknowledged that despite the fact that there are quite a few studies analysing entrepreneurial personality traits, there are few studies that investigate the change of entrepreneurial traits in participating in the business simulation enterprise activities. This narrowed the scope for comparing the results of our study. As the formation of entrepreneurial traits has been little explored in this respect, we believe this could be an area for further research.

Summarizing the research results, it can be reasonably stated that designing implementation of entrepreneurship education in higher education studies, students' performance in simulated real business environment work situations, providing opportunities to apply theoretical knowledge, realistic representation of business environment and encouraging active participation, students' entrepreneurship is being developed. Thus, the effectiveness of simulation as a teaching / learning method in developing entrepreneurial skills and personal traits of entrepreneurship is beyond question. It is likely that the expression of students' entrepreneurial skills is a natural tendency: by participating in the activities of a business simulation enterprise, students have the opportunity to develop their communication skills, acquire problem solving skills and teamwork skills. On the other hand, students have the opportunity to achieve good results in the process of starting a business, to get acquainted with the business enterprise and its departments, to apply theoretical knowledge in practice. This, of course, is a prerequisite for successful students' professional preparation and involvement in the business world.
Thus, the results of our study validated the suitability of a business simulation enterprise in developing students' entrepreneurial abilities, skills and personal entrepreneurial qualities. The obtained data indicate the following tendencies: participation in the business simulation enterprise activities not only improves students' teamwork skills, encourages sharing of acquired experience and teaches to trust teammates, but also enables students to get to know themselves as managers, as well as develops skills for planning and managing the department and personal entrepreneurial qualities. On the other hand, the obtained results also contribute to the discussion on the extent to which entrepreneurship is innate and / or acquired and nurtured.

When discussing opportunities for entrepreneurship education through higher education studies, it should be noted that effective entrepreneurship education is based on a multi-system approach. Internships in real business enterprises, meetings with the business world and sharing their success stories and good personal experiences in starting their own businesses play an important role in developing students' entrepreneurship. Due to their positive influence on the efficiency and development of students' entrepreneurship education, these systems should be more actively involved in the educational process and coordinated with the activities of the business simulation enterprise in higher education studies.

While this study has broadened the scope of other studies, it should be acknowledged that research lacks clear evidence of changes in student entrepreneurial abilities and qualities through participation in a business simulation enterprise activity. Therefore, the research data discussed in this paper at the theoretical level cannot be interpreted as fully consistent with the results of our study. Taking this into account, we believe that in the future, using experiment (initial - before training, and final - after training) measurements, it would be appropriate to assess the change in entrepreneurial skills, abilities and attributes of students who have participated in a business simulation enterprise activity. We believe that student entrepreneurship education in higher education is an important subject for education and research, so that changes in entrepreneurial abilities, skills and personal qualities as students participate in a business simulation enterprise could be an area for further research.

3. Entrepreneurship education opportunities in the higher education studies from the theoretical point of view

Entrepreneurship is one of the main drivers of the country's economy. Entrepreneurship is the source of GDP growth, employment and unemployment. Many Lithuanian, European and world scientists are currently exploring the issue of entrepreneurship. It is stated that the development of entrepreneurial skills requires the creation of a learning environment that is consistent with the modern business world. Most scholars admit that unconventional teaching / learning methods such as business simulation, teamwork and other innovative teaching / learning strategies can help to achieve this goal.

Entrepreneurship concept. Obaji, Olugu (2014) stated that entrepreneurship is job creation, economic development, "making a favourable environment for the entrepreneurs". Obaji, Olugu (2014) defined that "government needs to enact policies that would be user friendly to the entrepreneurs". Entrepreneurship is a qualitative social characteristic that describes the ability of a person, society, to develop business and innovation. Table 1 presents different concepts of entrepreneurship. Kuratko and Hodgetts (2001) explain that entrepreneurship is risk taking propensity, while Rivetti, F.; Migliaccio, M. (2015) examine entrepreneurship aspects, taking into account the entrepreneurial motives, the challenges faced by entrepreneurs. Fitriati, R., Hermiati, T. (2010) define entrepreneurship as "risk taking propensty", while Rahim, H., L and others (2015) define it as "to see change as an opportunity for value creation". Florida, R. (2002) states that entrepreneurship is "the creation of technologically dynamic, high-value added, high growth firms". Thurik, R., Wennekers, S. (2004) define entrepreneurship as "concentrating on opportunities".

Table 1. Entrepreneurship definition

Author	Highlight
Fitriati, R., Hermiati, T.(2010)	risk taking propensity
Rahim, H., L., Kadir, M.A., B., A., Abidin, Z.,Z., Junid,J., Kamaruddin, L., M., Lajin, N., f., M., Buyong, S. Z., Bakri, A. (2015)	to see change as an opportunity for value creation
Yusuf, N., Albanawi, NI. (2016)	the ability of an individual or a group of individuals to create or discover an opportunity
Kritikos, A.S. (2014).	"innovative entrepreneurs" and "replication entrepreneurs"
Thurik, R., Wennekers, S. (2004).	concentrating on opportunities
Florida, R.(2002)	the creation of technologically dynamic, high-value added, high growth firms
Matsuda , N1., Matsuo, Y. (2017)	human capital, social capital and financial capital of an entrepreneur band the firm's character
Rivetti, F.; Migliaccio, M. (2015)	examine entrepreneurship aspects, taking into account the entrepreneurial motives, the challenges faced by entrepreneurs
Abbas, S. A. (2018)	change in the world of business
Čiburienė, J. Guščinskienė, J. (2009).	to recognize the potential to create added value both economic and action-oriented used
Navasaitienė, S., Subačiūtė, V. (2012).	emphasize the possibility of learning and teaching entrepreneurship
Gevorgianienė, V., Fargion, S. (2012).	the ability to initiate innovation
Kiškis, M. (2011)	Highlight technological expansion of a non-technological business and as a technological business enterprise where the technology is a vehicle for the whole company

There are different opinions and characteristics about the traits of an entrepreneur: one should be able to create and develop organizations, get things done in a new way, actively explore opportunities, address uncertainties, combine production elements for joint work, identify market failures and gaps and take appropriate action. It seems that the concept of entrepreneurship is multi-faceted and diverse. Even professionals do not have a unanimous opinion concerning the definition of this concept. The entrepreneurial phenomenon was studied by the famous Austrian economist Joseph Schumpeter, who concluded that the concept of entrepreneurship includes creative identification and development of the following: new products, new production methods, new markets, new forms of organizations.

*Promoting entrepreneurship***.** Promoting entrepreneurship in Lithuania is one of the main cornerstones and tools of the Lisbon Strategy. One of the main reasons for the EU lagging behind was the lack of entrepreneurship when comparing European and US development potential. EU people are less inclined to take responsibility for their business, although they have better education and higher competences. Entrepreneurship refers to one's personal motivation to find and exploit opportunities, create new added value, and successfully develop a business. Entrepreneurship is encouraged and financially supported in Lithuania. According to the data of Entrepreneurship Promotion Fund 2014-2020, the European Social Fund business start-up loans up to € 25,000 were given for micro, small businesses and individuals (those who have a business or individual activity certificate) who intend to start a business and / or operate for up to 1 year and comply with state aid rules. Loans will be granted for a maximum of 120 months period. Priority under this measure is given to individuals who are facing difficulties in the labour market or those who are organizing their own business: persons under 29, people with disabilities, persons over 54, the unemployed, women, ones creating green jobs.

Simulation companies in Lithuania. As stated by Stonienė, A and others (2018) today's career is understood as a process of a life-long development that encourages people to look for new opportunities throughout the modern work society. It is consistent and purposeful personality training for a reasonable and conscious choice of profession. In order to encourage entrepreneurship and strengthen professional practical skills, business simulation companies were established in Lithuania, which are supervised by the Lithuanian Simulators' association (hereinafter referred to as LIBA) together with the Simulith Centre. Tendencies to start your own business or to rise up a career are very difficult and risky. Association LIBA is a non-profit organization uniting Lithuanian institutions, simulation companies (VPMFs), their managers, coordinators, educators, and trainees. Its aim is to bring together institutions operating in the Republic of Lithuania, which operate as simulation companies, also their managers, educators and trainees of these companies, sponsors and social partners, other natural and legal persons in order to: improve the model of the simulation company according to the needs of target groups (trainees, teachers or others); to promote quantitative and qualitative development of the network of simulation companies in Lithuania; retain open, fair, united, responsible, respectful and mutually beneficial partnership between Lithuanian Association members and all interested organizations. Lithuanian Simulation Companies (or Business Practice Training Firms or Business Practice Training companies) play an important role in implementing entrepreneurship education initiatives in Lithuania. Simulation companies contribute to improving the quality of studies and training programmes: they help to improve the career guidance, make competitiveness more attractive by presenting specialties, increase internationalization of the institution and provide opportunities for teachers working in these companies to participate in international projects, share their success stories in seminars and taking over international experience at simulation companies' network events. Simulation companies have been operating in Lithuania for 22 years. During this time, a lot of valuable experience and methodological materials for entrepreneurship education was accumulated. Universities and colleges have 29 simulation companies in Lithuania. These companies simulate the activities of real companies. Students deepen their core entrepreneurship principles by working in different departments, taking up certain positions, performing different job functions, creating various business idea realization programmes, trading with

other simulation companies in Lithuania and all over the world. Students acquire the skills necessary to work in a real company, get acquainted with the internal procedures of a business enterprise, independently solve problems that arise at work, implement their ideas and plans.

4. Research methodology

Research participants. During the quantitative survey, the whole array of students was comprised of Lithuanian higher education institutions' students who participated in the activities of business simulation enterprises (N = 138), including 63 (46%) males and 75 (54%) females. The aim of the quantitative research was to involve students from different Lithuanian higher education institutions. The study followed the ethical principle of free choice to participate in the survey. The research was conducted anonymously, the results were processed and presented in a summarized form, data confidentiality was ensured, and the participants were informed about the details of the research. At the request of the Higher Education Institutions Administration, the names of the Higher Education Institutions are not announced.

Research methods. The analytical descriptive method has been applied in order to analyse entrepreneurship education possibilities in higher education studies on the theoretical aspect. *Quantitative method.* A questionnaire survey was used to investigate the peculiarities of Lithuanian higher education institutions students' entrepreneurial abilities and qualities, their expression when participating in the activities of business simulation enterprises, to evaluate the strong features of these activities, to identify aspects that need to be improved. *Statistical method.* A statistical analysis method was used to process the data collected during the study: descriptive statistics (statistical averages). The percentage distribution (frequency) was also calculated. Statistical analysis of the data was performed using SPSS (Statistical Package for Social Sciences) software version 17 data package.

5. Research results

In today's society, with the development of new information technologies, individuals with exceptional abilities, including entrepreneurship, become more successful. Entrepreneurship is a way of thinking, personal qualities, technical and business leadership skills that allow you to put your knowledge into practice and enable you to start and grow your own business.

In the context of social, economic and technological changes, the current situation encourages educational institutions to respond flexibly to the needs of the environment and the society and to develop entrepreneurial skills. There is a growing emphasis on the need for higher education institutions to focus on promoting student entrepreneurship, initiating and supporting additional activities related to student entrepreneurship and occupation, and to enable as many young people as possible to set up their own businesses. When preparing future professionals for the business world, it is important to pay attention to the development of entrepreneurial skills during studies, to create opportunities for students to get acquainted with the business world, develop personal qualities, promote problem solving and self-decision, develop creativity and promote self-knowledge. On the other hand, in the higher education study process, it is necessary to create an entrepreneurial environment, strengthen the link between theory and practice, organize the study process to encourage students to take responsibility, be brave and to have the necessary skills, abilities and knowledge to start their own business. It is also necessary for the students to form an understanding of the business enterprise, its departments and business development trends.

Entrepreneurship skills development takes place using the business simulation enterprise form, which simulates the activities of a real business enterprise in HR management, accounting, purchase, sales and other areas, promoting student autonomy, creativity, increasing motivation and developing entrepreneurial qualities of personality.

An empirical study was conducted in order to find out students' attitudes towards learning in a business simulation enterprise and to determine the effectiveness of a business simulation enterprise on students' entrepreneurship education. After completing the training in a business simulation enterprise, students were asked to fill out a questionnaire regarding their experience.

Evaluation of satisfaction of the activities, related to entrepreneurship education in a business simulation enterprise: A Student Approach. As shown in the survey results (see Figure 1), the majority of students (72.8%) rated the experience as "extremely favourable" or "rather favourable" of working in a business simulation enterprise, and only 5.2% students admitted that they "disliked" or "totally disliked" working in a business simulation enterprise. The results show that the majority of students expressed a positive attitude towards activities in a business simulation enterprise, which suggests that most students liked working there.
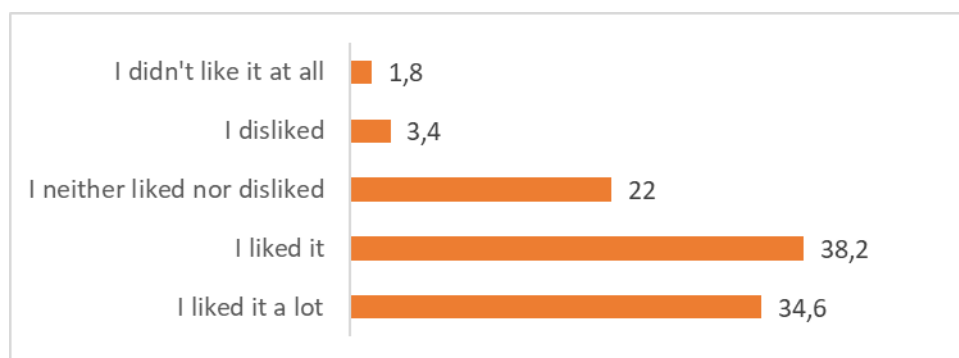
Fig. 1. Evaluation of students' satisfaction of entrepreneurship education activities in a business simulation enterprise (%)

Assessment of the entrepreneurial skills development process in a business simulation enterprise: A Student Approach. In promoting the development of learners' entrepreneurial skills, it is important to develop learners' understanding of the business enterprise and its departments, to create a favourable educational environment, to promote the development of practical skills and the application of theoretical knowledge in practical situations.
In order to find out what opportunities are created to develop students' entrepreneurial skills in the business simulation enterprise, the students were asked to rate the statements from 1 to 5, where 1 - "Strongly disagree"; 5 - 'Totally agree'. The results of the study are summarized in Figure 2.

The analysis of the survey results showed that the majority of the respondents positively evaluate the process of entrepreneurship skills development in the business simulation enterprise and admit that students are able to get acquainted with the business enterprise activities by participating in the business simulation enterprise activities. The highest average scores indicate that the majority of students consider that *the business simulation enterprise is a suitable form of teaching to develop practical skills of students and help to apply the theoretical knowledge acquired during lectures to practical situations* (V = 4.72) *while studying in an unusual learning environment* V= 4.58). On the other hand, the survey participants acknowledge that in a business simulation enterprise, students *have a possibility to get acquainted with business enterprise activity* (V = 4.51), *develop business leadership skills* (V = 4.49) *and personal entrepreneurial qualities* (V = 4.43).

However, students' evaluations show, that the business simulation enterprise *cannot substitute the practice in a real enterprise* (V = 3.47) and *does little to promote students' self-knowledge as a manager* (V = 3.66). On the other hand, despite the fact that one of the aims of the business simulation enterprise is to develop students' practical skills to work with modern software and the latest programmes used in the Lithuanian companies, students indicated that they miss modern technologies, computer hardware and the latest software in business simulation enterprises (V = 3.52).
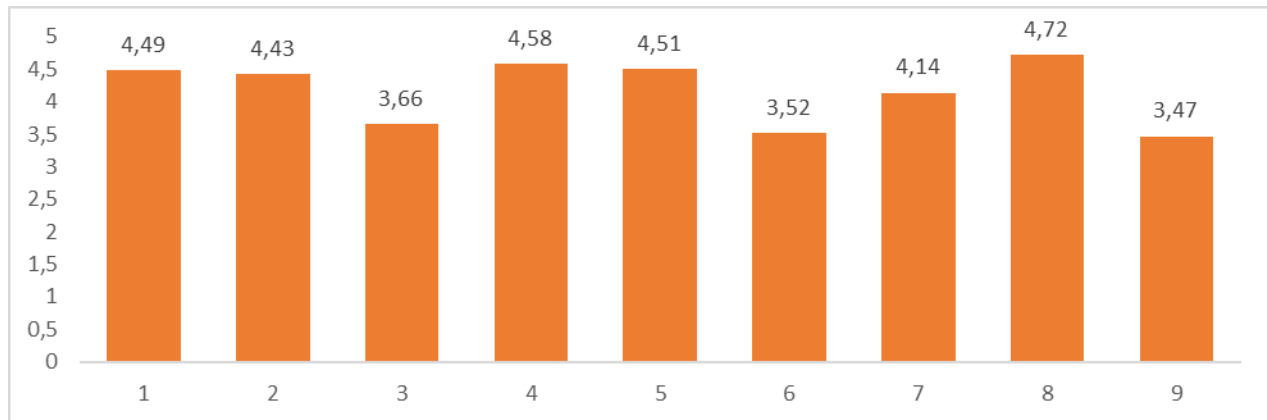
Fig. 2. Assessment of entrepreneurship skills development process in a business simulation enterprise (average scores)

Remarks:

1 – Students' business management skills are developed in business simulation enterprise (problem solving, planning, negotiation etc.)

2 – Students' entrepreneurship skills are developed in business simulation enterprise (persistence, independence, responsibility etc.)
3 – Business simulation enterprise promotes students' self-knowledge as a manager
4 – Business simulation enterprise create unusual learning environment

5 – Business simulation enterprise gets students acquainted with business enterprise activities
6 – Business simulation enterprise provides adequate modern technical equipment (photocopying machines, faxes, computer software and hardware etc.)
7 – Appropriate learning methods are applied in business simulation enterprise (team work, group work, problem-based learning etc.)
8 - Business simulation enterprise is a suitable form of training to develop practical skills, to apply theoretical knowledge in practice
9 – Business simulation enterprise can change practice in a real enterprise.

Summarizing students' attitudes towards the development of entrepreneurial skills by participating in the activities of a business simulation enterprise, it can be stated that business simulation enterprise is a suitable form of training for students to develop practical skills, apply theoretical knowledge in practice and get acquainted with business activities, when students' entrepreneurship skills are developed not in a traditional classroom, but in a room that looks more like an enterprise's office. This, of course, has a positive impact on the professional preparation process and students' attitude towards starting their own business, and it provides opportunities to improve their business management skills, such as problem solving and decision making, work planning, negotiation skills, etc. and to develop the independence, initiative, responsibility, perseverance and other personal business qualities. However, attention should be drawn to the need to focus on providing students with modern equipment, computer hardware and software, and promoting students' self-knowledge as a leader, enabling them to discover and evaluate their own skills and to try themselves in a business simulation enterprise, bringing its activities closer to the real enterprise.

Evaluation of organization of activities in a business simulation enterprise. Analysing the peculiarities of organization of activities in a business simulation enterprise, the research aimed to find out the factors that determine the satisfaction with entrepreneurship education activities, to reveal the causes of dissatisfaction with work in a business simulation enterprise, to identify problematic areas.

According to the results of the research, the majority of the students who participated in the survey rated *the support provided by the teachers* as the highest average (V = 4,74). Also, according to the participants of the research, in the business simulation enterprise the lecturers *encourage students to plan and organize various activities* (V = 4,63), *to solve problematic situations and make decisions* (V = 4,47), *positively evaluate students' initiative and resourcefulness* (V = 4,57) and *accept and value their opinions* (V = 4,52). On the other hand, the rather high average values of the estimates suggest that *the business simulation enterprise enables the sharing of experience and problem solving* (V = 4,43) and *encourages students to come up with new ideas* (V = 4,39). The latter evidence suggests that teachers have a positive attitude towards students' ingenuity, encouraging them to come up with new ideas, independently plan and organize various activities and problematic situations, as well as relationships based on trust and respect (respect for personal autonomy, personal ideas etc.), when difficulties arise, assistance is usually present in the organization of the business simulation activities.

However, summarizing the results of the study of organization of activities in a business simulation enterprise, the areas for improvement were revealed. The results of the survey showed that in the business simulation enterprise students missed *the variety of tasks* (V = 3,51) and *rational time allocation for tasks* (V = 3,42). Furthermore, the low averages of the estimates suggest that in the business simulation enterprise, according to the students, *they were not able to complete the tasks* (V = 3,31), *there was not enough of time to master everything well* (V = 3,24). Thus, when time is too short, the knowledge is not acquired properly, and when it is too long the learning can become uninteresting, the learning motivation and expected results are reduced. The survey results show, that students working in the business simulation enterprise were only partially able to complete the tasks, there was a constant rush and tension in completing the work. On the other hand, according to the students who participated in the research, the work in the business simulation enterprise was too intensive, not allowing the students to master the acquired knowledge. All these difficulties can be attributed to the short working hours in the business simulation enterprise and the lack of a rational allocation of tasks. A more detailed analysis of the results is presented in Figure 3.
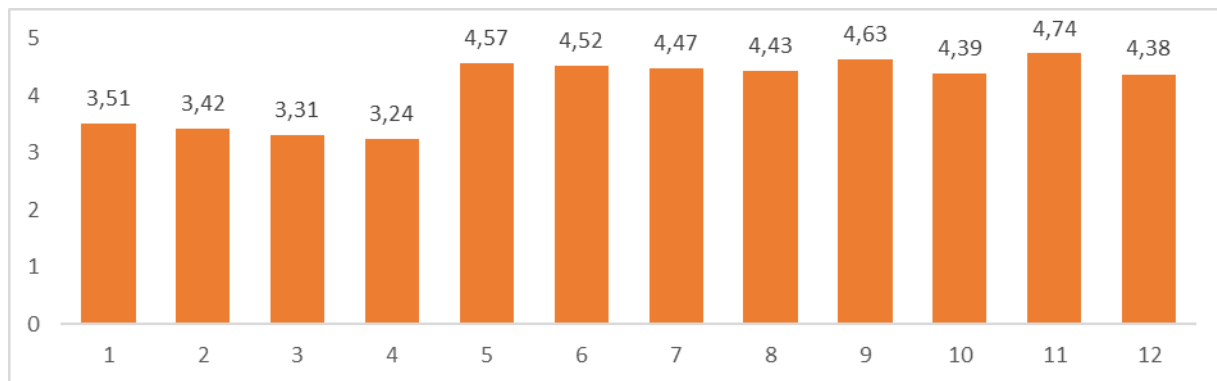
Fig. 3. Evaluation of organization of activities in a business simulation enterprise (average scores)

Remarks:
1 – Tasks and activities provided in a business simulation enterprise are varied and help to develop entrepreneurship skills
2 – Time allocated for the accomplishment of tasks in business simulation enterprise is rational
3 - It was enough time to accomplish the tasks in business simulation enterprise
4 - Time allocated for the accomplishment of tasks in business simulation enterprise was enough to master and learn everything
5 – In business simulation enterprise, the teacher positively evaluates the students' initiative, resourcefulness in performing tasks
6 - In business simulation enterprise, the teacher accepts and values different opinions of the students

7 - In business simulation enterprise, the teacher encourages students to solve problematic situations and make decisions.
8 - In business simulation enterprise, the teacher encourages students to share their experience (e.g. ways of problem solving etc.)
9 - In business simulation enterprise, the teacher encourages students to plan and organize different activities
10 - In business simulation enterprise, the teacher encourages students to come up with new ideas
11 – The teacher provided help when there were any difficulties

12 – In business simulation enterprise, the teacher provided clear instructions how to accomplish the task

Summarizing the peculiarities of organization of activities in the business simulation enterprise, the majority of students participating in the research evaluated the activity of the teacher, his / her ability to provide assistance in case of difficulties, positive attitude towards students, creativity while generating new ideas, with the highest scores. Undoubtedly, the effectiveness of teaching depends on the ability of the teacher and his / her mastery. Despite the fact that the business simulation enterprise develops individual autonomy, where learning is based on experience, learning from mistakes, this obviously reduces the role and importance of the teacher and the student has to organize learning and self-control independently, nevertheless, the teacher always tends to give advice and help when it is difficult. However, when analysing the peculiarities of organization of activities in a business simulation enterprise, the results of the research showed that students missed variety of tasks. On the other hand, it was found that the majority of students had a relatively long time to complete their work and master the study material. Thus, based on the results of the study, it can be seen that the simulation of a business enterprise activities encounters difficulties in selecting tasks and allocating appropriate time for them. Undoubtedly, lack of time to complete a task causes discomfort and can diminish learners' motivation to learn.

Business management, peculiarities of technical and personal entrepreneurship skills development in a business simulation enterprise: students' evaluation. The aim of the research was to find out what entrepreneurial abilities and skills are developed from the students' point of view when participating in business simulation enterprise activities. Areas covered include business leadership, technical and personal entrepreneurial skills. The Likert scale was used to measure these entrepreneurial abilities. Students were asked to rate each statement from 5 – "Strongly agree" to 1 – "Strongly disagree". Percentages and average values of responses were calculated.

Analysing the technical skills of entrepreneurship which students developed during the activities in the business simulation enterprise, they were asked to evaluate what they had learned from working in a business simulation enterprise and what competencies, necessary for starting a business, were developed. Technical skills include written and oral communication, organizational skills, and the ability of a person to work with a variety of computer programmes, and use information resources.

When evaluating the expression of the development of technical entrepreneurship skills through participation in the business simulation enterprise activities, the highest average scores indicate (see Figure 4) that students *developed their communication skills* and *learned how to present their ideas fluently* (V = 4,67) also *how to place orders* and *issue invoices* (V = 4,61). Furthermore, the research results showed that working in a business simulation enterprise, developed students' abilities *to find the necessary information* and *use it for problem solving* (V = 4,56), *how to negotiate* and *make presentations* (V = 4,42). On the other hand, the results of the research showed that participation in the business simulation enterprise activities improved students' skills to work with computer programmes (V = 4,3) and to prepare annual reports (V = 4,14). Thus, we can see a clear trend in the highest-rated scores of technical entrepreneurial abilities which are related to a person's ability to communicate, present ideas, negotiate, place orders and issue invoices. On the other hand, according to the students' evaluations it is obvious that they were trained to work with computer programmes and to prepare annual reports, and were encouraged to look for relevant information and use it to solve problems. However, despite the fact that foreign language proficiency is an important factor for success in the business world, the low average scores suggest that most students have doubts about their ability *to develop spoken* (V = 3,2) and *written* (V=3,51) *foreign language skills* when participating in a business simulation enterprise activities. Figure 4 provides a more detailed analysis of the indicators for assessing the development of technical entrepreneurship skills through participation in the business simulation enterprise activities.

Fig. 4. Assessing the development of technical entrepreneurship skills through participation in the business simulation enterprise activities (average scores).

Remarks:

1 – In a business simulation enterprise I got acquainted with enterprise's documents, learned how to fill them in

2 – In a business simulation enterprise I learned how to make orders and issue the bills

3 – In a business simulation enterprise I learned to work with computer programmes

4 - I learned to analyse and summarize the accounting data

5 – I learned to make annual reports

6 – I improved spoken foreign language skills

7 – I improved written foreign language skills

8 – I learned how to negotiate and make presentations

9 – I learned how to find relevant information and to use it in problem solving

10 – In a business simulation enterprise I learned to present my ideas fluently

A more detailed analysis of the data in assessing the development of technical entrepreneurship skills showed, that most students said they *had the opportunity to improve their communication skills* by participating in a business simulation enterprise activities and *learned how to present their ideas fluently* (strongly agree (31,5%) and agree (36,2%)) and *negotiate and make presentations* (strongly agree (25,3%) and agree (39,2%)). Also, the vast majority of students stated that working in a business simulation enterprise helped to develop their ability to use information sources to solve problematic situations: 66 percent of students admitted that they learned how to find the information they need and to use it for problem solving (strongly agree (32,6%) and agree (33,4%)). According to the results of the survey, most respondents admit that in a business simulation enterprise they *have learned to place orders and issue invoices* (totally agree (31,7%) and agree (34,8%)), *work with computer programmes* (totally agree (24,8%) and agree (38,2%)) and *prepare the annual reports* (totally agree (28,6%) and agree (32,9%)). The opinions expressed by the participants about the learning process that took place in a business simulation enterprise showed that the participation in its activities developed certain technical entrepreneurial abilities. However, the assessment of foreign language skills development revealed that only less than half of the students who participated in the survey totally agree or agree that while working in a business simulation enterprise they *had an opportunity to improve their spoken* (38,5%) and *written* (47,1%) skills. A more detailed analysis of the data showed that some of the respondents disagree (18,7%) or strongly disagree (5,3%) that they had opportunity to improve *spoken foreign language skills* by participating in a business simulation enterprise activities. Similar results were obtained when assessing the development of written foreign language skills while working in a business simulation enterprise, where 10,5% students disagreed and 8,1% strongly disagreed. Also, more than one third of students doubt whether the participation in a business simulation enterprise activities helped to improve their *spoken* (37,5%) and *written* (34,3%) *foreign language skills*. On the basis of the latter results, it can be assumed that students do not always have the opportunity to improve their foreign language skills when participating in a business simulation enterprise activities. Therefore, in order to develop these abilities, it is necessary to pay more attention and allocate funding, to promote cooperation with foreign business simulation enterprises, to communicate in business language with foreign partners, to provide students with access to international documents, to participate in international fairs and exchange programmes. Table 2 provides

a more detailed analysis of the assessment indicators for the development of technical entrepreneurship skills through participation in a business simulation enterprise activities.

Table 2. The assessment indicators for the development of technical entrepreneurship skills through participation in a business simulation enterprise activities (%)

	Totally agree	Agree	Neither agree nor disagree	Disagree	Totally disagree
In a business simulation enterprise I got acquainted with enterprise's documents, learned how to fill them in	22,6	34,2	36,1	4,4	2,7
In a business simulation enterprise I learned how to place orders and issue invoices	31,7	34,8	26,5	4,8	2,2
In a business simulation enterprise I learned how to work with computer programmes	24,8	38,2	26,1	7,4	3,5
I learned to analyse and summarize the accounting data	27,4	31,3	29,6	5,8	5,9
I learned how to make annual reports	28,6	32,9	31,2	4,1	3,2
I improved spoken foreign language skills	18,2	20,3	37,5	18,7	5,3
I improved written foreign language skills	20,9	26,2	34,3	10,5	8,1
I learned how to negotiate and make presentations	25,3	39,2	22,8	5,8	6,9
I learned how to find necessary information and use it for problem solving	32,6	33,4	21,7	8,1	4,2
In a business simulation enterprise I learned to express my ideas fluently	31,5	36,2	22,5	5,3	4,5

After summarizing the factors for the evaluation of technical entrepreneurship skills, it can be stated that students, by participating in a business simulation enterprise activities, developed communication skills and learned how to negotiate, fluently present their ideas, and mastered the ability to make orders, issue invoices, find the information they need and use it to solve problems. They also learned to work with computer programmes and to prepare annual reports. However, most students question whether they have had an opportunity to develop spoken and written foreign language skills while working in a business simulation enterprise.

Opportunities for business leadership development through participation in a business simulation enterprise activities. Business leadership skills include the ability of a person to communicate and collaborate, to listen to someone else's opinion, to reach a common understanding, to solve problems and make appropriate decisions, to work in a team, to lead and to plan. According to the results of the research, most of the students who participated in the survey admit, that they had an opportunity to improve their *group-work skills* (V = 4,82). According to the students who participated in a business simulation enterprise activities, they learned *to trust their teammates* (V = 4,76) and *to share their experience* (V = 4,73) with them. On the other hand, the defined high average scores suggest that students in a business simulation enterprise *saw opportunities to start their own business* (V = 4,79), *became more familiar with the enterprise activities* (V = 4,61) and *different divisions of the enterprise* (V= 4,73). The latter results suggest that participating in a business simulation enterprise activities not only improves students' teamwork skills, encourages sharing of experience and teaches to trust teammates, creates students' perception that they are related to each other, and that teamwork can help to achieve the goals and complete the tasks, besides, it provides students with a better understanding of the company's operations and processes of its departments, which enables them to see opportunities for starting their own business. On the other hand, rather high average scores of business leadership development suggest that students *are encouraged to see* problems in the business environment and make decisions (V = 4,69), and are taught *how to analyse accounting data, summarize it and prepare annual reports* (V = 4,71). On the basis of the latter results it can be stated that the business simulation enterprise develops students' ability to see problems and implement solutions. According to the respondents' opinion, working in a business simulation enterprise provides students with opportunities *to recognise and evaluate their managerial abilities* (V = 4,61), *to develop division leadership skills* (V = 4,54) and

to develop their ability to plan activities while fulfilling tasks (V = 4,59), which means that working in a business simulation enterprise encourages students to recognise themselves as managers, and develops skills in business planning and leadership.

However, when evaluating the development of business leadership skills in a business simulation enterprise, it was found that many are unsure about their *ability to conduct marketing research*, *analyse and evaluate research data* (V = 3,84) and *do organizational work* (V = 3,86). The latter abilities and skills are evaluated with the lowest average scores, which suggests that in the business simulation enterprise less attention is paid to the development and expression of these skills. Figure 5 presents a more detailed analysis of the indicators for assessing the development of business leadership skills through participation in a business simulation enterprise activities.
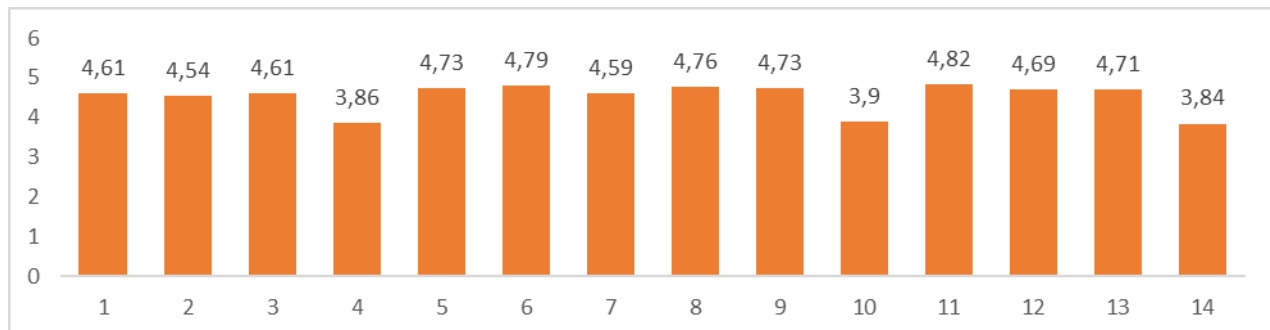
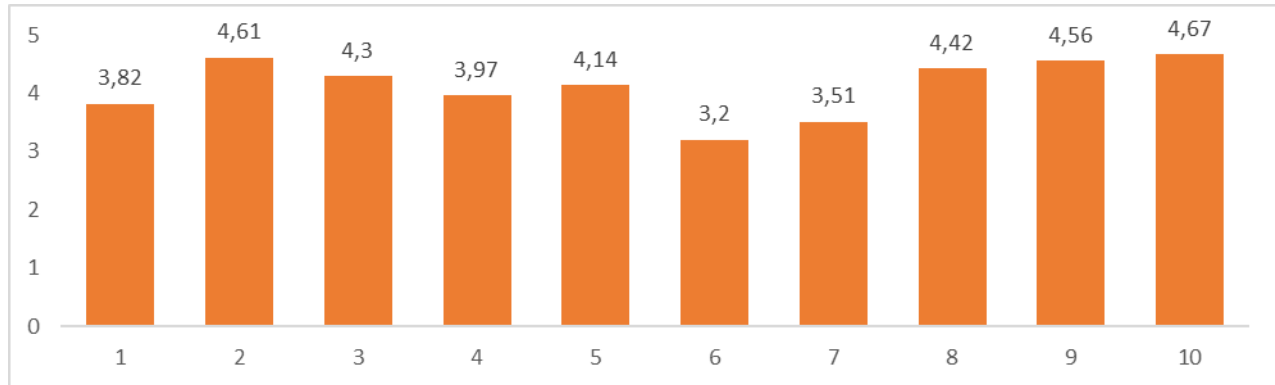**Fig.5.** Assessment of business leadership skills through participation in a business simulation enterprise activities (average scores)

Remarks:

1 – In a business simulation enterprise while completing tasks I self-assessed my managerial skills

2 – In a business simulation enterprise I developed division leadership skills

3 – In a business simulation enterprise I got better acquainted with enterprise's activities

4 – In a business simulation enterprise I learned to do organizational work.

5 – I got acquainted with the activities of different departments

6 – I saw opportunities for starting my own business

7 – I learned to plan my activities and time while performing tasks

8 – I learned to better trust my teammates

9 – I learned to share experience with my teammates

10 – I learned to plan business operations

11 - I improved group work skills

12 – I improved skills for recognizing problems in a business environment, and making decisions

13 – I learned to analyse and summarize the accounting data, to make annual report

14 – I learned to carry out market research and analyse the research results

A more detailed analysis of the data showed that most of the students who participated in the study fully agreed (45,9%) or agreed (36,7%) that they had improved their *group work* skills by participating in a business simulation enterprise activities. However, some respondents (5,2%) disagree or strongly disagree with the idea that group work is encouraged in a business simulation enterprise. The results of the study also show that the vast majority of students in a business simulation enterprise *have learned to trust their teammates* (strongly agreed (57,4%) and agreed (21,6%)) *and share their experience with the teammates while fulfilling the tasks* (fully agreed (51,7%) and agreed (24,4%) respectively). On the other hand, 45,4% strongly agreed and 34,5% agreed that they *saw opportunities to start and grow their own business in a business simulation enterprise.* The research also showed that students participating in a business simulation enterprise activities had the opportunity to get to know the company better (40,4% and 34,9% respectively), and *to assess their managerial abilities* (38,7% and 39,8% respectively) and *improve leadership skills* (32,8% and 41.3% respectively). While analysing the problem solving and decision-making skills development while working in a business simulation enterprise, it was found that students had the opportunity *to improve their ability to identify problems that arise in the business environment and to make decisions* (totally agreed (34,1%) and agreed (42,6%)), which suggests that students

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have acquired problem-solving and decision-making abilities. Also, the majority of students who participated in the survey stated, that in the business simulation enterprise, they *were encouraged to analyse and generalize accounting data, and learn how to prepare annual reports* (totally agreed (35,7%) and agreed (41,9%)). The percentage of disagreeing or strongly disagreeing students is very low (6,2%). The students' opinion about the learning process in the business simulation enterprise showed that although some of the students admitted that their skills to plan business operations and do organizational work were trained, it turned out that there are quite a few who doubt that they *learned to plan business operations* (disagreed (10,2%) and strongly disagreed (8,1%)), *do organizational work* (disagreed (10,5%) and strongly disagreed (4.8%)) and *conduct marketing research and analyse and evaluate research data* (respectively disagreed (14,1%) and strongly disagreed (5.9%)). Table 3 provides a more detailed analysis of the assessment of business leadership development through participation in business simulation enterprise activities.

Table 3. Assessment of business leadership skills through participation in a business simulation enterprise activities (%)

	Totally agree	Agree	Neither agree nor disagree	Disagree	Totally disagree
While completing tasks in a business simulation enterprise I self-assessed my managerial skills	38,7	39,8	17,6	2,7	1,2
In a business simulation enterprise, I developed leadership skills	32,8	41,3	21,3	2,5	2,1
In a business simulation enterprise I got better acquainted with enterprise's activities	40,4	34,9	16,4	5,6	2,7
In a business simulation enterprise, I learned to do organizational work	31,3	36,6	16,8	10,5	4,8
I got acquainted with the activities of different departments	37,2	41,3	16,3	3,5	1,7
I saw opportunities for starting my own business	45,4	34,5	13,5	3,9	2,7
I learned to plan my activities and time while performing tasks	42,5	31,8	13,5	7,3	4,9
I learned to better trust my teammates	57,4	21,6	14,3	3,4	3,3
I learned to share experience with my teammates	51,7	24,4	15,7	5,5	2,7
I learned to plan business operations	24,7	36,2	20,8	10,2	8,1
I improved group work skills	45,9	36,7	12,2	3,1	2,1
I improved skills for recognizing problems in a business environment, and making decisions	34,1	42,6	16,1	5,4	1,8
I learned to analyse and summarize the accounting data, to make annual report	35,7	41,9	16,2	4,5	1,7
I learned to carry out market research and analyse the research results	23,7	38,4	17,9	14,1	5,9

Summarizing the results of the research it can be seen that working in a business simulation enterprise students had the opportunity to get to know and evaluate their managerial abilities, became more familiar with the company activities, learned how different business units operate and saw opportunities to start their own business. Likewise, high grade point averages indicate that by participating in a business simulation enterprise, students gained leadership skills, were encouraged to recognize problems in a business environment, learned to plan activities, used information to solve problems, analysed and summarized accounting data, and prepared annual reports. On the other hand, working in a business simulation enterprise improved the teamwork abilities of students: they learned to trust teammates and to share their experience with them. However, according to the respondents, not all business management skills were effectively developed through participation in a business simulation enterprise activities. In the future, when planning the activities of a business simulation enterprise activities, attention should be paid to improving the efficiency of the development of the students' ability to conduct marketing research and to analyze and evaluate research data and to plan business operations.

Assessing personal entrepreneurial qualities developed through participation in a business simulation enterprise: A student perspective. The present day scientific work explores the individual personality traits of people in the business world. When analyzing the peculiarities of an entrepreneurial personality, one of the most important features that characterizes the purposefulness of a personality, which includes the person's need to reach goals and the tendency to control situations, is one of the most important. Most researchers (McCarthy, 2000, Cromie, 2000, Kirby, 2004, Strazdienė, 2009) emphasize the importance of creativity, risk-taking, initiative, innovation, autonomy, and other distinctive and unique personality traits in the business environment. According to other researchers, personal qualities such as initiative, self-confidence, need to strive for creativity, aspiration to be independent are among the determinants of success in the business world. The authors emphasize that the representative of the business world must be able to act independently, solve problematic situations and make decisions. Thus, for a person in a business environment, professional activity requires individual qualities and traits such as perseverance, responsibility, ability to act independently and creatively in a particular field, be active and able to compete, etc.

A 5-step Likert scale was used to find out what personality traits that influence entrepreneurial expression are being developed while participating in a business simulation enterprise activities. Respondents were asked to rate the statements on a five-point scale, with 5 being "totally agree" and 1 being "totally disagree". Average values and percentages were calculated. The results of the study are summarized in Figure 6 and Table 3.

Analysed research data show that participating in a business simulation enterprise activities allows students to reveal such personality traits as *activeness and initiative in performing tasks, problem solving* (V = 4,86), *perseverance in reaching their goals (*V = 4,69). Also, based on the results of the research, it turned out that working in a business simulation enterprise students *were not encouraged to make hasty decisions* (V = 4,72) and *to perform tasks responsibly* (V = 4,66). We can observe a clear tendency, that the personality traits related to the person's activeness and responsibility in accomplishing tasks and perseverance in achieving the set goals, were rated with the highest average scores. Undoubtedly, the individual characteristics mentioned above are important to a person operating in a business context.

Although personal creativity is an important feature in the business world, the survey results showed that student's creativity had less chance of being expressed when participating in a business simulation enterprise activities. Lower average scores indicate that working in a business simulation enterprise was less motivating for students *to look for new ideas* (V = 3,87) and *perform tasks creatively* (V = 3,96). On the other hand, reasonably low average points indicate that students doubt that participating in a business simulation enterprise has developed the ability *to take risks in making business decisions* (V = 4,09), *to analyse mistakes and improve them* (V = 4,14) and t*o encourage self-confidence while completing difficult tasks* (V = 4,14). Based on recent results, it can be assumed that a business simulation enterprise should encourage students to take risky business decisions and enable students to learn how to analyse and correct their mistakes. Self-confidence is an important attribute in business settings, activities, decision making, setting and achieving goals, as well as in any other jobs, therefore, working in a business simulation enterprise, it is important to create situations and select tasks that promote students' self-confidence. Results of the study show, that taking part in a business simulation enterprise activities, too little attention was paid to the individual's autonomy at work and decision-making and diligence in the execution of tasks (Figure 6).

Fig.6. Assessment of personal entrepreneurial qualities development through participation in a business simulation enterprise activities (average scores)

Remarks:

1 – In a business simulation enterprise I learned to thoroughly perform every task

2 – In a business simulation enterprise I learned to perform tasks creatively

3 – In a business simulation enterprise I experienced job-satisfaction

4 – I learned to make well-judged decisions

5 – I learned to analyse my mistakes and fix them

6 – I became more self-confident in performing difficult tasks

7 – I learned to work and make decisions independently

8 – I learned to be persistent in achieving my goals

9 – I learned to take risky business decisions

10 – I learned to be responsible while performing tasks (e.g. signing the documents)

11 - I was active, showed initiative while performing tasks and solving problems

12 – I learned to look for new ideas

A more detailed analysis of the data on assessing the personal qualities of entrepreneurship show, that the respondents had the opportunity to develop these qualities through participation in a business simulation enterprise activities. Most students totally agree (32,1%) or agree (35,3%) that they *have learned how to proactively solve problems by taking the initiative to complete tasks*. However, it turned out that a part of the respondents (11,3%) disagree or totally disagree that working in a business simulation business enterprise *encourages students' activity to perform tasks and solve problematic situations*.

The study showed that the majority of students working in a business simulation enterprise were encouraged to make well-judged decisions (totally agreed 33,4% and agreed 31,7%). On the other hand, most students who participated in the survey stated that they were encouraged to be persistent while achieving their goals (totally agreed 30,7% and agreed 34,2%) and improve their sense of responsibility in completing tasks (totally agreed 29,8% and agreed 31,6%). According to the results of the study, although more than half of the students who participated in the study fully agreed or agreed that in a business simulation enterprise they experienced a sense of job satisfaction (57,4%), learned to complete each task thoroughly (56,5%), work independently and make decisions on their own (56,1%) and analyse and correct their mistakes (54,8%), nevertheless a significant number of respondents disagreed or strongly disagreed with these statements (see Table 3). It is also important to note that most students have doubts if they have had opportunities to express creativity and innovation by participating in a business simulation enterprise activities. Students' opinion about learning in the business simulation enterprise showed that they were less creative in finding new ideas (strongly disagreed 9,1% and disagreed 10,5%) and performing tasks creatively (strongly disagreed 5,1% and disagreed 11,5%). On the other hand, the survey revealed that a part of the respondents disagreed (11,4%) or strongly disagreed (6,6%) that working in a business simulation enterprise encouraged students to take risks when making business decisions. Likewise, a relatively high percentage of students strongly disagree (6,2%) and disagree (8,9%) that participating in a business simulation enterprise activities students' confidence in performing complex tasks is encouraged. Table 4 provides a more detailed analysis of the indicators for assessing the personal development of entrepreneurship through participation in a business simulation enterprise activities.

Table 4. Assessment of personal entrepreneurial qualities development through participation in a business simulation enterprise activities (%)

	Totally agree	Agree	Neither agree nor disagree	Disagree	Totally disagree
In a business simulation enterprise I learned to thoroughly perform every task	25,4	31,1	24,6	10,6	8,3
In a business simulation enterprise I learned to perform tasks creatively	21,3	27,4	34,7	11,5	5,1
In a business simulation enterprise I experienced job-satisfaction	27,2	30,2	26,3	9,3	7
I learned to make well-judged decisions	33,4	31,7	19,5	8,7	6,7
I learned to analyse my mistakes and fix them	26,5	28,3	29,7	8,2	7,3
I became more self-confident in performing difficult tasks	32,4	21,2	31,3	8,9	6,2
I learned to work and make decisions independently	21,7	34,4	32,7	6,4	4,8
I learned to be persistent in achieving my goals	30,7	34,2	26,3	5,6	3,2
I learned to take risky business decisions	22,4	32,1	27,5	11,4	6,6
I learned to be responsible while performing tasks (e.g. signing the documents)	29,8	31,6	25,2	9,1	4,3
I was active, showed initiative while performing tasks and solving problems	32,1	35,3	21,3	9,1	2,2
I learned to look for new ideas	20,6	27,1	32,7	10,5	9,1

Summarizing the results of the research it can be stated that most students think that working in a business simulation enterprise stimulates students' activeness, initiative in solving problematic situations, perseverance in reaching the set goals and develops a sense of responsibility in performing tasks. The study also found that participation in a business simulation enterprise activities also promoted students' diligence in performing the tasks assigned to them. However, most respondents admitted that it rarely encouraged the expression of students' creativity in performing tasks and looking for new ideas.

Conclusions

1. The research has showed that business simulation enterprise is a suitable form of teaching / learning for students to develop business leadership skills, develop their personal entrepreneurial qualities, apply theoretical knowledge in practice and get acquainted with business enterprise activities. However, some of the research participants admitted that the business simulation enterprise cannot replace practice in a real enterprise and that students are not encouraged to know themselves as managers.

2. The results of the research have showed that students participating in the business simulation enterprise activities develop communication skills, abilities to express their ideas fluently, to make orders, to issue invoices, to find and use the necessary information for problem solving, to negotiate and make presentations, to work and to prepare annual reports, but students do not always have opportunities to improve their spoken and written foreign language skills

3. Quantitative research shows that business simulation enterprise activities promote students' self-knowledge and self-esteem as a manager, ability to work in a team, trust and share experiences with teammates, develop leadership skills and time management skills. There is also a focus on opportunities for starting a business: students working in a business simulation enterprise saw opportunities to start their own business, became more familiar with a company and its departments. However, from the

students' point of view, insufficient attention was paid to developing skills in conducting a market research, analysing and evaluating research data and doing organizational work.

4. The results of the research have shown that participating in a business simulation enterprise activities provides opportunities for students to reveal personality traits such as activeness, initiative and responsibility in completing tasks, perseverance when achieving goals, and low average scores indicate that students were less motivated to look for new ideas and creatively perform tasks, take risks in making business decisions, analyse and correct their mistakes, and be self-confident while accomplishing difficult tasks.

5. Entrepreneurship education in a business simulation enterprise can be improved in the following ways: *by improving the study programme*: extending the time for studying in a business simulation enterprise, by familiarizing students with the business enterprise creation process (from starting to closing the enterprise); *by improving the material resources of the enterprise* in order to make it more realistic, *by encouraging communication and cooperation* with foreign business simulation enterprises, by diversifying activities at foreign events, by strengthening communication with representatives of foreign companies, *by applying various teaching / learning methods* which promote students' creativity, by teaching to overcome risk factors and building self-confidence while making difficult business decisions.

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METHOD FOR EVALUATING THE POSSIBILITY OF CLUSTER FORMING

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Abstract. Over the past few years clustering has undergone significant changes as a tool for economic development. Now it is actively positioned as an intensifier of the transition of the current economic model to the digital channel. At the same time issues of ensuring high socio-economic efficiency of individual cluster initiatives are relevant both for Russia and for countries with developed market economies. This is largely due to the emerging crisis in the modern theory and methodology of the cluster approach. The authors consider some existing approaches of clusterization and assessment methods to indicate the disadvantages that do not allow to justify the need to establish an effectively functioning cluster. The method of geometric drawing of cluster objects based on ranking of services provided by its members with subsequent interpretation of the positions of the actual and geometric centers of the cluster is proposed.

1. Introduction

Clustering is considered to be one of the most effective and universal drivers of development in the context of economic instability (Abdurakhmanov, 2018). This circumstance is primarily due to the synergy effect achieved through the interaction of business structures, the state, research centers and universities, which forms the basis for a system of financial and non-financial incentives to support business (Egorova, 2014). At the same time the interests of all cluster participants are balanced as well as the basis for healthy competition and the development of market relations is created (Nikulina & Yakunina, 2011). The special role of clusters in European countries is to develop the Institute of small and medium-sized businesses, in particular in the context of the development of a "cyclical" economics (Nielsen, 2019; Petrenko et al., 2019). Some authors compare performace of clusters in different countries (El Idrissi et al., 2020).

Some authors (Charykova & Markova, 2019) emphasize the importance of the cluster approach in the context of the transition of the historically established economic model to the digital channel. Other scientists (Kiseleva & Samodinsky, 2018) also note the role of public-private collaboration tools in the development of the digital economy where clustering is the most important part. Some experts (Turgel, Bozhko & Zinovieva, 2019) justify the crucial importance of the cluster approach in the development of free economic zones, in particular from the point of view of international partnership.

We will not consider in detail the evolution of the cluster approach (Bondarenko, 2016) but we will analyze the most significant problems in this area at the present stage.

2. Literature review

There are a lot of publications that focused on clarifying the concept of "cluster". For example, some authors (Kolesnikov & Khazalia, 2016) studied the evolution of the concept of "cluster" for the period from 1992 to 2008. They identify cluster as "a set of organizations and institutions interacting in a particular sphere of activity where competition and cooperation (coordinated actions) lead to a competitiveness increase of each of them due to such factors as aggregate efficiency (exchange of knowledge and information, network effects, savings from diversity), training, and economies of scale".

In the press release "Clusters in the circular economy. Building Partnerships for Sustainable Transition of SMEs" the authors specify: today many clusters are defined by a group of companies when the most important element of such a partnership is cooperation with research organizations, the state, private investors and startups in order to make effectively interaction in defined technological areas. It describes cluster as a neutral platform that is independent of political and industrial interests. This approach is largely focused on the formation of the so-called social economy, the creation of new jobs in accordance with changing requirements for the competence of specialists.

In the scientific literature (Korchagina et al., 2016) was found that there are significant differences in the mechanisms of cluster development in European countries. It concerns the scale of cluster policy in different regions and differentiation of goals and methods of cluster policy. At the same time, it was emphasizing (Ketels, 2009) that there are two opposite approaches to understanding cluster policy: one of them considers agglomeration as a key factor (the agglomeration grows the competitiveness increase) and another one, on the contrary, considers competitiveness as the central element of cluster policy.

It is important to note that the exact sciences use largely universal approaches of clustering but in the vast majority of cases they are outside of the scope of research in the field of economics. These methods could be successfully used as tools for evaluating the feasibility of implementing a cluster initiative. For instance, some authors (Polishchuk & Kochergin, 2011) consider the issues of spatial data analysis based on multidimensional clustering using geoinformation systems, in particular an algorithm for using the maximum local distance method is used. It's based on principle to consistently combine objects into homogeneous groups (first is the closest) in a multidimensional feature space.

Some experts (Tolstova, 2011) used the analytic hierarchy process and cluster analysis and proposed to divide regions into clusters based on the criteria for assessing the investment climate at the level of the corresponding territorial units. It was found the function determined the value of the integral indicator of each region for the investment block.

The other experts (Moskovkin & Arinella, 2017) propose to use matrix clustering: clusterization of countries of the world based on the Trade Competitiveness Map database; clusterization of enterprises that produce (or export) m-types of similar products when each of them is characterized by indicators; clusterization of retail chains that sell m-types of similar products when each of them is characterized by n-indicators etc.

Besides the coefficient method is widely used in the economic literature. For example, the method of location quotient calculating can be used to determine the integrated index of the clustering potential of a region.

Summarizing the conclusions of the experts in the field of clustering it could be said that the understanding of the essence of the cluster is changing in accordance with the current trends in the development of the economic model as a whole. In other words, the vision of clustering evolutionizes while preserving its generic features (Kolesnikov & Khazalia, 2016). Unfortunately, a significant destructive factor of the clustering theory development is the high influence of the subjective component – most of the works are purely theoretical or, in contrast, they evaluate the cluster's performance based on achieving/not achieving the target values of ordinary economic indicators (Korableva et al., 2018). At the same time, the methodological component of the cluster approach stays largely out of the boundaries of such studies. A significant negative factor is the lack of strong links between using of clustering tools in the exact sciences (Pestunov et al., 2011) and in economics.

Nowadays many of the formed clusters are going through the collapse and crisis as well as the departure of the basic enterprises that formed the cluster core. This trend is caused not so much by intra-cluster processes but by a general change in the business environment and investment climate in the region. And no doubt it implies a considerable danger to innovation security (Gorochnaya, 2019).

The crucial issue of cluster is a process of defining the core since its viability directly depends on it (Trifonova, Borovskaya & Epstein, 2018). In most cases the cluster core is determined either on the basis of the coefficient method (and its variants – by calculating the multipliers) or on the basis of a major industry player.

In the conditions of economic crisis, the cluster core is determined on the base of the coefficient method (Kostenko, 2017) and its varieties (Karayeva & Shogenova, 2017) or the method of delegating control and management functions to the largest industry player (Battalova, 2012). They are generally applicable but do not have a sufficient flexibility and universality.

From the point of view of justifying the location of the cluster core it should be pay attention to calculation methods (Maltsev & Davankov, 2017) that are largely used outside the scope of research in the field of economics. For example, the identification core algorithm for the high dimensional data clustering includes the following indicators:

- the radius of the cluster core can be:

$$R_i = \bar{r_i} + \sqrt{2}\sigma_i,$$

where $\bar{r_i}$ – average distance between the cluster center and its elements, σ_i – mean-square deviation;
- the cluster density is determined by the formula:

$$p_i = \frac{R_i}{\bar{N_i}},$$

where Ri - the radius of the cluster core, $\bar{N_i}$ – the number of elements that make up the core.

The average density will be an estimate of the final clusterization result:

$$\bar{p} = \frac{p_1 + \cdots + p_{nc}}{p_{nc}}.$$

Of particular note, the mobile cluster core model should be mentioned: the authors of the paper have formulated the assumption that there is a mental, dynamic nature of the innovation cluster core which assumes the transition of the dominant company's function from production and business structures to large university and research centers.

It can be concluded that in the conditions of economic crisis both methods – determining the cluster core based on the coefficient method as well as the method of delegating control and management functions to the largest industry player – does not have a sufficient flexibility, objectivity and universality. In other words, there is a need to develop universal and – at the same time – accurate clustering methods with a minimum level of error which determine the correct position of the core not only base of the optimization of time and financial expenditure.

So, there is an objective need to improve both the theoretical basis of the cluster approach (taking into account the changes in the economics over the past twenty years) and the methodology by introduction of mathematical methods and models.

3. Methods

The methods are based on importance ranking of the main directions of business entities' work taking into account the following evaluation criteria: R_1 – recreation, R_2 – convenience, R_3 – products, R_4 – cognition, R_5 – service, R_6 – comfort, R_7 – safety. The following condition must be met:

$$\sum_{i=1}^{6} R_i = 1 \ . \tag{1}$$

Within each of the selected directions k_j-organizations were ranked based on its number in their own direction. After that the main and secondary organizations were allocated while:

$$\sum_{j=1}^{10} k_j = 1 \ . \tag{2}$$

Then each organization was evaluated in terms of the set of R_i-services provided by it. After that the arithmetical mean for an individual set of parameters $k_j(R_i)$ is defined for each organization. Similarly, values for the actual cluster center Z were found. To find the coordinates of the geometric center M of the cluster the average arithmetic value k_j и Z was calculated for the respective axes.

By defining the axes of coordinates in the system "x – the number of organizations (or the number of services)" and "y – the arithmetical mean for an individual set of parameters (ranking)" a graph of the points density of the cluster was plotted.

It was suggested to mark out the thematic border and geographical border of the cluster. The thematic border includes the basic (cluster-forming) organizations. If even one of them goes out from the cluster the further work of the cluster will be impossible or poor. Geographical border includes others organizations and cluster can exist without them. But it will be "incomplete" in terms of the volume or security of provided services.

So, the expediency of an attract of each of the potential participants to the cluster as well as the possibility of exclusion of organizations that duplicate each other's functions can be assessed.

As part of the study, an analysis of domestic experience in the formation of the perimeter of the integration of corporate reporting information was carried out. System analysis, empirical research, principles of formal logic, synthesis and analysis of theoretical and practical material were used as research tools.

4. Results

There are several clustering methods that define the necessary data to determine the effectiveness of existing or creating cluster such as:
• K-means clustering method and hierarchical clustering when they try to find the partitioning of set of observations into a predefined number of clusters
• clustering of observations based on characteristics – it consists of searching for a subgroup among observations or searching for a subgroup among characteristics;
• clusterization method based on point density analysis where much attention is paid to the location of cluster objects in space and there is no need to select the size of the "union territory".

Currently, the methods for combining several cluster procedures, combining methods with data visualization and others are actively developing. It is important to use cluster algorithms that meet the invariance criteria in relation to the initial numbering (permutation) of clustered objects and invariance in relation to monotone transformations of similarity values.

There is also a clustering method based on point density analysis. When using this method much attention is paid to the location of cluster objects in space and there is no need to select the size of the association territory.

The methods and algorithms for clustering based on fuzzy equivalence relations are defined by studying the development and research of clustering methods and algorithms for data analysis systems. Besides both the clustering quality criteria (they are suitable for building an adaptive system) and adaptive clustering techniques are developed.

In most case this approach takes into consideration a stationary cluster that has clear limitations and scope. Therefore, not all clustering methods may be effective and appropriate for the "temporary" cluster that we are creating as part of a sport-dance competition.

The "temporary" cluster acts as a link that includes all the necessary activities of the structure and their complements. However, we need to define a clustering method that can be used to calculate more accurate data and make sure that it is appropriate to create a cluster at all.

However, this approach takes into account the equivalence of all organizations including their economic might and the readiness of management to inter-cluster interaction without zero-sum game and other methods of daily operations that are no longer typical for individual organizations. This clustering system can be described by a linear function (Fig.1, position a).

a   b   c
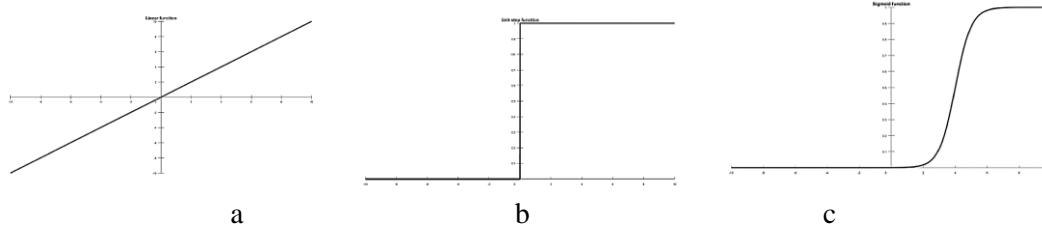
Fig. 1. Plot of functional relation
Source: compiled by the authors

Threshold function (Fig.1, position b) allows to describe the "qualitative" jump that occurs when the "critical mass" of organizations wishing to enter into new economic relations within the cluster is exceeded. However, the "jump" will largely be determined by the number of organizations willing to participate in clusterization even if they are already ranked using weight coefficient.

The sigmoid function (Fig.1, position c) has the property of amplifying weak signals better than strong ones as well as preventing saturation from strong signals coming at the same time. Thus, it allows to evaluate their ability to cluster without "egalitarianism" but taking into account the capabilities of all incoming organizations. This process can be implemented by assigning the average weighted factor for each incoming organization taking into account all aspects – from economic soundness to management methods and assessing the need for its participation in the cluster.

The number of objects included in the cluster must meet the value of the criterion of optimality which determines the best possible functioning of the system. The correct selection of criteria plays a significant role in choosing the optimal solution. It is difficult to choose one of such criterions that would ensure the fullness of the requirements when describing an object. But the desire for a comprehensive solution and the assignment of a large number of criteria greatly complicates the task. Therefore, the number of criteria may differ for different tasks.

Let's assume that the following organizations are included in the "temporary" cluster that is being created for a single event in sport-dance competition (table 1). The table also shows the number of organizations that can potentially be involved in a particular area of cluster activity. Besides, it introduces the designations for each of the areas.

Now let's consider the relative similarity of the expected activities of organizations that are the part of the cluster based on plotting the density of points. Each object in the cluster has an individual set of parameters. The following criteria are offered: 1 – leisure; 2 – convenience; 3 – products; 4 – cognition; 5 – service; 6 – comfort; 7 – safety.

We will rank these criteria based on expert evaluation. For this case the sum of the seven criteria for an individual set of parameters will be equal to one. Each rank R will have its own special value. Next, we distribute the unit's fractions according to the criteria (Fig.2) and assign a letter denotation for each parameter: R_1 – leisure, R_2 – convenience, R_3 – products, R_4 – cognition, R_5 – service, R_6 – comfort, R_7 – safety.

Table 1. The potential organizations of the cluster

Areas of work of organizations	Number of organizations	Letter denotation
Food services	3	k1
Equipment and accessories for dancing	6	k2
Transport organization	2	k3
Beauty industry (makeup and hairstyles)	4	k4
Hotels (accommodation for participants of the competition)	2	k5
Model agency (organization shows dresses)	1	k6
Museum-exhibitions of the dance history	1	k7
Tourist organization (excursions to the event)	1	k8
Security and control of order during the competition	2	k9
Organization demonstrates the concerts and master classes	1	k10

Source: compiled by the authors
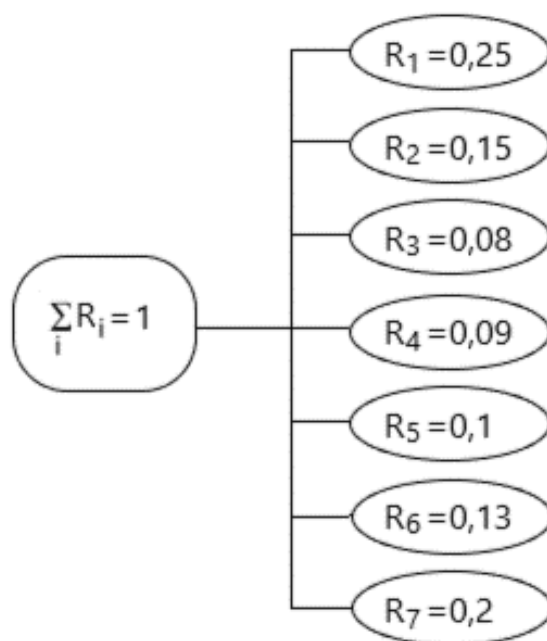
Fig. 2. Ranking criteria for individual parameters by significance
Source: compiled by the authors

Then we will distribute the received data in according to the description of each directions: $k_1(y)=\{R_1,R_2,R_3,R_5\}$; $k_2(y)=\{R_2,R_3,R_5\}$; $k_3(y)=\{R_2,R_5,R_6\}$; $k_4(y)=\{R_2,R_3,R_5\}$; $k_5(y)=\{R_1,R_2,R_5,R_6\}$; $k_6(y)=\{R_1,R_2,R_5,R_6\}$; $k_7(y)=\{R_1,R_4\}$; $k_8(y)=\{R_1,R_3,R_4,R_5\}$; $k_9(y)=\{R_5,R_6,R_7\}$; $k_{10}(y)=\{R_1,R_3,R_4,R_5\}$.

Substituting numeric values for the criteria significance levels we get: $k_1(y)=\{0,25;0,15;0,08;0,1\}$; $k_2(y)=\{0,15;0,08;0,1\}$; $k_3(y)=\{0,15;0,1;0,13\}$; $k_4(y)=\{0,15;0,08;0,1\}$; $k_5(y)=\{0,25;0,15;0,1;0,13\}$; $k_6(y)=\{0,25;0,15;0,1;0,13\}$; $k_7(y)=\{0,25;0,09\}$; $k_8(y)=\{0,25;0,08;0,09;0,1\}$; $k_9(y)=\{0,1;0,13;0,2\}$; $k_{10}(y)=\{0,25;0,08;0,09;0,1\}$.

From the data obtained above, we find the coordinates of the points on the Y-axis (the arithmetical mean of data for an individual set of parameters):
$k_1(y)= (0,25+0,15+0,08+0,1)/4=0,145$;
$k_2(y)= (0,15+0,08+0,1)/3=0,11$;
$k_3(y)= (0,15+0,1+0,13)/3=0,126$;
$k_4(y)= (0,15+0,08+0,1)/3=0,11$;
$k_5(y)= (0,25+0,15+0,1+0,13)/4=0,157$;
$k_6(y)= (0,25+0,15+0,1+0,13)/4=0,157$;
$k_7(y)= (0,25+0,09)/2=0,17$;
$k_8(y)= (0,25+0,08+0,09+0,1)/4=0,13$;
$k_9(y)= (0,1+0,13+0,2)/3=0,143$;
$k_{10}(y)= (0,25+0,08+0,09+0,1)/4=0,13$.

Accordingly, we get the coordinates of ten points of corporate business line on the X-axis (the number of organizations of this corporate business line) and on the Y-axis (the arithmetical mean of an individual set of criteria): $k1=\{3;0,145\}$; $k2=\{6;0,11\}$; $k3=\{2;0,126\}$; $k4=\{4;0,11\}$; $k5=\{2;0,157\}$; $k6=\{1;0,157\}$; $k7=\{1;0,17\}$; $k8=\{1;0,13\}$; $k9=\{2;0,143\}$; $k10=\{1;0,13\}$.

Due to the fact that some activities of the included economic units imply the presence of several organizations (k_1, k_2, k_3, k_4, k_5, k_9) it is necessary to further divide the already separated unit's fractions between these organizations.

Ranking by significance indicates that dance and sports events will not be complete without a Gala-concert and master-classes for participants of the competition. At the same time "secondary" organizations include a company that organizes a museum of the dance history; a company that organizes the show of costumes for dancing; a second hotel complex; two organizations that provide food services and a one tourist organization. The "third plan" includes one organization that provides food services; six stores with inventory and equipment for dancing as well as all the masters or organizations that provide makeup and hair services.

Let's explain the abovementioned: three organizations that provide food during the competition are evaluated in accordance with certain parameters that meet the conditions of the event (menu, readiness to move, staff, service rate, decoration of dining area) as follows: 1st has a rank of 0,05; 2nd – 0,04; 3rd – 0,03. At the same time, it should be emphasized that the sum of the ranks of all three organizations is equal to the rank of this direction.

The stores that sell inventory, equipment and accessories for dancing represents by six organizations. In this case the significance is distributed in accordance with the diversity of the assortment in relation to the conducted disciplines: 1st – 0,010; 2nd – 0,016; 3rd – 0,015; 4th – 0,018; 5th – 0,013; 6th – 0,018.

Two transport organizations must be as mobile as possible and have high speed and quality of passenger transportation: 1st – 0,05; 2nd – 0,05. Two selected organizations have an equal fraction since they not only provide the same service but also meet the necessary requirements equally.

The beauty industry must be represented by four organizations or private masters. Due to the fact that the sport-dancing competition is a large-scale event it would be more acceptable to cooperate with organizations since there are several specialists work instead of one. The choice of a specialist (master) is based on the client's preferences, so it is impossible to clearly identify more or less significant organizations. Thus, the ranking for this organizations is equal to 0,015 for each.

To provide accommodation services we selected two hotel complexes often involved in such events. They are located in different territories of the Russian Federation. The distribution of significance in this case was taking into account the scale of the hotel complex network: 1st – 0,09; 2nd – 0,06.

Two organizations were invited to safeguard the event. It is unlikely that two security organizations can work effectively together within the framework of a single event since each firm operates on its own principle and according to a special developed system. Therefore, the distribution of significance corresponds to the number of provided services and readiness to participate in a sports event of a cluster type: 1st – 0,08; 2nd – 0,12.

Thus, the ranking of the significance of organizations included in the cluster can be represented as a graph (Fig.3).
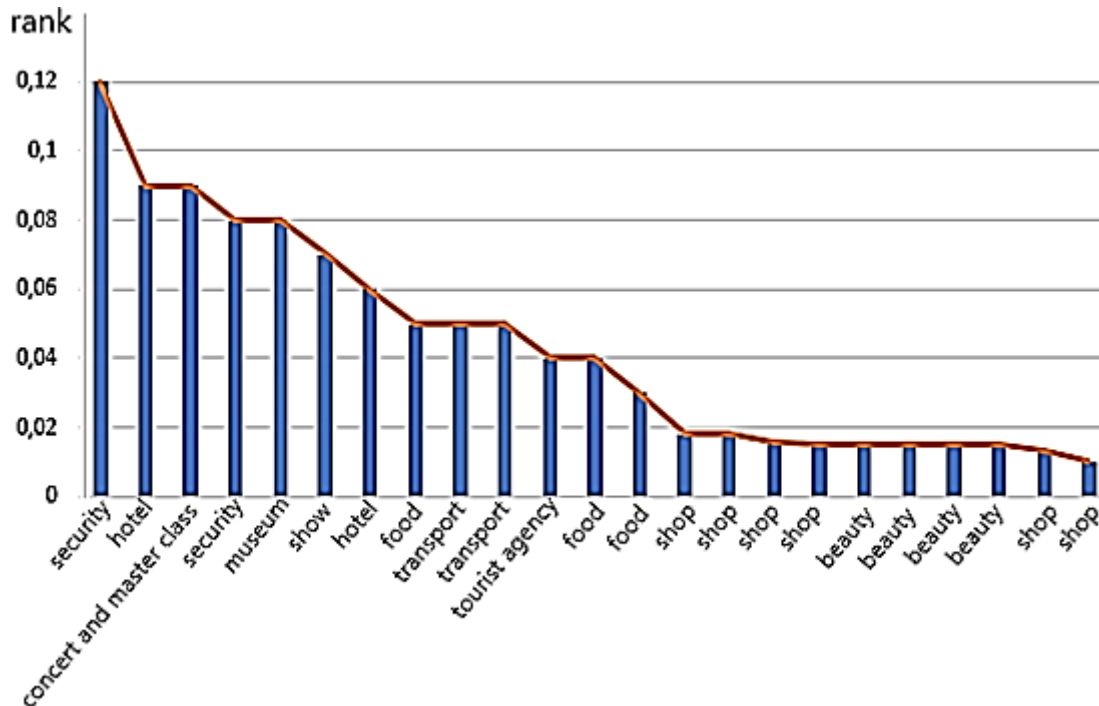
Fig. 3. Significance of organizations in descending order
Source: compiled by the authors

We use the indicated approach to grouping for a newly created "temporary" sport-dance cluster taking into account the fact that the actual center Z of the created cluster is a dance organization with the coordinates "ranking" {0,08;0,09;0,1;0,13}=0,1 and "the number of objects/services/directions" is equal to 3. In this coordinate system we will draw the actual center Z and the geometric center M (its coordinates are calculated as

the arithmetical mean values of k_i and Z on the corresponding axes) and we will also highlight the geographical and thematic borders (Fig.4).
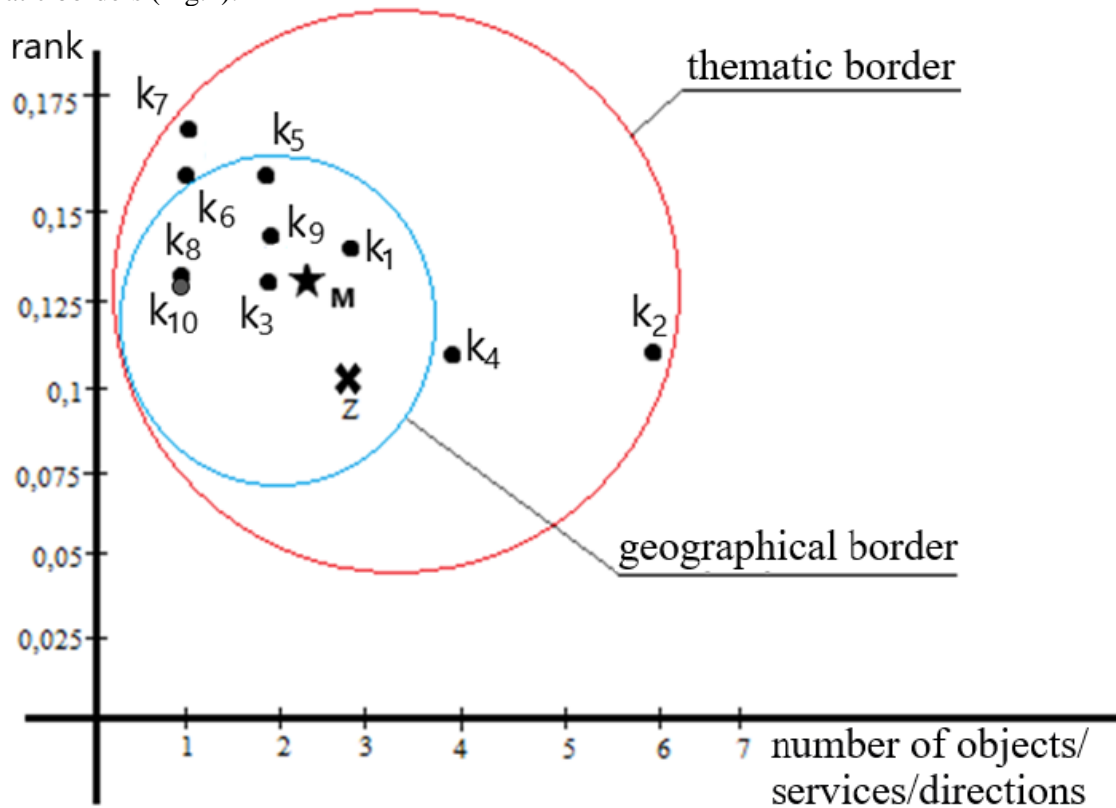
Fig. 4. Point density in a sport-dance cluster
Source: compiled by the authors

In the sport-dance cluster the main focus is made on the need to move the event objects because of sport-dance competitions are often held in completely different locations. Thus, the thematic border goes to the background and the basis for such cluster is food facilities, hotel complexes, security and transport organizations.

5. Implementations and Conclusion

On the basis of this research it is possible to come to the following conclusions^
1.   When the actual center coincides with geometric center it indicates that the actual center does not have a significant "attractive force" and it perceives as an equal partner but not the center of grouping.
2.   The relative position of the geometric center and the actual center will be determined by the resources available to the actual center and their diversity – the more resources the far away these centers will be from each other.
3.   The narrower the cluster boundaries the greater the concentration of resources at the actual center and the less need for clusterization (most likely it will be changed by subcontracting/outsourcing).
4.   Clusters based on a thematic border will be characterized by a stationary association. If the basis of the association is a geographical border then such cluster is considered mobile and ready to function on different territories.
5.   The opportunity for adjusting the location map of cluster members (formatting the cultural and thematic landscape) are indicated. It is very interesting for developing programs for creating flexible models of innovation

clusters with a significant number of mobile objects and experimental sites. On the other hand, it can be successfully used for short-term cluster initiatives such as organizing competitions in dance, sports, eSports events etc.

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TRANSPARENCY OF CREDIT INSTITUTIONS[*]

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Abstract. The article is devoted to a problem of information transparency of credit institutions, which plays a key role in ensuring an effective interaction of such institutions with their stakeholders and is considered as one of the factors of their competitiveness and investment attractiveness. Credit organizations are the main players on the services' market. Therefore, it is necessary to provide complete and most transparent information about the activities of a credit institution, in order to receive a high level of trust from both - clients and investors. This article contains an analysis of the stages of development of international regulatory rules in the specified subject area, which allowed to determine and structurize the information to be disclosed by banks and other credit organizations in accordance with the requirements of international financial institutions. The research methodology was based on the main international regulations issued by the Basel Committee on Banking Supervision and governing the activities of credit organizations. During the research it was concluded that it is reasonable to use the XBRL technology adaptation algorithm developed by the authors as a tool to increase the transparency of credit institutions. The result of the study was the development of this algorithm. A study conducted by the authors revealed that, in the development of the developed concept, its provisions on the development of accounting and analytical tools to ensure information transparency of credit institutions, as well as improving the control system for the reliability of data generated, provided and published by credit organizations, are specified.

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1. Introduction

Information transparency plays a key role in ensuring the effective interaction of economic entities with their stakeholders and is considered as one of the factors of their competitiveness and investment attractiveness. Information transparency plays a special role in the activities of credit organizations, since it is associated with high risks and is largely determined by the operational actions of the regulator, the country's central bank (Hilkevics and Semakina, 2019). Credit organizations are the main operators in the market for providing not only banking services. Therefore, in order to create a high level of trust in both clients and investors, it is necessary to provide complete and most transparent information about the activities of a credit institution (Dutta and Mukherjee, 2018; Korableva et al., 2018).

The transparency of the activities of credit organizations occupies an important place in the process of ensuring transparency of the country's economy as a whole, since the degree of transparency of the banking sector largely determines the level of transparency in other sectors of the economy. Leading credit organizations in the course of their activities impose certain requirements on the information provided to them by customers - representatives of other sectors of the country's economy (Harden et al., 2020). As a result, more stringent requirements placed by banks on their customers increase information transparency indicators by representatives of other sectors of the Russian economy.

However, the level of information disclosure by Russian credit organizations is quite low in comparison to similar foreign banks. Confirmation of this thesis is the active withdrawal by the Central Bank of the Russian Federation of licenses for banking activities, as well as the results of ongoing research on this issue (Gayovets, E.A, 2013). They indicate that it is the insufficiently full disclosure of information about their activities by credit organizations, as well as the low transparency of the banking regulation process by the regulator that inhibits the development of the national banking sector (Bodea and Hicks, 2018; Petrova et al., 2019; Grittersová, 2020).

The issue of transparency of credit organizations has been discussed for a long time. At the same time, it has gained particular relevance in recent years after the Basel Committee on Banking Supervision issued the Principles of Strengthening Corporate Governance, attempting to eliminate the gaps in corporate governance of banks that were discovered during the financial crisis of 2007-2008 (Sarkisyants, 2013). Thus, the study by A. Payne (Payne, 2010) assessed the role of insufficient informational transparency of economic entities (including credit organizations) in the 2007 crisis. It was established that the asymmetry of information led to errors in the assessment and distribution of risks.

2. Methods

The analysis carried out during the study showed that the following system of interrelated concepts is most often used in scientific and specialized literature and legal acts: "information disclosure", "information openness", "information transparency", "transparency" (Addo et al., 2018; Bulyga, 2019; Sitnov and Maksutova,2019; Akhmadeev et al., 2018).

The category "information transparency" is a key one. It is achieved in the process of "disclosure of information". At the same time, "informational openness" means the lower (minimum acceptable in accordance with regulatory requirements) level of transparency of the economic entity, and the voluntarily formed "transparency" - its maximum possible level (rather ideal, used as a standard in the rating process). In real practice, due to commercial risks, economic entities form the so-called "rational information transparency", the achievement of which is the goal of risk management of organizations (including credit organizations) (Thomas et al., 2006; Semenova, 2009; Vyatkina and Sitnov, 2018; Kashirskaya et al., 2019).

The process of integration of the domestic banking sector into the global financial system necessitates taking into account the requirements of the main international financial institutions in the formation of the concept, methodology and tools of information transparency of the activities of credit organizations in Russia. The main international financial institutions that directly or indirectly regulate the requirements for information transparency of banks include (Gaevets, 2013):

- International Monetary Fund (hereinafter - the IMF);
- Basel Committee on Banking Supervision (hereinafter - BCBS);
- Organization for Economic Co-operation and Development (hereinafter - OECD);
- The World Bank and its structures;
- Intergovernmental Commission on the fight against the laundering of criminal capital (hereinafter - the FATF).
The most significant international documents that regulate the activities of banks in general and in particular, in terms of ensuring transparency of their activities are:
- The Code of Good Practice for Ensuring Transparency in Monetary and Financial Policies, developed by the International Monetary Fund (hereinafter - the Code for Ensuring Transparency);
- Agreement of the Basel Committee on Banking Supervision.
The Code for Transparency discloses the content of the basic principles of transparency (accessibility, openness, reliability, timeliness). It regulates the procedure for ensuring transparency of all types of financial institutions (including their regulators), discloses the main directions in terms of ensuring transparency of activities, such as:
- transparency of the regulator;
- determination of conditions which lead to the increasing level of information transparency of a credit institution;
- definition of basic concepts related to the problems of ensuring transparency of banks;
- the procedure for disclosing financial information about the activities of a credit institution.

The Explanatory Memorandum to the Code of good transparency practices in monetary - credit and financial policies contains: specific recommendations to be used by banks to ensure transparency of their operations; the definition of conditions, which make it possible to achieve a high degree of transparency of operations, as well as examples of different ways to ensure transparency. So, among the main ways to ensure the transparency of banks are: disclosure of the provisions of the internal regulations of the credit institution; publication of press releases on performance; disclosure of information on financial condition, including in published annual reports; use of Web-sites as a mean of communication with interested users of information about the activities of a credit institution.
The basic international regulation governing the activities of credit organizations is a document issued by the Basel Committee on Banking Supervision - "Fundamental Principles of Effective Banking Supervision" (1998). It identified the main approaches to information disclosure by credit organizations.

3. Results

The study allowed us to highlight the following stages of development and improvement of the basic agreements developed by the Basel Committee on Banking Supervision**:**
a) Basel I (1988): it was mainly associated with the implementation of recommendations on capital adequacy covering credit risk (the bank's capital for regulatory purposes was prescribed to be divided into two groups - capital of the 1st and 2nd levels, and all bank assets for these the goals should be divided into 5 groups depending on the risk level of each type of asset), while the issues of providing banks with information transparency of their activities were addressed only indirectly (mainly regarding disclosure of information on capital adequacy). This standard has not been fully used by foreign and Russian banks.
b) Basel II (2004): Basel II's approach is based on 3 main components: minimum capital requirements (Basel I framework), supervision procedures and market discipline. As part of the latter component, a wide system of

disclosing information when reporting for banks was added, and the issue of maintaining a balance between openness of information and its confidentiality was also raised.

c) Basel III (2010): The main motivating factor for it to appear was the reaction on the negative trends of the global financial crisis of 2007-2008: to prevent them in the future. When creating Basel III, the shortcomings of previous agreements were taken into account. In addition, new provisions were adopted in order to better align risk management processes, as well as control and supervision in the banking sector. The main innovations of Basel III are: strengthening the banking sector; improving risk management to improve the quality of corporate governance in banks; increase of information transparency of credit organizations.

In total, over the period between Basel I and Basel III, more than dozens of documents were adopted defining the transparency standards of banks and their disclosure. So, in order to increase the transparency of the activities of banks and to eliminate gaps in their corporate governance, which was discovered during the financial crisis of 2007 - 2008, the BCBS was amended with the following aspects:

- a description of the main activities of credit organizations and indicators of its financial effectiveness;
- the requirement for regular disclosure by banks of information about their activities on a consolidated, and if necessary, individual basis;
- establishing the level of detail and systemic significance of the information provided by credit organizations;
- disclosure in reporting in the form of quantitative and qualitative information of the remuneration system for key management personnel;
- the introduction of a mandatory external audit of operations to consolidate and use off-balance sheet instruments of banks.

As the study showed, the main to date approaches to the disclosure of information in the banking sector of the EU and the US are formulated in the Basel Accords. The Basel Accords define transparency as the disclosure of reliable and relevant information that enables interested users to correctly assess the financial position and performance of a credit institution, the structure of its risks, and risk management methods.

For participants in the European insurance market, the main regulatory document governing their activities and determining the requirements for information disclosure is the European Union Directive (2009) on the organization and implementation of insurance and reinsurance organizations (Solvency II). This Directive, being a national act of the European Union, establishes fundamental and comprehensive requirements for regulatory processes and supervision of the activities of insurers (including reinsurance organizations) and insurance groups. In particular, it identifies 3 key components of the structure of regulating the solvency of insurers: quantitative requirements; quality requirements; disclosure requirements.

The study showed that the architecture of the Solvency II Directive in terms of the composition and structure of its main components almost completely coincides with the architecture of Basel II. Both Solvency II and Basel I-III are based on a risk-based approach to regulating and supervising the activities of controlled facilities (insurance companies and banks, respectively). At the same time, a two-level approach to determining the amount of regulatory capital (Solvency capital requirement), as well as risk profiles, the quantitative impact of which on the bank's capital must be evaluated in accordance with the requirements of the considered aspects, with the exception of the insurance risk of insurers, is similarly constructed. So, for example, in accordance with the requirements of Solvency II and Basel II, the regulatory capital of both the insurer and the bank is divided into two levels: the minimum possible for carrying out business and the target one, which provides certain probability of protection against bankruptcy. Both of these levels determine the requirements and algorithms for analyzing its sufficiency.

The study allowed us to determine the composition and structure of information to be disclosed by banks and other credit organizations in accordance with the requirements of international financial institutions. This information includes two blocks: information on the main areas of activity (basic information) and additionally disclosed information (additional information).

The Russian peculiarity is that, despite the presence of an impressive list of regulators, the Central Bank of the Russian Federation as a mega-regulator plays the main role in the formation of requirements for information transparency of credit organizations to the federal body that regulates financial markets in terms of monitoring any activities in the provision of financial services by banks and other types of financial institutions. Powers for regulation and control in the field of financial markets in accordance with Federal Law of July 23, 2013 N 251-FZ (as amended on July 29, 2017) "On Amending Certain Legislative Acts of the Russian Federation in Connection with the Transfer of Regulation Powers to the Central Bank of the Russian Federation, control and supervision in the sphere of financial markets." transferred to the Bank of Russia from September 1, 2013.

One should note that assigning the functions of a megaregulator to the country's central bank is a fairly common world practice. Currently megaregulators in one form or another operate in more than 55 countries of the world, in 13 of which (Belgium, Great Britain, Germany, Greece, Ireland, Lithuania, Portugal, Saudi Arabia, Slovakia, the USA, Singapore, France and the Czech Republic) they were created on the basis of central (national) banks (Sarkisyants, 2013).

Moreover, the legislation of the Russian Federation contains requirements for transparency of the Bank of Russia itself as the main regulator of the country's banking system. And as the study showed, the roots of the problems of low transparency of the Russian banking system are due to insufficiently high regulatory requirements for information disclosure by the Bank of Russia, primarily in those areas of activity that relate to the decision-making process. So, according to the Federal Law of the Russian Federation of July 10, 2002 N 86-FZ (as amended on December 27, 2018) "On the Central Bank of the Russian Federation", only five forms of accountability of the Central Bank of the Russian Federation to the State Duma and disclosure of information on its activities are provided. As a result, the Bank of Russia uses less than half of the foreseen information policy instruments of the country's central bank. In this regard, the CBR is significantly inferior to foreign regulators.

As the study showed, in contrast to international documents, national regulations require transparency of the activities of credit organizations only in the areas of "Financial Information" and "Property Structure" (Gaevets E.A., 2013). At the same time, true and complete information about the structure of the ultimate beneficial owners of large blocks of shares in banks continues to be one of the problematic areas of transparency in the Russian banking system.

A study of the requirements and practice of applying legislation in terms of regulating the information transparency of credit institutions activity showed that, in the presence of a mega-regulator of the financial market in the country, the regulations issued by it, in essence, already contain requirements for information transparency of credit organizations activities, taking into account the requests of the main groups of their interested users.

One of the most influential studies in the area of transparency of economic entities is the "Study of Information Transparency of Russian Companies", conducted by the international rating agency Standart & Poor's. The objects of this study are the activities of 90 Russian public organizations of various sectors of the economy: banks, engineering, metallurgy, oil and gas, electricity, telecommunications companies, as well as food industry, retail, consumer goods and development activities. The study evaluates such indicators of the degree of disclosure of information as: "Financial information", "Ownership structure", "Operational information", "Shareholder rights", "Information on the board of directors and management", "Remuneration of management and members of the board of directors". Based on the results of the study, a transparency index weighted by capitalization (ITVC) is calculated and published, which is the average score for information disclosure.

To determine the degree to which credit organizations in Russia comply with regulatory requirements for the disclosure of information about their activities and the calculation of the transparency index, we conducted a special study. The reference group for the study selected 10 banks that meet the criteria of systemically important credit organizations (table 1). The total assets of these banks account for about 50% of all assets of the banking system of Russia.

Table 1. A reference group of banks to conduct a study of the degree of compliance with regulatory requirements for the disclosure of information about their activities

No.	Name of credit institution	Reg. No.
1	JSC UniCredit Bank	1
2	VTB Bank (PJSC)	1000
3	JSC "ALFA-BANK"	1326
4	PJSC Sberbank	1481
5	PJSC "Moscow Credit Bank"	1978
6	PJSC Bank "FC Otkrytie"	2209
7	PJSC ROSBANK	2272
8	PJSC "Promsvyazbank"	3251
9	JSC "Raiffeisenbank"	3292
10	JSC "Agricultural Bank"	3349

Source: own research

The calculation of the transparency index for the banks selected in the reference group is based on the methodology developed by the Transparency International, combined with the methodology of the corporate governance rating service Standard & Poor's. To calculate the index, the information disclosed in three main sources was used: annual reports, the official websites of banks and the statements provided on the Bank of Russia website. The study was conducted as of January 1, 2019. Evaluation and calculation of the transparency index was carried out in three blocks (anti-corruption documents, organizational transparency and reporting), including specific assessment criteria. The study was conducted in the form of respondents' answers to questions asked by each criterion. The questions are given a positive / negative answer. Banks were given points according to the answers, given in the questionnaires. Points were adjusted for the timeliness of disclosure of information to the public as a whole and multiplied by weight. The final bank transparency index is in the range from 0 to 10 conventional points.

As a result, it was found that the considered banks publish almost the entire amount of information required by regulatory legal acts of the Russian Federation. To disclose information, banks use official websites (for example, information about a bank, deposit rates for individuals, issue documents, etc.), statements (annual and interim financial statements, issuer's quarterly reports, etc.), websites Central Bank of the Russian Federation (for example, information on financial instruments used by a credit institution, information about bank owners, etc.). The bank transparency indices calculated during the study are presented in table 2.

Table 2. Calculation of the transparency index for the 10 largest Russian banks

Bank	Total assets of $ million	Anti-corruption documents	Organizational transparency	Reporting	IT
Sberbank PJSC	71 911	85	88	69	8.3
PJSC VTB	14 929	23	75	65	7.1
Gazprombank JSC	12 706	50	61	51	6.4
Afa-Bank JSC	7 339	78	55	39	5,4
PJSC Promsvyazbank	2 945	77	38	39	4.8
PJSC Moscow Credit Bank	5 361	70	41	40	4.1
JSC "Bank of Russia"	4,908	56	20	thirty	2, 3
JSC Russian Standard Bank	1 606	64	34	25	3.4
PJSC "Bank" Saint-Petersburg"	1 900	fifty	63	41	4.2
PJSC "Discovery"	1 088	59	61	42	4.6

Source: own research

A study of the information transparency of the 10 largest Russian banks showed that the level of public disclosure of information by Russian banks is in the middle. The banks of the first five have an index above 5.0, which indicates a relatively high transparency. Nevertheless, even among the largest banks in the country, the index decreases in proportion to the decrease in capitalization. The average information disclosure of banks included in the study was 5.1, which is almost two times lower than that of similar public importance for the economy of foreign banks (Table 3).

Table 3. Transparency level of foreign banks, %

Bank	The country	Total score	Ownership structure and shareholder rights	Financial and operational information	Composition and working procedures of the board of directors and management
Deutsche bank	Germany	90	79	95	85
JPMorgan Chase	USA	89	74	95	88
Bank of America	USA	88	78	93	87
Hsbc	Great Britain	87	79	93	85
Citigroup Inc.	USA	86	76	93	82
ABN AMRO	Netherlands	83	79	85	84
Royal Bank of Scotland	Great Britain	83	69	89	85
Ubs	Switzerland	82	75	87	79
Ing	Netherlands	82	83	83	79
Credit suisse group	Switzerland	77	73	81	72
Grade point average		85	76	89	83

Source: (Standard & Poor 's) and own research

It should be noted that there is a clear correlation of relatively low transparency indices of leading Russian banks with the level of assessment of their creditworthiness and international competitiveness by leading world and domestic rating agencies. Thus, the leading rating agency Moody's, Fitch's Ratings has during the same period under review of the reference banks assigned credit ratings below the world average, while their national assessment on the part of "Expert RA" was in the highest position.

The study and the data of rating agencies indicate a rather low level of public disclosure of information by Russian credit organizations, which reduces the trust of the investment community and the population in financial institutions. Moreover, as world practice shows, the level of transparency is directly proportional to the scale of activity of large organizations.

The lack of transparency of Russian credit organizations is in the following aspects.
Firstly, in the international aspect. As shown above, the average disclosure rate for Russian banks is two times lower than the level of disclosure by similar foreign banks.
Secondly, in the industry aspect. The level of information disclosure by Russian credit organizations is significantly inferior to the level of information disclosure by domestic economic entities of other sectors of the economy. So, conducted by Gayevets E.A. (2013) the study showed that "the value of the transparency index, weighted by capitalization (ITVC), of the banking sector is inferior to the value of ITVC in almost all other sectors of the Russian economy (except for the engineering industry), as well as the average value of the indicator as a whole in the country".
Thirdly, in the structural aspect. The level of information disclosure by Russian banks is very heterogeneous in the context of three main sources - annual reports, corporate websites and reporting submitted to regulatory authorities (table 4). Moreover, it should be noted that foreign banks are characterized by a very uniform quality and degree of detail of information disclosed in all major sources. The aforesaid is confirmed by a slight difference in the level of disclosure of information in the least informative source (statements sent to regulatory authorities) and the level of disclosure of information in the most informative source (annual reports of banks). This is due to the fact that in international practice each of the sources is an equivalent independent channel for information disclosure.

Table 4. The Degree (%) and the ratio of sources of information disclosure

	Annual report	Web sites	Reporting to Regulators
Russian banks	28	46	26
Russian companies	36	60	43
Foreign banks	86	85	82

Source: (Sarkisyants, 2013)

As the study showed, the reporting submitted by credit organizations to regulatory authorities is relatively less informative for a wide range of interested users than similar reports by major Russian companies. Moreover, the problem is that not all reporting submitted by credit organizations to the Central Bank of the Russian Federation can be used for public disclosure. So, in the reports that credit organizations disclose publicly, there are no such important blocks of information for investors as the names of beneficial owners of shares, the structure and procedures for managing and making decisions. Such information is partially contained in the quarterly reports of credit organizations, however, the requirement for its disclosure applies only to banks issuing securities.

Based on the research results, a matrix of transparency zones of a credit institution has been developed (Table 5).
The specified matrix is the most complete set of objects, information about which is subject to disclosure based on the requirements of regulatory - legal acts and the needs of all interested users (stakeholders) of credit organizations, which will achieve the following results:

- First, to identify the "non-transparency zone" (low transparency zone) of credit organizations.
- Second, to implement the basic principle laid down in the basis of the XBRL technology (form once, use it repeatedly to satisfy the interests of all interested users in information about the activities of a credit institution) when developing a specific set of key indicators (control indicators) that can be used for monitoring and oversight of the activities of credit institutions in order to increase its transparency.

Table 5. The Matrix of the transparency zones of the credit institution

Area code	Name of transparency zones
100	Credit institution background
200	Information on the activities of a credit institution (banking products)
210	Information on activities to attract funds of individuals and legal entities in deposits
220	Information on the activities for the placement of borrowed funds on its own behalf and at its own expense
230	Information on the activities of opening and maintaining bank accounts of individuals and legal entities
240	Information on the activities on the implementation of money transfers on behalf of individuals and legal entities, including correspondent banks, on their bank accounts
250	Information on the collection of cash, bills, payment and settlement documents and cash services to individuals and legal entities
260	Information on the activity of buying and selling foreign currency in cash and non-cash forms. Information about foreign exchange transactions.
270	Precious Metals Information
280	Information on major transactions and significant transactions
290	Information on other aspects of a credit institution
291	Information on the activities of a credit institution as a professional participant in the securities market
300	Information on the organizational structure and points of service
310	Organizational Structure Information
320	Service Point Information
400	Information on ownership structure and shareholder rights
410	Stock structure
420	Information on beneficial (real) owners
430	Information on mechanisms for protecting the rights of minority shareholders
500	Information on business relations and partnerships of a credit organization
510	Affiliate Information
520	Information on the participation of a credit organization in banking groups, bank holdings and other structures
530	Information on relations with non-residents
600	Information about the management and decision-making system
610	Board and Management Information
620	Remuneration of management and board members
630	Information on decision making by the shareholders meeting
700	Financial and non-financial information
710	Information on the financial condition of a credit institution
711	Information on credit institution assets
712	Information on liabilities and off-balance sheet liabilities of a credit institution
713	Information on capital and sources of equity of a credit institution
714	Credit institution liquidity information
720	Information on the financial performance of a credit institution
721	Information on the income of a credit institution
722	Information on expenses of a credit institution
723	Information on profit (loss) of a credit institution
724	Information on the profitability of a credit institution
730	Information on cash flow of a credit institution
740	Information on compliance by a credit institution with established standards
750	Information on Sustainable Development of a Credit Organization
800	Information on risks and measures to minimize them
810	Information on the risks of the credit institution and the procedure for determining them
811	Information on credit, operational and market risks
820	Strategies and methods of risk management of a credit institution
830	Information Risks and the Information Security System of a Credit Organization
840	Information about the system of control over the activities of a credit organization
841	Information about ICS credit organization

842	Information on an external audit of a credit institution
843	Information about the system of control and supervision of the activities of a credit institution
850	Information on the activities of a credit institution to combat fraud and PODFT
851	Information on the activities of a credit institution to combat fraud
852	Information on the activities of a credit institution in terms of PODFT
900	Information about the accounting system and information systems
910	Information about the credit organization accounting system
920	Information on information systems and technologies used by a credit institution

Source: own research

The study allowed us to identify areas of low transparency of Russian credit organizations, the main of which is the disclosure of the following information about:
- the ownership structure, beneficial (real) owners and shareholders' rights of credit organizations;
- affiliates of a credit organization;
- the remuneration of a member of the board of directors and top managers of the bank;
- banking risks and measures to minimize them.

As the study showed, the transparency of specific banking information from the point of view of the interests of shareholders of a credit institution is about 40%, which is lower than the transparency level of large companies with foreign investment, where the disclosure level exceeds 80%. At the same time, the level of disclosure of information on the ownership structure of credit organizations increases as banks enter the global financial markets. In terms of information disclosure, the largest Russian banks, whose shares in most cases are not traded on trading floors, are significantly behind the criteria that meet the requirements of the largest world exchanges. The transparency of banks from the position of minority shareholders is at the lowest level: the share of private capital, information on the owners of which is disclosed, is only 8% of total capital and only 16% of total private capital (private capital is slightly more than 50% of total capital). This indicator is also twice lower than the share of private blocks of shares of the largest Russian companies, information about the owners of which is disclosed.

The most acute issue of transparency, or rather, the opacity of Russian banks is the weak disclosure of information on beneficial (real) owners, which does not give a real picture of the ownership of a credit institution. The essence of the problem is that they have no reliable means of identification of beneficial owners in the case of indirectly of ownership of shares of the bank (except for voluntary disclosure of shareholder s information about themselves).

This situation is due to the fact that in Russia there is a priority of the legal form over economic content. In this regard, credit organizations have the opportunity to hide the true owners (beneficiaries) of the bank who do not fit the requirements formally specified in Russian law. IFRS, however, rely more on the substantive aspect and are not tied to certain formal requirements fixed at the legislative level, which leads to a higher level of disclosure of information on the ownership structure of foreign banks that record IFRS. For example, most of the foreign banks disclose the beneficial owners of large blocks of shares, including those of the shares owned by top management.

The legislation of the Russian Federation does not provide sanctions against credit organizations with an opaque ownership structure. At that time, the legislation of many countries of the world contains a requirement for mandatory disclosure of information on large blocks of shares owned by shareholders (directly or indirectly). So, the minimum size of a block of shares, information on the owners of which is subject to disclosure, can be from 3 to 10%% of voting shares, depending on the requirements of national legislation and the type of organization. At the same time, in many countries, banks are allowed to deprive the voting rights of owners of shares whose beneficial owners are not disclosed.

It should be noted that the problem of disclosing information on beneficial (real) owners by Russian banks is not so clear. It significantly depends on the scale of banks and the degree of their global integration. So, Banks from the first hundred of the Russian rating, that actively attract funds from private individuals, have begun to reveal the ownership structure according to international standards long ago. Measures of the Bank of Russia are now aimed more at smaller credit institutions that are part of the deposit insurance system but have insignificant amounts of deposits (disclosing the ownership structure was one of the conditions for banks to join the deposit insurance system). In today's conditions, the most effective way to attract investment by banks on favorable terms and on a large scale is to work according to the rules of international stock markets, high transparency of the organization, and the availability of reports prepared in accordance with international standards.

According to the results of a review held by the Central Bank of the Russian Federation which was based on data disclosed by joint stock companies whose shares were included in the quotation lists of the first and second levels of Moscow Exchange PJSC as of June 30, 2018, it was established that the principles of corporate governance are worst observed in these banks. These principles are aimed at creating conditions for a fair and equal treatment of each shareholder and relating to such important rights of shareholders as participation in the management of the company and distribution of profits, as well as mechanisms of reliable accounting of rights on shares and the possibility of their easy disposal.

The next problematic area of transparency of both foreign and domestic banks is the disclosure of information about related parties (affiliates). The essence of the problem is that in foreign practice, as in Russia, approaches to determining the connectedness of individuals in accordance with international financial reporting standards are widespread. At the same time, the determination of such connectivity is carried out using the Bank's judgment, including on the basis of existing control or significant influence. However, it should be noted that the list of connectedness features contained in IFRS does not cover the whole variety of connectedness signs that may exist between organizations; therefore, it is not complete or complete. Thus, the approaches to information disclosure enshrined in IAS 24 "Related Party Disclosures" determine that the disclosure format can be independently selected by the credit institution based on the best presentation to users of information about the impact of transactions with related parties on the financial position of the bank. IAS 1 Presentation of Financial Statements contains a complete list of financial reporting forms that are required to be disclosed, as well as minimum disclosure requirements in notes, and IFRS do not contain unified disclosure requirements in notes, therefore, each a credit institution discloses information in accordance with its professional judgment, as in our example below.

In the course of the study, we reviewed the reporting of credit institutions for 2017 and revealed that banks use different approaches to disclosing information about transactions with related parties. Thus, in the statements of JSC CB INTERPROMBANK there is no detailed information on persons associated with the Bank (the notes reflect only the total amount of risk for related persons - 0.11 billion rubles). The statements of JSC Russian Standard Bank in the notes of the IFRS statements for 2017 contained detailed information, that is, criteria for relatedness and transactions with related parties are displayed, including information about related parties with amounts attributable to the parent company and other companies are listed in the notes. Despite the conceptual differences in the disclosure of information in the IFRS statements, audit organizations indicate a reliable reflection of the financial situation of credit organizations in both cases. And also, the calculation of the standard in accordance with Russian Accounting Standards is confirmed, including in terms of compliance with the N25 standard.

The most significant gap between the performance of Russian and foreign banks is observed in the disclosure of remuneration of directors and senior management. With respect to such information the Financial Stability Board (the Financial Stability Discussion Board) adopted requirements for the effective setting of remuneration taking into account the risks taken, as well as supervision and obligations to stakeholders (2009). They state that the

disclosure of information on the practice of remuneration should be clear, comprehensive and timely in order to satisfy the needs of all interested users (stakeholders) of the bank (and above all, the regulator).

The study showed that in Russian practice the disclosure of this information is usually limited to the publication of general information related to the remuneration policy and the indication of the amount of salary expenses in the bank (sometimes with the allocation of the amount of bonuses and social insurance expenses), from which the amount of compensation is not allocated top management in accordance with the requirements of IFRS 24. So, according to the results of a review by the Central Bank of the Russian Federation, compiled on the basis of data disclosed by joint stock companies whose shares were included in the quotation lists of the first and second levels of PJSC Moscow Exchange as of 06.30.2018 it was determined that such personalized information has been presented only three public companies out of 75 companies in the sample.

It should be noted that information on the remuneration of directors and senior management is insufficiently disclosed in general for most Russian enterprises from various industries (the average information transparency index according to Standard & Poor's rating agency does not rise above 20-25%).

4. Discussion

As the study showed, the reporting submitted by credit organizations to regulatory authorities is relatively less informative for a wide range of interested users than similar reports by major Russian companies. Moreover, the problem is that not all reporting submitted by credit organizations to the Central Bank of the Russian Federation can be used for public disclosure. So, in the reports that credit organizations disclose publicly, there are no such important blocks of information for investors as: the names of beneficial owners of shares, the structure and procedures for managing and making decisions. Such information is partially contained in the quarterly reports of credit organizations, however, the requirement for its disclosure applies only to banks, issuing securities.

Conclusions

The study made it possible to justify and highlight the following priority areas for improving control and supervision activities based on the use of modern IT tools in order to increase the information transparency of credit and other financial organizations:

- the use of blockchain technologies and distributed ledgers to expand the range of banking services, as well as transforming the methodology for disclosing and monitoring the reliability of information on the activities of credit organizations;
- to transfer to the formation and presentation of reports of all financial organizations (i.e., the distribution of the project for NFOs and to credit organizations) in the XBRL format in order to increase the efficiency of the collection, processing and electronic exchange of information between all participants in the financial market.

The introduction into practice of the activities of credit institutions of the technology of generating and collecting reporting information using XBRL will provide the opportunity for transforming the methodology of control over their activities, in particular, it will allow introducing innovative approaches to the organization of remote banking supervision into the practice of control and supervisory activities, primarily related to assessing the situation in credit organizations, based on modern methods of analysis of significant banking risks, their concentration and qualities and management.

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DIGITALIZATION PECULIARITIES OF ORGANIZATIONS: A CASE STUDY[*]

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Abstract. The relevance of this study is caused by the growing role of digital technology in the organization and functioning of socio-economic relations. Universities and enterprises are actively using digital technology to realize their traditional functions. Digital transformation requires the adoption of an adequate government policy for the effective management of modern digital processes. The objective is to conduct a study of the digital transformation of universities and enterprises at the micro and macro levels of the socio-economic system and to formulate some recommendations on improving the efficiency and safety of using digital technologies. As special methods, the authors used the methods of sociological survey and statistical information processing. An institutional approach was used to analyze digitalization processes in the national socio-economic system. The most favorable institutions for the development of digital technologies were identified. A multilevel approach to the analysis of digitalization processes at the personal, organizational and institutional levels was also used. The study revealed a discrepancy in the level of development of the necessary digital competencies between universities and the real sector of the economy. The reason for this was the absence or insufficient development of relevant institutions: trust, competition, entrepreneurship, property rights. Some recommendations were formulated to improve the institutions that promote digitalization, depending on the level of socio-economic activity: personal, organizational, routine.

JEL Classifications: A13, L70, M14.

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1. Introduction

Currently, digitalization issues are becoming relevant. Digitalization of social and economic relations touched all spheres of human life: household, market transactions, financial activities, banking, industry, agriculture, medicine, education, and government. Together with the positive effects, such as saving time on data transfer and saving the cost of performing work operations (Yli-Viitala et al., 2019), digitalization is also characterized by negative effects – new types of digital fraud and excessive enthusiasm for virtual reality (Tvaronavičienė, 2018; Zhao et al., 2019; Chehabeddine, Tvaronavičienė, 2020). However, scientific and technological progress and limited economic resources necessitate the use of digital technologies throughout the national economy. There is an urgent need to study digitalization processes to reduce negative and increase positive effects. It is necessary to develop a system of institutions that would make digitalization manageable to meet the national development goals and ensure the safety of people's lives. According to these documents, their results should be: an increase in domestic costs for the development of the digital economy from 1.7% to 5.1% of the gross domestic product of the country; creation of a stable and secure information and communication infrastructure for the efficient transfer, processing, and storage of large amounts of data between organizations and households; the use of predominant domestic software by state authorities, local governments, private legal entities, and individuals (Vu, 2019; Vural, 2019; Fedulova et al., 2019; Sturm and Quaynor, 2020; Herningsih et al., 2019). The implementation of such large-scale tasks will require the training of appropriate human resources, developers and users of digital technologies. In such circumstances, universities must become digital, and the national innovation system and relevant development institutions must take into account the effects of digitalization (Selomo & Govender, 2016: Soleimani & Esfahani, 2018).

The European Commission, as part of the Digital Education Action Plan, has proposed the following definition of digital competence. Digital competence is the willingness and ability of a person to confidently, efficiently, critically and safely apply information and communication technologies in various spheres of life (Dvir & Yemini, 2017; Amirova et al., 2019; Ivanova et al., 2019; Pavlyshyn et al., 2019). The following components of digital competence are distinguished: knowledge; skills and abilities; motivation; responsibility, including safety. In turn, the digital skills that underlie digital competencies are divided into the following types: user basic digital skills require functional literacy in the use of electronic devices and applications; derivative digital skills consist of the ability to consciously apply digital technologies in everyday life, creative skills for working in digital services are important here; specialized professional digital skills are the basis of high-tech professions, for their development, it is necessary to obtain a special education (Zeibote et al., 2019; Yemelyanov et al., 2018; Masood et al., 2019).

The fact is that a high level of digitalization of the socio-economic system will be achieved only if the digital competence of the population is enhanced. On the other hand, to increase the digital literacy of citizens of the country, it is necessary to create appropriate programs and organizations responsible for this task. That is why it is important to study the institutional conditions for digitalization at both the micro and macro levels. The result of the study is presented in this paper.

2. Literature review

By institutions in this study, the authors will mean "rules of the game" or human-created restrictive frameworks that organize relationships between people. In other words, institutions define the structure of the incentive motives of human interaction (North, 1997). External factors, such as scientific and technological progress that brought globalization and digital technology to the world, have an impact on existing institutions, forcing them to change, providing a new framework for human interaction. However, there are reverse processes – the institutions themselves, in particular, the institutions of the national innovation system, have a significant impact on the quality and content of innovation processes and the use of digital technologies to ensure their effectiveness and safety (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Sycheva et al., 2019; Nagimzhanova et al., 2019). In this

regard, there is an urgent task of forming a system of institutions for the development of digitalization of the national socio-economic system at the micro and macro levels.

The modern economy is characterized by the increasing role of knowledge and human capital in the organization of modern industries and services. Science and technology allowed expanding the limited possibilities of economic resources, offered consumers radically new types of goods and services and ensured the growth of national corporations that are actively innovating at the global level (Singareddy et al., 2019; Akhmadeev et al., 2018). There are a number of factors that contribute to these trends. First of all, it is globalization and digitalization of economic relations. Digitalization allows making the interrelation of the sphere of science, education, production and the market closer (almost uniform), and globalization erases the boundaries of national economies. This leads to the fact that modern universities are developing not only their physical infrastructure but also virtual space. This allows universities to form a new intellectual resource in a digital form. Due to the increase in distance education, the time for a deeper study of theoretical and applied course materials increases. At the disposal of teachers in a single digital space of the entire scientific, educational and entrepreneurial sphere, there are hypertext information systems and technologies that improve the quality of education of a future specialist. The task of the state is to promote the digital transformation of universities, shifting the focus from internal, socio-economic problems to market, external conditions of the demand for educational, research products in the real sector of the economy (Nedelkin, 2018; Saenko et al., 2020; Polyakova et al., 2019; Magsumov, 2019a,b; Mullins, 2019; Franco and Bedin, 2019).

The role of universities in shaping the institutions of society has always been a core one (Bykanova and Akhmadeev, 2019). University is a center of knowledge, culture, education, mobilization of individual initiatives, socialization of a person, a construct of social relations. Accordingly, in the context of the orientation of the whole world toward innovation, universities have become a kind of banks of innovative requests and offers, or in other words – innovative hubs. However, for the qualitative fulfillment of this role, the rate of change at universities must be higher than the rate of change in the external environment. The new industrial (digital) revolution 4.0 is a challenge, first of all, for universities. A shift in thinking is needed in order to lead the process of digitalization of the economy (Chichenev, 2019; Sousa et al., 2019; Girdzijauskaite et al., 2019).

Foreign experience in the digital transformation of the economy shows various models of this process. In the literature, a certain classification of the directions of development of a digital economy is given: the production sector (Germany), the service sector (United Kingdom), with priority state support (China), and with priority in the development of private initiatives (USA) (Polozhikhina, 2019). However, the institutional aspects of ensuring efficient and safe digitalization of the economy are not sufficiently addressed in the literature, and for the educational system, the requirements are not formulated to the institutional environment that would ensure the preservation and reproduction of human capital in the context of digital transformation.

3. Methodology

This paper used general scientific research methods, such as analysis and synthesis, deduction and induction, the relationship of historical and logical processes, the laws of dialectics, the search for cause and effect relationships. As special methods for research at the micro level, the methods of sociological survey and statistical processing of information were used, and at the macro level, the authors applied the institutional approach for the analysis of digitalization in the national socio-economic system.

Let us describe in more detail the research methodology at the micro level. On the basis of the Elabuga Institute of the Kazan Federal University, a sociological study was conducted on the problems and results of using digital technologies. As a result of the study, the main difficulties in the field of digital competence and the sources of its improvement were identified. The study involved 2,105 students aged 18-23 years (45% boys and 55% girls),

2,103 parents of students and 225 university teachers (43% male and 57% female) living in the Republic of Tatarstan, Republic of Udmurtia, Republic of Bashkortostan, Ulyanovsk Region, Samara Region, Orenburg Region and in other territories of the Russian Federation. The purpose of this study was to identify the level, problems, and prospects of the formation of digital competencies in higher education organizations in Russia.

The questionnaire was conducted within one month after the training, using Google forms. To systematize and analyze the results of the survey, an automatically created Google spreadsheet was used. To conduct the survey and analyze its results, written permission was obtained from the respondents for the use of their personal data. There were no refusals to take part in the survey. The questionnaire included 10 questions related to understanding the essence of modern digital competencies (see Table 1).

Table 1. Questions for the analysis of the institutional environment for the formation of digital competencies at the micro level

Question	Answer options
Personal data (age, gender)	Age: Gender:
Organization in which you work/study	
1. Are you satisfied with the level of digital technology in your organization?	yes no
2. Do you use social networks in your professional activity?	yes no
3. Evaluate your digital proficiency	high medium low
4. Evaluate your experience in using digital technologies	1. Less than 5 years 2. 5 to 10 years 3. Over 10 years 4. Other
5. Do you enhance your digital competence?	1. From time to time 2. All the time 3. I do not pay attention, everything turns out by itself 4. Never 5. Other
6. In your opinion, do digital technologies improve the educational process?	1. Yes, they do 2. No, they do not 3. They rather do 4. They rather do not 5. They do only subject to deep preparatory work and use without prejudice to personal communication 6. Other
7. What do you mean by digital competencies?	1. The willingness and ability of a person to confidently, efficiently, critically and safely apply information and communication technologies in various spheres of life 2. The ability to work on the Internet, with various information products and mobile applications 3. Other
8. Evaluate the quality of digital knowledge gained at school/university	1. High quality 2. I learned more myself than I was taught at school/university 3. Low quality 4. I know more than school/university teachers 5. Other

9. What do you think is the main task of the school/university in the formation of your digital competencies?	1. To teach how to work on the Internet and use various information products and systems 2. To teach to maintain a high level of information security 3. To transfer the main educational process to distance technologies 4. To provide ongoing training in digital technologies 5. Other
10. Do you think the role of digital technologies in human life will be expanded or reduced?	1. It will strengthen only in professional activities 2. It will strengthen everywhere: at work, at home, on vacation 3. It will decrease 4. Other

Based on the analysis of questionnaires, an assessment was made of the effectiveness of the existing institutional environment in the formation of digital competencies in the education system in Russia.

The authors will describe in more detail the methodology for studying the institutional environment for the development of digitalization processes at the macro level. The method of SWOT analysis and a multi-level approach to the study of digitalization processes at the personal, organizational and institutional levels were used. SWOT analysis is a strategic planning method consisting in identifying factors of the internal and external environment of educational organizations and dividing them into four categories: Strengths, Weaknesses, Opportunities, Threats. Strengths and weaknesses are factors in the internal environment of the Russian education system; opportunities and threats are factors in the external environment of the Russian education system. The objective of SWOT analysis is to provide a structured description of the existing institutional environment for the development of digitalization processes in the Russian education system and in the national economy as a whole. At the same time, the study decided to formulate recommendations on improving the institutional environment for using digital technologies at the individual person level – the personal level, at the enterprise and university level – the organizational level, at the level of existing norms and laws – the routine level. This approach was justified by the fact that the processes of exchange of information and knowledge at different levels require different institutional conditions. The results of such a study at the macro level are presented in this paper.

4. Results

Research of the institutional environment of digital transformation processes at the micro level
As already noted, human resources are a prerequisite for the successful digitalization of the economy. A modern employee must have a set of digital competencies. Here are briefly described results of the studies (Figures 1, 2, 3).
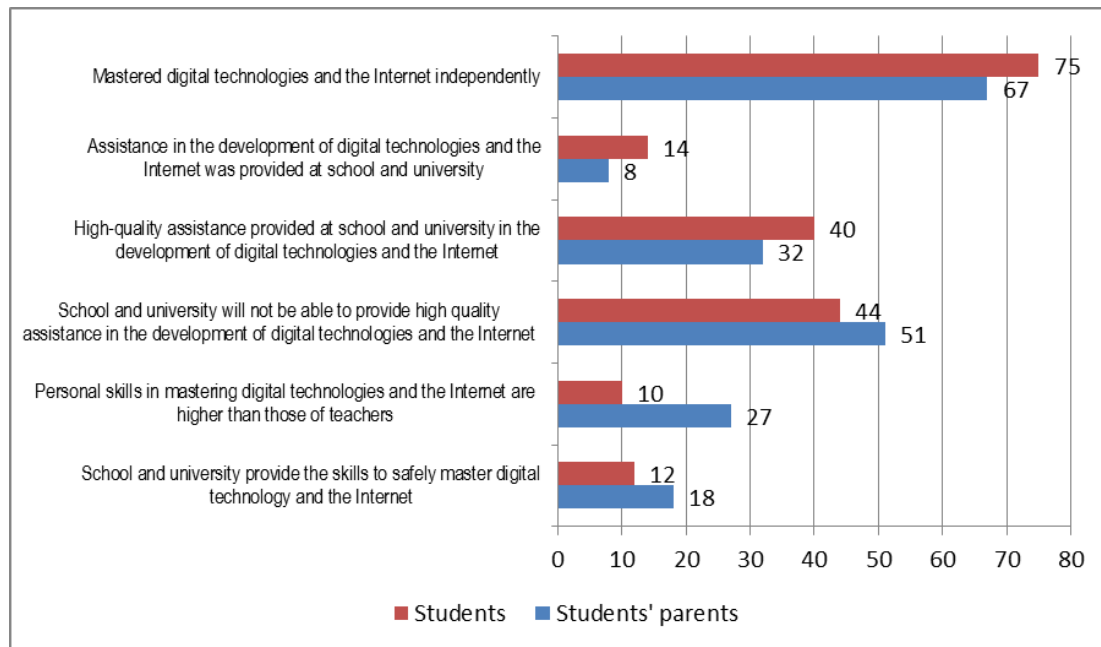
Figure 1. Answers to the question "How did you gain knowledge and skills in using digital technologies and the Internet?"
Source: Prepared by the researchers

Now let us describe the indicators presented in Figure 1:
1. Sixty-seven percent of adults and 75% of students studied using the Internet on their own.
2. Only 14% of students indicated that they were taught to use the Internet at school.
3. Students rated the help of school teachers weakly: only 40% of students are fully or partially satisfied with the knowledge about the use of the Internet received at school.
4. At the same time, 44% of students believe that the school does not give them any useful knowledge in this area or is generally unable to teach them.
5. One out of ten students claims to know more than teachers about the Internet.
6. Only every tenth student received information on the safe use of the Internet at school.

Teenagers and their parents differently assess the role of school and university in the formation of digital competencies. Most students have more positive opinions about the school and the university on the acquired knowledge and skills. Students' parents have fewer positive opinions in this regard. This is explained by the fact that the format of the school and university has changed significantly recently due to changes in the institutional environment focused on digital transformation (Digital Educational Environment: New Teacher Competencies, 2019). On the other hand, students have less positive expectations from school and university than their parents. This is because students see the situation more deeply, as they are more familiar with the risks and threats of modern digital technologies. Now, the authors are presenting the results of the respondents' assessment of the sources of digital competence.
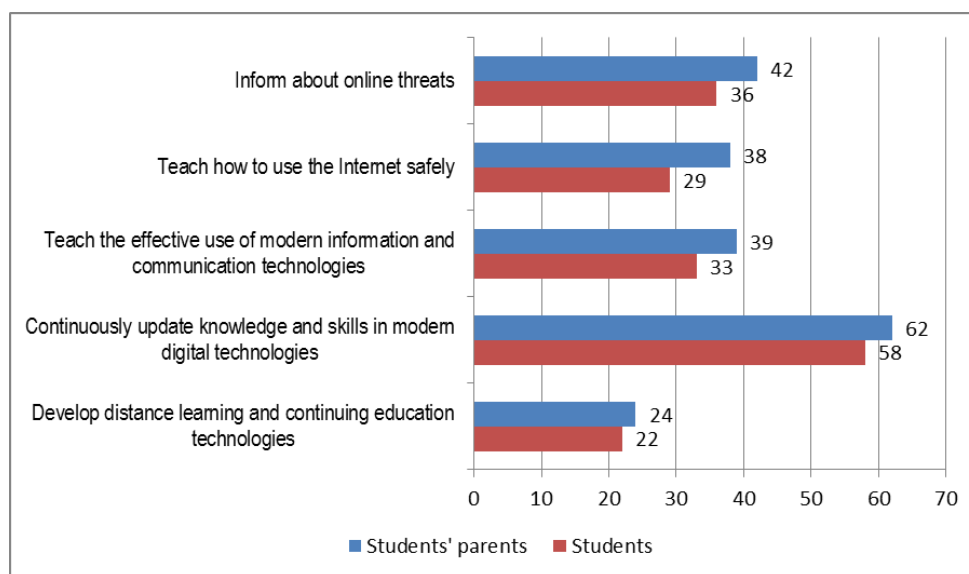
Figure 2. Answers to the question "In your opinion, what knowledge and skills should be taught at school and university?"
Source: Prepared by the researchers

The indicators presented in Figure 2 show the following:

1. Inform about online threats (42% of parents and 36% of students);
2. Teach how to use the Internet safely (38% of parents and 29% of students);
3. Teach the effective use of modern information and communication technologies (39% of parents and 33% of students);
4. Continuously update knowledge and skills in modern digital technologies (62% of parents and 58% of students);
5. Develop distance learning and continuing education technologies (24% of parents and 22% of students).

It can be noted that neither among parents nor, to a greater extent, among students, the university still enjoys any authority in the field of mastering the capabilities of digital technologies. The difference in the results of the answers of parents and students is caused by the changed institutional conditions of the past and modern education and economy systems (Soldatova et al., 2013). The backlog of university education from economic trends is becoming more noticeable in the face of accelerating rates of scientific and technological progress.

Considering the results of a study of the accumulated digital competencies of university teachers, in this survey, the majority of respondents are teachers aged 36 to 55 (63%), women – 88%. More than half of the teachers (52%) taught humanitarian and public subjects, the second smaller part (48%) taught STEM subjects. Work experience was over 20 years for 56% of teachers, from 11 to 20 years for 23% of teachers, less than 10 years – for 21%.
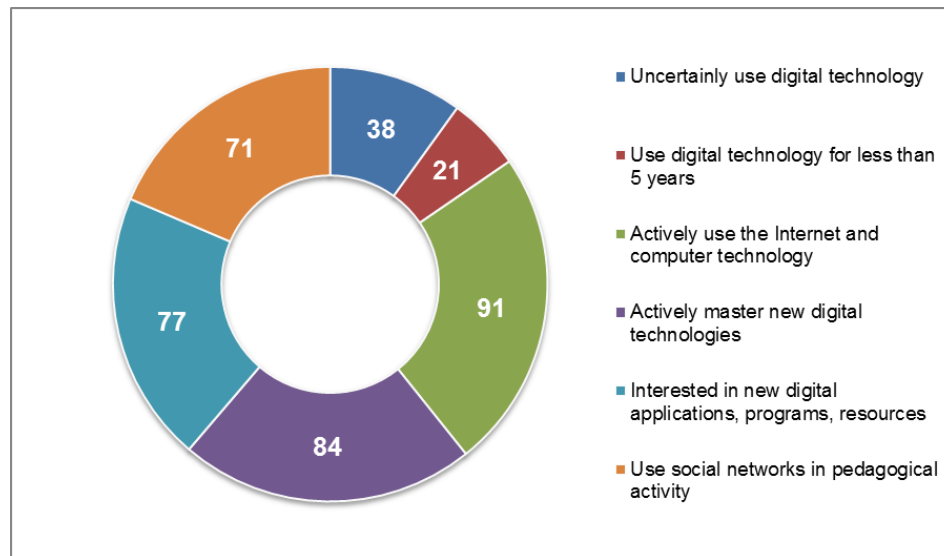
Figure 3. Evaluate the quality of accumulated digital competencies
Source: Prepared by the researchers

The indicators presented in Figure 3 show the following:
1. According to estimates of 38% of teachers, from 40 to 100% of their colleagues use digital technologies uncertainly or do not use them at all.
2. One fifth (21%) of teachers have been using digital technology for less than 5 years.
3. The majority of teachers (91%) actively use the Internet and do not experience difficulties with working on a computer and other digital devices (84%). At the same time, teachers are interested in new applications, software, and resources (77%) and actively use social networks (71%).

Therefore, teachers believe that most of them use digital resources very efficiently, however, students and their parents talk about the lack of digital knowledge and skills acquired at the university. Accordingly, a discrepancy in the assessments of the accumulated and acquired level of digital competencies at the personal level between teachers, students, and their parents is revealed. At the organizational level, this mismatch of assessments occurs between universities and the real sector of the economy (Aimaletdinov et al., 2019). For this reason, it is necessary to form educational programs for the formation of digital competence in students, in demand under modern conditions of economic and social development. A high level of general motivation to increase digital competence both for parents and students (more than 60%) with a low level of digital competence (one-third of the maximum possible) indicates the demand for the development of educational programs in this area.

Research of the institutional environment of digital transformation processes at the macro level
Modern conditions for the development of the economy dictate the need for cooperation between industrial companies and universities. Modern corporations conduct research with a fifty-year planning horizon. Leadership in digital technology is currently provided by fundamental science. Research covers the entire life cycle of a digital product. Attention is paid to all stages of the innovation chain to ensure self-sufficiency. The main threats to digitalization for the corporate sector are to lag behind competitors. Accelerating the pace of scientific and technological development leads to the need to work ahead of competitors. Technological depreciation comes faster than physical depreciation. The contribution of intellectual labor in such conditions is constantly increasing. The research departments of modern corporations, for example, Huawei, are already approaching half of the headcount. Currently, with a total number of 180 thousand people in 170 countries, Huawei has 14 laboratories with 80 thousand researchers, 8 thousand of which are in the Russian Federation (Guo, 2019). From the point of view of the protectionist approach to education, the modern policy of private market companies, especially

transnational ones, has a devastating effect. In other words, modern multinational companies operate as global "vacuum cleaners" of unique human capital in their own interests. Digital technology allows one to do this without leaving a place of residence. Thus, a commercially attractive corporate intellectual resource is created. There is a conflict of interests with the sources of the formation of human capital, primarily with the education system of the national economy. In the priorities of national policy, mechanisms must be created to ensure reverse financial flows from transnational corporations to the education system, where the demanded human capital is mainly formed.

Modern leaders in the production and use of digital technologies, for example, Microsoft, also participate in the formation of new digital technologies, adapting them to the corporate university network (Graham et al., 2019; Jarrah, 2019). Currently, students have the opportunity to choose: study in the university building or watch a video broadcast of lectures on the Internet. The technology of social computer networks can be extended to the educational process. The moderator of the topic is the teacher, he/she coordinates the discussion, gives tasks, students complete them, communicate with each other and the teacher, complement each other's answers, and critically look at the educational process. Thus, a common intellectual resource is created. In addition, for solving comprehensive problems, modeling and assessing a problem situation, teachers and students have the opportunity to use new digital technologies – artificial intelligence, big data analysis, blockchain, and the Internet of things.

The study at the macro level made it possible to compile a matrix of SWOT analysis and outline the appropriate directions for improving the institutional environment for the development of digitalization of the national socio-economic system (Table 2).

Table 2. Results of a SWOT analysis of the digital transformation of education and the economy

Strengths	Weaknesses
1. The high level of academic, fundamental, theoretical training of applicants, students, and graduate students due to the legacy of the Soviet educational system 2. The availability of natural resources, territory, infrastructure, power capacities, budgetary resources to fulfill the indicators to increase the digital literacy of the population 3. A sufficiently high level of teaching staff (the Kazan Federal University ranks 94th in the TOP 100 universities of the world by "Education" in the Times Higher Education rating) 4. High level of informatization and computerization of the Russian economy (28th place in the world)	1. Lack of a systematic policy in teaching the supersubject competencies in demand in a digital economy (the ability to learn, master new knowledge and technologies, incentive and entrepreneurial spirit) 2. Lack of effective and long-term mechanisms for reverse financial flows from transnational corporations to the national educational system 3. Inadequate interaction between universities and enterprises, including the level of use of digital technologies and the formation of digital competencies 4. Commission costs for the implementation of digitalization (low level of domestic software and hardware of digital infrastructure) 5. Lack of effective regulatory tools in international and national copyright laws
Opportunities	Threats
1. A transition to a new scientific and technological lifestyle based on digital technology 2. Formation of a protectionist model of digital education 3. Capturing new markets (willing to work and study remotely) 4. Stimulating the development of new jobs 5. Stimulating export growth of knowledge 6. Changing the structure of the economy and education, increasing the productivity of these sectors	1. Loss of leadership in digital technology due to a significant dependence on foreign developments of the previous scientific and technical wave 2. The flow of the highest quality human resources abroad (remote work for multinational companies without a change of residence or employment in local branches of these companies) 3. Loss of control over digital infrastructure 4. Loss of control over knowledge distribution channels 5. The emergence of new competitors 6. Lack of effective tools to control the owners of digital content and Internet sites

To assess the degree of digitalization of the economy for all countries, the Digital Evolution Index is calculated, according to which Russia in 2017 ranked 39th out of the 60 countries studied, while in 2013 Russia was 40th. This rating includes indicators in key areas, such as the supply and demand for digital technology, the institutional environment, and the innovation climate. As a result of the study by the parameters of digital transformation, the countries were divided into four groups: the leaders – distinguished (Singapore, Great Britain, New Zealand, the United Arab Emirates, Estonia, Hong Kong, Japan, Israel), the slowing growth rates – silent (South Korea, Australia, countries of Western Europe and Scandinavia), promising – breaking through (China, Kenya, Russia, India, Malaysia, Philippines, Indonesia, Brazil, Colombia, Chile, Mexico), problematic – out of concern (South Africa, Peru, Egypt, Pakistan, Greece) (The top 10 digital-competitive countries, 2017). The study identified a modern factor of success in digitalizing a country's economy, the level of confidence, which is gaining importance. The level of confidence, in turn, depends on such indicators as consumer behavior and attitude toward new technologies, the experience of their use and innovative climate. Thus, all the traditional problems of the Russian economy, which in recent years have hindered its innovative breakthrough, also serve as an obstacle to the digital transformation of society. Until the necessary level of confidence is accumulated in the business environment, in the civil society, in the education system, in the relation of people to the government and the state policy of supporting innovation – a radical leap to a new digital economy will not happen. The level of confidence also depends on the moral standards of behavior in society, the degree of criminalization, and the risks of non-fulfillment of market contracts. In other words, innovators will not develop new digital technologies and services unless they trust the institution for the protection of intellectual property rights. Entrepreneurs will not actively sell developed digital technologies and services if they do not trust the institution of fair competitive relations. Consumers will not begin to use digital technologies and services if they do not trust the institution of contract market relations. Accordingly, one can formulate the components of the institutional mechanism for the development of the digitalization of the national socio-economic system (Figure 4).
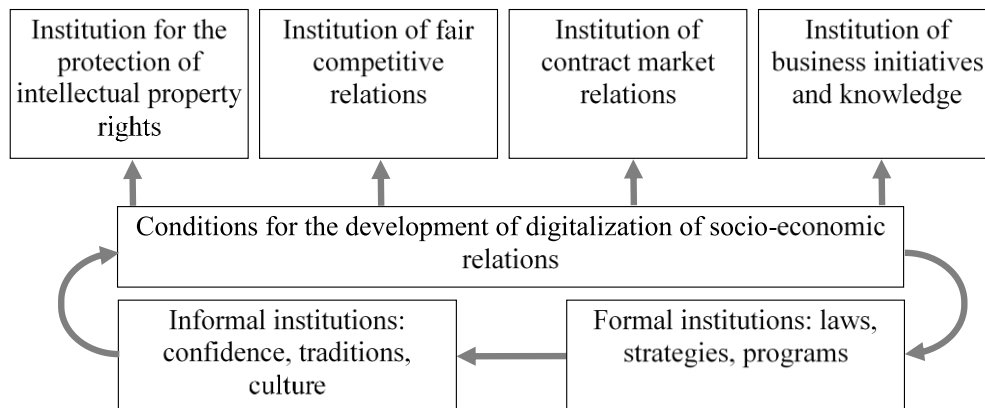
Figure 4. The institutional mechanism for the development of digitalization of the national socio-economic system
Source: Prepared by the researchers

To accelerate the digital transformation of the education system, institutions to stimulate the use of digital technologies are required. Stimulation should be indirect in nature and ensured by integrating digital media into the learning process. Adequate digital infrastructure is needed. This will motivate the active use of digital technology. Another important step is to ensure digital literacy, not only in the professional field, but also in interdisciplinary, and even in everyday activities. It is necessary to develop an institution of consistent, lifelong, from the early years, training in digital literacy and the formation of digital competencies. Employers already require such competencies from future university graduates. It is also necessary to improve the institution of intellectual property and copyright in the use of digital technologies. Knowledge and information, which are the main objects of use in digital technologies, have the property of being inseparable from their source and, accordingly, need more complex protection of commercial rights to use them. On the other hand, knowledge and

information also have the property of "club goods", the value of which only increases with increasing use. Such contradictions impose requirements for the improvement of copyright law.

5. Discussion

Researchers of the digitalization phenomenon note significant changes in all areas of socio-economic activity, including in higher education (Vasetskaya, 2018; Ziyadin et al., 2018; Tikhonov et al., 2019). Digital transformation has the following impact on universities:
1. The introduction of basic information services – the creation of a single digital space. This direction allows all participants in the educational and research process to interact in digital format. Students have the opportunity to build their individual educational trajectory, do any distance online courses, regardless of the place and time of their stay (Korableva et al., 2019a, b).
2. Creation and implementation of the University 4.0 service, including research project management, procurement management, scientometrics digitalization, interaction with teachers and students. This direction allows building on a new basis the processes of interaction of all participants in research activities. Digitalization helps organize knowledge-sharing communications more efficiently. The interaction takes place in real time. Teachers, employees of scientific departments and students can jointly solve the tasks of innovation.
3. The orientation of the university to the implementation of "smart manufacturing". In this direction, the university becomes a member of the new digital space related to the introduction of Internet technologies in economic activity, production and services, household activities and everyday human life. Such technologies as cognitive procedures, on-line things management, big data analysis, and cloud storage have become widespread.

It seems relevant to study a digital transformation of the university as a process of creating new business conditions, the interaction of all students and university staff on a new, digital platform integrated into the digital economy platform of the country and the world. Digital technology allows creating a digital profile of a student, taking into account his/her individual, physical, psychological, national and social characteristics. This allows choosing the most appropriate digital profile tools and training methods (online and offline, problematic, practice-oriented), as well as the mode and forms of training (full-time and distance, mixed, individual and group). Thus, the student's digital profile is another element in shaping the digital system of the new university (Bockshecker et al., 2018: Villalobos, 2018).

The modern digital environment of the university is a combination of information systems, technologies, and services that allow conducting educational, research, methodological, administrative and business activities in digital format, working remotely, in real time via the Internet from anywhere in the world to enter information into the digital environment of the university and use the data presented in it. The digital environment of a modern university has such properties as security, openness, accessibility, flexibility, reliability, responsiveness, and informational content. The digital system of a modern university consists of an Internet portal, personal accounts of students, personal accounts of teachers and staff, electronic educational resources, libraries and reference books, modules for the automation of educational, administrative and financial activities. The digital capabilities of a modern university make it possible to automate the traditional workflow (Rosa et al., 2019), the formation of contracts, orders, resolutions, reports, service requests and other management decisions. The introduction of data analysis units into the digital environment of a modern university will provide opportunities for assessing the individual characteristics of students and teachers, the formation of individual educational trajectories and joint scientific research. The integration of the digital environments of universities in the future may lead to the emergence of a universal, mixed, human-machine intellectual resource, which allows bringing the development of innovative activity to a new level.

From the point of view of philosophical and methodological analysis, University 4.0 is an element of a cognitive society, where the processes associated with the production, processing, exchange and distribution of information

become core ones. The producer of knowledge is becoming the collective and hybrid (human-machine) intelligence. Digital technologies allow the use of human and machine intelligence to solve complex problems not only in production but also in the cultural and social spheres. The society acquires the nature of network interaction, and an individual gets the opportunity to use the collective mind. An individual can influence the activities of other people in real time using digital technology and the Internet. In these conditions, a special culture of will and trust is needed, which ensures the concentration of cognitive capabilities, fixation of meanings and intentions, critical filtering of information and communications. Universities are turning into a platform of collective knowledge, while any facets with the external environment are erased. University employees and students actively participate in joint search activities to form common meanings, while at the same time maintaining their individual attitudes and building effective communicative connections. The university's functions are shifting towards coordinating promising research, launching startups, deploying and improving a communications network, and promoting digital technologies (Efimov & Lapteva, 2017).

According to scholars, the modern digital era is characterized by the emergence of such innovations, the creation of which required the cooperation of many people, various professions and motivations. The conditions created at a company or a university for the exchange of knowledge, and in the long run for that at the level of inter-corporate (inter-university) cooperation, are a key factor in the success of any innovation process, including the creation and use of digital technologies (Yagolkovsky, 2011). The free exchange of knowledge creates a comfortable socio-psychological climate for employees (Yankovskaya et al., 2019). The factors influencing free information exchange are: confidence, creative motivation, corporate culture, cognitive activity (Brachos et al., 2007). Accordingly, at the personal level and in the first stages of using digital technologies, it is necessary to take such measures that would facilitate the free exchange of knowledge and information. On the other hand, corporations and universities are organizations that operate in a market economy and compete for various economic resources. Corporations are fighting for consumers of their products, universities are seeking for applicants. Digital technology exacerbates this rivalry, making it more dynamic and versatile. The largest sales proceeds go to those companies that have launched the making of competitive products at the most attractive prices and quality. Budget resources are provided to universities that also have more attractive results of research, employment of graduates, contractual business relations with the real sector of the economy. Competition at the organizational level is an incentive for the development of their corporate information systems, digital educational technologies, digital environment and communications. Competition is recognized as an incentive for all innovations (Schumpeter, 1982). Accordingly, the government needs to support the competitive process at the level of corporations and universities, at the organizational level. For this, rating mechanisms and competitions are widely used in Russia and the world, as a result of which financing is provided. The conditions for the development of a competitive environment are: private property, freedom of entrepreneurial activity, freedom of consumer choice, priorities of personal interest, and a limited role of the government (Khasanova, 2016). Thus, at the organizational level and at the stages of using digital technologies, where intellectual property rights are clearly defined, the development of appropriate institutions is necessary: competitive conditions, state support on competitive terms, public centers for collective use.

The protectionist model of Russian education proposed by the authors in the context of the digitalization of the economy should include at the personal level of using digital technologies the institutions of cooperation and knowledge sharing, and at the organizational level and stages of the market interaction of participants in the digital environment, the institutions of competition and fair competition for limited economic resources, including human capital.

In this regard, the state policy to attract and keep the best personnel in the education system should take into account this thesis. The point is not to let personnel go abroad or work for transnational companies, but to create special conditions to stimulate the creative development of scientists, researchers, innovators and to maintain high competitiveness of Russian universities and the real sector of the economy.

6. Findings and Recommendations

The study of the institutional environment at the micro level using the example of the university made it possible to formulate the following conclusions and recommendations. Educational programs should include the following elements:
- motivational, aimed at setting specific goals, demonstrating the capabilities and importance of digital learning;
- modeling, the main task is to visualize the model of "a citizen of the digital world".

Among other things, the structure of programs should take into account the peculiarities of the activities of parents and students on the Internet, since the use of digital devices increases significantly on weekends, and students themselves are focused on quickly receiving the necessary information. Therefore, educational programs are required that are not tied to the school working schedule, accessible from anywhere and at any time, and aimed at stimulating the exchange of experience and cooperation.

An effective educational program should pay attention to the development of responsibility and the possibility of ensuring the safety of students and parents in the digital space, as well as the development of specific skills on the Internet, namely: working with information; communication; technological sphere; consumption. In addition, both adults and students need to form an active and independent position on the Internet. When working with parents, the most important task is to bridge the digital gap and teach them the correct assessment of their capabilities to help students work on the Internet.

It should be noted that Russian users are more likely to be involved in a digital competence-building program offering them communication, collaborative search, and developmental games than in a program similar to an electronic textbook. Thus, the importance of the conscious and responsible use of digital technologies in training and everyday activities on the basis of confidence between users of digital products is emphasized. The results of the above studies indicate the presence of many difficulties in the process of forming digital competencies in students in Russia. According to the foreign classification, the digital skills that underlie digital competencies are divided into user and specialized. The authors believe that digital competence must include, in addition to special knowledge, skills and abilities, the ability to digital cooperation, to ensure its security and solve digital problems. A major role in this process is played by: the personality of the teacher, his/her professionalism, desire to develop; educational opportunities; parental activity and mobility; the level of motivation for learning among students themselves.

The study of the institutional environment at the macro level using the example of the national education system and the economy made it possible to formulate the following conclusions and recommendations. The modern education system is at the stage of active digital transformation. Each university is developing its own digital environment. A significant part of the university's traditional activities is carried out in digital format and this part is rapidly increasing. Universities are drifting smoothly toward the University 4.0 model, which is characterized by the total digitalization of all types of activities: educational, methodological, scientific, financial, economic, and entrepreneurial.

The real sector of the economy is in a digital transformation to an even higher degree. Moreover, the gap in digital development and digital competence achieved is gradually widening between universities and the real economy. This is largely due to the most effective institutional incentives created in the market sector: competition, entrepreneurship, property rights. To make a profit, enterprises are forced to become digital. University education, mainly funded by the state, is also becoming digital, under the indirect influence of market incentives. The employment of graduates, as the main criterion of the demand for a university, largely depends on the digital competencies of future specialists obtained at the university.

To improve the digitalization processes of universities and enterprises in the interests of the national socio-economic system, the development of appropriate institutions is necessary. The key institution is confidence, as the main condition for the effective and safe development of digitalization processes. This study has shown that with a low level of confidence between users of digital technologies, the negative effects of digitalization increase and the positive ones decrease. The time and resource savings achieved through digital technology tend to zero if users begin to increase the cost of security and duplication of electronic information on tangible media.

The state policy for the development of digitalization should take into account the levels of socio-economic activity of users. At the personal level, measures to support cooperation, confidence and information exchange are paramount. At the organizational level, priority is given to measures to support competition, intellectual property rights, contractual relations, entrepreneurial (digital) initiatives and knowledge. The state, using formal institutions (laws, strategies, programs) should ensure the formation of relevant informal institutions (confidence, traditions, culture). This process will be effective if adequate measures for the development of digital relations are formulated and implemented for various levels of the socio-economic system.

7. Conclusion

Thus, the study at the micro level of the institutional environment for the digitalization of Russian universities revealed quite important trends. First of all, this is a mismatch of assessments in obtaining digital competencies between universities and the real sector of the economy. Accordingly, this made it possible to clarify the research program for analyzing the institutional environment of digitalization of Russian education at the macro level, in the interests of the national economy. The formulated recommendations on improving the development of digitalization of the socio-economic system will ensure the development and implementation of an effective public policy for all levels of education.

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THE INTRODUCTION OF PECTIN-CONTAINING FOODS FOR THE COMPETITIVENESS OF ENTERPRISES[*]

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Abstract. The article discusses scientific findings of development new innovative products of high nutrition value. Specifically, the article presents the results of economic efficiency in the production of bread and confiture enriched with pumpkin pectin. The cost of 1 ton of bread enriched with pumpkin pectin in an amount of 0.5% exceeded 14.0%, compared with a control batch without pectin. The cost of 1 kg of confiture with pumpkin pectin (1.0%) is lower by 9% of the cost of the control sample due to the reduction in cooking time, which saves energy consumption by 25% and the amount of sugar by 7.5%. The obtained results can be used for introduction of innovative pectin-containing products and enhancing competitiveness of food producing enterprises.

Keywords: economic and social efficiency; innovative food products; pectin-containing bread; confiture

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1. Introduction

The competitiveness of various business entities is an urgent topic of economic research. To increase the competitiveness of food enterprises, important conditions are: technological –innovation in the field of industrial technology, assortment - the creation of new food products, marketing, as well as the creation of innovative infrastructure. The features of technological innovations at the food industry include: the development and implementation of innovative technologies for processing and storage of agricultural products, characterized by the most useful output of a new range of finished products.

The level of development of the food industry determines the viability of the population and is an important part of the food safety of the state. This industry, consisting of more than 20 industries, produces almost all food products necessary for the population, including special products (Almaty's contribution to food production in the country, 2019).

In modern conditions of development of scientific and technological progress, more and more attention is paid to improving the structure and quality of nutrition as one of the main factors in a healthy lifestyle. Many diseases of civilization, such as obesity, atherosclerosis are directly related to malnutrition, which is expressed in increased consumption of foods with high energy value and inadequate consumption of foods containing biologically active nutrients: vitamins, dietary fiber, pectin and others. The solution to this problem is mostly connected with the introduction of new food formulations with natural additives. With using additives of plant origin that increase the nutritional value of food products, it is also necessary to take into account the influence that they have on their quality, since the modern consumer, in a competitive environment in the food manufacturing market, pays considerable attention to their quality.

One of the important functional additives is dietary fiber, which has certain physiological properties in the prevention and treatment of a number of diseases. Pectins of various origin are also considered dietary fiber. Pectins have sorption properties based on the interaction of their molecules with heavy and radioactive metal ions due to the presence of free carboxyl groups. Therefore, the inclusion of pectin in the diet of people in an environment contaminated with radionuclides and in contact with heavy metals is relevant (Gavrilenkov, 2006; Kostyuk, 2005).

In recent years, in our country and abroad, scientists have been actively searching for substances that can truly protect the health of people working in hazardous industries, residents of large cities and large industrial centers, suffering from increased environmental pollution. Naturally preferred are detoxifiers of natural origin (Kostyuk, 2005; AlmovaI et al., 2014).

Today, heavy metal intoxications are the leading among the harmful factors of production, this is especially evident in enterprises of the mining industry for the extraction of non-ferrous metals, metallurgical and chemical industries (lead-zinc, copper smelters, enterprises for the production of polyvalent metals). In addition, heavy metal pollution of atmospheric air, soil, water in the vicinity of such industries, near major highways and in large metropolitan areas of the country poses a risk of their entry into the adult population and children living in these regions (Azimova et al., 2016; Ecology and health of the nation. Collection, 2016; Alibaeva et al., 2015; Moumen et al., 2019).

One of the priorities of the state policy of Kazakhstan in the field of healthy nutrition of the population is the creation of innovative food products using physiologically functional ingredients that can prevent the effects of negative environmental factors on the human body. The solution to this problem is possible by expanding the range of products containing pectins, which occupy a leading position among effective biological sorbents and possess immunomodulating, antioxidant, antibacterial and other effects.

2. Relevance

The use of pectins in the food industry has reached enormous proportions. Pectins are used as an additive to medicinal varieties of bakery and pasta; in bakery - for baking non-stale varieties of bread (Noreen et al., 2017; Grassino et al., 2018; Azimova et al., 2017; Lara-Espinoza et al., 2018; Martins et al., 2017; Babich et al., 2017). Improving the quality of bread with the addition of low-etherified pectin (NE) is associated with the presence in its molecule of a greater number of free carboxylic groups than that of highly etherified (CE) pectin. These groups are reactive, and, actively interacting with the components of the dough, form a large number of compounds, affecting the properties and quality of bread.

A change in the storage process of the structural and mechanical properties of bread crumb with the addition of pectin in an amount of 0.05-1.0% by weight of flour indicates that bread with the addition of pectin is stale 1.04-1.9 times slower than bread without pectin, which is extremely important for increasing the period of implementation of bakery products in trade organizations (Janabi et al., 2017; Murzahmetova et al., 2015).

Preserving vegetables and fruits by freezing, drying, boiling using sugar, antiseptics, pasteurization, sterilization has a number of disadvantages, the main of which is a decrease in the nutritional value of the product, loss of the original taste and aroma. Therefore, the preservation of the native properties of berries and fruits and the development of confiture with the addition of pectin on their basis is an urgent task. Due to their complex-forming, gel-forming, emulsifying properties, pectins are used in the production of confectionery, canned goods, medical preparations, in bakery, and therapeutic and preventive nutrition (Donchenko, 2000; Belousova, Donchenko, 2019).

It was also found that the introduction of pectins in the dough affects the biological, colloidal and microbiological processes of dough preparation. Due to its special physico-chemical properties, pectin affects the shelf life of the freshness of bread, gingerbread, cookies, biscuits, muffins. Studies in this area show that this process is almost 2 times slower.

Thus, the use of pectins makes it possible to increase the shelf life of bread, as a result of which the return of products from trade organizations back to production is reduced, which is economically beneficial for the bakery industry. The economic efficiency of the production of confiture using pectin as a thickener will allow energy savings by reducing the duration of boiling and the amount of sugar added (Azimova et al., 2018).

It is worth noting that in the context of rapidly growing competition, with the constant and dynamic development of the business, it is necessary to radically revise modern approaches to the essence and specifics of innovation (Melnikov et al, 2019). The US Department of Commerce has estimated the size of the domestic market for environmentally friendly products. Even during the economic downturn in 2008-2011, in the United States every three out of four companies reported an increase in sales of environmentally friendly products relative to ordinary categories of products, 49% of which estimated growth by more than 10%. Obviously, what is good for buyers can be beneficial for business as well. In the USA, according to a survey, 79% of companies confidently agreed that the provision of environmentally friendly products and services gives their business a competitive advantage. This study reveals the economic and social importance of introducing innovative food products in the food industry of Kazakhstan using the example of individual enterprises - one of the large bakery «Almatynan» limited liability partnership (LLP) and fruit and vegetable factory «SDiK» (LLP) with using pumpkin pectin to create pectin-containing bread and confiture.

The purpose of this study is to assess the economic and social effectiveness of food enterprises based on the creation and implementation of innovative food products using pumpkin pectin.

Results and its discussion
In the production conditions of the bakery "Bakery factory Almatynan"production tests of bread made from wheat flour of the first grade with pumpkin pectin were conducted. Based on the numerous results of experimental data, we have developed the optimal bread formulation using pumpkin pectin 0.5%. To use pumpkin pectin in the production of bread, it was considered correct to calculate the economic efficiency of introducing such bread. The economic effect of production is expressed in the amount of profit received from the sale of the developed product. When calculating the costing, all cost items were calculated on the base case (without the use of pumpkin pectin) and on the developed variety of bread with pumpkin pectin.

Calculation of the main raw materials - flour grade 1
The amount of flour was determined for the production of 1 ton of bread: amount of flour = (production / yield) x 100 = (1000kg / 138%) x 100% = 724.6kg. The output rate means the minimum allowable yield of 100 kg of flour. The yield of bread is set on flour with a certain "base" humidity. The base moisture content of flour is 14.5% [22].
When using 0.5% pumpkin pectin, the yield of bread increased by 8.7% in comparison with the control (table 1), which corresponds to a decrease in the consumption of wheat flour by 8.7% to produce 1 ton of bread.

Table 1. The effect of pectin content on the volume of bread

Indicator	Control	The content of introduced pectin,%				
		0,25	0,5	0,75	1,0	1,25
The volume of bread, cm^3	2190	2280	2380	2100	2070	2050

Thus, the amount of necessary flour for an experimental batch of bread weighing 1 ton is not counted on the yield of bread 138%, but with an increase of 8.7%, i.e. by 146.7%: (production / output) x 100 = (1000kg / 146.7) x 100% = 681.7kg.
We determine the cost of the 1st grade flour used in control with an average market value of 110 tenge 1 kg (as of September 2019) for the production of 1 ton of bread:
The cost of flour for a control batch = price of flour x amount of flour = 110 tenge x 724.6 kg = 79706 tenge.
The cost of flour for an experimental batch = price of flour x amount of flour = 110 x 681.7 kg = 74987.0 tenge.

Calculation of additional raw materials
The consumption of additional raw materials was calculated according to the norms of flour.
In the control batch, the additional raw materials are pressed salt and yeast, and in the experimental batch another 0.5% of the mass of flour is included in the additional raw materials.
The required amount of salt in the control batch = (amount of flour x normal salt) / 100 = (724.6 x 1.5%) / 100 = 10.869 kg.
The average cost of table salt in Almaty is 35tenge / kg. The total cost of salt for the production of 1 ton of bread will be 380.4 in the control, for the experimental batch = (amount of flour x normal salt) / 100 = (681.7 x 1.5%) / 100 = 10.226 kg or 357.9, respectively (table 2).
The amount of pressed yeast required for the control and experimental batch of 2.5% or 18.115 kg and 17.04 kg, respectively. With the average wholesale cost of pressed yeast in Almaty being 450 tenge / kg, the cost of the required yeast for the production of the control lot will be 8152 tenge, and for the experimental one - 7668 tenge.
The amount of pumpkin pectin recommended with an optimal dosage of 0.5% by weight of flour in an experimental batch will be 681.7 x 0.005 = 3.41 kg, and the cost of pectin on September 1 is about 6000 tenge x 3.41 kg = 20460 tenge (table 2).

Fuel and electricity consumption:

The cost of the fuelexpenses (gas), electricity and water for kneading and baking the dough were taken according to the actual data of the bakery of "Almatynan" LLP, which for the production of 1 ton of bread are: natural gas about 1522 tenge, electricity about 1683 tenge, water consumption 136 tenge (from costing of the enterprise).

The amount of costs for electricity and fuel in table 2 are indicated with a decrease of 20% due to a reduction in the time for fermentation and baking bread with pumpkin pectin, respectively, while the cost of water increased by 3-4 tenge, because 180-200 kg more water was spent in the experimental batch than in the control one.

Table 2 presents the calculation of the cost of 1 ton of control and experimental lots (with pumpkin pectin 0.5% by weight of flour) of bread.

Table 2. Calculation of production costs of 1 ton of control and experimental batch of bread enriched with pumpkin pectin (according to the company)

Indicator	Quantityper 1 t, kg	Pricefor 1 kg, tenge	Amount per 1 ton of bread, tenge		Amount per loaf weighing 0.5 kg, tenge	
			control	experienced	control	experienced
The main raw materials, flour 1 s	724,6	110,0	79706	74987	39,9	37,5
Additionalrawmaterials:						
Salt	0,869	5,0	380,4	357,9	1,9	0,18
Pressedyeast	8,115	450,0	8152	7668	4,48	3.8
Pumpkinpectin	-	-	-	20460	-	10,23
Water	0,40	36	54,4	57,12	0,029	0,03
Pieceworkwage			3859	3859	2,1	1,9
Socialtax			444	444	0,2	0,2
Totaldirectcosts			92595,8	**107833,2**	48,6	**53,8**
Electricpower			1683	1346,4	0,9	0,67
Naturalgas			1522	1217,6	0,84	0,61
Totalconditionallyvariablecosts			**3205**	**2564** 2576	**1,8**	1,42 **1,28**
Salaryofdrivers			6832	6832	3,76	3,76
Fuelandlubricantsexpenses			1557	1557	0,9	0,9
Fixedcosts			**8389**	**8389**	**4,61**	**4,61**
Totalcost			104189,8	**118786,2**	**55,1**	**59,7**

The production costs of 1 ton of bread enriched with pumpkin pectin in an amount of 0.5% exceeded 14,596.4tenge or 14.0%, compared with the control batch without pectin. When calculating the consumption in the experimental batch per 1 roll of molded bread weighing 0.5 kg, the prime cost was higher by 8.3% and amounted to 59.7 tenge, in the control batch –55.1 tenge, respectively.

3. The calculation of production costs for the production of confiture enriched with pumpkin pectin

In the conditions of the fruit and vegetable cannery of "SDiK" LLP, production tests were carried out to develop confiture with pumpkin pectin. These products on organoleptic and physical-chemical indicators met the requirements of technical conditions, the results are issued by the corresponding act approved by "SDiK" LLP.

Referring to the fact that the pumpkin pectin isolated by us is classified as low-esterified (CE = 39-43%), has a low gelling ability, but a high complex-forming ability, we developed a technology for preparing confiture using crushed pieces of pumpkin and pumpkin pectin.

On the basis of production research, the economic efficiency of the production of confiture with pumpkin pectin was determined. Confiture prices were calculated according to the methodological materials "Cost of production and product shipment". The cost calculation is shown in table 3. The cost of the resulting confiture is 12% cheaper than the control sample due to savings: the power consumption in the control was 1.75 tenge and 1.31 tenge with pumpkin pectin due to a decrease in the cooking time; sugar 66.2 tenge in control and 57.1 tenge with pumpkin pectin. The boiling process was reduced by 25% for 15 - 20 minutes, instead of 25-30 minutes according to the classical scheme, because recommendations for boiling confiture are mainly based on berries, which have a dense, undisturbed skin, and sliced pieces of pumpkin do not have a skin, so the boiling process has been reduced.

Table 3. Calculation of the cost of 1 kg of "Pumpkin"confiture at "SDiK" LLP

Name of raw materials and costs	Rawmaterialconsumption				Price for 1 kg of raw materials, tenge	Cost of 1 kg of confiture, tenge	
	control		withpumpkinpectin			control	withpumpkinpectin 1,0 %
	%	gram	%	gram			
Sugar	55,0	550	**47,5**	475	185,0	101,8	87,9
Sliced pumpkin	42,5	425	**50**	500	70	29,8	35,0
Agar-agar	1,0	10	**-**	-	6500,0	65,0	-
Pumpkin pectin	-	-	**1,0**	10	6000	-	60,0
Lemon acid	1,0	10	**1,0**	10	560,0	5,6	5,6
Cinnamon	0,5	5	**0,5**	5	1500,0	7,5	7,5
Data on the costs of the fruit and vegetable factory "SDiK" LLP							
Boilingpower	-	-	-	-	-	2,0	1,5
Cold water, sewer	-	-	-	-	-	0,44	0,44
Hot water, heating, fuel and lubricants	-	-	-	-	-	13,0	13,0
Salary	-	-	-	-	-	20,0	20,0
Total cost:	-	-	-	-	-	245,1	230,9

Thus, the calculations showed that the use of pumpkin pectin in the production of bakery products is not cost-effective. However, in modern conditions, for business to realize their economic goals, it is not enough to focus only on making a profit. Long-term development involves a move in the direction of social responsibility, which not only creates a positive image of the company, but also expands the market.

It is necessary to take into account that the social effect also contributes to the increase of economic efficiency, since "improving the health of the population provides savings on the payment of temporary disability benefits, disability pensions." The social results can be improved public health, increased life expectancy due to the consumption of pectin-containing foods that reduce the negative impact of increased environmental pollution.When the social effect in money cannot be measured (since many social processes cannot be completely formalized), many social results can be measured with varying degrees of fidelity, which allows companies to evaluate the usefulness of their actions to the social environment (Sindyashkina, 2010). In general, an increase in the number of positive social effects contributes to intensive economic growth and the strengthening of the serious competitive advantages of the national economy.

Conclusions

1. The social efficiency of the production of developed pectin-containing products is determined by expanding the range of functional food products with improved consumer properties.

2. The enrichment of bread with pumpkin pectin (0.5%) increases the yield of bread by 8.7%, which is importan in solving the problem of ensuring food security of the country. However, the cost of producing 1 ton of bread enriched with pumpkin pectin in an amount of 0.5% , exceeded by 14.0%, compared with the control batch without pectin.

3. The use of pectins allows you to increase the shelf life of safe bread, resulting in reduced return of products from trade organizations back to production, which is economically beneficial for the baking industry.

4. The optimal dosage of pumpkin pectin in the composition of the jelly product - confiture in the amount of 1.0% was established. The cost of 1 kg of confiture with pumpkin pectin amounted to 230.9 tenge, which is 9% lower than the cost of the control sample due to the reduction in boiling time, which reduced the energy consumption by 25% and the amount of sugar by 7.5%.

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SUSTAINABLE DEVELOPMENT OF CROP PRODUCTION WITH ELEMENTS OF PRECISION AGRICULTURE IN NORTHERN KAZAKHSTAN[*]

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Abstract. The Agricultural Experimental Station «Zarechnoye» LLP (AES «Zarechnoye» LLP, Kostanay region, Kazakhstan) has always been the initiator of introduction and dissemination of advanced innovative technologies; in this regard, the agriculture has been identified as the basis for the introduction of digitalization elements, i.e. precision agriculture. The use of elements of the precision agriculture system by the AES «Zarechnoye» LLP, the use of modern technology equipped with an automatic driving system, a differential fertilizer application system and plant protection products ensured a guaranteed yield with high technological indicators in an extremely arid year. The obtained yield level of grain crops exceeded the average regional level by 79.7%. An economic model for the introduction of precision agriculture elements for the farm «Agrofirma Karkyn» LLP with medium technical equipment, indicating the costs of applying the developed technologies per 1 ha, was built. The analysis of economic return was carried out as a result of increased productivity with indicating the payback period. The production and economic indicators of the surveyed farm in the Kostanay region, obtained as a result of constructing financial and economic models taking into account the introduction of precision agriculture elements, are presented. Based on the constructed financial and economic models, the calculations showed that the introduction of precision agriculture elements will reduce production costs for wheat growing to 1.6 thousand tenge per 1 ha of cultivated area, or 4% of all production costs. The payback period for simulated improvements in the implementation of precision agriculture elements for the farm, while maintaining the current processing area, will be 4.4 years. The data obtained during the study can be used by agricultural producers to develop measures to increase productivity and reduce the cost of production, as well as by government agencies to improve measures of state support and regulation in the field of agriculture, aimed at digitalization, the introduction of precision agriculture elements and increasing the competitiveness of agricultural production.

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1. Introduction

One of the basic elements of sustainable technologies in agriculture is «precision agriculture» (or as it is sometimes called «precision agriculture»). Precision agriculture is the management of crop productivity, taking into account the in-field variability of the habitat of plants. Relatively speaking, this is the optimal control for each square meter of the field. The purpose of such a management is to maximize profits, subject to the optimization of agricultural production, preserving economic and natural resources. This opens up real opportunities for the production of quality products and environmental conservation. As international experience shows, this approach provides a much greater economic effect and, most importantly, allows farmers to increase the reproduction of soil fertility and the level of ecological purity of agricultural products.

Currently, rising prices for seeds, mineral fertilizers, plant protection products, machinery and other means of production in agriculture lead to the need to increase the efficiency of their use. The managers and agricultural specialists are faced with the task of increasing the level of management, as an important factor for achieving effective agriculture. The task is solved by means of a new direction called 'precision agriculture', which is currently gaining ground in many countries (Yakushev *et al.*, 2007; Allahyari *et al.*, 2016; Far *et al.*, 2018).

The development of modern information technology is the basis of the transition to precision agriculture. The considered elements of precision agriculture are most important for agricultural commodity producers. The development of the precision agriculture system is an urgent task, since it helps the industry to reach a qualitatively new level of production, which, with certain changes in state policy supporting agriculture, will allow farmers to compete with foreign enterprises (Sychev *et al*., 2011; Higgins *et al*., 2017).

The aim of this work is to establish the effectiveness of the introduction of precision agriculture elements in the farms of Northern Kazakhstan. The results of this study will form the basis of recommendations on creating a competitive crop production, reducing production costs for field crop producers, improving state support measures in crop production, and will provide access to data on the activities of agricultural producers for foreign and Kazakhstani research organizations, researchers and other concerned parties when conducting marketing and science researches.

2. Review of literature

The issues of reforming agricultural complex of the country, introducing precision agriculture technology that contribute to increasing soil fertility and obtaining stable crops at minimum cost are relevant for the Republic of Kazakhstan. The most important stage of the transition to precision agriculture is the assessment of the spatial heterogeneity of the fields and the calculation of the doses of differential fertilizer application. Obtaining operational information on the properties of arable soils is necessary for monitoring and timely assessment of their condition. In precision agriculture, such information is used for spatial differentiation of tillage technologies, fertilizer, ameliorant, plant protection products and growth regulators application, which contributes to the implementation of more effective crop management, reduce the environmental load, reduce the costs of

agricultural production and use the resource potential of agricultural land more productively (Nukeshev, 2015). The differential application of fertilizers consists in the fact that fertilizers are applied not with a single dose to the entire field being treated, but taking into account the needs of individual elementary sections of the field in fertilizer elements. In this case, the application dose and the ratio of fertilizer elements are selected so that the payback of fertilizers is maximized and environmental pollution is minimized (Nukeshev *et al*., 2014; Kurishbaev *et al*., 2012). A practical, economic and environmental rationale for the targeted application of fungicides is the differentiation of consumption rates in heterogeneous crops of grain, rape or other crops, depending on the size of the plant surface. Therein the following goal is pursued: to ensure uniform coverage of the plant surface with fungicides throughout the field, taking into account differences in growth and development at different points of the same field (Shpaar *et al*., 2009). For differential application of plant protection products, systems operating in real time are of practical importance. All technological steps are carried out at the same time, that is, data collection, processing and control of the sprayer are carried out in one working pass. To implement this technological approach, various sensor systems and electronically controlled sprayers with direct and multi-chamber power are offered on the market (Truflyak *et al*., 2016). One of the problems of setting and monitoring field experiments is the operational monitoring of plant vegetation during the experiment. The most promising method for remote monitoring of industrial field experience is the use of Earth remote sensing (ERS) (Tugarinov *et al*., 2018).

In recent years, satellite imagery has been widely used to solve problems associated with the prediction of the spatial distribution of environmental data. However, this source of information has a number of disadvantages, the main of which are the following: high cost of images; limiting the possibility of obtaining images in a short time and with the necessary frequency; the need for decryption of images; errors caused by weather conditions, cloudiness and haze (Truflyak *et al*., 2015; Mitrofanov *et al*., 2018). In this regard, a promising alternative to this method is the use of radio-controlled unmanned aerial vehicles (UAVs). The use of UAVs for monitoring and collecting remote sensing data can significantly reduce the cost of research and speed up the process of obtaining relevant data with high temporal and spatial resolution (Yakushev, 2002; Pestunov *et al*., 2018; Srivastava *et al*., 2019; Maes *et al*., 2019; Abuova *et al*., 2019).

In Europe, space technologies in agriculture are widely used from GPS which allow you to determine the location of equipment, organize parallel driving, control the operation of actuators, to the use of images in the near-infrared range to determine the heterogeneity of crop growth, their further alignment using systems and precision fertilizer units. Most agricultural enterprises in Germany are equipped with computers and modern technology. Soil maps and aerial photographs are available to any entrepreneur (Truflyak, 2016).

According to some scientists, when comparing the NDVI indicators obtained by means of remote and ground surveys during a three-year observation, it was found that the largest discrepancies between the results of ground and remote assessment for cereals were noted in the initial phases of development (25-33%), and the smallest – at the time of reaching the peak of NDVI in the earing phase. In addition to the necessary atmospheric correction procedure, the results of satellite imagery should be calibrated against ground reference objects: a pond, asphalt, ploughed soil without vegetation, crops with different backgrounds of fertilizers. For calibration, a sensor with an active radiation source in the red and infrared spectral regions should be used, for example, GreenSeeker (Hmiminaa *et al*., 2013; Spitkó *et al*., 2016).

When introducing precision agriculture technologies in agricultural production, the most popular direction was the use of parallel driving systems. There are three options for the implementation of parallel driving. In the first case, driving the tractor is adjusted by the driver using the steering wheel, which is guided by the indications of the LED or graphic track indicator located in the cab; in the second case, the driving direction of the tractor is supported by a thruster driven by an electric motor mounted on the steering column. In the third version, the adjustment of the driving direction of the tractor is carried out by an actuating mechanism connected to the

hydraulic system of steering gear (Goltyapin, 2013). Monitoring agricultural yield allows us to identify its heterogeneity for each crop within the field and present it in digital map format. They document what yield indicators are provided for certain sections of the field, and what the range of differences within one field is. Mapping of the yield has received the most practical application in the cultivation of cereals (Truflyak, 2016).

Currently, agricultural enterprises of the Kostanay region apply various technologies using domestic and foreign agricultural equipment. Moreover, the equipment purchased by agricultural producers has model lines with various technical and operational indicators (Agriculture, forestry and fisheries..., 2013; Catalog of tractor factories...). Often, engineering services of economic entities, intending to acquire equipment, are not aware of its technical and technological capabilities (traction capabilities, performance as a part of various units, fuel consumption, etc.) and its options for equipping with instruments and equipment for working in the precision agriculture system from due to lack of scientific and technical information. At the same time, the use of agricultural machinery and expensive digital equipment for purposes other than intended only increases the costs of crop production without solving the problem of increasing labour productivity. This problem can be solved by the rational use of modern tractors, combines and agricultural machines in the precision agriculture system based on scientific and technical information about their capabilities for specific natural-production conditions (Lichman *et al*., 2016; Leonard, 2016; Baerdemaeker, 2013).

The main results achieved through the application of precision agriculture technologies are as follows (Polshakova, 2017):

1. optimization of the use of consumable materials (cost minimization);
2. increasing the yield and quality of agricultural products;
3. minimization of the negative impact of agricultural production on the environment;
4. land quality improvement;
5. information support for agricultural management.

The table 1 below shows the comparative characteristics of various technologies for the cultivation of agricultural crops (Shilova, 2014).

Table 1. Comparative characteristics of various agricultural cultivation technologies

Technology	Technological characteristics	The essence of technology	Advantages	Disadvantages
Traditional technology.	In the framework of this technology reversible ploughs turning soil layers are used; centre ridges and backfurrows are absent.	The use of agricultural techniques throughout the field.	Simplicity and accessibility of use.	There is a cutting of weeds and their incorporation into the soil. Excessive or insufficiently fertilized areas. Economic efficiency is uncertain. Active degradation of soils and landscapes.
Minimal technology (direct seeding).	Includes one or a series of small tillages with cultivators or disc harrows. Straw and stubble are in the form of mulch in the topsoil. The seeding is carried out in finely cultivated soil with the creation of a mulching layer of plant debris and crumbly soil.	Direct seeding is carried out on stubble without any tillage. Minimization of soil tillage.	Reducing direct costs, reducing fuel consumption by 2-3 times, reducing labour costs by 2.0-2.5 times.	Deterioration of the phytosanitary situation, the need for pesticides, increased mineral nitrogen deficiency. Differentiation of the arable layer, the impossibility of applying organic fertilizers and ameliorants.
Precision agriculture.	GPS, Glonass system.	Each agricultural field is considered as heterogeneous	Ecological safety of the environment, production of products of a specified quality,	High acquisition price. In most agricultural enterprises there is no

		according to many criteria, which depend on the ongoing agricultural operations. Electronic records and storage of the history of field work and crops.	preservation of soil fertility. Reducing fuel consumption and optimizing the use of mineral fertilizers, increasing labour productivity. Significant reduction in dependence on weather conditions, obtaining higher and more stable yields.	equipment and specialists for examining agricultural territories according to the criteria of precision agriculture.

Precision agriculture includes many elements, but all of them can be divided into three main stages (Sharapov *et al.*, 2014):

- Collection of data on the farm, field, crop, region.
- Analysis and decision making.
- Implementation of decisions – carrying out technological operations.

To implement the precision agriculture technology, modern agricultural equipment, controlled by an onboard computer and capable of differentially performing agro-technical operations, and precision positioning devices on the ground are required. Technical systems are needed to help identify field heterogeneity. All of the above entails the necessary costs, in connection with which, before making a decision on the introduction of precision agriculture elements, it is necessary to analyze the current state of the enterprise, as well as evaluate the material and technical support of the enterprise. The scheme is shown in the figure 1 below.
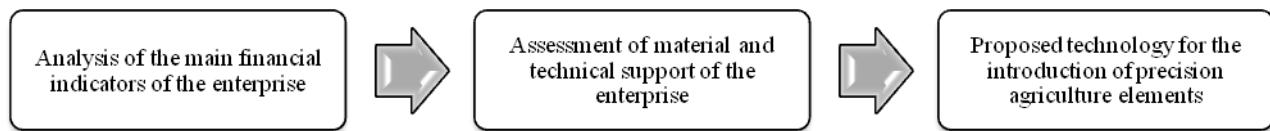
Fig. 1. Precision Agriculture Implementation Scheme

The basis of the technology of precision agriculture is software filling, which provides automated management of spatial attribute data of a card index of agricultural fields, as well as the generation, optimization and implementation of agricultural solutions, taking into account the variability of characteristics within the cultivated field.

The first stage in the implementation of precision agriculture technology is the development of a database that will contain information on the area, yield, agrochemical and agro-physical properties of the soil and the level of plant development. To collect information, automatic soil samplers equipped with GPS receivers and on-board computers; geographic information systems (GIS) for compiling spatially oriented electronic field maps; yield maps of threshed crops obtained immediately after harvesting; remote sensing methods (RSD), such as aerial photography and satellite imagery, are used.

The second stage is by far the least developed, however, there is a number of software products on the market designed to analyse the information collected and make production decisions. Decision support systems, expert systems, programmes that use mathematical models for the agricultural sector are just beginning to appear. Basically, these are programmes for calculating fertilizer doses with elements of geographic information systems (GIS).

At the third stage of the introduction of precision agriculture technology, the obtained and analyzed information is used when carrying out agro-technological operations, mainly in the differential application of fertilizers, when seeding. The stage of agro-technological operations, as well as the first stage, is developing dynamically. This stage is the most difficult. This stage is impossible without special equipment with on-board computers, GPS-receivers and various sensors that allow metering seeds and fertilizers, taking into account the needs of a

particular section of the field. For more accurate operations, it is advisable to purchase a parallel driving system. Such devices allow you to perform agricultural operations even at night with an accuracy of several centimetres (Bikbulatova, 2008).

3. Materials and Methods

Precision agriculture is a set of separate technologies, the need for the implementation of which is determined at the discretion of the owners and managers of the agricultural enterprise. That is, it is possible to use both all technologies at once, or only some, the effect of which will be most significant for this enterprise (Genrikh *et al*., 2018).

A precision agriculture system is not a strictly defined set of techniques and technical means, but rather a general concept based on the use of satellite positioning technologies (GPS), geographic information systems (GIS), accurate mapping of fields, etc. (Galeev *et al*., 2019).

Orenburg scientists Lyubchich *et al*., (2013) distinguish 11 main stages for the development and implementation of precision agriculture systems:

1. parallel driving
2. cartography and topography of farmland,
3. yield mapping
4. soil sampling,
5. agrochemical soil analysis,
6. development of fertility maps,
7. development of job cards for the differential application of fertilizers (application of pesticides),
8. offline differentiated fertilizer application,
9. online differentiated fertilizer application,
10. online monitoring of agricultural machinery,
11. operating control of resources and precision enterprise management based on automated collection and processing of agro-technical data, accounting and planning.

The introduction of each of these stages of the precision agriculture system provides a more economical use of resources involved in agricultural production: labour, equipment and materials. This is the basis for the economic efficiency of the introduced elements of precision agriculture.

When conducting research, methods used in international practice were used: a review of sources, brainstorming, comparative analysis, SWOT analysis, a monographic method for determining economic efficiency, methods of mathematical modelling and other methods. To analyze the economic efficiency of simulated measures to increase the degree of technical equipment of precision agriculture with the elements of precision agriculture of the machine and tractor fleet of the enterprise under study, we determined the saving of current production costs due to the introduction of precision agriculture elements; the calculation of the indicator of the simple payback period required for such an investment is carried out. To calculate the effectiveness of information systems, a cost-benefit analysis was used. In cost-benefit analysis, monetary units are used to quantify costs and benefits. This type of analysis has a wider scope than other types of analysis, providing information on the distribution of resources between different sectors of the economy.

4. Results

The AES «Zarechnoye» LLP (Kostanay region, Kazakhstan) has always been the initiator of introduction and dissemination of advanced innovative technologies; in this regard, the agriculture has been identified as the basis for the introduction of digitalization elements, i.e. precision agriculture.

In the framework of the scientific and technical programme «Transfer and adaptation of precision agriculture technologies for crop production on the principle of «demonstration farms (*testing area*s) in the Kostanay region», in 2019 work on the created demonstration farm at an area of 2500 hectares (ha) was continued in the AES «Zarechnoye» LLP.

In 2019, the AES «Zarechnoye» LLP digitized agricultural land using a digital platform «Qoldau» on a total area of 22,984.3 hectares, including hayfields and pastures (4,231.4 hectares). (See figure 2, figure 3, figure 4, figure 5, figure 6).

Fig.2. Digitization of fields using the digital platform «Qoldau», AES «Zarechnoye» LLP

To simplify the production processes in the cultivation of agricultural crops, the Agricultural Experimental Station «Zarechnoye» LLP uses the web-based crop management service ANT (AgroNetworkTechnologies). This service was developed by Russian specialists from the Krasnodar Territory and provided on the Kazakhstani market by Agrosmart KZ. The service is intended for large farms, because the larger the area under crops, the more difficult it is to manage them. ANT service is intended for chief and field agronomists, economists and record keepers, accountants (for work), as well as for managers and owners (for monitoring the work performed).

The main applications in the ANT system are: «My fields» (electronic field map); «Scouting» (agro-ecological surveys, field trips); «Agronotepad» (logging of technological operations and their parameters in the framework of events); «Seasons» (construction of crop rotation taking into account cultivated crops); «AHO» (agrochemical inspection of fields, analysis of the dynamics of nutrients in the soil); «Field passport» (the current state of the fields, taking into account the history of fields); «Satellite imagery» (identification of areas of heterogeneity using NDVI images for quick decision-making on plant protection and fertilizer application); «Meteo» (weather data and weather forecast by the weather station Caipos connected to the ANT service), etc. As practice has shown, the use of ANT service in production can reduce the cost of fertilizer application, plant protection products, the consumption rate of seeds, fuel, and, as a result, increase the profitability of agricultural production, as well as align the physical and agrochemical properties of the soil, which is directly relevant for agriculture of the steppe zone of Northern Kazakhstan.
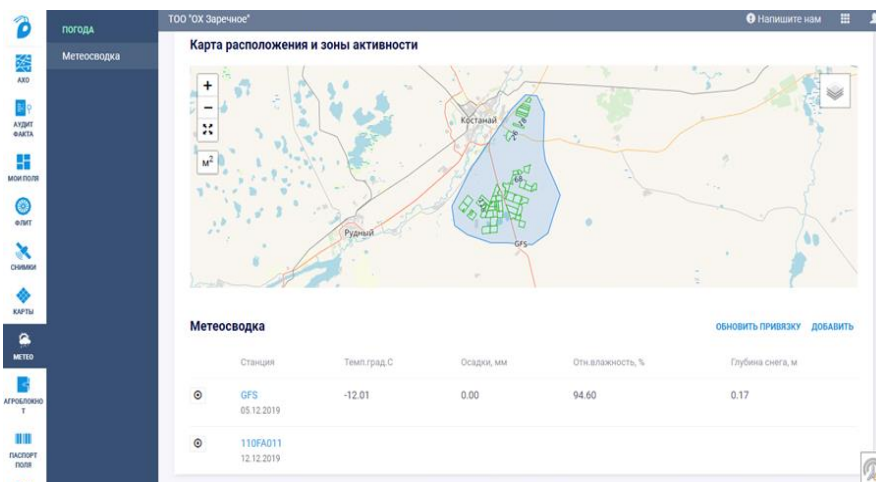
Fig.3. Application «Meteo» in the ANT service, AES «Zarechnoye» LLP
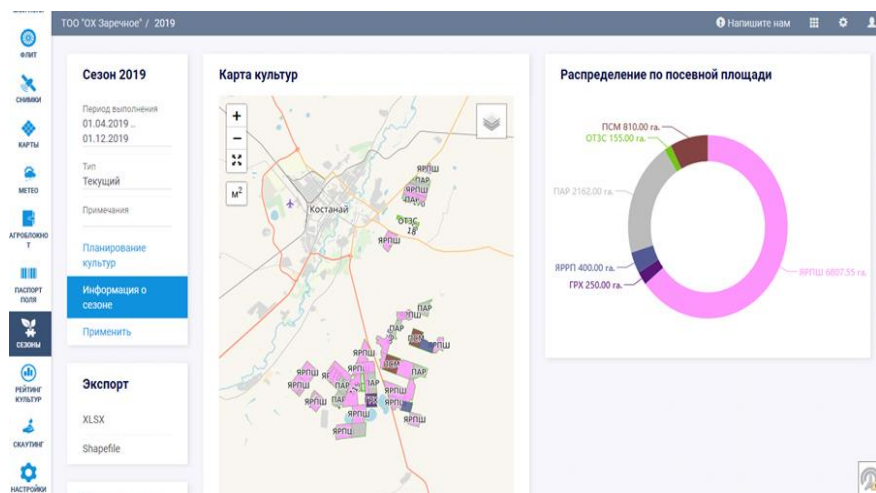
Fig.4. Formation of crop rotation structure according to the ANT service, AES «Zarechnoye» LLP
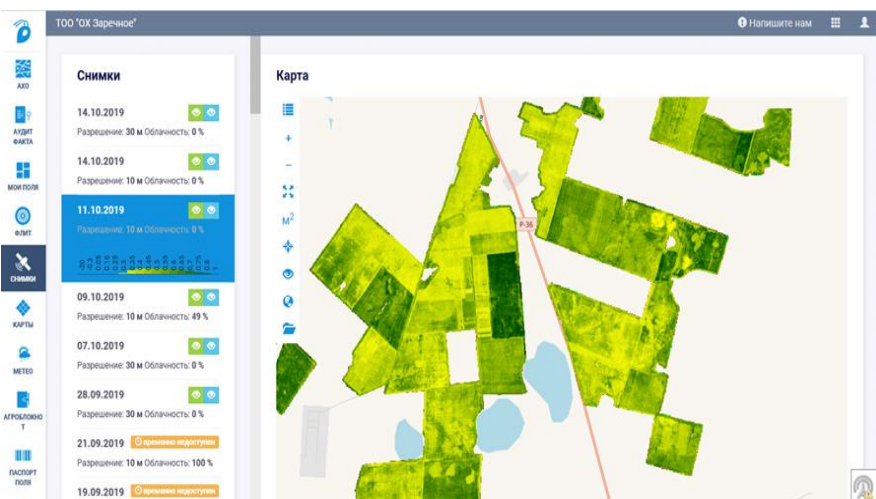
Fig.5. Satellite monitoring data allowing the analysis of heterogeneity in the field, AES «Zarechnoye» LLP

Fig.6. The register of fields allowing you to get field maps in electronic form, AES «Zarechnoye» LLP

The capabilities of the ANT service are quite extensive. Thanks to the ANT service, agricultural producers have the ability to remotely control the cultivated land and the structure of sown areas, the status of existing sown areas, plan crop rotation and technological operations in an autonomous mode, taking into account all agronomic processes. In addition, this service allows you to monitor all available equipment, save all information about a specific field for a long time, keep «Agronomist's Diary», and also create analytical data on production processes. At the testing area of AES «Zarechnoye» LLP, a sprayer John Deere 4730 equipped with an autopilot system and WeedSeeker system was used for the introduction of precision agriculture elements. Pre-seeding chemical treatment was carried out on the testing area. The use of an automatic driving system allowed to reduce the number of floors in 2019, thereby increasing the precision in movement of the unit along the lines and improving its performance. Thus, a saving of 6% glyphosate was achieved.

Using high-resolution satellite imagery, electronic maps of fields of the testing area were created in ArcGIS. A survey for the presence of field nutrients in the soil in elementary plots was carried out. In 2019, based on the data of the agrochemical survey of fields of the AES «Zarechnoye» LLP for 2018, maps of the availability of fields with humus, mobile phosphorus, exchange potassium, sulphur and nitrate nitrogen were created in QGIS 3.6. The development of job cards for differential application was carried out for nitrogen-phosphorus fertilizer of ammophos for spring wheat when seeding in accordance with the scale of soil supply with mobile phosphorus. Differential application of fertilizers was carried out by the seeding company Bourgault (Canada), which was specially equipped with an electric actuator for this purpose, and by the navigation complex Agronavigator-doser.

According to the data of the field flight with an unmanned aerial vehicle GeoScan 101, a map of the requirements for the differential application of foliar feeding was created. The application of a liquid mineral fertilizer Strada N was carried out during the tillering period with further tracking of all morphometric indicators. In 2019, the differentiated application of mineral fertilizers and foliar feeding significantly improved the economy of spring wheat grain production not only due to the difference in yield, but also due to the difference in the cost of products of different classes in quality.

The use of automated driving systems for seeding, chemical weeding, spring wheat harvesting and primary processing allows to increase productivity by 3.8-22.1%, reduce fuel consumption – by 4.6-18.4%, the consumption of technological material and total costs for the operation of technical equipment – by 3-14%.
To draw up economic models for the implementation of precision technologies for the economy of the Kostanay region with medium technical equipment, the farm data of «Agrofirma Karkyn» LLP (Mendykara district,

Kostanay region) were obtained and processed. This farm has about 25,000 ha of sown area, of which about 12,000 ha are sown with wheat.

The specified farm can be attributed to the category of farms with medium technical equipment, since the equipment fleet has equipment with integrated precision agriculture elements:

– tractors equipped with a parallel driving system, including a display Trimble GFX-750 with a navigation system NAV-900 Controller;

– all equipment is equipped with GPS trackers;

– all equipment is equipped with fuel level control systems.

Model No. 1. In the developed economic model No. 1, the transition of the machine and tractor fleet of the indicated farm to the next stage of precision agriculture will be simulated, which will give even greater resource savings, namely:

– introduction of an automatic driving system on tractors with a parallel driving system;

– introduction of parallel driving systems on the rest of the self-propelled machines involved in the main technological operations for wheat processing;

– introduction of a system of differential fertilizer application.

Table 2 shows data on the current state of technology and simulated transitions to the next stage of the introduction of precision agriculture in the farm according to Model No. 1.

Model No. 2. In the developed economic model No. 2, the transition of the machine-tractor fleet of the indicated farm to the next stage of precision agriculture will be simulated, which will give even greater resource savings, namely:

– introduction of automatic driving systems on all self-propelled machines involved in the main technological operations for wheat processing;

– introduction of a system of differential fertilizer application.

Table 3 shows data on the current state of technology and simulated transitions to the next stage of the introduction of precision agriculture in the farm according to Model No. 2. It simulates the option of equipping the agriculture machinery involved in the cultivation of wheat with automatic driving systems, as well as equipping seeding complexes with the system of differential fertilizer.

Table 2. Simulated equipment of farm machinery of «Agrofirma Karkyn» LLP for the transition to the next stage of precision agriculture according to Model No. 1

Name of machinery	Actual current equipment				Planned transition according to Model No. 1	Transition cost of 1 unit, thousand tenge	Investments for the transition to the next stage of precision agriculture, thousand tenge
	quantity, pcs.	parallel driving	GPS tracker	fuel control			
Tractor BUHLER VERSATILE 2375	6	yes	yes	yes	parallel-automated*	3,800.0	22,800.0
Tractor BUHLER VERSATILE 435	1	yes	yes	yes	parallel-automated	3,800.0	3,800.0
Sprayer Emperor 3100	1	no	yes	yes	parallel driving	700	700.0
Self-propelled sprayer FAVOT	1	no	yes	yes	parallel driving	700	700.0
Combine harvester RSM-142 ACROS-550	5	no	yes	yes	parallel driving	700	3,500.0
CLAAS Mega 350 combine-harvester + header 7.5 m	4	no	yes	yes	parallel driving	700	2,800.0
Seeding machine with a fertilizer application system	8				differentiated fertilizer application	1,100.0	8,800.0
Total							43,100.0
Note: * – «parallel-automated» transition means a transition with the replacement of parallel driving equipment with an automated driving system.							

Table 3. Simulated equipment of farm machinery of «Agrofirma Karkyn» LLP for the transition to the next stage of precision agriculture according to Model No. 2

Name of machinery	Actual current equipment				Planned transition according to Model No. 2	Transition cost of 1 unit, thousand tenge	Investments for the transition to the next stage of precision agriculture, thousand tenge
	quantity, pcs.	parallel driving	GPS tracker	fuel control			
Tractor BUHLER VERSATILE 2375	6	yes	yes	yes	parallel-automated*	3,800.0	22,800.0
Tractor BUHLER VERSATILE 435	1	yes	yes	yes	parallel-automated	3,800.0	3,800.0
Sprayer Emperor 3100	1	no	yes	yes	parallel driving	4,500.0	4,500.0
Self-propelled sprayer FAVOT	1	no	yes	yes	parallel driving	4,500.0	4,500.0
Combine harvester RSM-142 ACROS-550	5	no	yes	yes	parallel driving	4,500.0	22,500.0
CLAAS Mega 350 combine-harvester + header 7.5 m	4	no	yes	yes	parallel driving	4,500.0	18,000.0
Seeding machine with a fertilizer application system	8				differentiated fertilizer application	1,100.0	8,800.0
Total							84,900.0
Note: * – «parallel-automated» transition means a transition with the replacement of parallel driving equipment with an automated driving system.							

Next, we will build economic models for the transition to the next stage of the introduction of precision agriculture elements in «Agrofirma Karkyn» LLP and calculate the project payback by saving the cost of growing wheat on 12,000 hectares.

The economic model implies the use of cost-saving factors used in modelling the transition to the next stage of precision agriculture in calculating the costs of the technological map for growing wheat. Thus, potential savings will be calculated.

Increasing productivity in simulating the transition to the next stage of precision agriculture leads to lower costs. Cost savings in this case can be used to ensure a return on investment in ensuring the modernization of technology for the transition to the next stage of precision agriculture.

Table 4 shows the calculation of the simple payback period for investments in the modernization of the equipment fleet of «Agrofirma Karkyn» LLP according to two models of transition to the next stage of precision agriculture.

Table 4. Calculation of a simple payback period for the transition to the next stage of precision agriculture

Indicator	According to Model No. 1	According to Model No. 2
Investments for the transition to the next stage of precision agriculture, thousand tenge	43,100.0	84,900.0
Potential cost savings from the introduction of a simulated transition to the next stage of precision agriculture, thousand tenge	15,225.8	19,360.5
Simple payback period, years	2.8	4.4

Thus, a partial transfer of equipment to a parallel driving system, the introduction of a differential fertilizer application system and the modernization of tractors with automated driving equipment according to Model No. 1 will make it possible to recoup the investment by saving costs for 2.8 years. In this case, the total cost savings will be 15.2 million tenge or 3.1% of direct production costs for growing wheat.

5. Discussion

Simulated improvements in the transition of Agrofirma Karginy LLP to the next stage of precision agriculture will save the following costs:
– labour costs for drivers due to an increase in the production of norm-change due to a decrease in the overlap area during coverage;
– fuel costs due to a decrease in specific fuel consumption due to a decrease in the overlap area during coverage;
– costs of seeds, herbicides, water and other materials for processing due to the reduction in the overlap area during coverage;
– costs due to a decrease in the actual dose of mineral fertilizers when introducing a system of differential fertilizer application.
The introduction of the next stage of precision agriculture in the studied farm when processing wheat on 12,000 hectares according to Model No. 1 will save up to 15.2 million tenge annually or 3.1% of direct production costs.
Cost savings per 1 ha of cultivated arable land in this case will be 1264 tenge. The savings from the introduction of Model 2 will amount to 19.36 million tenge from processing 12,000 hectares of wheat or 4.0% of production costs. This is 1607 tenge per 1 hectare of arable land.

Conclusion

The use of elements of the precision agriculture system (differential seeding and fertilizing, foliar feeding using digital devices, using an information-analytical system, Earth remote sensing (ERS) using unmanned aerial vehicles and satellite images), using modern technology equipped with an automatic driving system, a system of differential application of mineral fertilizers and plant protection products by AES Zarecnoye LLP ensured a guaranteed yield with high technological indicators in an extremely arid year in the conditions of the Kostanay region. The obtained yield level exceeded the average regional level by 79.7%.
The equipment of all self-propelled machinery of «Agrofirma Karkyn» LLP, involved in the basic production operations with automated driving systems and the introduction of a differential fertilizer application system, according to Model No. 2, will make it possible to recoup the investment in 4.4 years. According to this model, total cost savings will amount to 19.36 million tenge or 4.0% of direct production costs.

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FORMING OF INTEGRATED UNDERSTANDING OF PROJECT TERMS: FAULK'S ALGORITHM AS ONE OF THE FORMALIZED APPROACHES

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Abstract. The success of the project implementation depends not only on the highly qualified professional project team. Success also depends on a clear (integrated) understanding of all project processes by all stakeholders. Integrated understanding is based on a clear understanding of project terms and concepts. Such terms and concepts are captured in conventional project management methodologies, methods, and approaches. However, they need to be understood not only by industry experts, but also by some stakeholders. Lack of an integrated understanding of terms and concepts leads to misunderstanding of project actions and, therefore, delays in project implementation, which is determined by the time of integrated understanding formation. The necessary terminological volume for stakeholders can be determined by applying a frequency dictionary approach, which allow all terms and concepts to be ranked according to their appearance and use at different stages of the project life cycle. The purpose of the article is to present a formalized approach to implementing a consistent presentation to capture project terms and concepts by stakeholders. To this end, it is proposed to use the Faulk's algorithm to construct an effective acquisition sequence. If there is a certain set of terms, each of which must be appropriately mastered, and between these terms there are certain dependencies (sequence of mastering), then the problem of constructing the best path to mastering can be solved by applying a Faulk's algorithm based on a graph theory approach.

Keywords: project management; terms; integrated understanding; Faulk's algorithm; graph theory

1. Introduction

Economic processes, currently taking place in society, are based on globalization processes. The main consequence of globalization is the division of labor, migration (and, as usual, concentration) across the planet of capital, labor, production resources, standardization of legislation, economic and technological processes, as well as the approximation and merging of different countries' cultures. The process of globalization that exists at present in society, could not affect the processes of project management.

There are many methodologies, methods and approaches to project management that are well known to both professionals and beginners. Everyone knows about PMBoK, PRINCE, Agile, Scrum and etc. The purpose of methodologies, methods and approaches is to standardize certain areas of project management knowledge in order to provide a more managed approach to projects and programs. Some fields of knowledge are easily standardized. However, there are some that are more advisable from a management standpoint. Among them there are management of communications and management of stakeholders.

One of the problems as one of the effects of globalization on project management is the diversity of cultures. The diversity of cultures is reflected in the wide involvement of professionals from different countries in project management. Each country brings its cultural diversity to the project process, which can be reflected in the interpretation of well-known project approaches and the creation and use of "own". Practical experience shows that implementation of projects faces one of the important factors that directly affects the effectiveness of implementation - an integrated understanding of the identified goals, values, strategies and objectives of the project or program implementation, as well as their unambiguous use at management level. Substantial "misunderstandings" arise from the presence of various factors of influence, including the existence of different approaches to the management, interaction, communication, knowledge management and culture of the parties involved in the project and program implementation.

2. Literature review

A considerable number of terms in project management are interconnected to related disciplines. However, the interpretation of terms has its specificity. The simplest example to cite is the term "project". Turning to the dictionary (Dictionary.com), we get the following meanings:
1. something that is contemplated, devised, or planned; plan; scheme.
2. a large or major undertaking, especially one involving considerable money, personnel, and equipment.
3. a specific task of investigation, especially in scholarship.
4. to propose, contemplate, or plan.
5. to throw, cast, or impel forward or onward.

According to Project Management Institute (2013), a project is temporary in that it has a defined beginning and end in time, and therefore defined scope and resources. And a project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal. Even in this example, there can be seen the diversity of understanding of only one term. According to the theory of conceptual integration proposed by G. Gilles Fauconnier a person "uses a great deal of cognitive resources during speech, evoking numerous models and frames, although linguistic forms do not carry much information, but they are based on a chain of cognitive events in the subject's mind." (Fauconnier, G. 1999). Stakeholders have their own experience, so their thinking frames may differ, and substantially, from thinking frames of a project manager. "In cognitive linguistics, a frame is called an appropriate set of knowledge about stereotypical situations and actions, which is verbalized by linguistic means, at the same time the meanings of the terms are regarded as special structures that are based on real situations" (Alekseyeva, M., 2009).

To create an integrated understanding of project terms, the project manager must ensure the uniqueness of the "cognitive frames" of all stakeholders in the project process. It should be noted that stakeholders are unlikely to agree to take a course in basics of project management, and the project manager, in its turn, is not provided with the appropriate time resource. Lack of integrated understanding will significantly increase project implementation time, and may even lead to its closure. Therefore, it is necessary to find certain approaches that will provide the formation of an integrated understanding of the project terms by all stakeholders.

First of all we can turn to pedagogical approaches to the formation of a professional thesaurus. The following principles are applied in such approaches (Veidt, V. 2019):
1. The principle of consistency and systematicity, in which we mean the continuity of the previously studied material and the integrity of learning terms based on the construction of concepts and terms that are subordinate to a certain logic.
2. The principle of consciousness and activity, which aims at the conscious activity of learners in forming a system of knowledge, independence in the choice of ways to achieve learning outcomes.
3. The principle of strength and validity of learning outcomes, which can be realized if the learner, when memorizing new training material, refers not to mechanical memory, but to content.
4. The principle of science and fundamentality implies the selection of educational material in class so that it not only reflects the current level of development of pedagogical science, but also allows to answer the problematic questions of educational practice.

Qualitative result can be obtained due to the holistic and optimal adherence to the practice of training principles. Applying all of these principles requires time and substantial training for project managers on the implementation of such training. This is usually not possible.

Another approach that can be applied is to create a topic model. According to (Chang, J. & Blei, D.M. 2009), "topic model – is a collection of text documents that defines which topics each document refers to and what words (terms) make up each topic". "The transition from the space of terms to the space of found topics allows to solve the synonymy and polysemy of terms, as well as solving topic tasks such as topic search, classification, summarization and annotation of document collections and news feeds". This model is effective and widely used in areas such as machine learning and natural language processing. For a certain goal achievement, applying a topic model is not an approach that is effective enough. Because, we are not interested in the selection of certain documents by topic, but the formation of the correct thematic interpretation of concepts.

The best, in our opinion, is an approach based on creating a certain mixed mental space that will provide an integrated understanding (Verenych, O. 2016). Creating such a space is described in detail in (Verenych, O. & Dorosh, M., 2017). This approach is based on the creation and implementation of a single conceptual framework. In general, the conceptual framework is presented in detail in the framework and standard documents of project management, an example of which can be considered PMBoK (Project Management Institute, 2013).

On the other hand, in (Project Management Institute, 2013) there are more than 200 terms. As experience shows, stakeholders do not need knowledge of all these terms. Knowledge of basic terms is required for integrated understanding. In addition, it is necessary to study them as they emerge, apply, disseminate, interconnect with one another to understand the context of all project processes. One approach that can be applied to this is to use the frequency dictionary approach. Frequency dictionary approach allows you to create word sets (phrases) together with information about their appearance in texts. The use of frequency dictionaries to formulate the most commonly used terms is described in detail in (Verenych, O., 2018).

Frequency dictionaries allow you to define a pool of commonly used terms. However, approaches must be found to create a sequence of study. In this case, some formalized approaches may help. To this end, graph theory

approaches appear to be the most appropriate. They are used to build a network model in project management, where the list of all works is represented by an oriented graph without contours and loops with inalienable weights of vertices and arcs. Also, graph theory approaches are applied to Network Analysis of Project Communication (Ohshima, N. & Akihito Kawashima, 2011). In addition, thematic modeling is based on probabilistic models, some of which are based on Bayesian networks, which are probabilistic models on oriented graphs (Soni, D., 2018).

However, the study of terms is also associated with a certain sequence. When the number of terms is small, the sequence of their study can be determined expertly. In the case of a large number of terms and the existence of certain relationships between them, determining the rationality of their study can be difficult. In this case, it is useful and efficient to consider certain methods in graph theory based on the construction of Hamilton's paths. They can also be used to study terms. Next, let's look at how to apply them.

3. Hamilton's paths and Faulk's algorithm

Using the sources (Kaufmann, A. & Faure, 1963) and (Site "Discretnaya matematica") we can give basic mathematical justifications.
We'll consider six elements, that will be defined as *A, B, C, D, E, F*. Among these elements are the relationships that are presented in table 1.

Table 1. The relationship between the elements

Relationships for A	Relationships for B	Relationships for C	Relationships for E	Relationships for F
A<B	*B/<C*	*C<D*	*E<D*	*F<D*
A<D	*B<D*			*F<E*
A ⧓ *F*	*B* ⧓ *E*			
	B ⧓ *F*			

Source: Kaufmann, A. & Faure, 1963

We will use the next notations:
We will use the next notations:
< - defines that one element is a predecessor of another element (for example, *A<B* defines that "the element *A* is the predecessor of the element *B*", in other words, the sequence is the element *A* and then the element *B*, not at once);
|<- defines that one element is the direct predecessor of another element (for example, *A/<B* defines that "the element *A* is the direct predecessor of the element *B*", in other words, the sequence is the element *A* and then at once the element *B*);
⧓ - defines that is explicit precedence between elements is absent (for example, *A* ⧓ *F* defines that "is not defined dependence precedence between elements *A* and *F*, in other words, the first element may be both the element *A* and the element *F*).
These relationships between elements can be presented in both a graph and a figure. The graph can be presented as a matrix. We will input "1" on the crossing of the row and column if elements have a connection.
For these conditions, the purpose of the problem is to find (if possible) path(-s) passing once and only once through each element and satisfy the above written relations. Such paths will be called the Hamilton's paths.
To explain, we give some definitions on graph theory (Site "Discretnaya matematica").
Definition 1. A chain is a path without repeating edges.
Definition 2. A Hamilton's graph chain is called its simple chain that passes through each vertex of the graph exactly once.

Definition 3. The cycle of a graph passing through each of its vertices is called the Hamilton's cycle.
Definition 4. A graph is called a Hamilton's if it has a Hamilton's cycle.
We present the relation of Table 1 in the form of a graph (Fig. 1) and a matrix M.

$$M = \begin{array}{c|cccccc} & A & B & C & D & E & F \\ A & 1 & 1 & 0 & 1 & 0 & 1 \\ B & 0 & 1 & 1 & 1 & 1 & 1 \\ C & 0 & 0 & 1 & 1 & 0 & 0 \\ D & 0 & 0 & 0 & 1 & 0 & 0 \\ E & 0 & 1 & 0 & 1 & 1 & 0 \\ F & 1 & 1 & 0 & 1 & 1 & 1 \end{array}$$
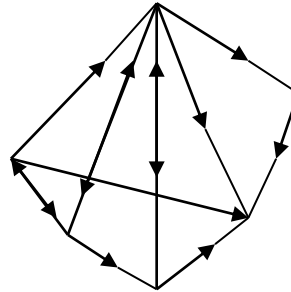
Fig 1. The ratios represented as a graph
Source: (Kaufmann, A. & Faure, 1963) and (Site
"Discretnaya matematica")

The study of the graph shows that the element D is the absolute end point of each Hamilton's path (if one exists), since no arc has this element at its beginning, whereas an arc coming from any other element reaches element D. This property is expressed by the presence of units throughout column D and zeros throughout row D (obviously, with the exception of their intersection).

The opposite may also be the case: if for some element the whole row is made up of units and the whole column, except for the intersection, is made of zeros, this element is the beginning of each Hamilton's path (if one exists). The graph matrix can be simplified by pre-plotting all pairs of rows and columns corresponding to either the beginning or the end of each Hamilton's path.

In this case, row and column D can be omitted in advance. The matrix M' is the matrix M without the column and the row for the element D.

$$M' = \begin{array}{c|ccccc} & A & B & C & E & F \\ A & 1 & 1 & 0 & 0 & 1 \\ B & 0 & 1 & 1 & 1 & 1 \\ C & 0 & 0 & 1 & 0 & 0 \\ E & 0 & 1 & 0 & 1 & 0 \\ F & 1 & 1 & 0 & 1 & 1 \end{array}.$$

Now we want to determine if there is such a path between some element serving as an input and some element serving as an output. The path should make a possibility to connect all the elements in such a way that it passes through each element only once.

To solve this problem, it is necessary to multiply the matrix M' by itself, replacing the usual arithmetic sum by the Boolean sum of elements.
T
he logical algebra (Boolean algebra) is a branch of mathematics that studies statements considered from the side of their logical values (truth or falsehood) and logical operations on them. The logical algebra allows encoding

any statements whose truth or falsity are needed to prove, and then manipulate them like ordinary numbers in mathematics.

In Boolean algebra, logical factum and sums are represented as follows:

$0 \cdot 0 = 0, 0 \cdot 1 = 0, 1 \cdot 0 = 0, 1 \cdot 1 = 1, 0 \dotplus 0 = 0, 0 \dotplus 1 = 1, 1 \dotplus 0 = 1, 1 \dotplus 1 = 1$.

The point means "and" (not a multiplication) and the sign plus with point means conjunction "and/or" (not an adding).

What is the logical sence of the matrix's M' elements. $M^{[2]}$Suppose, we have to go from A to C.

Then:

a) there is no direct path from A to C;

b) there is a straight path leading from A to B and a path from B to C; accordingly, there is a path of length 2 from A to C;

c) there is no direct path from A to C;

d) there is no direct path from A to F, no path from F to C exists.

Since we are looking for a path that connects different points of a graph, instead of generating an arithmetic sum, like in a regular matrix product, we add a boolean sum.

The general approach to the multiplication a matrix on a matrix is presented below (for a matrix 2X2, but the general principle is the same):

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} * \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} a*e+b*g & a*f+b*h \\ c*e+d*g & c*f+d*h \end{bmatrix}.$$

After mathematical operations, we obtain the matrix $M^{[2]}$, all 1 of which denote the existence of paths of length less than or equal to 2, and zeros - their absence.

$$M'^{[2]} = \begin{array}{c|ccccc} & A & B & C & E & F \\ \hline A & 1 & 1 & 1 & 1 & 1 \\ B & 1 & 1 & 1 & 1 & 1 \\ C & 0 & 0 & 1 & 0 & 0 \\ E & 0 & 1 & 1 & 1 & 1 \\ F & 1 & 1 & 1 & 1 & 1 \end{array}.$$

From the matrix $M^{[2]}$ we obtain that point C is the extreme point of the Hamilton's path, if one exists. Again, we discard row and column C, thus we obtain

$$M''^{[2]} = \begin{array}{c|cccc} & A & B & E & F \\ \hline A & 1 & 1 & 1 & 1 \\ B & 1 & 1 & 1 & 1 \\ E & 0 & 1 & 1 & 1 \\ F & 1 & 1 & 1 & 1 \end{array}.$$

Just as it was, calculating $M'^{[2]}$, a path of length not less than or equal to 2 was found, we find a path of length not less than or equal to 3 by calculating $M'^{[3]}$.

$$M''^{[3]} = \begin{array}{c|cccc} & A & B & E & F \\ \hline A & 1 & 1 & 1 & 1 \\ B & 1 & 1 & 1 & 1 \\ E & 1 & 1 & 1 & 1 \\ F & 1 & 1 & 1 & 1 \end{array}.$$

The matrix $M'^{[3]}$ has only 1s, this proves the existence of paths less than or equal to 3 between all *ABEF* points taken by two.

In the general case, when consecutive symbolic powers of M are calculated, we can dwell on n for which $M^{[n+1]} = M^{[n]}$, since this means that M does not have a path that exceeds n. The matrix $M^{[3]}$, obtained by returning rows and columns C and D can be rearranged so that all zeros are located below the main diagonal and the units above it.

Square matrices consisting of units based on the main diagonal create *equivalence classes* regarding to the law: point X is connected to point Y and vice versa

	A	B	C	D	E	F
A	1	1	1	1	1	1
B	1	1	1	1	1	1
C	1	1	1	1	1	1
D	1	1	1	1	1	1
E	0	0	0	0	1	1
F	0	0	0	0	0	1

For example, A is connected to E via B or F or $F\&B$; E is connected to A through B and F. Let's simplify the original graph and break it into classes. Determining the single Hamilton's path AFEBCD becomes quite simple.

Remark. It is clear that when *order* ratios are written (such as, for example, the preceding ratio) in some plural, Faulk's algorithm is one way of finding out their compatibility (since there should be no cycle). It also allows to find all order relations between two elements, that are deduced from the assumptions due to the transitivity of order relations (from $A<B$ and $B<C$ it follows that $A<C$, though this relationship has not been explicitly presented previously).

Only when there is no relation between the points in the form of a relation, legitimate relation of indifference ⋛ can be entered.

However, in practice, it is often necessary to deal with a partial ordering arrangement that allows for cycles. In this case, this algorithm provides us with a method, well suited for solving problems.

4. Practical application of the Faulk's algorithm to manage the project manager's workflows when learning terms and concepts

Consider an example of using the Fowls algorithm to study terms by stakeholders, that a project manager should provide for them to create an integrated understanding.

Consider using a simple example of term study «work breakdown structure» (nextly - WBS) and related terms.

According to the presented theoretical base (Section 3 of the article) our sequence of actions is the next:
1. Choose a list of terms that are connected with WBS;
2. Encode the terms (it is doing next actions more ease);
3. Define dependencies between terms;
4. Present dependences as a matrix;
5. Change matrixes for as long as $M^{[n+1]} = M^{[n]}$;
6. Analyze the result;
7. Build sequences terms on the base of the calculations.

Using this sequence of actions for our example.

1. Choose a list of terms that are connected with WBS. The list of terms is taken from the glossary of basic terms given in PMBoK of 5th edition (Project Management Institute, 2013). Arrange the terms alphabetically (as they appear in the original source).

2. Encode the terms. Encode the terms by numbering them:

1. Create WBS – the process of dividing project results and project work into smaller, more manageable components.
2. Decomposition – methodology used to separate and divide project volumes and project output into smaller, more manageable parts.
3. WBS Dictionary - a document that provides detailed information on the outcome, activities and planning of each component in the WBS.
4. Work Breakdown Structure (WBS) - hierarchical breakdown of the total amount of work undertaken by the project team to achieve the project objectives and produce the intended results.
5. Work Breakdown Structure Component – a separate entry in the WBS, which can be at any level.
6. Work Package – a work defined at the lowest level of WBS for which cost and duration are determined.

3. Define dependencies between terms. We can immediately evaluate that concept (4) must be presented and clarified first. Without a basic definition of the structure itself and the purpose of its creation, all other terms relevant to it do not make any sense. So there are 5 terms left.

These terms can be represented in 5! sequences, ie 1*2*3*4*5=120 combinations. Let's try to find this sequence of presentation and learning terms, so they make up Hamilton's way.

The relationships of these terms look like this:
- (1) immediately preceded (3), (5) and (6);
- between (1) and (2) there is no some dependency;
- (2) immediately preceded (3);
- between (5) and (6) there is no some dependency;
- (5) and (6) preceded (3).

4. Present dependences as a matrix. Let us present the following relationships in the form of a matrix *M*. It is immediately clear that term (3) is the endpoint of the Hamilton's path (if one exists). This follows from the fact that all values in the column are equal to 1, and in the row - 0, except for the intersection of the row and column.

$$
M = \begin{array}{c c c c c c}
 & 1 & 2 & 3 & 5 & 6 \\
1 & 1 & 1 & 1 & 1 & 1 \\
2 & 1 & 1 & 1 & 0 & 0 \\
3 & 0 & 0 & 1 & 0 & 0 \\
5 & 0 & 0 & 1 & 1 & 1 \\
6 & 0 & 0 & 1 & 1 & 1 \\
\end{array}.
$$

So we can omit this row and this column and get the matrix M':

$$
M' = \begin{array}{c c c c c}
 & 1 & 2 & 5 & 6 \\
1 & 1 & 1 & 1 & 1 \\
2 & 1 & 1 & 0 & 0 \\
5 & 0 & 0 & 1 & 1 \\
6 & 0 & 0 & 1 & 1 \\
\end{array}.
$$

Let's create elementary productions of row elements into column elements for calculation $M^{[2]}$. Because the paths connecting different vertices of the graph are searched, then instead of the arithmetic sum, as in a regular matrix product, we add a boolean sum and get:

$$M'^{[2]} = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 0 & 0 \\ 2 & 1 & 1 & 0 & 0 \\ 5 & 1 & 1 & 1 & 1 \\ 6 & 1 & 1 & 1 & 1 \end{array}.$$

We define the elements of matrices $M^{[3]}$ and $M^{[4]}$:

$$M'^{[3]} = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 1 & 1 \\ 2 & 1 & 1 & 1 & 1 \\ 5 & 0 & 0 & 1 & 1 \\ 6 & 0 & 0 & 1 & 1 \end{array}, \qquad M'^{[4]} = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 0 & 0 \\ 2 & 1 & 1 & 0 & 0 \\ 5 & 1 & 1 & 1 & 1 \\ 6 & 1 & 1 & 1 & 1 \end{array}.$$

We can see that the matrix $M^{[4]}$ exactly repeats the matrix $M^{[2]}$. Therefore, we can stop calculations.

5. Analyse the result. Analys of the results showed that there were two classes: (1)-(2) and (5)-(6). This flows out from the calculation – values of these classes don't change in the frame of the calculate.

$$M' = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 1 & 1 \\ 2 & 1 & 1 & 0 & 0 \\ 5 & 0 & 0 & 1 & 1 \\ 6 & 0 & 0 & 1 & 1 \end{array} \quad M^{[2]} = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 0 & 0 \\ 2 & 1 & 1 & 0 & 0 \\ 5 & 1 & 1 & 1 & 1 \\ 6 & 1 & 1 & 1 & 1 \end{array} \quad M^{[3]} = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 1 & 1 \\ 2 & 1 & 1 & 1 & 1 \\ 5 & 0 & 0 & 1 & 1 \\ 6 & 0 & 0 & 1 & 1 \end{array} \quad M^{[4]} = \begin{array}{c|cccc} & 1 & 2 & 5 & 6 \\ \hline 1 & 1 & 1 & 0 & 0 \\ 2 & 1 & 1 & 0 & 0 \\ 5 & 1 & 1 & 1 & 1 \\ 6 & 1 & 1 & 1 & 1 \end{array}$$

6. Build sequences terms on the base of the calculations. Therefore, such sequences of presentation and study of terms are appropriate (the classes (1)-(2) and (5)-(6) are variability between each other):

(4) – (1) – (2) – (5) – (6) – (3) = Work Breakdown Structure - Create WBS – Decomposition - Work Breakdown Structure Component - Work Package - WBS Dictionary;

(4) – (2) – (1) – (5) – (6) – (3) = Work Breakdown Structure - Decomposition - Create WBS - Work Breakdown Structure Component - Work Package - WBS Dictionary;

(4) – (1) – (2) – (6) – (5) – (3) = Work Breakdown Structure - Create WBS – Decomposition - Work Package - Work Breakdown Structure Component - WBS Dictionary;

(4) – (2) – (1) – (6) – (5) – (3) = Work Breakdown Structure - Decomposition - Create WBS - Work Package - Work Breakdown Structure Component - WBS Dictionary.

Summary

Management processes are complex processes that cannot always be applied by formalized approaches because of their poor formalization. This is especially true for human resources management and organization of communication. Different communication technology approaches offer expert and approximate methods. They are quite effective. However, certain aspects of management can be clearly stated and formalized approaches can be applied to them.

Formalization in project management is first and foremost related to the creation of a workflow network. More than 50 years ago this approach allowed to provide project management as a separate area of science and to lay the groundwork for further finding approaches to formalize and apply mathematical approaches to better project management and project success. The approach proposed in the article allows to formalize certain aspects of the management process at the level of creating an integrated understanding of all project processes among all stakeholders. In fact, it can be seen as one way of organizing effective communication of the project manager with the stakeholders, which is a prerequisite for the success of the project.

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FACTORS RELATED TO GENDER AND EDUCATION AFFECTING THE EMPLOYEE MOTIVATION [*]

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Abstract. Enterprise is a place where an activity contributing to the success of a business is held. When an enterprise wants to succeed, achieve goals and to develop, employees must be in the centre of its attention. According to current trends, human resources are considered the most important of all the assets the organization possesses. Employee motivation can lead to high employee performance, effectiveness, quality, subsequent organisation success, and development. The research aimed at defining the differences in perceiving the level of motivation in terms of selected socio-demographic features was conducted in the Slovak enterprises over the course of the years 2015 - 2018. Following the achieved results, when creating the motivation programmes not only the gender but also the education completed by the employees must be taken into account by the senior managers.

Keywords: employee working motivation; differences; gender; education

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1. Introduction and theoretical background

Motivated employees are an important factor for the company success, development on the way to achieve the goals (Arnania-Kepuladze 2010; Hitka, Balážová 2015; Vydrová 2018). Motivated employees are those who are inspired and goal-driven. When the employees do not feel motivated or attracted, the company usually does not improve or progress (Ryan, Deci 2000; Manzoor 2011). The actual research (Feinstein 2000; Kropivšek et al. 2011; Khan 2012; Qayyum 2012; Lizbetinova 2014; Ruzzier, Konecnik Ruzzier 2014; Kucharcikova et al. 2015; Minárová 2015; Salyova et al. 2015; Faletar et al. 2016; Marková et al. 2016; Cagáňová et al. 2017; Malá et al. 2017; Peracek et al., 2017; Loucanova et al. 2018) highlighted the importance of motivation leading to the high employee performance, effectiveness, success and enterprise development. According to Delir et al. (2009) and Kanfer (1990) motivation is considered a driving force behind human behaviour necessary to meet the needs, to supply the energy and encourage desirable employee behaviour. It can be understood as anything affecting the human behaviour aimed at meeting the goal (Kontodimopoulos et al. 2009; Farajzade et al. 2013). It shows the level, direction and effort made in the workplace (Kachall 2014). It is an essential tool to control employees' behaviour in the workplace (Olusola 2011).

The role of motivation – to support others as well as the employees themselves, is the same for managers at all levels (Ryan, Deci 2000). In order to motivate employees properly, managers must be familiar with factors motivating employees in the workplace (Irum et al. 2012; Hajduková 2014; Damij et al. 2015; Wang 2016; Pingping 2017; Sánchez-Sellero et al. 2018; Vlacseková 2019; Horváth, Hollósy 2019). The fact that employees are motivated by various factors must be taken into consideration (Ahmed 2010). A position of higher responsibility can be a motivation factor of an employee and another one can be motivated by flexible working hours or sense of success (Ahmed 2010). Lots of factors affecting the human behaviour were defined in the present research (Imhof 2003; Anitha 2014; Mura et al. 2019) such as: healthy working conditions, career opportunity, supportive boss, unambiguous and definite goals, competitive compensation, stable workplace, interesting job, high prestige, good performance evaluation, pleasant working atmosphere, peaceful private life, competent leadership, recognition, participation in decision-making and fringe benefits, working environment, management, training and professional development, salary, workplace, team work and relationship with co-workers.

Following the research studies, (Patton, Creed 2001; Gooderman et al. 2004; Peterson 2004; Meece et al. 2006) the fact that within the human resource strategy, the approach to an employee motivation in various areas of sociology must be different can be stated. Differences or similarities between individuals of the different gender, age or other socio-demographic characteristics (education, seniority) are defined in the research (Locke 1999; Kooij 2005; Arnania-Kepuladze 2010; Milošević et al. 2015; Olsovska et al. 2015; Musa et al. 2017; Olsovska, Svec 2017; Brady, King 2018; Svec et al., 2018; Fernández-Muñoz, Topa 2018; Kovaľová et al. 2018; Štefko 2019; Malchrowicz-Mośko et al. 2019). Based on the gender-role stereotypes, Arnania-Kepuladze (2010) mentioned that the goals and needs of men and women differ, therefore there are motivated in different way. Men want to be independent, have a power, be in a good job position, be popular and successful. They are especially motivated by an income, promotion or responsibility (Hofstede 2001). On the other hand, women prefer to be a part of a team, they look after the help of their colleagues (Peterson 2004). They appreciate friendly atmosphere,

prestige, challenge, job security, mutual cooperation (Hofstede 2001). They are motivated mainly by human relationships, sense of safety, social benefits and the environment (Meece et al. 2006). In terms of age, the baby-boom generation employees (1946-1964) are motivated by the position benefits and prestige (Kane 2010). Generation X (1966-1976) prefer flexible working hours, autonomy at work, interesting but difficult job and career opportunities (Murphy et al. 2010). The motivation of generation Y (1980-2000) is based on good team cooperation (Murphy et al. 2010). However, generation Z (1995-2012) is a large group of people accepting various values, norms, believes and priorities. Due to the fact that members of this group are in a different stage of the lifecycle (there is a very low probability they have children, house or mortgage), it can be assumed that their behaviour, attitudes as well as preferences completely differ from those of older generations (Freund 2006; Kanfer et al. 2008). Deiblová (2005) mentioned the fact that employees at younger age work towards changes knowingly and wilfully, they appreciate to be in a centre of interest, because they think about recognition and success in their professional career. On the other hand, employees at the middle age prefer the status, prestige. According to Sumit (2014) employees meeting their basic needs prefer financial reward, while others tend to be recognised and rewarded in different ways. Following the results of the research of Nguyen et al. (2014), the fact that respondents – more educated employees are more motivated by relationship in the workplace than respondents with primary education completed can be seen. According to Freund (2006), employees with higher education are motivated by the success. Presented research shows that each employee is motivated differently. Due to effective motivation of subordinates, each manager must be familiar with employees' needs that subsequently results in achieving good results at work. Moreover, the fact that each employee is unique with different needs and motivation must be taken into consideration. The aim of the paper is to define the differences in perceiving the level of motivation in terms of gender and education.

2. Materials and methods

The importance of motivation factors was investigated through the research carried out in the Slovak enterprises in the years 2015 – 2018. Questionnaires as a sociology research method were used. The questionnaire consisted of two parts. Basic socio-demographic data about respondents (gender, education) were collected in the first part of the questionnaire. The second part was focused on the factors motivating the employees in terms of financial (basic salary, fair appraisal system, fringe benefits), in terms of social welfare (name of the company, social benefits, mission of the company, region's development, relation to the environment, free time), in terms of working conditions (physical effort at work, job security, workload and type of work, information about performance result, working hours, work environment, job performance, stress, mental effort), in terms of career aspiration (opportunity to apply one's own ability, career advancement, competences, prestige, individual decision-making, selfactualization, personal growth, recognition), in terms of human relationship (atmosphere in the workplace, good work team, communication in the workplace, supervisor's approach).

A total of 26,416 respondents participated in the questionnaire (13,663 men; 12,753 women; 689 respondents with primary education completed; 4,484 respondents with lower secondary education completed; 14,329 respondents with upper secondary education completed; 6,914 respondents with higher education completed). Respondents could assign each question to one of five levels of importance from the Likert scale, where five was the maximum and one the minimum value to show the importance of individual factors for respondents (5 = very important, 4 = important, 3 = neutral, 2 = slightly important, 1 = unimportant). Gathered data were evaluated using the statistical software Statistics 12.0. Using the χ^2 test at the level of significance α=5% through statistics as follows:

$$\chi^2 = \sum_{j=1}^{s} \sum_{i=1}^{r} \frac{(O_{ij}-E_{ij})^2}{E_{ij}}$$

following hypotheses were tested:

H₁: We assume that there are differences in motivation between men and women.

H₂: We assume that motivational needs of people with different level of education completed are different.

3. Results

In the first step, the level of importance of employee motivation was investigated through 30 motivation factors regardless of gender and completed education of respondents. Basic descriptive characteristics and 95% intervals of reliability of investigated motivation factors in the case of average values in the basic sampling unit are presented in Table 1. Following the given data, the results of the research could be generalised.

Table 1. Descriptive statistics and 95% confidence intervals

Motivation factor	Average	Standard deviation	Confidence interval	
			-95.00%	95.00%
Basic salary	4.494	0.82	4.48	4.50
Fair appraisal system	4.408	0.81	4.40	4.42
Good work team	4.406	0.76	4.40	4.42
Job security	4.398	0.82	4.39	4.41
Atmosphere in the workplace	4.391	0.79	4.38	4.40
Supervisor's approach	4.354	0.83	4.34	4.36
Fringe benefits	4.330	0.81	4.32	4.34
Communication in the workplace	4.242	0.84	4.23	4.25
Working hours	4.186	0.86	4.18	4.20
Work environment	4.173	0.84	4.16	4.18
Social benefits	4.143	0.89	4.13	4.15
Recognition	4.122	0.89	4.11	4.13
Job performance	4.116	0.84	4.11	4.13
Stress	4.079	0.93	4.07	4.09
Workload and type of work	4.077	0.85	4.07	4.09
Free time	4.057	0.95	4.05	4.07
Opportunity to apply one's own ability	4.040	0.88	4.03	4.05
Personal growth	4.033	0.93	4.02	4.04
Mental effort	4.019	0.93	4.01	4.03
Career advancement	4.010	0.89	4.00	4.02
Selfactualization	3.978	0.90	3.97	3.99
Individual decision-making	3.971	0.90	3.96	3.98
Information about performance result	3.960	0.91	3.95	3.97
Relation to the environment	3.899	1.02	3.89	3.91
Mission of the company	3.873	0.99	3.86	3.88
Competences	3.864	0.95	3.85	3.88
Name of the company	3.845	1.05	3.83	3.86
Physical effort at work	3.821	0.95	3.81	3.83
Region's development	3.785	1.05	3.77	3.80
Prestige	3.710	1.01	3.70	3.72

Source: Own reseach

Following the results presented in Table 1, the fact that basic salary, fair appraisal system and good work team were considered three most important motivation factors can be seen. Motivation factor basic salary was evaluated with the level ranging between 4.48 – 4.50. The motivation factors fair appraisal system and good work team will be evaluated with 95% reliability with the same average level ranging from 4.40 to 4.42. Furthermore, following the results the fact that 20 motivation factors were evaluated with the level of importance of 4 (important) can be stated. 10 motivation factors were evaluated neutrally with the level of importance of 3 (neutral). 8 motivation factors marked with the highest level of importance by employees were selected for further research into motivation in terms of gender and education. Motivation factors basic salary, fair appraisal system, good work team, job security, atmosphere in the workplace, supervisor's approach, fringe benefits, communication in the workplace were examined in the further step of the research.

3.1. Factors affecting the employee motivation in terms of gender

Frequency of responses related to eight most important motivation factors in terms of gender are compared in Table 2.

Table 2. The importance of selected motivation factors in terms of gender

Motivation factor	Gender	Frequency	Value of importance					Total
			1 unimportant	2 slightly important	3 medium important	4 important	5 very important	
Basic salary	Male	Absolute frequency	168	298	1,043	3,514	8,640	**13,663**
		Relative frequency	1.23%	2.18%	7.63%	25.72%	63.24%	100%
	Female	Absolute frequency	166	231	842	3,172	8,342	**12,753**
		Relative frequency	1.30%	1.81%	6.60%	24.87%	65.41%	100%
	Total		**334**	**529**	**1,885**	**6,686**	**16,982**	**26,416**
Fair appraisal system	Male	Absolute frequency	124	263	1,397	4,396	7,483	**13,663**
		Relative frequency	0.91%	1.92%	10.22%	32.17%	54.77%	100%
	Female	Absolute frequency	137	270	1,007	3,782	7,557	**12,753**
		Relative frequency	1.07%	2.12%	7.90%	29.66%	59.26%	100%
	Total		**261**	**533**	**2,404**	**8,178**	**15,040**	**26,416**
Good work team	Male	Absolute frequency	91	277	1,278	4,985	7,032	**13,663**
		Relative frequency	0.67%	2.03%	9.35%	36.49%	51.47%	100%
	Female	Absolute frequency	59	204	897	4,300	7,293	**12,753**
		Relative frequency	0.46%	1.6%	7.03%	33.72%	57.19%	100%
	Total		**150**	**481**	**2,175**	**9,285**	**14,325**	**26,416**
Job security	Male	Absolute frequency	122	304	1,476	4,251	7,510	**13,663**
		Relative frequency	0.89%	2.22%	10.80%	31.11%	54.97%	100%
	Female	Absolute frequency	102	250	1,199	3,736	7,466	**12,753**
		Relative frequency	0.80%	1.96%	9.40%	29.30%	58.54%	100%
	Total		**224**	**554**	**2,675**	**7,987**	**14,976**	**26,416**
Atmosphere in the workplace	Male	Absolute frequency	120	264	1,410	4,887	6,982	**13,663**
		Relative frequency	0.88%	1.93%	10.32%	35.77%	51.10%	100%
	Female	Absolute frequency	92	185	997	4,187	7,292	**12,753**
		Relative frequency	0.72%	1.45%	7.82%	32.83%	57.18%	100%
	Total		**212**	**449**	**2,407**	**9,074**	**14,273**	**26,416**
Supervisor's approach	Male	Absolute frequency	150	349	1,469	4,838	6,857	**13,663**
		Relative frequency	1.10%	2.55%	10.75%	35.41%	50.19%	100%
	Female	Absolute frequency	118	298	1,126	4,014	7,197	**12,753**
		Relative frequency	0.93%	2.34%	8.82%	31.48%	56.44%	100%
	Total		**268**	**647**	**2,594**	**8,852**	**14,054**	**26,416**
Fringe benefits	Male	Absolute frequency	121	337	1,484	4,868	6,853	**13,663**
		Relative frequency	0.89%	2.47%	10.86%	35.63%	50.16%	100%
	Female	Absolute frequency	107	272	1,167	4,787	6,420	**12,753**
		Relative frequency	0.84%	2.13%	9.15%	37.53%	50.35%	100%
	Total		**228**	**609**	**2,651**	**9,655**	**13,273**	**26,416**

Communication in the workplace	Male	Absolute frequency	131	418	2,006	5,451	5,657	**13,663**
		Relative frequency	0.96%	3.06%	14.68%	39.90%	41.40%	100%
	Female	Absolute frequency	114	286	1,375	4,722	6,256	**12,753**
		Relative frequency	0.89%	2.24%	10.77%	37.03%	49.06%	100%
	Total		**245**	**704**	**3,380**	**10,173**	**11,913**	**26,416**

Source: Own reseach

Following the results presented in Table 2, the fact that men as well as women evaluated all investigated motivation factors with the level of importance of 5, i.e. very important, can be seen. Moreover, each examined motivation factor was evaluated with the level of importance of 5 – very important, by higher percentage of women in comparison to men.

Table 3. Testing the selected motivation factors in terms of gender

Motivation factor	Statistical indicator	Chi-square	Degree of freedom	p-level
Basic salary	Pearson's chi-square	21.30	df = 4	p = 0.000
	M-V chi-square	21.34	df = 4	p = 0.000
Fair appraisal system	Pearson's chi-square	79.22	df = 4	p = 0.000
	M-V chi-square	79.44	df = 4	p = 0.000
Good work team	Pearson's chi-square	108.72	df = 4	p = 0.000
	M-V chi-square	109.07	df = 4	p = 0.000
Job security	Pearson's chi-square	37.70	df = 4	p = 0.000
	M-V chi-square	37.74	df = 4	p = 0.000
Atmosphere in the workplace	Pearson's chi-square	117.87	df = 4	p = 0.000
	M-V chi-square	118.22	df = 4	p = 0.000
Supervisor's approach	Pearson's chi-square	107.10	df = 4	p = 0.000
	M-V chi-square	107.22	df = 4	p = 0.000
Fringe benefits	Pearson's chi-square	29.14	df = 4	p = 0.000
	M-V chi-square	29.21	df = 4	p = 0.000
Communication in the workplace	Pearson's chi-square	195.28	df = 4	p = 0.000
	M-V chi-square	195.94	df = 4	p = 0.000

Source: Own reseach

Following the χ^2 test results shown in Table 3, the alternative hypothesis H_1 was accepted and the hypothesis H_0 was rejected. The fact that the level of importance of the analysed motivation factors depends on gender can be stated.

Table 4. Residual frequency of selected motivation factors in terms of gender

Motivation factor	Gender	Value of importance				
		1 unimportant	2 slightly important	3 medium important	4 important	5 very important
Basic salary	Male	-4.76	24.38	**68.00**	55.71	-143.32
	Female	4.76	-24.38	-68.00	-55.71	**143.32**
Fair appraisal system	Male	-11.00	-12.68	**153.59**	**166.14**	-296.06
	Female	11.00	12.68	-153.59	-166.14	**296.06**
Good work team	Male	13.42	28.22	153.04	**182.57**	-377.24
	Female	-13.42	-28.22	-153.04	-182.57	**377.24**
Job security	Male	6.14	17.45	92.37	**119.77**	-235.73
	Female	-6.14	-17.45	-92.37	-119.77	**235.73**
Atmosphere in the workplace	Male	10.34	31.76	164.99	**193.53**	-400.62
	Female	-10.34	-31.76	-164.99	-193.53	**400.62**
Supervisor's approach	Male	11.38	14.34	127.27	**259.36**	-412.35
	Female	-11.38	-14.34	-127.27	-259.36	**412.35**
Fringe benefits	Male	3.07	22.00	**112.79**	-125.47	-12.38
	Female	-3.07	-22.00	-112.79	**125.47**	12.38
Communication in the workplace	Male	4.28	53.86	**257.72**	189.08	-504.93
	Female	-4.28	-53.86	-257.72	-189.08	**504.93**

Source: Own reseach

The results presented in Table 4 shows that basic salary was considered very important motivation factor by women. Men tended to be neutral in the case of motivation factor basic salary. Fair appraisal system was again considered very important by women while according to men, the mentioned factor was considered important or neutral. Women tended to perceive motivation factors good work team, job security, atmosphere in the workplace as very important ones. On the other hand, men considered the mentioned motivation factors important. Motivation factors fringe benefits and communication in the workplace were of neutral importance for men. For women, the mentioned motivation factors were important even very important.

3.2. Factors affecting the employee motivation in terms of completed education

In the next step, selected motivation factors (basic salary, fair appraisal system, good work team, job security, atmosphere in the workplace, supervisor's approach, fringe benefits, communication in the workplace) were investigated in terms of completed education. The results are presented in Table 5.

Table 5. The importance of selected motivation factors in terms of completed education

Motivation factor	Education	Frequency	Value of importance					Total
			1 unimportant	2 slightly important	3 medium important	4 important	5 very important	
Basic salary	Primary	Absolute frequency	19	21	68	174	407	**689**
		Relative frequency	2.76%	3.05%	9.87%	25.25%	59.07%	100%
	High school without GCSE	Absolute frequency	90	123	367	1,060	2,844	**4,484**
		Relative frequency	2.01%	2.74%	8.18%	23.64%	63.43%	100%
	High school with GCSE	Absolute frequency	161	275	993	3,550	9,350	**14,329**
		Relative frequency	1.12%	1.92%	6.93%	24.77%	65.26%	100%
	University	Absolute frequency	64	110	457	1,903	4,380	**6,914**
		Relative frequency	0.93%	1.59%	6.61%	27.52%	63.35%	100%
	Total		**334**	**529**	**1,885**	**6,686**	**16,981**	**26,416**
Fair appraisal system	Primary	Absolute frequency	20	36	87	212	334	**689**
		Relative frequency	2.90%	5.22%	12.63%	30.77%	48.48%	100%
	High school without GCSE	Absolute frequency	65	112	501	1,426	2,380	**4,484**
		Relative frequency	1.45%	2.50%	11.17%	31.80%	53.08%	100%
	High school with GCSE	Absolute frequency	118	263	1,308	4,420	8,220	**14,329**
		Relative frequency	0.82%	1.84%	9.13%	30.85%	57.37%	100%
	University	Absolute frequency	58	122	508	2,120	4,106	**6,914**
		Relative frequency	0.84%	1.76%	7.35%	30.66%	59.39%	100%
	Total		**261**	**533**	**2,404**	**8,178**	**15,040**	**26,416**
Good work team	Primary	Absolute frequency	14	33	96	256	290	**689**
		Relative frequency	2.03%	4.79%	13.93%	37.16%	42.09%	100%
	High school without GCSE	Absolute frequency	38	129	514	1,734	2,069	**4,484**
		Relative frequency	0.85%	2.88%	11.46%	38.67%	46.14%	100%
	High school with GCSE	Absolute frequency	66	215	1,124	5,035	7,889	**14,329**
		Relative frequency	0.46%	1.50%	7.84%	35.14%	55.06%	100%
	University	Absolute frequency	32	104	441	2,260	4,077	**6,914**
		Relative frequency	0.46%	1.50%	6.38%	32.69%	58.97%	100%
	Total		**150**	**481**	**2,175**	**9,285**	**14,325**	**26,416**
Job security	Primary	Absolute frequency	12	32	104	230	311	**689**
		Relative frequency	1.74%	4.64%	15.09%	33.38%	45.14%	100%
	High school without GCSE	Absolute frequency	60	167	520	1,579	2,158	**4,484**
		Relative frequency	1.34%	3.72%	11.60%	35.21%	48.13%	100%
	High school with	Absolute frequency	110	291	1,413	5,212	7,303	**14,329**

	GCSE	Relative frequency	0.77%	2.03%	9.85%	36.38%	50.97%	100%
	University	Absolute frequency	46	119	615	2,633	3,501	**6,914**
		Relative frequency	0.67%	1.72%	8.89%	38.08%	50.64%	100%
	Total		**228**	**609**	**2,652**	**9,654**	**13,273**	**26,416**
Atmosphere in the workplace	Primary	Absolute frequency	11	32	111	209	326	**689**
		Relative frequency	1.59%	4.64%	16.11%	30.33%	47.32%	100%
	High school without GCSE	Absolute frequency	53	130	564	1,702	2,035	**4,484**
		Relative frequency	1.18%	2.90%	12.58%	37.96%	45.38%	100%
	High school with GCSE	Absolute frequency	99	196	1,247	4,981	7,806	**14,329**
		Relative frequency	0.68%	1.37%	8.70%	34.76%	54.48%	100%
	University	Absolute frequency	50	91	485	2,182	4,106	**6,914**
		Relative frequency	0.72%	1.32%	7.01%	31.56%	59.39%	100%
	Total		**212**	**449**	**2,407**	**9,074**	**14,273**	**26,416**
Supervisor's approach	Primary	Absolute frequency	15	38	95	235	306	**689**
		Relative frequency	2.18%	5.52%	13.79%	34.11%	44.41%	100%
	High school without GCSE	Absolute frequency	68	148	530	1,617	2,121	**4,484**
		Relative frequency	1.52%	3.30%	11.82%	36.06%	47.30%	100%
	High school with GCSE	Absolute frequency	124	327	1,411	4,705	7,762	**14,329**
		Relative frequency	0.86%	2.28%	9.85%	32.84%	54.17%	100%
	University	Absolute frequency	62	134	558	2,295	3,865	**6,914**
		Relative frequency	0.90%	1.94%	8.07%	33.19%	55.90%	100%
	Total		**269**	**647**	**2,594**	**8,852**	**14,054**	**26,416**
Fringe benefits	Primary	Absolute frequency	12	32	104	230	311	**689**
		Relative frequency	1.74%	4.64%	15.09%	33.38%	45.14%	100%
	High school without GCSE	Absolute frequency	60	167	520	1,579	2,158	**4,484**
		Relative frequency	1.34%	3.72%	11.60%	35.21%	48.13%	100%
	High school with GCSE	Absolute frequency	110	291	1413	5,212	7,303	**14,329**
		Relative frequency	0.77%	2.03%	9.85%	36.38%	50.97%	100%
	University	Absolute frequency	46	119	615	2,633	3,501	**6,914**
		Relative frequency	0.67%	1.72%	8.89%	38.08%	50.64%	100%
	Total		**228**	**609**	**2,652**	**9,654**	**13,273**	**26,416**
Communication in the workplace	Primary	Absolute frequency	15	47	131	246	250	**689**
		Relative frequency	2.18%	6.82%	19.01%	35.70%	36.28%	100%
	High school without GCSE	Absolute frequency	58	178	704	1,831	1,713	**4,484**
		Relative frequency	1.29%	3.97%	15.70%	40.83%	38.20%	100%
	High school with GCSE	Absolute frequency	117	338	1,857	5,553	6,464	**14,329**
		Relative frequency	0.82%	2.36%	12.95%	38.76%	45.11%	100%
	University	Absolute frequency	55	141	689	2,543	3,486	**6,914**
		Relative frequency	0.80%	2.04%	9.97%	36.78%	50.42%	100%
	Total		**245**	**704**	**3,381**	**10,173**	**11,913**	**26,416**

Source: Own reseach

Following the results presented in Table 5, the fact that all analysed motivation factors were evaluated by the respondents with the level of importance of 5, i.e. very important, motivation factor, with the exception of the motivation factor communication in the workplace evaluated by most of the respondents (40.83%) with the lower secondary education completed with the level of importance of 4 (important).

The results of statistical verification between the level of completed education and the selected motivation factors are shown in Table 6. Following the results mentioned in Table 6 the hypothesis H_1 is accepted and the hypothesis H_0 is rejected. The fact that the level of motivation depends on the education can be stated.

Table 6. Testing the selected motivation factors in terms of completed education

Motivation factor	Statistical indicator	Chi-square	Degree of freedom	p-level
Basic salary	Pearson's chi-square	106.73	df = 12	p = 0.000
	M-V chi-square	98.85	df = 12	p = 0.000
Fair appraisal system	Pearson's chi-square	168.90	df = 12	p = 0.000
	M-V chi-square	147.96	df = 12	p = 0.000
Good work team	Pearson's chi-square	356.41	df = 12	p = 0.000
	M-V chi-square	326.56	df = 12	p = 0.000
Job security	Pearson's chi-square	167.88	df = 12	p = 0.000
	M-V chi-square	155.10	df = 12	p = 0.000
Atmosphere in the workplace	Pearson's chi-square	378.68	df = 12	p = 0.000
	M-V chi-square	352.05	df = 12	p = 0.000
Supervisor's approach	Pearson's chi-square	186.57	df = 12	p = 0.000
	M-V chi-square	175.74	df = 12	p = 0.000
Fringe benefits	Pearson's chi-square	148.77	df = 12	p = 0.000
	M-V chi-square	134.87	df = 12	p = 0.000
Communication in the workplace	Pearson's chi-square	319.56	df = 12	p = 0.000
	M-V chi-square	300.21	df = 12	p = 0.000

Source: Own reseach

Despite the fact that eight investigated motivation factors are considered the most important, Table 6 shows that there are statistically significant differences in the motivation in terms of completed education. The results in Table 6 are confirmed by further results presented in Table 7.

Table 7. Residual frequency of selected motivation factors in terms of completed education

Motivation factor	Education	Value of importance				
		1 unimportant	2 slightly important	3 medium important	4 important	5 very important
Basic salary	Primary	10.29	7.20	**18.83**	-0.40	-35.93
	High school without GCSE	33.30	33.20	**47.02**	-74.96	-38.56
	High school with GCSE	-20.17	-11.94	-29.46	-77.61	**139.18**
	University	-23.42	-28.46	-36.39	**152.97**	-64.70
Fair appraisal system	Primary	13.19	**22.10**	**24.30**	-1.30	-58.28
	High school without GCSE	20.70	21.53	**92.93**	37.82	-172.97
	High school with GCSE	-23.58	-26.12	3.98	-16.04	**61.76**
	University	-10.31	-17.50	-121.21	-20.47	**169.50**
Good work team	Primary	10.09	20.45	**39.27**	13.82	-83.63
	High school without GCSE	12.54	47.35	144.80	**157.91**	-362.61
	High school with GCSE	-15.37	-45.91	-55.80	-1.52	**118.60**
	University	-7.26	-21.89	-128.27	-170.21	**327.64**
Job security	Primary	10.16	14.55	**38.23**	7.67	-70.60
	High school without GCSE	15.98	34.96	**95.91**	81.19	-228.04
	High school with GCSE	-11.50	-23.50	-36.97	-111.30	**183.27**
	University	-14.63	-26.01	-97.17	22.44	**115.37**
Atmosphere in the workplace	Primary	5.47	20.29	**48.22**	-27.68	-46.29
	High school without GCSE	17.02	53.78	155.41	**161.67**	-387.87
	High school with GCSE	-16.99	-47.55	-58.60	**59.09**	**64.05**
	University	-5.49	-26.52	-145.02	-193.08	**370.11**
Supervisor's approach	Primary	8.01	**21.12**	**27.34**	4.11	-60.58
	High school without GCSE	22.51	38.17	89.66	**114.35**	-264.70
	High school with GCSE	-22.37	-23.95	3.96	-96.49	**138.84**
	University	-8.15	-35.35	-120.97	-21.97	**186.43**
Fringe benefits	Primary	6.05	16.12	**34.85**	-21.81	-35.21
	High school without GCSE	21.30	63.62	**69.99**	-59.79	-95.12

	High school with GCSE	-13.67	-39.33	-25.95	-24.51	**103.47**
	University	-13.68	-40.40	-78.89	**106.11**	26.86
Communication in the workplace	Primary	8.61	28.64	**42.84**	-19.35	-60.73
	High school without GCSE	16.41	58.49	**130.24**	104.11	-309.26
	High school with GCSE	-15.89	-43.86	22.62	**34.97**	2.16
	University	-9.13	-43.27	-195.70	-119.73	**367.83**

Source: Own reseach

Despite the fact that the respondents with primary education completed consider analysed motivation factors very important, they tend to evaluate analysed motivation factors neutrally (the level of importance of 3) even slightly important (the level of importance of 2) (Table 7). The respondents with lower secondary education tend to evaluate analysed motivation factors as neutral (the level of importance of 3) even important (the level of importance 4) motivation factors. The more educated respondents tend to evaluate analysed motivation factors with higher level of importance. The respondents with upper secondary education and higher education tend to evaluate the investigated motivation factors as important (the level of importance of 4) even very important (the level of importance of 5).

Discussion and conclusions

Enterprise is a place where an activity contributing to the success of a business is held. In order to succeed there must be a person able to manage the business excellently (Bajzikova et al. 2013; Bartuska et al. 2016; Kampf et al. 2016; Stopka et al. 2016; Gejdos, Vlckova 2017; Grenčíková et al. 2017; Joniaková et al. 2017; Lizbetinova 2017; Zaborova et al. 2017; Lizbetin 2018; Papula et al. 2018; Sertić et al. 2018; Anyakoha 2019; Hasan et al. 2019; Matzembacher et al. 2019). All efforts must be given to employees as the human resources are considered the greatest asset of the business (ShaemiBarzoki et al. 2012; Fernández-Olmos, Díez-Vial 2015; Sheehan et al. 2016; Urbancova et al. 2016; Jankelová et al. 2017; Kampf et al. 2017; Kucharcikova, Miciak 2017; Nemec et al. 2017; Bencsik et al. 2019; Kimengsi et al. 2019; Paluš et al. 2019; Sedliačiková et al. 2019; Stachová et al. 2019). The main role of managers is to motivate employees to achieve the goals. It means one of the most important difficulties the managers face in the business environment (Richer et al. 2002; Latham, Pinder 2005; Latham 2007; Kanfer et al. 2008). Not only the environment and situation but also factors like gender, education, age affecting the needs of individuals must be taken into account. Mentioned conclusions are confirmed by the research results of Kachall (2014), mentioning the fact that employee motivation is affected by varied personal, mental, financial as well as social factors. According to Nadeem et al. (2011), there are lots of variables affecting the employee motivation. The opinion of Ryan and Deci (2000) is similar. The employees are motivated; there are differences in the level of their motivation especially due to socio-demographic characteristics.

The research focused on investigating the level of motivation in terms of selected socio-demographic characteristics was conducted in the years 2015 – 2018. 26,416 respondents participated in the research. The motivation factors such as basic salary, fair appraisal system, good work team, job security, atmosphere in the workplace, supervisor's approach, fringe benefits, communication in the workplace were considered the most important motivation factors. Following the achieved results, in the process of creating motivation programmes managers are recommended to take into account the fact that motivation is affected by gender. Women tend to consider motivation factors more important than men. They are evaluated as important even very important by women in comparison to men who tend to evaluate them as important even neutral. Actual research studies are confirmed by our findings (Arnania-Kepuladze 2010; Fapohunda 2017). The fact that goals and needs of men and women are different and therefore, they must be motivated in different way can be seen. Men want to be independent, want to have power, position, and want to be popular and successful. They are motivated by income, promotion, and responsibility (Hofstede 2001). On the contrary, women prefer to work in a team; they look after the cooperation with colleagues (Peterson 2004). Friendly atmosphere, prestige, challenge, job security, and

cooperation are appreciated by them (Hofstede 2001). They are mainly motivated by human relationship, sense of safety, social benefit and the environment (Meece et al. 2006).

The human needs change not only due to the gender (Patton, Creed 2001; Gooderman et al. 2004; Meece et al. 2006) but following the actual research (Nguyen et al. 2014) as well as our research, the fact that there is an effect of education as well can be stated. In the issue of motivation programmes, the differences resulting from the different level of employee education must be taken into consideration by managers. The respondents with primary education tend to evaluate motivation factors as neutral even slightly important. According to the respondents with lower secondary education, the motivation factors are neutral even important and the respondents with upper secondary education and higher education consider the motivation factors important even very important.

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THE ROLE OF AUDITOR CHARACTERISTICS: EARNINGS MANAGEMENT AND AUDIT COMMITTEE EFFECTIVENESS

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Abstract. This study aims to analyze the moderating effect of auditor characteristics on the relationship between audit committee effectiveness and earnings management. Mechanisms of good corporate governance can limit and control the opportunistic actions of management. A highly effective audit committee will reduce the prevalence of earnings management. In addition to the audit committee as an internal party that oversees the credibility of financial statements, it is also necessary to supervise external parties, through the use of external auditors. With expectations of reducing earnings manipulation, this study examines the effects of the combination of an effective audit committee and an independent auditor. The research sample selection uses a purposive judgmental non-probability sampling technique. The sample obtained is 754 firm years, consisting of three years of company observations in the Indonesian capital market between 2016 and 2018, except those in the financial sector. Earnings management is measured by accrual value using a modified Jones model. The independent variable of the study is the effectiveness of the audit committee (EFAC) which will be assessed using the DeZoort index. The results of the empirical testing support the research hypothesis; the more effective the audit committee is and the longer the external audit period is, the more prevalent earnings management will be. In addition, the more effective the audit committee is, coupled with the use of one of the big four auditors, the less prevalent earnings management will be, which means the auditor's reputation also strengthens the relationship between the effectiveness of the audit committee and earnings management. Further, the moderating effect of auditor specialization on the influence of the audit committee on earnings manipulation did not provide significant results.

Keywords: earnings management; specialist auditor; audit committee; audit quality; governance

1. Introduction

There are two main causes of corporate governance issues (Zgarni, Hlioui & Zehri, 2016). First, strong stakeholder pressure, rapid technological change and ever-changing environmental and social culture promotes good governance and demand transparency of financial reporting. Second, financial reporting issues in a number of companies trigger a decline in confidence in the accuracy of the information provided and adversely affect the behavior of stakeholders. Recently, in Indonesia, an accounting firm called Satrio Bing Eny & Partners (KAP SBE), which is an affiliate of Deloitte in Indonesia, experienced difficulty with the auditing process. Both public accountants from SBE's public accountant office, Malinna and Merliyana Syamsul, received administrative sanctions from the OJK. Based on a decision from the Center for Financial Professional Development (P2PK), both of them are unable to provide audit services to financial service entities for a period of one year. Sanctions given to SBE public accounting firms include the prohibition on the addition of new clients in the financial services sector (CNBC Indonesia, 2018).

In agency theory, information asymmetry triggers earnings management practices. Information asymmetry is a condition of information disparity between management and shareholders. The management, as the managers of the company, have access to more information, particularly in relation to the company's financial affairs, than the shareholders (Christiani & Nugrahanti, 2014). The data contained in financial statements can be manipulated by choosing certain accounting policies or arranging transactions to appear different from the actual conditions; this is also referred to as earnings management, the ultimate goal of which can mislead readers of financial statements about the company's performance (Healy & Wahlen, 1999). Good governance can control and regulate a company to create added value for each stakeholder. According to Inaam and Khamoussi (2016), the function of the governance mechanism in financial reporting is to ensure consistency between maintaining the credibility and reliability of a company's financial statements with financial accounting standards. Specifically, this study analyzes audit committees as part of corporate governance. Halim (2015) shows that the audit committee can reinforce the relationship between independent auditors and management. High quality audits conducted by external auditors and audit committees encourage a high quality of earnings (Becker et. al., 1998). The higher the effectiveness of the audit committee, the less prevalent earnings management will be (Abbott, Park, & Parker, 2000).

This paper enriches the existing literature, both theoretically and empirically, concerning the impact of audit committee characteristics on earnings management. Theoretically, it will expand on the agency theory and governance in improving the quality of financial reporting. Empirically, the results of research on interactions between audit committees and external auditors on the quality of reporting have been carried out in countries with advanced capital markets. Conversely, studies in countries with developing capital markets are still rare.

This paper consists of several sections. The previous section explained the background, objectives, and research contributions. The second section provides theories and logical thinking about developing research hypotheses. The research methods and models are contained in part three followed by the empirical results in part four. A discussion and critical evaluation with a consideration of previous findings is presented in the fifth section and the last section concludes the paper.

2. Literature Review

Agency theory and corporate governance are used in this study as a theoretical framework to investigate the preferences of managers in companies. The role of the audit committee and the characteristics of the auditor can be explained using this theory. It recognizes this as the most critical oversight mechanism that can reduce agency costs, manage conflicts of interest, and reduce earnings management. Audit committees and external auditors, as corporate governance actors, provide supervision that is expected to reduce the potential for earnings

management. Agency theory predicts that supervision ensures the quality of financial reporting (Zgarni et. al., 2016).

The big four public accounting firms are often assumed to have better audit quality, because they have an international reputation, have large clients, and use sophisticated technology in their activities. The interaction between the audit committee and the external auditor is related to the honesty and objectivity of the auditor, thereby reducing earnings management. The audit committee and external auditor aim to publish high-quality reports so they can carry out high-quality audits to maintain their reputation and avoid legal liability. Hence, it can be said that the audit committee and the use of external auditors can reduce agency problems and thereby reduce the prevalence of earnings management practices.

H1: The more effective the audit committee and the use of reputable external auditors, the less prevalent earnings management will be.

Mutmainnah and Wardhani (2013) suggest that auditors specializing in industrial practices tend to be more solution-oriented and responsive in carrying out audit procedures. Extensive experience and working hours I the relevant field will help the audit committee to conduct and advance the quality of supervision and control of financial statements. Zgarni et. al. (2016) show that companies that have an effective audit committee and industry specialization auditors can reduce earnings management. This is because there is a complementary relationship between the effectiveness of audit committees and industry specialization auditors in limiting earnings management practices.

H2: The more effective the audit committee, coupled with the use of specialized external auditors, the less prevalent earnings management will be.

The moderation effect of the audit committee and independent auditors can increase with the length of the audit period. This is because more effective audit committees tend to retain their auditors as long as the auditor can provide high-quality financial reporting (Meixner & Welker, 1988). According to Fitriany, Utama, Martani and Rosietta (2016), the longer an auditor remains engaged by a company, the more competent the auditor will be, because the auditor will obtain greater knowledge about the company's specific risks and its internal control systems.

H3: The more effective the audit committee and the longer the audit tenure, the less prevalent earnings management will be.

3. Research Methodology

The research sample selection uses a purposive judgmental non-probability sampling technique. The sample obtained was 754 years of the company, consisting of three years of observation between 2016 and 2018. The data used came from the audited financial statements and annual reports. Data can be obtained from the Indonesian capital market website or company website. The total sample has complete data and consists of all industries, except the financial sector, which has specific regulations.

3.1 Measurement of Variables

The dependent variable of this study is earnings management which is proxied by discretionary accrual (DAC), measured using the Modified Jones Model on a cross-sectional basis according to Dechow et. al. (1995). The discretionary accrual calculation using the Modified Jones Model is as follows:

a. Total accruals (TA) calculated using a formula:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_1 \left(\frac{1}{A_{i,t-1}}\right) + \beta_2 \left(\frac{\Delta REV_{i,t}}{A_{i,t-1}}\right) + \beta_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \qquad (1)$$

b. Non-discretionary accruals calculated using a formula:

$$NDA_{i,t} = \beta_1 \left(\frac{1}{A_{i,t-1}}\right) + \beta_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \beta_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) \qquad (2)$$

c. Discretionary accruals calculated using a formula:

$$DAC_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t} \qquad (3)$$

The independent variables in this study are the effectiveness of the audit committee and audit quality. The measurement of the effectiveness of the audit committee refers to the research of DeZoort, Hermanson, Archambeault and Reed (2002), while the measurement of audit quality refers to the research of Zgarni et. al. (2016).

3.2 Audit Committee Effectiveness (ACEff)

Audit committee effectiveness is measured by the total score of the audit committee effectiveness index by reference to DeZoort et. al. (2002) with a maximum score of 14. The four dimensions that determine the effectiveness of the audit committee are (table 1):

Table 1. Audit Committee Effectiveness Index

Dimension	Code	Proxy	Skoring
Composition	ACIND	Audit Committee Independence All members of the audit committee must come from outside the company or independent parties	1;0
	ACEXP	Audit committee Expertise At least one member has a background in accounting or finance	1;0
Authority	ACCHART	Audit Committee Charter Proxy statement regarding the audit committee agreement (work program)	1;0
	ACDUTY	Audit Committee Responsibility If the company writes in detail about the duties and responsibilities of the audit committee on financial information, it is given a score of 2. If the company writes a brief statement about the review conducted by the audit committee on the company's financial information, it is given a score of 1. If there is no	2;1;0

		disclosure, then given a score of 0.	
Resources	ACSIZE	Audit Committee Size The audit committee has a minimum of 3 members	1;0
Diligence	ACMEET	Audit Committee Meeting The audit committee meeting at least 4 times a year	1;0
	ACVOLDIS	Audit Committee Voluntary Disclosure The audit committee voluntarily discloses more financial information than other regulations or companies	1;0

The measurement of audit characteristics is by reference to Zgarni et. al. (2016) using three proxies. First, the auditor's reputation (REPUT) is given a score of 1 if the company is audited by one of the Big Four Public Accounting Firm and 0 if it is audited by a Non-Big Four Public Accounting Firm. Second, specialization of the auditor industry (SPEC), if the company being audited with a market share of more than 10%, then it is worth 1 and if less than 10% will be worth 0. The total sales of clients audited by KAP in the industry are divided by total sales in the industry. Third, the audit period (TENURE) is the number of consecutive years the client maintains the KAP. The number of tenure years is counted backward, starting from year t (research year) and traced to the year the client moves to another auditor.

3.3 Regression Model

$$DAC_{it} = \alpha + \beta_1 ACEff_{it} + \beta_2 REPUT + \beta_3 ACEff_{it} \times REPUT_{it} + \beta_4 FSIZE_{it} + \beta_5 LEV_{it} + \beta_6 MTB_{it} + \beta_7 ROA_{it} + \varepsilon_{it}$$

$$DAC_{it} = \alpha + \beta_1 ACEff_{it} + \beta_2 SPEC_{it} + \beta_3 ACEff_{it} \times SPEC_{it} + \beta_4 FSIZE_{it} + \beta_5 LEV_{it} + \beta_6 MTB_{it} + \beta_7 ROA_{it} + \varepsilon_{it}$$

$$DAC_{it} = \alpha + \beta_1 ACEff_{it} + \beta_2 TENURE_{it} + \beta_3 ACEff_{it} \times TENURE_{it} + \beta_4 FSIZE_{it} + \beta_5 LEV_{it} + \beta_6 MTB_{it} + \beta_7 ROA_{it} + \varepsilon_{it}$$

DAC, Discretionary accruals at the company i for years t. ACEffit. The effectiveness of the audit committee is measured using the Dezoort index. REPUT, auditor's reputation (1 if audited by a Big Four public accountant and 0 if not). SPEC, Specialization of auditor industry. TENURE, length of the audit engagement. ACEff x REPUT, Interaction between the effectiveness of the audit committee and the auditor's reputation. ACEff x SPEC, Interaction between the effectiveness of the audit committee and the auditor's specialization. ACEff x TENURE, Interaction between the effectiveness of the audit committee and the audit period. SIZE, company size (Ln of total assets). LEV, Leverage (total debt divided by total assets). MTB, market to book ratio (share market value divided by book value of equity). ROA, return on assets (net profit divided by total assets).

4. Results

4.1 Descriptive Statistics

The descriptive statistics for the 754 company years in the sample are presented in Table 2. The average absolute DAC is 4.11% of total assets, with a standard deviation of 0.17. TENURE has a value minimum and maximum of 1 and 20. Frequency statistical results show that Big Four auditors represent 27.6% of the sample companies, while companies audited by non-Big 4 audit firms represent less than 72.4% of the sample. In addition, the overall industry specialization (SEPC) average was 28.4%.

Table 2. Descriptive Statistics

	Min	Max	Mean	SD
DAC_{it}	-1,0113	1,5768	-0,0411	0,1771
ACEff	1	14	9,28	2,5040
TENURE	1	20	6,66	5,2340
ACEff x REPUT	0,00	14,00	3,0557	5,0600
ACEff x SPEC	0,00	14,00	3,0822	5,0409
ACEff x TENURE	1	252	65.0013	58,7541
FSIZE	9,9753	14,7541	12,4030	0,7145
LEV	0,00006	22.6105	0,5391	1,0019
MTB	-7,1200	26,2000	1,9554	2,6224
ROA	-1,0099	2,1920	0,0285	0,1376
n = 754				

4.2 Results of the Regressions

The results of the coefficient of determination are presented in Table 3. Models 1, 2, and 3 in this study show an adjusted R2 value of 0.384, 0.383, and 0.395. Table 3 also shows that the independent variable has a significant simultaneous effect on DACit because the significance value is below 0.05 or 5%. For model 1, 2 and 3, the F test results were 68.150, 67.833, and 71.183 with a significance value of 0.000. The coefficient of the interaction variable between audit effectiveness and the auditor's reputation (ACEff × REPUT) is negative and significant. These results support H1, which is that a higher audit committee effectiveness, and the presence of Big Four auditors will reduce earnings management. The effectiveness score of the audit committee and auditor specialist (ACEff × SPEC) is not significant meaning H2 is not supported. The coefficient of the interaction variable between audit effectiveness and the auditor's tenure (ACEff × TENURE) is negative and significant meaning H3 is supported.

Table 3. Regression Results (Audit Committee and Earning Management)

	(1)		(2)		(3)	
	t	Sig.	t	Sig.	t	Sig.
Constant	-2,153**	0,016	-2.301**	0,011	-2.846***	0,003
ACEff	-0,562	0,287	-0.560	0,287	1.986**	0,023
REPUT	1,539*	0,062				
SPEC			1.144	0,126		
TENURE					3.946***	0,000
ACEff x REPUT	-1,337*	0,090				
ACEff x SPEC			-0.988	0,162		
ACEff x TENURE					-3.656***	0,00
FSIZE	1,638*	0,051	1.789**	0,037	1.422*	0,078
LEV	-1,072	0,142	-1.069	0,142	-1.156	0,124
MTB	-3,849***	0,000	-3.941***	0.00	-4.083***	0.00
ROA	21,056***	0,000	21,155***	0,00	21,274***	0,00
F	68,150***		67,833***		71,183***	
n	745					
Adj. R2	0,384		0,383		0,395	

* Significant level 0.1; ** Significant level 0.05; *** Significant level 0.01

5. Discussion

The relationship between ACEff x REPUT and DAC in the tables above shows that there is a significant and negative effect. This indicates that hypothesis 1 is accepted, which means that the more effective the audit committee is, coupled with the use of a big four auditor, the less prevalent earnings management will be. This is consistent with the study of Alves (2013) which shows that the interaction between the effectiveness of the audit committee and the use of a big four auditor has a significant negative effect on earnings management. Rahmadani and Haryanto (2018) also found that the use of the big four external auditors had a significant negative effect on earnings management. Big four auditors have better incentives to detect and disclose reporting errors made by management. Big four auditors are more at risk when an audit failure occurs, so that the big four auditor can more effectively monitor the auditee. The audit committee has a close relationship with external auditors. The audit committee and external auditor have obligation to publish high quality financial statements. The oversight mechanism by the audit committee or external auditor cannot be carried out independently and separately because supervision they provide is a unity in the corporate governance structure.

The results in the tables above show that ACEff x SPEC has no significant relationship to DACit. This indicates that hypothesis 2 is rejected, which means that the effectiveness of the audit committee and the use of specialist auditors do not have a significant effect on earnings management. These results contradict previous studies, such as Zgarni et. al. (2016), which concludes that the complementary relationship between the effectiveness of the audit committee and auditor specialists will lower the prevalence of earnings management. The inability of auditor specialization to reduce the level of earnings management in the Indonesian stock market is perhaps because specialization is still in the initial stages in Indonesia. Further, only a small number of companies are audited by specialized auditors. The results of this study are in line with Dian and Yuyetta (2013), which states that auditors who are specialized in specific industries have no significant effect on earnings management. This

might be due to weak law enforcement in Indonesia, which makes auditors less able to develop the ability to detect earnings management practices. Auditors who are specific to certain industries and those not specific to certain industries have not been able to detect earnings management because the object of manipulation is not a financial report, but a process of reducing discretionary costs. This research is also in line with Fung, Gul and Krishnan (2012), which states that auditors who have experience and expertise are not necessarily independent and objective because they tend to retain their clients. Hence, it can be concluded that the ACEff and SPEC variables respectively do not have a significant effect on earnings management, and if the ACEff variable is modulated with SPEC, this also does not have a significant effect on earnings management.

Table 3 shows that ACEff x TENURE has a significant effect on DACit. This indicates that hypothesis 3 is accepted, which means the more effective the audit committee is, and the longer the external audit period, the less prevalent earnings management will be. This result is in line with Inaam and Khamoussi (2016), who state that an effective audit committee and a long audit period can reduce earnings management. Meixner and Welker (1988) suggest that interactions between audit committees and external auditors can increase with increasing audit periods (tenure) because more effective audit committees tend to retain auditors as long as the auditor can provide high-quality financial reporting. Further, Fitriany et. al. (2016) suggest that the longer the audit period, the more competent an auditor will be because they are able to achieve a deeper understanding of the company's internal controls, accounting information systems, and company-specific risks. This is also supported by Gul, Jaggi and Krishnan (2007), who state that auditors who do not have a deep understanding of clients will tend to depend on estimates and information provided by client companies. Audit quality and tenure have a non-linear or quadratic relationship, so that when it reaches its' optimal point, the independence of the auditor will decrease which will affect the auditor's relationship with the client, and will ultimately result in decreased audit quality. In the early years of audit assignments, there are many audit errors meaning that a longer audit period will result in better audit quality.

6. Conclusion

In conclusion, this study examines the effect of auditor characteristics on the relationship between audit committee effectiveness and earnings management practices in Indonesian companies. Acknowledging that Indonesia has an environment with different characteristics and regulations for company operations compared to other countries, this justifies an investigation of the problem in the Indonesian context. This study contributes to agency theory, enriching our understanding of how to effectively reduce agency costs by forming audit committees in Asian countries such as Indonesia. Countries with inadequate legal protection such as Indonesia will need more effective audit committees than countries with good legal protection.

The empirical results support the agency theory and corporate governance theory. The relationship between the audit committee and the quality of the external audit, which is an important mechanism of corporate governance, can reduce the manipulation of financial statements. The increased effectiveness of the audit committee and the high quality of auditors, which is characterized by the Big Four auditor, will be able to mitigate the possibility of earnings management. The effectiveness of the audit committee and the length of the audit work period can also reduce earnings management. However, specialist auditors and audit committee effectiveness cannot reduce earnings manipulation.

This study has some limitations. First, this research cannot be generalized to the entire world, particularly for developed countries. The results of the study may illustrate the condition of states with diffuse or no pyramid ownership, low investor protection, family ownership is common, and weak dependence on public debt. In addition, managers in developed countries often use more complex techniques, which are less likely to be captured with the accrual model in this study, thus making information for investors more opaque.

Secondly, earnings manipulation will be able to eliminate or reduce the ability of the cross-sectional expectation accrual model to detect earnings management actions. Third, estimates and choices of accounting policies are usually decided to signal private information. The use of one model to measure earnings management is subject to criticism.

Future research may wish to include aspects or other measures of earnings quality, such as actual earnings management or income smoothing. Further, it is also recommended that other measures of good corporate governance be used in future research. Other considerations include politically connected variables in the selection of company CEOs and state governments, as well as the role of audit committees in organizations with political connections in Indonesia.

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TOURISM MANAGEMENT IN BORDER DESTINATIONS: REGIONAL ASPECTS OF SUSTAINABLE DEVELOPMENT OF PROTECTED NATURAL AREAS

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Abstract. Mountain regions are natural boundaries and, in most cases, they are characterized by a fragmentation of ethnic composition and are places of contact between countries. Currently, national parks and reserves have been created in the border mountain areas. Touching within the state border, they require special attention for their sustainable development. In Central Asia, one of these regions is the Altai. In these areas, some specially protected natural territories were created as part of the World Heritage reserve, to preserve the nature, culture, traditions, and archeology of the four states. Studies of this area have revealed possible options for the development of cross-border tourism. This requires a coordinated policy on tourism management in cross-border destinations and the development of cross-border tourism. The results of the study made it possible to carry out functional zoning of the cross-border territory, develop a network of tourist routes and make recommendations on the creation of border crossings, as well as on the development of tourist infrastructure.

Keywords: cross-border region; Altai mountains; tourism; protected natural areas

1. Introduction

Many cross-border destinations are of interest to tourists. This is caused by an opportunity of closer contact with the territory of a neighboring state or of crossing the border and visiting a neighboring country. Tourism management in the border areas should be adaptive to the natural and socio-economic characteristics of a territory. Tourism development in protected natural areas is associated with territorial planning and allocation of functional zones, as well as identification of their recreational capacity.

Nature conservation and tourism development are closely interconnected, and therefore, research in this field may be of priority importance for border areas. However, various kinds of contradictions arise in the mountain regions. Complex terrain and inaccessibility lead to the need to build an infrastructure of a particular type. There are some contradictions of environmental and economic interests. Conflicts may be associated with a change in the traditional activities of the local population during the tourist season (Suprunenko, 2003; Singgalen et al. 2019).

Along with the tourist attractiveness of the mountain regions, they are distinguished by the increased vulnerability of the natural and socio-cultural environment. Management of tourism development in the border areas is of interest to neighboring states (Korableva et al., 2019).

The Altai mountain region is located in the center of Eurasia, within the borders of the four states: Russia, Kazakhstan, China, and Mongolia. In the alpine zone of the border area, there are protected natural areas. The presence of state borders in the region, on the one hand, separates, and on the other, connects countries in the Altai region, establishing the prospects for interaction in nature conservation and tourism development.

2. Literature review

Mountain regions are natural boundaries and, in most cases, they are characterized by a fragmentation of ethnic composition and are places of contact between countries. Borders can be barriers or areas of cooperation (Badenkov, 2002). The mountainous regions of the world are characterized by a significant variety of conditions and factors that ensure the opportunities for cooperation in border areas. The single natural-historical space of the border territories contributes to the interaction of nations.

A special type of space is created along state borders, characterized by different intensities of interaction between countries, including the intensity of cross-border flows. The border space is a zone characterized by the length, width, and density of objects (Kolosov, 2010).

Mountain ranges play a leading role in the territorial structure of tourism. They are natural boundaries and affect the fact that in a relatively small area, the climate, water resources (Yemelyanov et al., 2018), flora and fauna, and also local ethnic groups with a particular culture can vary significantly.

The desire to preserve the common natural and cultural heritage in a mountain region serves as a motive for many border territories of different countries to develop cross-border regional cooperation. The development of formal and informal ties between residents of border regions helps to strengthen mutual trust. Cross-border regionalism is caused by the desire to develop new effective forms of collective activity, to promote ethno-cultural interaction and economic development (Polyakova et al., 2019; Sharafutdinov et al., 2019).

Geographical cross-border entities are of particular importance in international cooperation. This is considered by the example of the Altai-Sayan region, and protected areas were identified that contribute to the conservation of biodiversity and the development of ecotourism (Dunets et al., 2019).

The idea of cross-border cooperation in the field of environmental protection in a region was first voiced in 1998 at a conference on the development strategy of Central Asia in Urumqi. A Protocol of Intent was signed to develop an international Convention on the sustainable development of the Altai Mountain Region (Badenkov, 2017). In order to preserve the unique natural complex and historical and cultural heritage in the Altai region, a number of major international projects have been implemented. Since 1997, on the initiative of the World Wide Fund for Nature (WWF), the project "Ensuring the Long-Term Conservation of Biodiversity of the Altai-Sayan Ecoregion (Global 200)" has been implemented. In 2001, a project for the development of protected natural areas in the region was prepared and a landscape map was created (Samoilova, 2000).

Important projects aimed at the development of protected natural territories of the border areas of the Altai were: the UN Development Programs UNDP/Capacity 21 "Development and Implementation of Local Sustainable Development Strategies in the Republic of Altai, Russia" (2001); UNDP/GEF "National Strategy and Action Plan for the Conservation of Biodiversity" (Kazakhstan, 2001); UNDP / GEF "Conservation of Biological Diversity in the Altai-Sayan Ecoregion" (Russia, Kazakhstan, Mongolia, China, 2001). UNDP/GEF "Biodiversity Conservation in the Russian Part of the Altai-Sayan Ecoregion" has contributed to the development of protected areas and ecotourism in the region. In 2012, WWF released the Altai-Sayan Ecoregion Conservation Strategy, which analyzes the situation, identifies strategic priorities for the protection and cooperation with the local population (Altai-Sayan Ecoregion ..., 2012).

In 2017, UNESCO officially approved the creation of Asia's first Big Altai transboundary biosphere reserve. It includes the Katun Reserve (Russia) and Katon-Karagay National Park (Kazakhstan). A plan of joint scientific and educational activities has been identified (Yashina, Krykbaeva, 2017). Based on the principles of the Seville Strategy for Biosphere Reserves, the main tasks are: to preserve the biological and landscape diversity, as well as the cultural values of the territory, to promote the sustainable development of local communities, to provide scientific and technical support for the conservation and sustainable development of the territory. During the development of the management plan for the cross-border territory, the main existing and potential threats that affect the biodiversity and ecosystems of the protected area were identified. In the Russian part of the Altai, there were three options for creating a cross-border biosphere territory. They suggested the inclusion of Russian units besides the Katun Reserve, a number of protected natural areas of the Kosh-Agachsky District of Republic of Altai and the Tigirek Reserve of the Altai Territory (Vinokurov, Krasnoyarova, Surazakova, 2006). However, the creation of a cross-border territory is a complex multi-year process that requires the political will and investment for development.

3. Methods

A study of the organization of tourism in the border territories of neighboring countries can be based on a regional research approach. For this, it is necessary to distinguish a cross-border territory as an object of study and consider the geographical position and administrative-territorial division of the studied territory. The sequence of studying the region involves an analysis of natural features and social conditions for the development of tourism. It is also important to analyze the social characteristics affecting tourism in the region (displacement of population, urbanization, ethnic structure, language, religion, traditions, etc.). An analysis of the main economic indicators of tourism should be carried out in accordance with the availability of infrastructure to preserve the natural environment, as well as the seasonality of tourist flows. This will identify the main problems and offer prospects for sustainable tourism development in the region. Such a study will allow for territorial planning, which is an important element of strategic management.

Territorial planning is aimed at identifying the spatial structure of actions and land use, which is necessary for rational nature management based on the region's natural resources, prerequisites, and limitations of tourism development (Hall, 2008). Territory planning has as its goal the preservation of the natural resource potential of

the territory, the formation of a comfortable environment for human life, safe and convenient settlement, cost-effective and environmentally sound distribution of economic activity. Suprunenko (2003) notes that mountain regions require special approaches to territorial tourism planning as they are characterized by reduced resistance of natural geosystems to anthropogenic stresses.

Management of tourism development can be based on the concept of a "polarized landscape" by Rodoman (2002), which proposes a model for the balanced development of urbanization poles and protected areas, while preserving the natural environment provides for the arrangement of recreational areas and tourist routes.

As an expression of the real planning embodiment of this concept in territorial design, the theory of the natural frame is used (Vladimirov, 1986). Kolbovsky (2006), studying the development of ecotourism, proposes to use the concept of ecological frame. The frame is a grid of numerous intersecting linear elements, in places at the intersections of which nodes are formed. The nodes of the frame are responsible for the implementation of the environment-forming function and are represented by the upper reaches of the largest rivers (upper landscape belts), lake systems, the largest forests, etc. (Stoyashcheva, 2007). Transit corridors are called continuous or partially discontinuous almost linear structures, the natural properties of which differ significantly from the surrounding environment. Ecological corridors are considered an important factor providing species migration (Kolbovsky, 2008).

Garms, Sukhova, Khromykh (2014) highlighted the zoning of the cross-border territory of the Altai. For this purpose, the favorable conditions for tourism of the relief, climate, water resources and vegetation were studied in the border administrative districts.

The territorial organization of tourism activities should be based on the development of concepts and models for the optimal localization of tourist flow and the identification of the territorial planning structures of the region. It includes zones with different security arrangements and tourist development. For this, it is necessary to carry out functional zoning as an obligatory action when doing the territorial planning of protected areas. The basic principles of functional zoning are considered in numerous sources and there is a study on the generalization of the available experience for recreational areas (Mironenko, Bochvarova, 1986). Functional zoning is aimed at preserving valuable territories and ensuring the maximum compliance of tourist resources in accordance with the law.

Chernova (2018), from the point of view of recreational zoning, suggests combining the natural complexes of the cross-border Altai region into recreational and nature protection, economic and recreational, nature protection and recreational, recreational and economic, economic and nature protection zones.

In the border regions of the Altai, one can distinguish such functional zones as the resource zone, including territories and water areas, the zone of residence of the local population and temporary service staff (housing, a number of tourism and recreation facilities, services, etc.), the zone with economic functions (agriculture, industry, and transport), the protected zone, the zone of tourist accommodation facilities, the intensive use zone for serving tourists, and the tourist routes. However, within the protected natural areas, it is necessary first of all to distinguish a nuclear protection zone and a buffer zone. In these territories, a special visiting arrangement and a limited number of tourists are provided.

In the territory of the Big Altai cross-border biosphere reserve, several functional zones have been identified: a reserved core to provide long-term protection of biological and landscape diversity; a buffer zone created to prevent and minimize the negative impact of anthropogenic activities on protected areas; a cooperation zone in which activities are aimed at promoting the sustainable development of local communities (Yashina, Krykbaeva, 2017). The earlier work on landscape planning of the Ukok Plateau made it possible to allocate territories for the

purposes of "preferential preservation of the current state", "abandonment of use" and "preservation of existing extensive use" (Babin *et al*., 2011).

The tourist route is the basis of the spatial organization of tourist activities. The functional purpose of the route, due to the combination of individual actions and attractions, determines the type of tourism. Therefore, in the territorial organization of tourism, the basis of ecotourism development of protected natural areas may be a network of routes that optimally ensures the availability of tourist facilities.

Thus, tourism research in protected areas includes regional studies of the natural basis and development of a territory, and management should include the development of an action plan based on functional zoning as a necessary part of planning the territorial development of a cross-border area of the Altai region.

4. Results

The geographical position of the border protected natural areas of the Altai is ambiguous. The Russian part of the region is remote from the main centers of tourist suppliers. To the north of the Altai, there is the main settlement strip in Asian Russia. Therefore, the Altai Mountains for tourists of Siberia are the most accessible region for recreation. In the west, the region is adjacent to the territories of Central Asia. The southwest Altai is interesting for both domestic and international tourists. The presence of the sanatorium "Rakhmanovsky Creek" contributes to the development of health tourism. This region is traditionally popular for hiking and exploring the life of Old Believers. The Altai District of Xinjiang Uygur Autonomous Region is located on the periphery of China and, basically, is now attractive for domestic (Chinese) tourism. There is the only area of Siberian taiga in China, the territory is very popular, and Kanas National Park attracts about 2 million tourists annually.

The intercontinental position of the Altai determines the intersection of the geopolitical interests of countries, including the protection of the natural and cultural-historical heritage, as well as the development of tourism. The presence of state borders in the Altai has now led to significant differences in the structure and types of environmental management. However, similar features are characteristic of border regions: a certain range of types of economic activity, a low level of development, ethnocultural similarity, etc.

The problems of tourism development in a cross-border region are largely associated with the difficulties of visiting border areas, poor development of border crossings and visa formalities. Many tourist-friendly objects are located in the border zone (the Ukok Plateau, the Belukha Mountain, etc.). Tourists are interested to visit two or more countries at once when traveling to the highlands of the Altai.

Specially protected natural territories have been created in the border areas of the Altai. The basis of territorial nature conservation is protected areas of the following categories: reserves, national parks, and wildlife sanctuaries. Among them are: Katun and Markakol Reserves; Saylyugem, Sayluchem Nuru, Katon-Karagay, Kanas, and Tavan-Bogd national parks. In 1998, five sites of the Republic of Altai were included in the register of the UNESCO World Heritage Sites. These territories are called the Altai Golden Mountains (figure 1).

Fig. 1. Protected areas of the cross-border Altai region
Source: authors' research

However, the increase in the number of protected areas, including those with a strict security arrangement, does not bring full satisfaction to both local residents and tourists. An important task is the functional zoning of the protected natural territories of the region and the management of the procedure of tourist visiting these territories and their buffer zones. The most successful work can be noted in Kanas National Park. Here, the allocation of protection nuclei is combined with the development of traditional farming in villages and the development of hiking trails. Most hotels are located outside the national park. Sustainable development in the region is impossible without improving the quality of life of the population. Therefore, it is necessary to combine nature protection with the development of the traditional economy and tourism.

The border has an important transit function. In most cases, tourists do not stay at the border; having passed the necessary control, they continue to follow the main destination. However, the state border may be an object of special interest for tourists, and the border territory can act as a tourist destination (Aleksandrova, 2009). For example, between Russia and Mongolia, at the border checkpoint of Tashant, the neutral strip occupies more than 20 km. For many tourists, the very stay in this strip is of interest, since there is no anthropogenic impact. For example, marmot-tarbagans (*Marmota sibirica*) have a large population there and are not particularly afraid of passing cars. The use of border areas as tourist destinations is based on a variety of landscapes and the presence of unique objects attractive for tourism.

The reliefs of the border areas of the Altai are characterized by mountain ranges, elevated hilly plateaus, and intermountain basins. The higher the mountains, the more they are popular among tourists. The relief most attractive for tourism is characterized by an absolute height of more than 1,500 m, a slope steepness of 30-35º, and a depth of vertical dissection of more than 800 m (Bredikhin, 2004). In the southwest of the cross-border zone in the Markakol Reserve and Katon-Karagay National Park, the depth of the relief is from 300 to 600 m. On the Katun Ridge in its highland part, the relief is 1,000-1,200 m or more (Garms *et al*., 2014). On a large territory of the Ukok Plateau at a height of about 2,000 m, there are many ancient moraine deposits. The relief of the highlands is distinguished by contrast, aesthetics, attractive landscapes, but is not suitable for mass tourism due to the severity of the bio-climate, low atmospheric pressure and the inaccessibility of tourist activities in the highlands. Most territories of the cross-border Altai have a favorable relief for the development of tourism.

The climate of the region has pronounced continental features: cold long winters and short warm summers. Together with the relief, the climate has a decisive natural influence on the development of tourist and recreational activities. In winter, an Asian anticyclone is located here, which gives a long cold winter with pronounced temperature inversions. The temperature at the surface of the earth in the intermountain basins is lower than on the mountain slopes. The relief affects the formation of local winds (hair dryers, slope, valley, glacial and other winds).

The water components of the natural complex constitute an important part of the natural resources of the cross-border region. Many lakes are picturesque and attract many tourists. A large center of glaciation is the Tavan-Bogdo-Ula mountain junction, where the largest valley glaciers are located. Other large massifs of glaciers are the Belukha glaciers. There are small glaciers and firn fields in a number of other mountain ranges. The lakes are also of interest; the largest one is the Markakol, Kanas. There are many lakes on the Katun Ridge and in the Mongolian Altai. A denser river network is in the Russian and Kazakhstani parts of the Altai. In forest and nival-glacial landscapes, it is possible to organize hiking, skiing, mountain trails, as well as climbing. The combination of glaciers and peaks with a height of more than 3,000 m creates excellent conditions for organizing mountain trips. Interesting water features for tourists are waterfalls. The largest of them is the Kokkol, its height being 80 m (the Katon-Karagay National Park). The Rassypnaya waterfall (the Republic of Altai), with a height of 35 m, is very famous.

On the leveled surfaces of valleys, hollows, and plateaus, the landscape is mainly steppe, and in the mountain taiga zone up to an altitude of 2,000-2,200 m, there are larch forests. In more humid areas, dark coniferous taiga of cedar, fir, and spruce dominates. In the lower zone of the highlands, thickets of undersized shrubs and subalpine meadows dominate, which are higher replaced by alpine meadows with an abundance of herbaceous plants. For scientific tourism, such factors as endemic species and the presence of rare plant communities are important. This enhances the cognitive and scientific value of the territory, represents a resource base for ecological tourism, but also imposes environmental restrictions. Landscapes of the territory are low-mountain, mid-mountain, and high-mountain (Fig. 2). The fauna of the cross-border territory is also very rich and diverse. The region is located at the junction of the Central Asian and Siberian faunistic provinces. In the southern, Mongolian part of the region, steppe and semi-desert species prevail: dzeren, marmot-tarbagan, birds of prey.

Argali (mountain sheep), mountain goat, snow leopard, golden eagle, and ular are found only in the highlands. In the highlands, yaks and camels are bred.

Currently, there is a revival of old traditions associated with pagan customs, Shamanism, Islam, Buddhism, and Lamaism. The culture of indigenous peoples is based on the traditions of pastoral tribes leading a nomadic lifestyle (nomadic animal husbandry). Part of the population still lives in plagues, yurts, and other traditional structures. Many ethnic groups still retain the traditional way of life and nature management.

The Bayan-Ölgii Aimag of Mongolia is mainly populated by Kazakhs (about 90%), Urikhai people (7.2%). The Kosh-Agachsky District of Russia is also populated predominantly with Kazakhs. In the Altai administrative district of China, the most numerous are Kazakhs, Chinese, Uighurs, Dungans, Oirat Mongols, etc. The Altai is famous for its abundance of archaeological sites. On the Ukok Plateau, there are mounds of the Pazaryk culture, including the burial place of "the Altai Princess". In recent years, many amazing archaeological finds have been made and the cross-border Altai can be a place of archaeological tourism. Traditional nature management and life features of the local population significantly increase the attractiveness of the territories (figure 2, table 1).
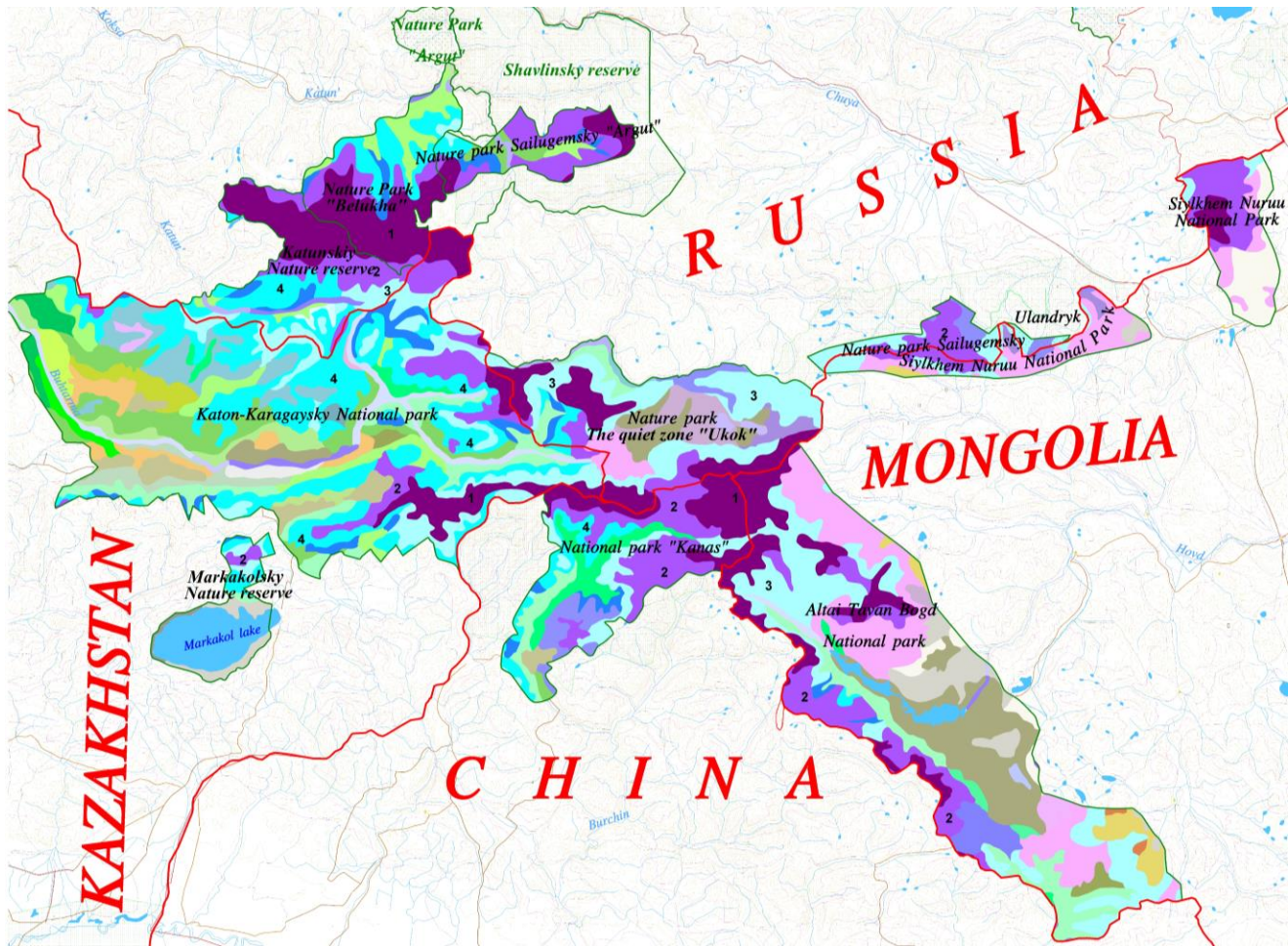
Fig. 2. Landscape map and protected areas of the cross-border Altai
Source: authors' research

Table 1. Characteristic landscape structure of protected natural areas of the cross-border Altai

№	Name protected natural areas and area in sq.m.	The number of types of landscapes / numbers of the main types (percentage of the total area)	Numbers and names of the main types of core landscapes protected natural areas
1.	Katunskiy Nature reserve, 3 275 342	9 / 1 (28%); 4 (26%)	**High-mountainous**
2.	Nature Park "Belukha", 3 037 360	10 / 1 (40%)	**Exarational erosion denudational**
3.	Nature park The quiet zone "Ukok", 5 758 661	15 / 3 (33%); 1 (20%)	**Nival-glasial** (1) Alpine deeply dissected and fractionated high mountains with glaciers, stony placers, snow-patches; cryopetrophytic plant communities, fragments of tundra vegetation on primitive mountain-tundra soils
4.	Nature park Sailugemsky, 900 861	3 / 2 (50%)	**Tundra**
	Ulandryk, 127 578	3 / (60%)	(2) Alpine deeply dissected high mountains with steep slopes, rock talus and glacial tills in valleys;
	Argut, 1 761 858	6 / 2 (49%); 1 (18%)	cryopetrophytic plant communities, moss-lichen and low-shrub tundra on skeletal mountain-tundra soils
5.	Katon-Karagaysky National park, 19 413 396	30 / 4 (23%); 3 (9%); 2 (6%); 1 (5,5%)	alternating with nival-glacial complexes (3) Planated deeply dissected high mountains with a shallow stony-loamy mantle, niv al-cryogenic
6.	Markakolsky Nature reserve, 1 719 919	8 / 4 (10%); 3 (7%); 2 (4%) Площадь озера 57%	features; lichen-moss, shrubby tundra, locally associated with cryophytic forb-grass-sedge and Cobresia communities on mountain-tundra peat-mucky cryogenic and mountain peat-raw-humus soils
7.	National park "Hanasi", 4 988 247	10 / 2 (27%); 1 (18%)	**Alpine and subalpine meadow**
8.	Altai Tavan Bogd National park, 1 412 125	25 / 3 (18%); 1 (10%); 2 (9%)	(4) Planated, with rounded summits, deeply and sharply dissected high mountains with rock outcrops and talus, locally of alpine type with a shallow
9.	Siylkhem Nuruu National Park (cluster 1), 1 556 426	8 / 2 (14%)	loamy-stony mantle, with fragments of boulder-loamy till, stony placers; alpine and subalpine meadows and low shrubs, parcels of tundra and
	Siylkhem Nuruu National Park (cluster 2), 1 873 605	5 / 2 (43%); 1 (11%)	sparse forests on mountain-meadow soils

Source: Samoilova, 2000

Landscapes of glacial-nival highlands with tundra vegetation are highly significant; however, the bioclimatic conditions of these territories are extreme for visiting. The landscapes of mountain taiga with larch forests, alpine meadows, mountain tundra with meadows and shrub tundra are attractive for tourism. Tundra-steppe landscapes are not of particular interest for visiting.

In order to develop cooperation in the border regions of the Altai, coordination of functional zoning is necessary, taking into account the value of landscapes for protection and the possibility of tourist use. Evstropyeva (2009) notes that the associated tourist development of the border areas leads to the "blurring" of the borders for tourists and the increase in the effects of interaction in the cultural, social, economic and environmental spheres. Active cooperation between Altai countries in connection with the implementation of joint tourism projects not only opens up the opportunities for increasing foreign tourist flows to the countries of the region but also helps to expand similar ties with other neighboring states.

An effective way to overcome administrative boundaries is to organize cross-border protected natural areas. Interstate borders are more surmountable, since states are territories of administrative division of a world level and agreements are reached at official negotiations between countries. This relates to the contradiction of the non-economic ideology of creating nature reserves at the global level (Kalikhman, 2007). The goal of creating cross-

border protected natural areas is to preserve the unique ecosystem of the Altai highlands and glaciers, and possibly to obtain the status of a World Natural Heritage. To manage them, a "polarization of ecosystems" is necessary with separation into areas of permissible tourist use and conservation of natural resources. It is also important to develop the local traditional economy. For this, the authors have proposed a scheme of functional zones (figure 3).
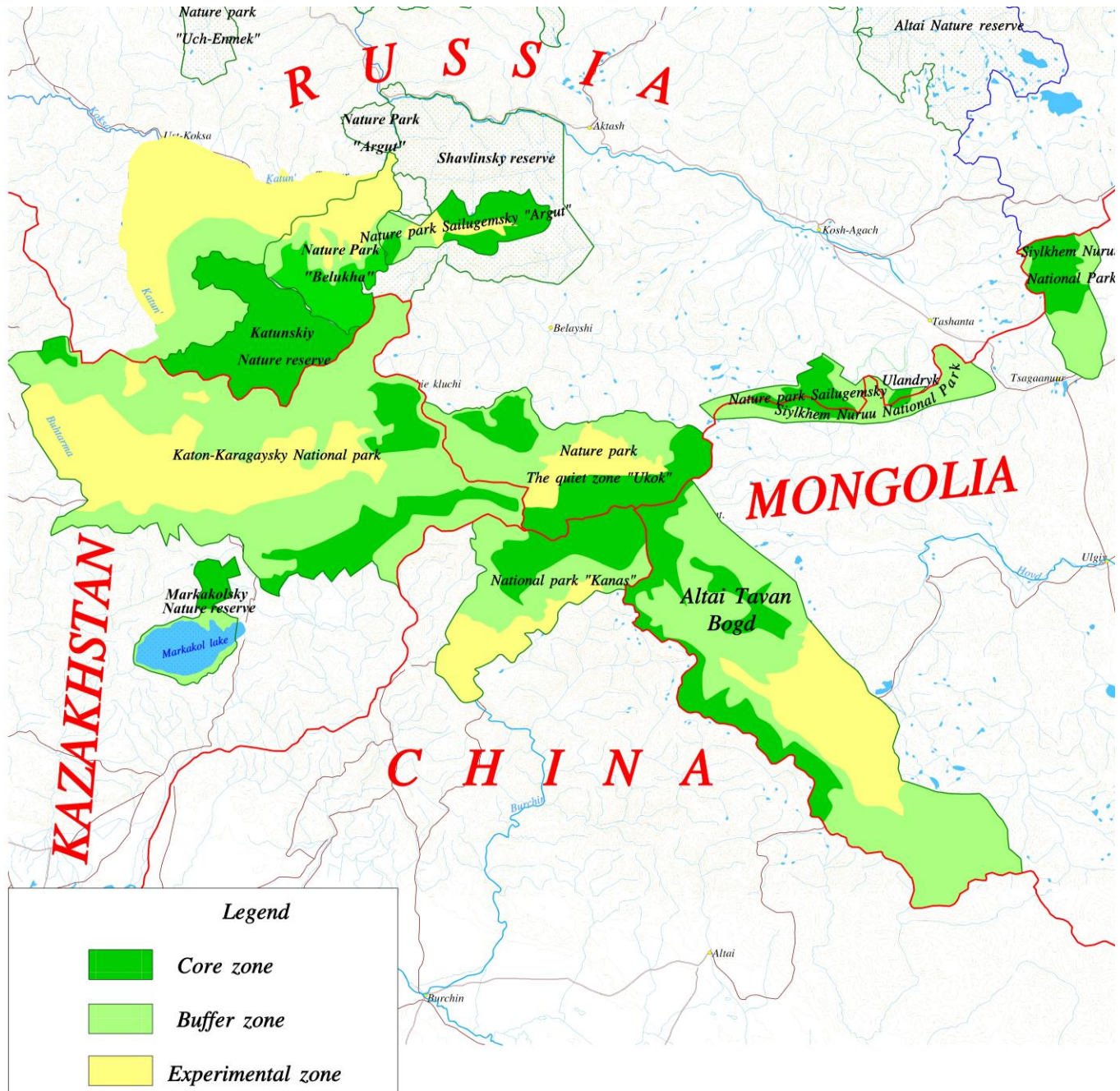
Fig. 3. Functional zoning of protected natural territories of the cross-border Altai
Source: authors' research

Functional zoning shows the priorities in organizing activities in the territory. In order to manage the development of tourism in the border areas, it is necessary to form a frame of ecotourism. The frame contributes to the formation of a single cross-border region. The analysis has shown that is the linear planning type of tourist zones, formed on the basis of natural dominants, intermountain basins, along the banks of water bodies, in river valleys, is the most widespread in the Altai. However, the presence of significant tourist sites, primarily lakes, contributes to the formation of tourism centers. The local population to some degree influences the ecological frame. For example, sacred places for residents are protected from the environmental, cultural, historical or spiritual points of view. An example would be an active public campaign against the construction of the Russia-China highway through the Ukok Plateau. From an environmental perspective, the issue is also not so straightforward. On the one hand, the construction of direct infrastructure is possible only with an obligatory intersection of at least a World Natural Heritage Site – the Ukok Quiet Zone, although there are some examples in the world of intersections of UNESCO World Heritage Sites by roads (Krasnoyarova, 2010).

In the conditions of a cross-border mountain region, it is advisable to design routes including territories of two or more states. For example, the main cross-border route is the Altai Golden Mountains. This route brings together many existing and planned tourist facilities located in four states. The idea of the route is combining objects with a network of roads and engineering infrastructure (Pomorov, 2008). However, the existing road network does not contribute to the development of the route. There is a need for the formation of new transport corridors primarily between the Republic of Altai and East Kazakhstan Region. The construction of the road from the point of the confluence of the Chuya River into the Katun to the settlement of Tyungur will significantly increase the flow of tourists to Belukha Natural Park and the Katun Nature Reserve. Tourist flows will not only be dispersed along the network of routes but will also concentrate in the ecotourism centers. Basically, they will probably be small and tend to the main roads, where several routes converge.

For cross-border cooperation in the Altai, it is necessary to create new border crossings, possibly working only in the warm season. One of them is advisable to be created in the upper Katun. This will provide a real link to the cross-border protected natural area – the Katun Reserve and Katon-Karagay National Park. This will contribute to an increase in the number of tourists in the border areas and, according to experts, after the opening of the crossing, within 1-2 years the number of cross-border tourists will be 10-15 thousand at the initial stage. The tourist flow to Katon-Karagay Region of Kazakhstan will naturally enter the Russian part. In addition, circular tours will become possible, starting in the Russian Altai through Kazakhstan and back to Russia. Such cross-border routes will be of particular interest for third parties (for example, Chinese tourists). Fig. 4 presents the offers on the development of the ecotourism frame of the cross-border Altai. The implementation of these offers will change the tourist and geographical position of the region. A peripheral border area may become a transit for tourists wishing to visit the Altai (figure 4).

Fig. 4. Promising ecotourism frame of the cross-border Altai
Source: authors' research

5. Discussion

The border parts of the Altai are distinguished by an increased relevance of ecological tourism, due to the presence of a large number of protected natural areas. Consideration of aspects of the territorial administration of protected areas should include the expansion of the area of protection and research of natural heritage, as well as the construction of trails in the natural territories as the basis of the visiting infrastructure in accordance with the principles of ecotourism.

Preservation of the natural and socio-cultural environment of the mountain region is associated with the planning of adequate types of tourism organization and identification of the optimal capacity of tourist flows. For mountainous areas, it is especially important that the higher the ecological value of objects, the less human-induced interference should be. The deeper the tourist center is embedded in the natural landscape, the smaller its size should be.

The mechanism for the development of cross-border tourism cooperation and tourism resources of the border areas of the Altai has not yet been developed. Therefore, it is important to create a coordination council for tourism, which may include administrative entities of the Altai countries, within the framework of which it could be possible to manage tourism activities in the region. Such work already has some initial results in connection with the activity of the International Coordination Council "Our Common Home – Altai".

Important principles for the development of border areas include: taking into account landscape elements in the architectural style of tourist zones; priority construction of year-round facilities; construction of tourist camps for a one-day stay of tourists on mountain routes. When planning tourism in protected areas, it is advisable to design not individual buildings, structures, and complexes, but the landscape as a whole, preserving its original characteristics and appearance; to integrate architecture and nature leaving the priority for the latter; to form buildings, structures, and complexes as "extensions" of the natural landscape (Pomorov, 2008). It is necessary to ensure low-rise construction of accommodation facilities and other tourist infrastructure. However, such territory planning should not affect the decline in the quality of service. Currently, consumers of travel services increasingly prefer comfortable accommodation, equipped territory and hiking trails.

The organization of the tourism structure of a cross-border region is associated with the implementation of specific tourism projects on the basis of the principles of sustainable tourism development and interstate cooperation. First of all, such projects are: ecotourism development of protected natural areas, cross-border routes, tourist infrastructure, information network (Altai Transboundary website www.altaiinter.info, etc.).

Tourism cooperation between administrative entities of the region may include support for inter-regional tour operators, branding of inter-regional (cross-border) tourism products, interaction in solving the problem of staffing in tourism, support and development of all forms of ecological and rural tourism, joint campaigns to popularize ecotourism, creating a tourist system monitoring, and exchanging information on border areas, development and interaction of regional and border information systems and creation of tourist information centers, exchange of staff in the tourism sector, ensuring interaction between educational institutions of states, the security of tourist trips.

Conclusions

Thus, the development of the Altai border territories is connected with the solution of a wide range of tasks for the protection of the natural and cultural heritage, the organization of tourism, and the search for ways of sustainable development of the territory. In the context of globalization, cross-border cooperation in the field of tourism is one of the most important elements of international cooperation. For the further development of tourism, it is necessary to comprehensively use border areas, ensure the accessibility of the territory by creating checkpoints and tourist infrastructure and developing cross-border tourist routes.

The authors have created maps to identify the features of the development of protected natural areas in the Altai border territories. The study done to identify the landscape diversity of protected areas and the analysis of nature

conservation and tourism development activities made it possible to identify functional zones for the purpose of territorial tourism management. This can be a management tool for the sustainable development of border areas.

Based on the idea of the ecological frame of a territory, the authors have proposed a scheme of the eco-tourist frame. The security nuclei, a network of major tourist routes and centers, some places for creating border crossings were recommended.

The unique natural and cultural-historical tourist and recreational resources of the Altai and a relatively good ecological condition of the territory attract the attention of not only tourists, but also of many state, public and private organizations. In this regard, at the interstate and inter-regional levels, it is necessary to conclude an agreement aimed at sustainable nature management; to develop programs for sustainable development of the Altai border territory.

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BANK RISK MANAGEMENT IN THE CONDITIONS OF FINANCIAL SYSTEM INSTABILITY

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Abstract. Purpose of research is to influence prompt decision-making on the financial market in case of risk management of the bank. The banking sector is usually undergoing a serious reform phase. Investigating the bank's risk management basics using modern approaches to risk assessment and management in banking. The bank's risk leads to the loss of credit institutions and deterioration of liquidity, due to adverse events occurring, depending on internal and external factors. The article discusses the organization of the bank risk management system, methods of risk management, quantitative and qualitative risk assessment. Banks use various methods to reduce their risk. The main types of risks, risk management system, ways of managing bank risks and ways to reduce them were considered. Quality of the bank's management, especially the risk management process, are the key factors that ensure stability and security of banks and the banking system as a whole. Common methods of scientific research have been developed. It is necessary to pay special attention to the risks of banks on the financial market. The deterioration of the situation in the financial market was associated with problems accumulated over many years, and some problems were solved, which in turn led to risks. The structure of the bank's risk management mechanism is presented, the characteristics of its elements are identified and the key objectives of the management mechanism are identified. In the study, all banks in the financial market were analyzed using the models in Gretl, with the major risk factors being analyzed. The mechanism of risk protection of banks consists of current methods of risk management and methods of its reduction. The roles, responsibilities and powers of regulatory bodies in the creation of an effective system of legal norms regulating the peculiarities of the risks taken by the bank are risk management as an element of the internal control system of banks. In the conditions of instability of the modern economy, the banking market can not be risky. The risk is in any bank activity, but it can be at different levels. In addition, the current risk management is to monitor important indicators and timely adopt operative decisions on banking transactions.

Keywords: bank risks; credit organization; profitability; stability; equity; risk management; competition; instability; financial markets; active transactions; internal control; bank system; banking supervisor authorities; executive management

1. Introduction

The significance of risks in the banking sector is determined not only by potential losses from the credit organization, but also by using its clients' money and assets in its activities as a whole as part of the banking system. Risk management policy in the banking sector is a document defining the overall strategy, directions and risk management strategies, as well as the development strategy of the risk management system. The head of the state has noted the need to complete the clearing of the bad loan portfolio (Nazarbayev, 2018). For 25 years, our Tenge has been established on the Kazakhstani market, but changes in the market are still affecting our Tenge, and the exchange rate is changing every day.

The Bank's failure in the market economy is a natural process that promotes the recovery of the banking sector. Given that the banks did not pay much attention to the risks, In July 2018 the legislative measures were taken to strengthen the National Bank's supervisory mandate to avoid a repeat of risk management policy. These amendments were enacted legally on 1st of January 2019. The National Bank's management has introduced a risk-oriented surveillance system based on the SREP (Supervisory Review and Evaluation Process).

This, of course, will have a positive impact on the banking sector and will improve its efficiency. In introducing the new system, the National Bank will ensure the continuous functioning of the financial sector and timely respond to the most pressing problems.

The new system will become more and more adaptable to the changing nature of emerging financial risks as the modern markets develop. The VIII Congress of Kazakhstani Financiers, jointly implemented by the National Bank and the Financiers' Association of Kazakhstan, is one of the most important measures. Decisions were made in the following matters such as the application of the national currency, introduction and use of risk-based approaches in financial supervision, the cash flow prospects, the protection of the rights of financial service consumers in the modern world.

In order to prevent the situation with high risk policy of Kazakhstan banks, starting from January 2019, risk-based supervision was introduced. The banks' capitalization requirements and the risk management system were tightened. The recovery of the banking sector and the introduction of new methods of regulation and supervision considerably reduce the risks for bank depositors. At the same time, due to the growth of bad debt balances and capitalization, banks tighten credit requirements.

2. Research background

Today we can be sure that the timely and implemented program not only gives impetus for new loans, but also improves the banks' loan portfolio, which, in turn, has a positive impact on the banking sector. The study of domestic and foreign scholars on the subject such as Lisak B.I. (2017), Iskakov U.M. (2016), Caplinska, A., Tvaronavičienė, M. (2020) is important for theoretical and analytical developments to analyze and evaluate credit risks in the bank's loan portfolio, which predetermines the bank risk vulnerability.

Banking operations are at greater risk due to market changes. Besides the functional function, the bank performs public functions and carries out monetary and credit policy. The bank's risk manifestations include reductions in profitability, loss of liquidity, loss of assets and so on. However, they generally affect the financial reliability of the credit institutions and the stability of the banking system as a whole, so they need to be managed and prevented (Lisak, 2017). In some banks, the share of unsecured collateral loans exceeds 80% of their loan portfolio. This is considered a very high risk. In this regard, last year the National Bank implemented the program of financial stability improvement of the second tier bank sector. A risk-based approach will be introduced since 2019 to prevent the situation with high risk policies of Kazakhstani banks.

Its main purpose is to improve the banking sector through increased activity to reduce non-performing loans in the banking sector and to facilitate further growth of lending to the economy (Iskakov, 2016).

Five major banks (Eurasian Bank, JSC ATF Bank, Tsesnabank, Bank CenterCredit and Bank RBK) have been assisted within the framework of the state program. It was the main support for economic growth in the country. They represent 30% of the total loan portfolio of the whole banking system and 25% of all deposits and public sector deposits. Second-tier banks have eliminated an overwhelming majority of bad loans of the program participants and have started to lend to the economy.

In the framework of the program, banks have started lending to borrowers from the beginning of 2018, taking into account the problem loans of about 865.4 billion Tenge and 775.5 billion Tenge. In addition, special attention should be paid to doubling the non-performing loans by more than two times from 25% at the beginning of 2017 to 50% by November 1st, 2018. In its turn, banks' shareholders have invested 421 billion Tenge in five years. The bank must take measures to recapitalize the bank in the amount of more than 1.2 trillion Tenge, and quality of assets (rehabilitation of borrowers, additional collateral, loan collection).

Within the framework of strengthening the National Bank's supervisory mandate, legislative strengthening of the regulatory and supervisory mandate and made a decision to supervise the banks' real financial condition, and the banks adopted risk-based supervision principles, taking measures to prevent the asset and passive operations of banks to the threshold level.

These measures will eliminate the negative experience of banks in conducting banking operations, which will allow to stabilize the banking sector and increase the role of banks in the medium-term perspective. In the first 9 months of 2018 inflation amounted to 3.3%.

Annual inflation in September 2018 decreased to 6.1% compared to 7.1% at the end of the last year. On October 15, the base rate increased from 9% to 9.25% to reduce the risk of inflation growth. A new level of basic rate increases demand for Tenge assets and saves favorable cash conditions.

Conditions for problem loans market at the legislative level were created to increase the effectiveness of problem assets solvency, tax incentives for transferring non-performing assets to special subsidiaries.

Last year, the program of financial sustainability of the banking sector adopted in January-September of the last year amounted to about 794.3 billion Tenge. Banks were obliged to reduce the "bad" assets in the amount of about 1.2 billion Tenge. Banks' bankruptcy or default is associated with economic conditions, independent ratings or political circumstances.

For example, in 2017 eight banks in the US were recognized bankrupt. In Russia in 2017-2018 there were insurance payments to 82 banks, and over the past three years there were 310 banks. In 2017, four banks were exposed to default, three of them - Bank Astana and Qazaq Banki JSC, Eximbank JSC, and Kazkommertsbank JSC owned by Halyk Bank.

It has made a significant contribution to the market of banks, especially the JSC Kazkommertsbank. If we take into account the share of the financial market, Qazaq Bank's share makes 0.9%, Eximbank - 0.3%, and Bank of Astana - 1%, so they did not cause serious financial market risks, but for several years, banks which were able to provide banking services, could not avoid the risks that can not be predetermined.

And as a result, we have nowadays this situation. In the crisis, the problems of banks can be solved only by the state, and can create all conditions for the restoration of financial relations and further development of the economy of the country as a whole (Lavrushina, Valentsova, 2016; Fakhry et al, 2018; Tvaronavičienė et al., 2018; Ashraf et al., 2019; Rahman et al., 2019; Siddique et al., 2020). Such government support is only applicable to a particularly serious systemic crisis.

3. Materials and methods

When considering the state of the loan portfolio of the second-tier banks of the Republic of Kazakhstan, JSC "Kazkommertsbank" failed to meet financial difficulties and could not resolve the internal risks in due course, this year it was transferred to JSC Halyk Bank. Halyk Bank JSC is currently holding the group. When analyzing the eight banking sectors in Kazakhstan, we see that second-tier banks can not lend money properly to the country's economy and lending is slowly growing.

Let's consider the loan portfolio of eight major banks in the financial market.
1. Loan portfolio of JSC Halyk Bank is 28%.
2. In Tsesnabank JSC makes 19%.
3. Sberbank JSC is 11%.
4. Bank Center Credit makes up 11%.
5. Kaspi Bank JSC makes up 9%.
6. ATF Bank is 8%.
7. The Eurasian Bank makes 8%.
8. The Forte Bank has a stake of 9%. (figure 1).
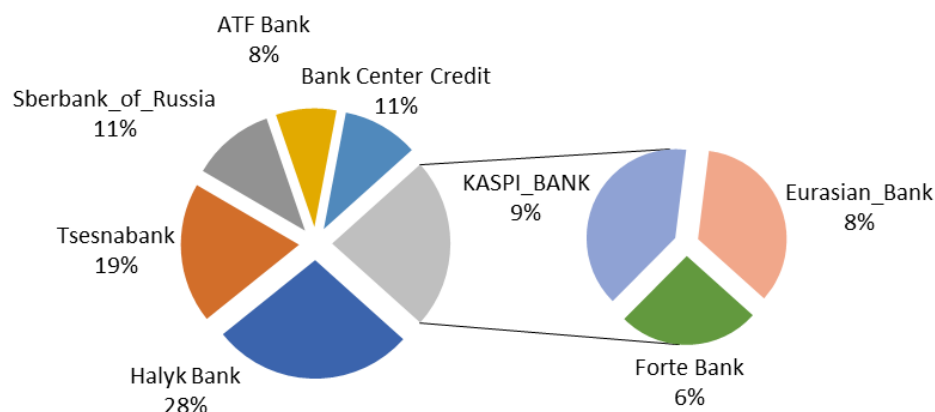
Figure 1. The percentage of loan portfolio of some second-tier banks of the Republic of Kazakhstan in 2017.
Source: compiled by authors according to www.nationalbank.kz

When considering the share of the loan portfolio in the financial market, we can see that banks providing retail lending, that's to say, loans which pay special attention to consumers and serve individuals - Kaspi Bank JSC - 9%, Eurasian Bank - 8%, Forte Bank - 9%, they make 23% of the whole market.

Apart from the functional activity of the bank, it performs public functions and carries out monetary and credit policy. Due to market changes, the bank's operations are at greater risk.

Identification and control of the bank's risks are of interest to most parties.

The estimation of the actual risk level for the bank consists of two approaches.
a) evaluation of risk level indicators.
b) classification of assets by risk groups.

Classification of risk indicators can be based on risk size and indicator type. Depending on the extent of risk associated with its object valuation, the bank's portfolio risk, personal risk and complex risk method are determined (International convergence of capital measurement and capital standards, 2018). The bank's asset quality affects all aspects of banking operations.

If the borrowers do not pay interest on the loan, the net profit of the bank will decline. In turn, low incomes (net income) can lead to lack of liquidity. In case of insufficient funds, the bank must increase its liabilities only to cover administrative expenses and interest on its current loans.

Unstable (low) net profit does not allow to increase bank capital (International convergence of capital measurement and capital standards, 2018). The quality of bad assets directly affects capital. If the borrowers do not pay the principal amount of the loan, the assets require the cost and the capital will be reduced, and the excessive debt is currently at the level of the credit risk. Let's consider the assets of eight major banks in the financial market (figure 2).
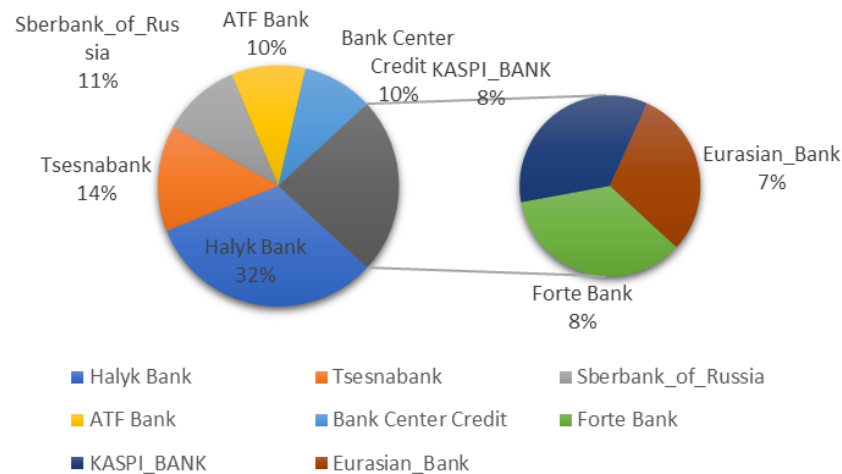
Figure 2. The percentage of assets of some second-tier banks of the Republic of Kazakhstan for 2017.
Source: compiled by authors compiled by authors according to www.nationalbank.kz

Analysis of this diagram shows that Halyk Bank has 32%, Tsesnabank 14%, Sberbank JSC 11%, Bank Center Credit 10%, ATF Bank 10%, Kaspi Bank 8%, Forte Bank 8%, Eurasian Bank 7 % in total.

The statistical characteristics of the variables analyzed are shown in Table 1. Based on banks' performance indicators. The dependent variables were obtained from banks' assets. Obligations of the bank's assets have connections with ROA, NPL, ROE. We can verify the factors that are important by using the X1 through X14 GRETL. Model 1: Method of small squares (MSS) (Table 1).

Table 1. Model 1: Gretl // MSS, obtained from indicators 1-32 (n = 31)
Dependent variable: Assets

	Coefficient	Std. error	t-ratio	P value	
Assets	37,1610	7,69979	4,826	0,0002	***
Liabilities	-0,234111	0,0973366	-2,405	0,0295	**
Growth_of_capital	0,139726	0,0978570	1,428	0,1738	
Loans_90d	6,23238e-08	4,24799-08	1,467	0,1630	
Eqity	2,36734e-08	3,53929e-08	0,6689	0,5137	
Size	0,0128938	0,0872006	0,1479	0,8844	
ROA	1,40032	0,593173	2,361	0,0322	**
Credit_portfolio	-2,20859e-09	5,37361e-09	-0,4110	0,6869	
Portfolio	0,0653407	0,0572242	1,142	0,2714	
Loans	0,11953	0,138105	0,8106	0,4302	
NPL	-1,8232e-07	8,52823e-08	-2,138	0,0494	**
NPL1	0,00272259	0,00810237	0,3360	0,7415	
Deposits	-9,26334e-09	7,14746e-09	-1,296	0,2146	
Deposits1	0,0241578	0,0358259	0,6743	0,5104	
ROE	-0,396898	0,153341	-2,588	0,0206	**
CIR	-0,0891888	0,0473814	-1,882	0,0793	

Mean dependent var	16,80645	S.D. dependent var.	9,371657
Sum squared resid	275,0365	Standard error	4,282028
R- squared	0,895615	Adj. R-squared	0,791231
F(7, 24)	8,579961	P- value (F)	0,000077
Logical likelihood	-77,82230	Akaike Criterion	187,6446
Schwarz Criterion	210, 5884	Hannan-Quinn Criterion	195,1237

Source: compiled by authors

In this model, the banks were ranked on the financial market, including Assets, Liabilities, Loans 90d (Doubtful Loans for Over 90 Days), Eqity (Capital), Credit portfolio, Loans, they were calculated by the Gretl model (The official website of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, 2018).

By analyzing, we assume that the predicted X4 is of importance in the equation model, since its P-value is greater than 0,05, although its multicollinearity. That is, our model will appear in the equation (y = a0 + a1x1). In our case, the independent factor X1 is important because we see that its value is much smaller than P = 0.05, i.e. zero hypothesis is rejected and an alternative hypothesis is confirmed. Also, we can verify it by using t-ratio.

On the basis of the obtained data it may be written many regression equations. However, we can only be sure of the fact that our model is important:
a) to estimate the statistical significance of multiple regression equation coefficients using the Student Criterion.
b) the quality of the regression model is assessed on the basis of the Fisher Criterion, which describes the statistical significance of the model and the feasibility of using it to analyze and predict the research object.

In the correlation-regression analysis, we have determined that assets can be a significant indicator for the liabilities and ROA, ROE, NPL variables. From Table 1, we see that R-squared = 0.89 and often R is not a correlation coefficient, but its multiplicity (common) factor R2 - squared.

The coefficient P2 = 0.89 is explained by factors included in the 89% model of effective fluctuation indicator, and 11% are explained by other factors not included in the model. The state is interested in helping the systemic banks, which play an important role in the economy of the country.

For example, bankruptcy of one or several strategically important banks in our country may be difficult for the country's economy, as the interests of ordinary depositors, businesses (enterprises, firms with accounts in banks) may suffer. Another important factor of state support for large banks is their long-term strategic interests in banking business development. In the study of risk it is necessary to distinguish two main directions (Rogachev, 2016).
- detection of risk level
- deciding on risk reduction.

The low level of corporate governance, including the risk management system in banks, and the low level of managerial bodies' responsibilities can be noted (Leontiev, Privalova, 2017). The state has taken a decision on state support for the economy on the basis of the systemic importance of large banks, on the banks' capitalization, through the active involvement of the bank's shareholders.

Due to the stagnation in the banking sector, the government continues to support this sector. In this regard, in relation to mid-sized banks, the National Bank has taken steps to eliminate the negative experience of non-performing loans in relation to the loans and assets in the future.

Bank crises are worse than production crises, as they lead to many financial losses for participants linked through the cash flow chain. When choosing the bank's strategy, the banking services market and its segments are studied (Makysh, 2016). One of the most dangerous strategies is the strategy of the leader and strategy for the sale of new services in the new market (Konovalova, 2018).

Strategy for working with VIP-clients is also a matter of personalization of services. In the case of an adverse event, i.e. the occurrence of the risk not only in the bank, but also in the clients of the bank, or vice versa, if the problem arises in the client, it also affects the bank.

4. Results and Discussion

The financial situation of the banks mostly affects loans, which are more than 90 days, i.e. problematic doubtful loans. In the banking environment, it is NPL, which reflects the total amount of overdue and overdue debt in the loan portfolio. Several banks have been defaulted this year because of the sharp rise in NPL. Borrowers of the bank make it difficult to overcome their burden.

At the request of respondents, 43% face financial difficulties (twice a year). As for the NPLs of the banks of the Republic of Kazakhstan, the situation is lower, that is to say, there is NPL volume of eight banks in the market (figure 3).
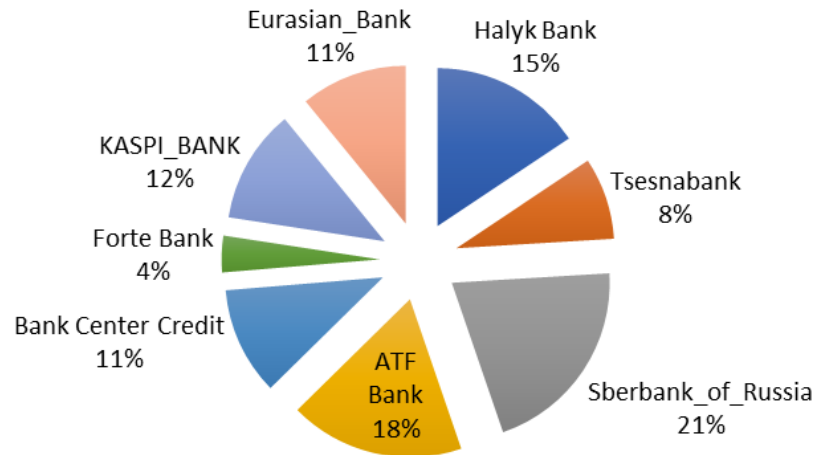
Figure 3. The percentage of NPL level of some second-tier banks of the Republic of Kazakhstan in 2017.
Source: compiled by authors according to www.nationalbank.kz

NPL is a non-performing loan, loans other than those whose principal loans are overdue for a period of 90 days or more, and other reasons for suspicion that loans and receivables can be fully credited, loans not covered by the original loan agreement requirement. Most overdue loans can bankrupt the bank.

If we build a model using R – programme, we get a box plot. A box plot, a span diagram is a graph used in descriptive statistics, compactly depicting a one-dimensional probability distribution. This type of diagram in a convenient form shows the median, the lower and upper quartiles, the minimum and maximum sampling values and outliers.
- Median * (50% quartile) is a line in the middle of the rectangle
- Upper and lower quartiles (25% and 75%) - the upper and lower borders of the rectangle
- Observed minima and maxima
- As well as outliers in data, as individual points (figure 4).
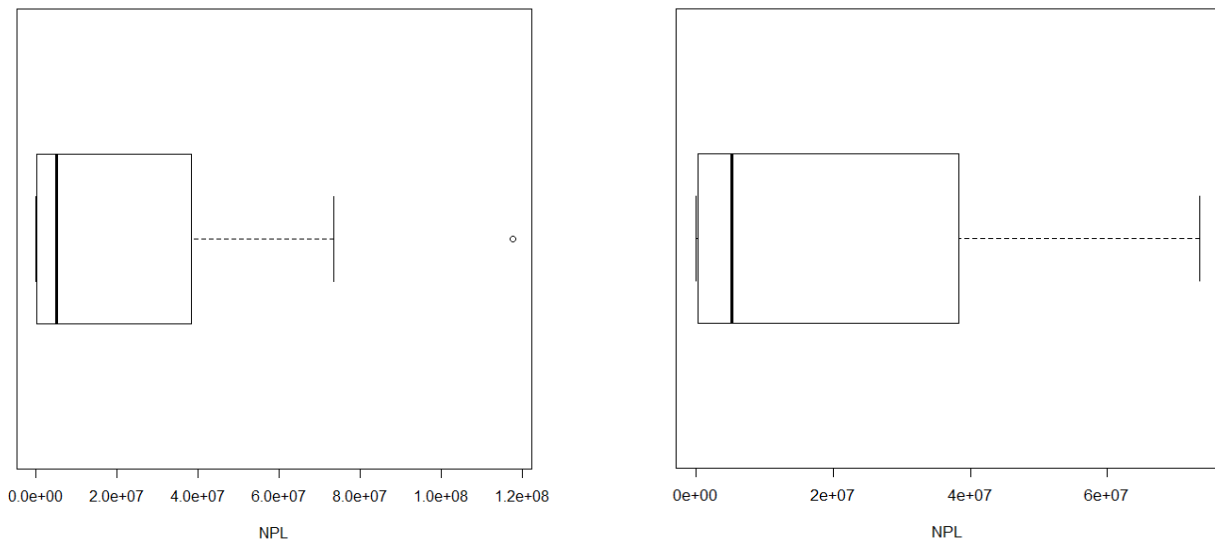
Figure 4. BOX PLOT of NPL to detect outliers
Source: compiled by authors

Analyzing the "box plot" chart, we see that the Median shows * that 50% of banks 'customers have overdue loans more than the amount of 5131245 Tenge, and the remaining 50% of banks' customers have debts less than this amount.

If we focus on the range of overdue loans between the lower and upper quartiles, in which 50% of the studied data are concentrated, we can say that the lower quartile shows the value of NPL, below which a quarter (25%) of the available data contains the total value of the urgent and overdue debt in the loan portfolio.

The upper quartile shows that 75% of clients in all the banks studied have a delay of 4.0 million Tenge.

The "box plot" diagram for the NPL parameter (overdue debt of bank customers) has left-sided asymmetry, that is, our sample does not have Normal distribution or Gauss-Laplace law. Therefore, outlier was formed, which we see in the figure as a point on the diagram.

Figure 5 shows some of Kazakhstan's second-tier banks with NPL, loan portfolio, loans over 90 days, asset level in percentage.
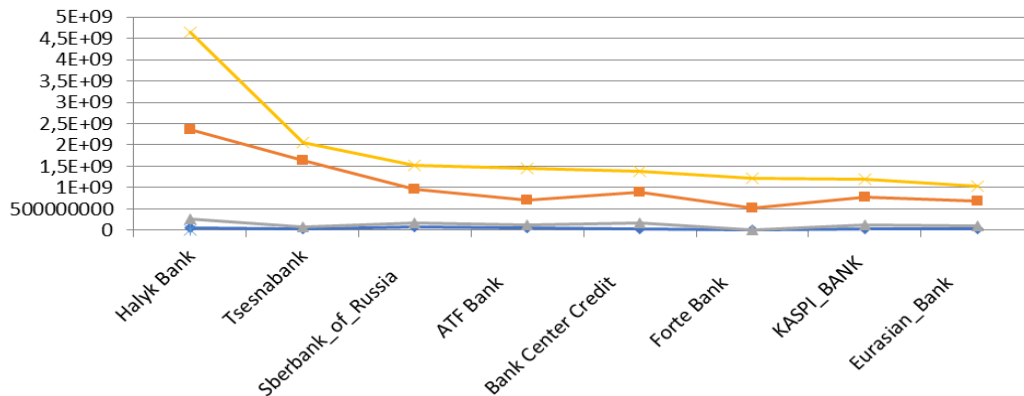
Figure 5. Kazakhstan's second-tier banks with NPL, loan portfolio, loans over 90 days, asset level in percentage.
Source: compiled by authors

Following the results of the first nine months, the bank's loan repayment increased by 42% compared to the same period last year. Over the past few years, a record 30% growth has been observed, and every fourth credit is a problematic issue. Using the GRETL application, we will issue the following report (table 2):

Table 2. Model 2: Gretl // MSS, obtained from index 1-32 (n = 31)
Dependent variable: NPL (non-performing loan)

	Coefficient	*Std. error*	*t-ratio*	P value	
Assets	−577721	254828	−2,2671	0,0327	**
ROA	109521	1,43442e+06	0,0764	0,9398	
Liabilities	265249	70619,1	3,7560	0,0010	***
Equity	−0,0786939	0,036191	−2,1744	0,0398	**
ROE	−164751	342988	−0,4803	0,6353	
Credit_portfolio	0,00296448	0,00993649	0,2983	0,7680	
Loans_90d	0,292296	0,0640243	4,5654	0,0001	***

Mean dependent var	20355959	S.D. dependent var.	29276781
Sum squared resid	2,62e+15	Standard error	10452510
R- squared	0,931998	Adj. R-squared	0,914997
F(7, 24)	46,98981	P- value (F)	1,75e-12
Logical likelihood	−541,0531	Akaike Criterion	1096,106
Schwarz Criterion	1106,144	Hannan-Quinn Criterion	1099,378

Source: compiled by authors

This Gretl model has only a few dependent variables that have been excluded from the previously unrelated indexes. They include Assets, Liabilities, Loans_90d (doubtful loans more than 90 days), Equity, Credit portfolio (loan portfolio). Variable NPL - (non-performing loan). The variable NPL has a strong relationship between Liabilities, Assets, Equity and Loans_90d. F = 46.9, which is greater than the table F = 4.057.

Consequently, our model is relevant and important and can be used for further forecasting. From Table 2 we see that R - squared = 0.91 and often R is not the correlation coefficient, but its multiplicity (common) coefficient R2 squared. By Fisher Criterion.

P2 = 0.91 is explained by the factors included in the model 91% of the effective indicator deviation, and 9% are explained by other factors not included in the model.

In the correlation-regression analysis, we have determined that assets, liabilities, doubtful loans over 90 days, will be significant indicators for NPL capital.In correlation-regression analysis, we have found that NPL is a significant indicator for other variables.

The current risk management is to monitor important indicators and to adopt operative decisions on the basis of banking operations. The mechanism of risk protection of banks consists of risk management current methods and its reduction (Kuzmicheva, Podkolzina, 2015).

The following elements are included in the risk supervisory system:
- methods of risk identification, methods of risk assessment, risk control mechanism.
The risk management policy is designed to ensure that the banking services market meets the efficiency and scope of the bank's operations (Pimenov, 2016).

The main objectives of the risk management policy are:
- formation principles of creation of high-quality assets portfolio;
- taking into account the risks of banking capital, their safety, formation of the asset portfolio, increasing the volumes of operations by maintaining an acceptable level of risk, developing the risk management system; modernization and creation of new approaches to risk management; development of risk management culture in the bank.

The role of consumer protection from the negative effects of the bankruptcy of the bank is related to the deposit insurance system in 140 countries, including Kazakhstan. Deposit guarantee is one of the types of security cushion and joint insurance against hedging of the savings of the population at the expense of the banking sector (Materials Basel Agreement, 2015). Moreover, in the last few years, despite the difficulties in the domestic financial market, the discoveries have egun to make positive changes. Kazakhstan has moved to the inflation-oriented and free floating exchange rate, and there are many disagreements and misunderstandings in the society. Risk identification consists of hazard-defining routes (Lobanova, Chugunova, 2017).

The risk identification, along with identifying hazardous areas, also involves the bank's practical benefits and negative consequences of the potential associated with these areas. It is important to have good information base, which includes the elimination and processing of relevant information, to identify the risk and other elements of its management system. The role of the relevant information is crucial for any risk.

Qualitative and quantitative analysis is carried out to assess the degree of risk.
- Qualitative analysis is an analysis of risk areas and potential hazardous areas identified by factors. On this basis, qualitative analysis is based on a clear definition of the factors characterizing each type of bank risk. The model of qualitative analysis is evidenced by the bank loan portfolio analysis (Prictup, Senchukova, 2015).
- Numerical analysis is aimed at risk assessment.

In the quantitative analysis it is possible to distinguish several blocks of conditionality: the choice of criteria of risk degree evaluation; determining the level of certain types of risks acceptable to the bank; determining the specific degree of risk based on individual methods; risk assessment or risk reduction in the future.

As the indicators of risk assessment can be given: factors; predictable loss; indicators of segmentation of the bank's portfolio (assets portfolio, credit, deposit resources, investments, trade portfolios, etc.).

Risk control is a decision that is aimed at systematic analysis of risk indicators by risk types and minimizing risks, retaining their level of profitability. The risk control process consists of: allocating responsibility for risk monitoring, identifying risk management methods (Belozerov, 2017).

Responsibility for monitoring is assigned to the bank's functional subdivisions, its specialized committees, internal control, auditing and analysis. The rule is defined by a set of methods aimed at protecting the bank's risks. Risk control includes measures to timely identify risk for its reduction or elimination (Tarasov, 2014).

There are three methods of risk management: internal audit, external audit, internal control. Internal audit is carried out by the internal structural division of the bank, which includes an independent assessment of the adequacy and effectiveness of the bank. Internal audit is in the interests of the bank and regulated by its internal documents. Internal audit institutions include auditors appointed by bank holders, audit commissions, internal auditors or group of internal auditors (Hasanova, 2016). Risk control and supervisory is carried out within the bank's internal control system. Except for external auditing, internal audit objectives are modified to meet the management requirements.

The main purpose of the external auditor is to determine the reliability of the financial statements of the bank and the compliance of the reporting procedure with the legislation of the Republic of Kazakhstan.

The auditor expresses an opinion on all material aspects of the financial statements. It should first assess how effectively the internal audit service operates. Internal control of the risk management system is carried out by the representative of the risk management body (Volkov, 2015). Internal control of the risk management system is an effective risk prevention tool and is an assessment and monitoring of the effectiveness of risk management policy (Manuilenko 2018).

Study of causes of harm, development of measures to optimize business processes, risk control of new products and risky operations to minimize risks are also of great importance.

Special attention should be paid to credit risk management, because its quality depends on its quality.

The key elements of good governance include: availability of well-developed credit policy, credit portfolio management, effective debt management, and, most importantly, qualified staff to work in this system. Banks are the main function of cash redistribution through lending to the economy, and provide loans under various government programs to support entrepreneurship (Zaytseva, 2016). 33% of the total loan portfolio of the banking system constitutes problem loans. In particular, some banks have been lending non-performing loans, without credit risk analysis, and most of them have not been refunded.

The overall view of risk management is as follows:
- studying the possible consequences of the risk;
- development of measures to prevent or minimize the harm;
- the risk assessment is likely to be neutralized.

However, much has been done to stabilize the situation on the money market (Schnatterly, Clark, Howe, DeVaughn, 2017). Presently, the conjuncture of Kazakhstani money market remains moderate, making 3.5 trillion Tenge due to continued liquidity structural surplus.

In the short term, the market rates are at the bottom of the base rates, which periodically affects volatility in the currency market. Since the branch oversight was simultaneously liberal, the state had to provide liquidity to the

banks several times. Therefore, after changing the supervisory functions of the National Bank, it was possible to prevent the consequences of the previous oversight.

But in fact, banks needed help - in April 2017 in favor of the National Bank's current management a regulated banking sector rehabilitation program launched - a large number of non-performing loans in the system and a solution to this problem. There was a rehabilitation program in total amount of 653 billion Tenge for ATF Bank, Eurasian Bank, Tsesnabank Bank, CenterCredit and Bank RBK. The shareholders carefully monitor the events in the financial sector, so pension asset management should be balanced.

It should be noted that the volume of investments of foreign issuers in financial instruments has increased from 6.5% to 22.5% over the past two years. For the portfolio diversification, it is necessary to invest a foreign currency in liquid financial instruments of foreign issuers (Santos, 2018).

At the same time, the share of such investments is 22.5%, as the remaining pension assets are invested in other sectors. The more risk diversification is, the better. For the fund's investors this year, the profitability of the UAPF's pension assets portfolio was 7.75%, the inflation rate was 3.3%.

On the eve of the Congress of financiers, experts negatively assessed the situation in Kazakhstan's financial sector. This year there was a test of strength for the banking sector of Kazakhstan. In 2018, two banks were able to reach the distance. In addition, for example, Bank Home Credit is confident in the market. Although the share of "bad" loans in the bank is small, the financial institution has improved the selection process for borrowers this year. The Bank continues to effectively develop its business, which is evidence of our financial performance. Since the beginning of the year the bank's assets have grown by 20%, loan portfolio - by 12.6%.

The achievement of such results was ensured by the active work of sales channels, with the largest retailers in the country, as well as the introduction of new conceptual market products. For example, customers with good credit histories and regular earnings are able to borrow at low interest rates. The maximum credit limit of 60 months for loyal customers of the Bank is 2 million Tenge. SB Home Bank JSC (Kazakhstan) is part of the International Finance Group "Home Credit", based on a highly effective risk management model.

The Bank uses high-tech scoring models used to estimate the borrower's solvency (Taylor, Begley 2016). The borrower's creditworthiness assessment processes are constantly being improved, and the bank's operations are improving gradually. The Bank annually allocates considerable funds for the development and upgrading of the risk management system.

Typically, this model works best with a large data array. At present the bank has an active customer base of 29 million clients. Taking this into account, the scoring model believes that it will be paid in a short time. However, because of the introduction of a swift model based on artificial intelligence, the quality of the loan portfolio has tripled.

Nowadays, this topic is being actively discussed; certain initiatives are being taken for the use of digital signature (EDS). As an experiment, it is assumed that the project will enable banks to independently produce EDS. That is, when the client first visits a bank, it receives EDS immediately. In subsequent banking operations, the borrower can not communicate directly with the bank. The most important for the bank is the security of customers.

Bank terminals are equipped with biometrics. Biometrics takes fingerprints of bank's card users. This technology protects clients from fraudsters because fingerprints are not the same. In India, Home Credit Group offers a loan, identifying its customers by scanning the lattices. In India, the population census is also scanned (Saifuddin, Scheule). If the government of the Republic of Kazakhstan steps in this direction, fraudulent schemes will be

eliminated, and online credit line fixing will be fast and safe. In the world, many banks have cut off their affiliates and become Internet companies. At present, banks are mainly get profit from deposits.

Conclusions

The banking sector of the country changes according to customer demand. The requirement of time is digitalization of all spheres of life. The bank's business is its main competitive advantage and the financial institution, which has not made any move to change, is displaced from the market.

From the beginning of 2018, the largest bank of Kazakhstan, JSC "Tsesnabank" announced the transfer of strategic tasks to the first issue. Analysis and the study of the state of the economy can not exist without statistic data. "Tsesnabank" JSC is also a participant of state programs to support the priority sectors of the world and the banking sector, to support small and medium-sized businesses, and to implement significant infrastructure and industrial projects in the country. The development of Kazakhstan's regions influences the overall welfare of our fellow countrymen. The main indicators of the bank's effective work are keeping the regulator's requirements and maintaining continuous success, and for 25 years, Tsesnabank has fulfilled its obligations to the National Bank, its customers and reserve partners.

The bank faces predictable deviations in the global economy and other risks. In the entire history of the bank, the majority of shareholders have never changed, and in the near future they intend to capitalize again. In accordance with the action plan on financial stability, the bank has plans to fulfill its obligations early ahead. These decisions show that each shareholder is ready to assume personal responsibility for customers and market risks and regulatory requirements.

Personal plans of the bank is a further development of digital platforms and Internet banking. The bank tries to create a convenient ecosystem for its clients - all services required for business management and development will be concentrated in one place and will be available 24/7 to customers.

Five banks participating in the National Bank's additional capitalization program in the first half of the year did not show a sharp decline in lending and market share in assets. The bank's risk management system co-ordinates ways and means of working with the bank's employees, allowing for positive financial outcomes, predicting the occurrence of risk events and taking action to eliminate or minimize their negative consequences.

Based on the types of banking risks, this system can be divided into complex blocks associated with risk management, debt liquidity risk, interest rate, operating risk, loss of profits, and risks arising from credit facility business lines. In the classification of other risks, the individual risk management subdivision and the total risk management unit are separated into independent units (Teodora).

The first block includes the risk management of credit operations and other types of banking operations, and the second one - various banking portfolios - credit, trade, investment, attracted resources etc. In our eyes, the banking sector of the country changes according to the consumer demand.

Risk identification includes areas that identify threats. In introducing the new system, the National Bank will ensure the continuous functioning of the financial sector and timely respond to the most pressing problems. The identification of risk includes identifying the hazardous areas and the potential benefits of the bank and its practical consequences associated with these areas. Additionally, the new system will adapt to the ever-changing financial risks of emerging markets. It is important to possess good information base, which includes access and processing of relevant information, to identify the risk as well as other elements of its management system. The directions of improvement of the banking risk management mechanisms based on the disclosure of the content of

the risk management system were presented in the study. Obviously, the research itself can not be analyzed without the use of modern models using statistical data. The article highlights the fact that banks focus on the major domestic risks in the financial market.

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PROBLEM LOAN MANAGEMENT IN THE COUNTRIES OF THE EURASIAN ECONOMIC UNION

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Abstract. The article discusses issues of managing problem loans in the countries of the Eurasian Economic Union. The main goal of the article is to solve problems for realizing the positive effects of easing the conditions of bank lending, identifying barriers and constraints taking into account the current policy to free the banking sector from unscrupulous participants. Therefore, the relevance of the topic determines that the problems raised by the authors in the article require a comprehensive study and comprehensive analysis preparing a scientific justification.Based on the identified goal, the authors analyzed approaches to determining problem assets in the banking system, the dynamics of indicators for the development of the banking sector, the share of problem loans in the banking system of the countries of the Eurasian Economic Union, a consolidated report on the profit and loss of commercial banks, the problems of unsuccessful and problem loans - NPL. Based on the study, conclusions are drawn and recommendations are given. The solution to these problems involves the prevention of banking risks, assessing the adequacy of the formation of provisions for possible losses on loans and the compliance of the business models used by credit organizations with their capabilities.

Keywords: entrepreneurship; entrepreneurial activity; factors; business environment

1. Introduction

In the process of carrying out their activities, commercial banks are exposed to a whole range of banking risks. All types, groups and subgroups of banking risks are interconnected and interdependent. Most banking risks contain elements of other risks. However, of all banking risks, credit risk is the most significant, since most of the financial losses and bankruptcies of banks are due to non-return by borrowers of loans and the bank's ill-conceived risk policy (Fakhry et al., 2018; Tvaronavičienė et al., 2018; Ashraf et al., 2019; Rahman et al., 2019; Caplinska, Tvaronavičienė, 2020, Siddique et al., 2020).

Thus, at present, the most effective and common methods for managing problem debt are the independent work of the bank to return the problem debt or selling loan portfolios to collection agencies. Most banks use several methods: in the early stages they work independently with problem debts, and in the later stages they transfer it to collection companies or sell them to third parties. However, it should be noted that subject to the availability of small amounts of debt on loans (when the costs of finding a borrower exceed the amount of the debt itself) they are written off at the expense of the bank's reserves.

2. Literature review

According to the article, the author suggests that in modern economic literature there is no single approach to the definition of problem loans of a commercial bank. Formulating a definition in a broad sense, we can give the following characteristic - obligations of legal entities, for which signs of impairment were identified and / or factors that could affect the timeliness and fullness of repayment were identified. In the narrow sense, debt on credit products, part of which is on the accounts of accounting for overdue loans (Bizin, 2016).

Therefore, the emergence of problem loans as a result of the realization of credit risk occurs regardless of external economic conditions. Crisis phenomena only affect the likelihood of problem loans and lead to their growth (Baibulekova, 2016).

Some authors suppose that the portfolio of problem loans is one of the components of the loan portfolio of the bank and represents the totality of all problem loans of a banking organization (Platonova, Zaichenko, 2018).
Others consider such a credit debt problematic, according to which the bank sees the danger of timely and full repayment as a result of various factors (economic, legal, social, etc.) (Yusupova, 2015).

Based on the study of foreign experience, K.R. Tagirbekova claims that in the presence of a large number of banks experiencing difficulties, as well as a certain degree of uniformity of acquired assets, a centralized method of restructuring the banking system is the most effective. The purchase or transfer of non-performing assets to the disposal of state-owned sanitation organizations has established itself as a very effective tool (Tagirbekova, 2015).

Foreign experience of bad banks, as described in his scientific articles by D. Potapeyko, is successful. In the 1990s, banks with distressed assets in Sweden managed to recover a third of the book value of bad debts. At the moment, at the end of March, the US Treasury Department announced the long-awaited program, called "TARP" (Troubled Asset Relief Program). Its essence lies in the redemption of "toxic assets" from banks and their transfer to the balances of specially created private-state investment funds (Potapeyko, 2014).

According to researcher, the management of problem loans should be considered as a process that is characterized by all the features of management: strategic, tactical, and organizational. Therefore, he considers:
 - "pre-problem debt" is debt in the framework of which the client has violated the terms of the loan agreement, including the terms on the maturity of the main obligation and / or interest, the conditions of preservation and amount of collateral, the conditions for maintaining the financial situation, etc.
- "bad debt" - debt, which is assigned the status of bad debt, i.e. there are significant, more than 60 days, violations of the deadlines for fulfillment of obligations to the bank, a significant deterioration in the financial condition of the debtor, a significant deterioration in the quality or loss of security;
- "doubtful debt" is debt in respect of which the bank has doubts about timely repayment of the principal obligation and / or interest.
- "overdue debt" is a debt for which there has been a violation of the repayment terms of the main obligation and / or interest (Aleksandrov 2017).

According to the authors, in various economic conditions, the tasks that a bank faces in selling a claim to a loan portfolio differ. In stable economic conditions, the sale of a portfolio is used as a tool to raise additional funds, and crisis conditions lead to the cession being perceived as an opportunity to clean the balance from non-core or distressed assets (Aliev, Ibragimova, Dzhamalova, 2016).

Studies in the field of troubled loan management, it is said that this is becoming one of the key aspects of a commercial bank, the tasks of which are faced by the bank's system of managing troubled assets are:
- identification of possible sources of troubled debt in the framework of existing obligations, as well as those planned for issuance in the short term;
- identification and regulation of industry concentration of the probability of default for corporate borrowers;
- assessment of the impact of the portfolio of problem loans on the financial results of the Bank in the reporting period;
- determination of sources of credit risk coverage in the event of a possible default of the counterparty;
- development, implementation and evaluation of the effectiveness of methods of neutralizing or resolving bad debts;
- monitoring of repayment of the current portfolio of problem loans (Rubleva, 2017).

3. Materials and methods

The quality of banking assets and, above all, loans is one of the most important indicators of the state of the banking sector and the country's economy as a whole. One of the main indicators used to assess the quality of banks' loan portfolios and their assets is the share of bad debt, which contributes to a deeper understanding of the existing dependencies in the economy and the identification of the main vulnerabilities of the financial system.

In banking science and practice, there is no single clearly defined indicator that gives a quantitative idea of bad debt. For example, the International Monetary Fund regards bad debt as a liability, the full repayment of which is doubtful due to the inadequate financial condition of the debtor or collateral for this obligation, and there is an delay in payment of the principal and / or interest on it for more than 90 days.

Based on the approaches, the US Federal Banking System is a loan that does not generate income, that is, interest payments delayed by more than 90 days.

In accordance with the income of the Basel Committee on Banking Supervision, bad debt is a loan product for which there are significant violations of the deadlines for fulfillment of obligations to the bank, a significant deterioration in the quality of collateral or its loss.

In conditions of macroeconomic instability and crisis phenomena, banks should pay increased attention to risk assessment and management. Credit risk is one of the main risks in the banking sector. As one of the main levels of credit risk, many experts and professionals consider the NPL indicator (doubtful and bad loans). This indicator reflects the quality of the loan portfolio in the banking sector.

Today, in the financial system, issues of primary importance have come to the fore, with which the problem of stability of the entire financial and economic system is associated. Among these issues is the problem of NPL, or problem loans.

If we consider the data of the World Bank regarding the share of NPL by region, country and year (starting from the crisis of 2008 to 2017 inclusive), then it is clear that the first blows of the global financial and economic crisis were taken by developed countries - such as Germany, France, the Czech Republic, Austria, Poland, the United

States and others, where during the crisis years the share of problem loans increased sharply. However, in subsequent years, it gradually began to decline. This indicates that these countries are emerging from the crisis, overcoming the problems arising from it and reducing the possibility and threat of a new crisis.

And the situation is quite different in the case of many developing countries whose economies have not been directly affected by the global crisis, and where the share of NPL has remained at an acceptable low level for some time. However, in the post-crisis years in countries such as Kazakhstan, Ukraine, Belarus, Russia and others, including Armenia, the share of bad loans began to increase, in this regard, new anti-records were set, and the consequences of the crisis began to deepen, that is, these countries hit into the maelstrom of the crisis with some lag in time.

Here, of course, it should be emphasized that the increase in NPL is due not only to the activities of the financial and banking system, but also to the state of the entire economy.

In the case of Armenia, if we consider certain areas of the economy, it should be noted that the share of non-performing loans in the portfolio of consumer loans reached 20 percent or more, in mortgage lending - 6%, in construction - 6%, in agriculture - 19%, in industry - 15%, in the commercial sector - 16%, which indicates a decrease in household incomes, and this, in turn, is accompanied by inflation. In the case of business, a decrease in turnover is observed.

In total, in Armenia, the share of NPL in the loan portfolio from 2008 to 2012 was in a narrow range from 4.10% to 4.86%. However, after 2013, the share of non-performing loans began to increase sharply, reaching from 5.56% in 2013 to 8.53% in 2014 and peak 9.48% in 2015. Over the past two years, this figure has been insignificantly reduced by a tenth of a percent, amounting to 9.41% in 2016 and 9.02% last year. Thus, at present, in comparison with the pre-crisis indicators, we now have a double increase in the share of NPL in the total loan portfolio.

Not limited to these official figures, it should be noted that in the real picture the tones are even darker, and the sizes presented by the NPL should be slightly larger. The fact is that today banks are actively refinancing loans to borrowers in a difficult situation, as a result of which such loans are not included in the problem, remaining standard, but in reality they are problem. In Armenia, the volume of loans officially recognized as past due is more than three times lower than extended.

This camouflages the problems and risks that have matured before the banking system. From the above it can be concluded that in the absence of a real and carefully verified picture, we may face serious risks threatening the financial and economic system, when even a relatively small systemic shock will lead to a sharp increase in the share of NPL.

And even in the absence of shocks, we can become eyewitnesses of how the next financial crisis, possibly of a regional scale, raises its head again. This can happen if accelerated development is not achieved in the economies of our countries, and the degree of inflation continues to increase, the solvency of the population decreases, and the activity of the business decreases, which implies a slowdown in the annual growth of the economy. Including the above problems, a more stringent version of the principles of Basel-3 appeared which sufficiently creates new requirements for capital - an additional amount of up to 7%.

4. Results and Discussion

Of course, the capitalization of banks is partially able to solve the problem, but not completely, since covering all risk with capital will increase the value of money. The most important and effective solution lies in the plane of

ongoing work with banks in banks so that more accurate analyzes are carried out and the existing problems and risks are not hidden. Of course, governments and central / national banks should also deal with these problems, start a dialogue with structures representing the financial sector in order to solve problems - from sphere to sphere, from problem to problem, from region to region. The net profit of the banking system of Armenia for the first quarter of this year amounted to 20.1 billion drams ($ 41.7 million) against 10.7 billion ($ 22.2 million) for the same period last year, an increase of 87,2%. According to reports, all 17 banks operating in the country completed the 1st quarter with a profit. At the same time, during the reporting period, Armenian banks increased credit investments by more than 1.7% - up to almost 2.7 trillion. drams ($ 5601.7 million). The main problem, of course, however, proceeds from the general state of the economy, however, we, being active representatives of the financial system, give manageability to the problems facing the banking system, ensuring stability and stability of the financial and economic system of this country and region (table 1).

Table 1. Dynamics of development indicators of the banking sector of Armenia

№	Name of indicator	unit of measurement	2017
1	Number of existing credit organizations (KO)	unit	17
2	The number of corporate bonds with foreign participation	unit	17
2.1	- including with 100% share of foreign capital	unit	9
3.	The number of branches of operating KO	unit	529
4.	Own funds (capital) KO	thousand dollars	1 488 394,2
5.	CO assets - total	thousand dollars	9 012 569,0
5.1	- loan debt -total	thousand dollars	5 894 036,6
5.1.1	- including past due	thousand dollars	437 737,6
5.2	- loans granted to individuals	thousand dollars	1 701 901,7
5.3	- loans to non-financial organizations	thousand dollars	3 940 786,8
6	Liabilities KO-total	thousand dollars	9 012 569,0
6.1	Deposits of individuals	thousand dollars	3 221 056,2
6.2	Resources attracted by credit organizations in the interbank market	thousand dollars	111 816,3
7	Financial result of the banking sector	thousand dollars	79 132,2
8	Minimum amount of capital for existing credit organizations	thousand dollars	61 983,471
9	Refinancing rate (key rate) of the National Bank	%	6
	For reference:		
10	Gross domestic product	thousand dollars	11 529 167,1

Source: compiled and calculated by authors

So, for example, in 2015, the share of non-performing loans in the portfolio of loans of Armenia provided by commercial banks amounted to 7.2% or about 172 billion drams, the largest part of which was provided to individuals, in particular consumer loans - 1.64% or Mortgage loans accounted for 39.2 billion drams and 0.51% or 12.2 billion drams.

In 2016, non-performing loans accounted for 6.9% of all loans or 167.5 billion drams, the largest part of which was provided to individuals, in particular consumer loans - 8% or 43.7 billion drams, and mortgage loans - 0.66 % or about 16 billion drams.

In 2017, non-working loans accounted for about 6.3% of all loans issued or 174.6 billion drams, of which the highest percentage was non-working loans to individuals, in particular, consumer loans - 1.4% or 38.8 billion AMD, mortgage loans - 0.51% or AMD 14.1 billion.

At the end of the first quarter of 2018, non-performing loans amounted to 5% or 150.9 billion drams of all loans issued to residents by commercial banks. Non-performing loans to individuals, in particular consumer loans amounted to 1.1% or 33.2 billion drams, and mortgage loans - 0.3% or 9.1 billion drams.

Analyzing the dynamics of the share of loans to individuals in non-performing loans in the loan portfolio of commercial banks, for the period 2015-2018 we see the following picture (table 2).

Table 2. Indicators characterizing non-performing loans in the portfolio of commercial banks of Armenia

№	Indicator	2015	2016	2017	First quarter of 2018
1	The share of loans to individuals in non-performing loans in the loan portfolio of commercial banks	51,4	59,7	52,9	42,3
2	Absolute volumes of non-performing loans to individuals	2,15	2,46	1,91	1,4

Source: compiled and calculated by authors

As can be seen from table 2, non-performing loans to individuals have the largest share in 2016, and then it decreased significantly in the first quarter of 2018 and reached 1.4%.

As for the dynamics of the absolute volumes of non-working loans to individuals for the same period, the dynamics of the volume of non-working loans to individuals has the same trajectory as was observed in the case of their specific weight. Non-working loans to individuals in 2016 amounted to 59.7 billion drams, and then fell sharply in the first quarter of 2018 and reached 42.3 billion drams.

Thus, as a result of the legislative amendment, commercial banks will have the opportunity, without additional tax obligations, to forgive individuals the fines and penalties charged on loans recognized as uncollectible for more than 42.3 billion drams accumulated until May 31, 2018. The latter will be an important step both for the financial situation of Armenian citizens, and for improving the loan portfolio of commercial banks, since in this case the amounts payable for overdue loans of individuals will be used to repay the main The total amount and interest on loans, rather than fines and penalties, which will contribute to the restoration of banking assets by more than 42 billion drams and accelerate the financial turnover of commercial banks.

The variety of approaches demonstrates differences in perceptions regarding the levels of risks and their consequences for banking. Based on the data of the Statistical Bulletin of the National Bank of the Republic of Belarus, various indicators are used to analyze and assess the quality of bank assets (table 3).

Table 3. Quality assets of Banks in the Republic of Belarus

Name of indicator	2016	2017
Debt on loans by banks of the Republic of Belarus by sector of the economy (million rubles)	35 851,0	38 762,5
Overdue and prolonged debt on loans issued by banks of the Republic of Belarus to the economic sector (mln. Rubles)	1 422,4	1474,7
The share of overdue and prolonged debt on loans issued by banks of the Republic of Belarus to the economic sector (%)	4,0	3,8

Source: compiled by authors according to Statistical Bulletin of the National Bank of the Republic of Belarus No. 1.

The deterioration in the quality of bank assets stopped due to the fact that the growth of distressed assets was restrained by clearing the balances of large state-owned banks. The "bad" assets of state-owned banks were either transferred to a specially created agency, or transformed into the bond debt of the Ministry of Finance of Belarus and local authorities.

Indeed, the proportion of troubled assets of Belarusian banks from January 1, 2017 to January 1, 2018 increased slightly - from 12.79% to 12.85%. However, in the context of various groups of banks, the dynamics of "ballast" differed sharply. Thus, the share of distressed assets among state banks in 2017 jumped from 12.71% to 14.94%. In banks with foreign and private capital, the share of non-performing assets decreased from 13.29% to 9.05% and from 9.40% to 7.33%, respectively. If we measure the deterioration in the quality of assets of state-owned banks in money rather than shares, then their volume of distressed assets increased by BYN 0.7 billion. Interestingly, in parallel, the size of distressed assets of large banks increased by almost the same amount.

The share of non-performing assets of large banks increased from 12.96% to 13.40%, while that of medium and small banks decreased. According to the NBRB classification, 3 state banks are classified as large. Apparently, their asset quality deteriorated. The largest state-owned banks in Belarus are Belarusbank, Belagroprombank and Belinvestbank.

A decline in the quality of assets could happen both for all of them, and for one or two. In total, as of January 1, 2018, state-owned banks concentrated 4.2 billion BYN of distressed assets, and large banks - 5.1 billion BYN. At the same time, the total volume of non-performing assets of 24 operating banks was 5.5 billion BYN.

Banks of Belarus had troubled assets both in Belarusian rubles (1.9 billion BYN) and in foreign currency (3.6 billion BYN). The share of troubled assets in BYN rubles for 2017 as a whole in the system fell from 12.41% to 9.62%. Improved asset quality was observed across all groups of banks. Things were completely different with distressed assets accumulated in foreign currency. Their share in the system as a whole increased - from 13.05% to 15.66%.

On a monthly basis, the Statistical Bulletin of the National Bank of the Republic of Belarus publishes data on the volume of debt on loans and other active operations, including prolonged and past due, which can be perceived as distressed assets. Debt detailing is carried out in the context of types of loans (short-term, long-term), groups of currencies (national, foreign), types of counterparties (customers, other banks) and sectors of the economy (state, private, individuals, and non-bank financial institutions). For example, data from the specified source allows us to assess the dynamics of the following indicators for 2017.

In addition, the Republic of Belarus used an alternative approach to identifying distressed assets. It is presented in the Methodological comments on the indicators of analytical tables and charts of the information collection "Banking Sector of the Republic of Belarus.

In accordance with this approach, distressed assets included: assets exposed to credit risk, classified according to risk groups III – V in accordance with the Regulations on the Procedure for Formation and Use by Banks, Open Joint Stock Company "Development Bank of the Republic of Belarus" and Non-Bank Credit and Financial Organizations Special reserves to cover potential losses on assets and operations not reflected on the balance sheet approved by the resolution of the Board of the National Bank of the Republic of Belarus of September 28, 2006 138 (hereinafter - the instruction №138) (Resolution of the Board of the National Bank of the Republic of Belarus, 2006).

Information on assets subject to credit risk includes: loans issued to legal entities and individuals; funds placed in other banks; financial rent (leasing); operations using bills, purchased bills; executed bank guarantees and guarantees in cash; financing against the assignment of a monetary claim (factoring); other active operations subject to credit risk.

The data will allow you to analyze bad debts on assets exposed to credit risk and determine its share in their total volume. The table below contains information on the share of distressed assets in the banking sector of the Republic of Belarus (Table 4) (Information collection "Banking sector of the Republic of Belarus).

Table 4. Information on the share of distressed assets in the banking sector of the Republic of Belarus

Name of indicator	2016	2017
Banking sector assets exposed to credit risk (mln. Rubles)	40 182,6	43 177,1
Distressed banking sector assets exposed to credit risk (mln rubles)	5 139,8	5 549,2
The share of troubled banking sector assets exposed to credit risk in the total volume of banking sector assets exposed to credit risk (%)	12,79	12,85

Source: compiled by authors according to Information collection "Banking sector of the Republic of Belarus

Credit indebtedness of organizations and legal entities increased by 5.9% over the past 12 months, it is encouraging that bad debt decreased by 9.8% over the same period of time (Table 5) (www.infobank.by).

Table 5. Credit indebtedness of resident organizations and resident individuals, million rubles

Indicator	01.07.2017	01.04.2018	01.07.2018	Changes	
				For 3 months	For 12 months
Credit debt of resident organizations					
Credit debt	27271,3	28455,5	28877,5	1,5%	5,9%
in% to assets	43,99	44,45	45,08	0,63	1,08
Bad credit debt	1815,1	1802,3	1636,9	-9,2%	-9,8%
% to credit debt	6,6	6,33	5,67	-0,67	-0,99
Credit indebtedness of resident individuals					
Credit debt	7648,9	9497,0	10143,7	6,8%	32,6%
in% to assets	12,34	14,84	15,83	1	3,5
Bad credit debt	46,9	45,0	48,9	8,6%	4,2%
% to credit debt	0,61	0,47	0,48	0,01	0,13

Source: compiled by authors according to electronic resource: www.infobank.by

Table 6 provides information on the share of troubled assets exposed to credit risk provided to legal entities and individuals by banks of the Republic of Belarus (Information collection "Banking sector of the Republic of Belarus)

Table 6. Information on the proportion of distressed assets exposed to credit risk

Name of indicator	2016	2017
Assets exposed to credit risk provided by legal entities and individuals (mln. Rubles)	34 808,5	37 992, 2
Distressed assets exposed to credit risk provided to legal entities and individuals (mln rubles)	5 139,8	5 549,2
The share of troubled assets exposed to credit risk provided to legal entities and individuals in the total volume of assets exposed to credit risk provided to legal entities and individuals (%)	14,6	14,4

Source: compiled by authors according to Information collection "Banking sector of the Republic of Belarus

In April 2018, a new version of Instruction No. 138 entered into force in the Republic of Belarus. In accordance with it, the number of risk groups for which the classification of assets exposed to credit risk is carried out in order to create a special reserve increased from 5 to 6. In addition, the concept of "Maintenance-free assets" (NPL) was legislatively enshrined. This indicator is traditionally used in foreign practice when assessing the value of bad credit debt and troubled assets of banks. In accordance with the norms enshrined in the new edition of Instruction No. 138, non-performing assets include:
- assets for which overdue from 8 to 90 days were formed for which there is no collateral;
- debt overdue from 8 to 90 days for which there is no collateral;
- restructured debt in IV-VI risk groups;
- debt on funds in other banks, overdue from 31 days to 90 days;
- debt of debtors in respect of which bankruptcy proceedings have been opened, liquidated, declared bankrupt;
- indebtedness upon the occurrence of force majeure circumstances specified in the contract, which caused damage to the debtor, preventing him from continuing his activities.

These approaches are quite new. The lack of relevant statistics does not allow us to estimate the size of non-serviced assets (NPL) in the Republic of Belarus at the moment (Information collection "Banking sector of the Republic of Belarus).

Table 7. Dynamics of indicators of development of the banking sector of the Republic of Belarus for 2018

№	Name of indicator	Unit of measurement (in national currency)	01.01.18	01.03.18
1	Number of existing credit organizations (KO)	units	24	24
2	The number of corporate bonds with foreign participation	units	20	20
2.1	- including with 100% share of foreign capital	units	5	5
3.	The number of branches of operating KO	units	34	33
4.	Own funds (capital) KO	million rubles	9631,4	9811,2
5.	Assets TO (total)	million rubles	66679,6	65955,0
5.1	- loan debt (total)	million rubles	38762,5	38934,8
5.1.1	- including prolonged and past due	million rubles	1474,7	1327,3
5.2	- loans granted to individuals	million rubles	9031,9	9327,8

5.3	- loans to private ownership	million rubles	15619,8	15693,0
6	Liabilities KO (total)	million rubles	66679,6	65955,0
6.1	Deposits of individuals	million rubles	22029,2	22005,8
6.2	Resources attracted by credit organizations in the interbank market	million rubles	1878,9	1540,4
7	Financial result of the banking sector	million rubles	886,7	127,8
8	Minimum amount of capital for existing credit organizations	million rubles	51,71	52,75
9	Refinancing rate (key rate) of the National Bank	%	11,0	10,5
	For reference:			
10	Gross Domestic Product (January - February 2018)	billion rubles	17,2	
11	National Currency to US Dollar	Rubles for 1 US dollar	1,9727	1,9537

Source: compiled by authors according to Information collection "Banking sector of the Republic of Belarus

Next, we consider the situation with lending in the Republic of Kazakhstan, where as of April 1, 2018, the loan portfolio (main debt) of the banking sector of the Republic of Kazakhstan amounted to 13,306.3 billion tenge. Overdue loans amounted to 16.4% (2,181.4 billion tenge) of the loan portfolio, while loans overdue for more than 90 days (NPL) amounted to 10.01% (1,331.6 billion tenge).

Despite the current level of non-performing loans in the loan portfolio of banks, the adjustment of the tenge and the deterioration of macroeconomic conditions (lower prices for the main export positions of the country) have reduced the creditworthiness of most banks' clients. So, a survey of large enterprises in the real sector of the economy shows:
1) Decrease in economic activity in 2015-2017;
2) Deterioration of the financial and economic state of enterprises.
Accordingly, maintaining a high level of problem loans on the balance sheet of banks continues to be one of the main problems restraining lending activity of banks. Recent surveys of the credit market show that despite the created conditions for improving the loan portfolio, most banks do not expect a significant improvement in the quality of the loan portfolio. So, in the 1st quarter of 2018, more than 65.6% of banks predict that the quality of the loan portfolio will remain unchanged, 12.5% of respondents expect deterioration and 21.9% of some improvement in the quality of the loan portfolio.

The deterioration in the quality of the loan portfolio leads to a decrease in the risk of appetite among banks; one hundred is confirmed by the low level of approval of loan applications. Most banks do not forecast an increase in the number of approved loan applications. The loan portfolio for the first quarter of 2018 decreased by 285.3 billion tenge.

The instability of the financial condition of borrowers, a significant decrease in the rate of repayment of overdue debts due to a drop in demand for the purchase of collateral at current market prices, the high cost of funding in the national currency for banks, the revaluation of the foreign currency of the loan portfolio leads to an increase in non-performing loans and puts pressure on banks' capital.

At the same time, the real level of non-performing loans and their write-off for the balance sheet. Given the slowdown in economic growth, restructuring, in fact, has become the only available tool for banks to reduce the debt burden on borrowers.

Under these conditions, the potential volume of non-performing loans may be higher. The National Bank of the Republic of Kazakhstan conducted a selective analysis of the largest loans in the banking system, which showed that the amount of potential NPL, taking into account the restructured loans, is about 25% of the banks' portfolio. The problem of a high level of non-performing loans is aggravated by the low quality of banks' collateral in the form of property and money coming in the future, insurance contracts that have many reasons for refusing insurance payments; guarantees of individuals and small enterprises. In individual banks, the share of such loans exceeds 80% of their loan portfolio. It is widely practiced by individual banks to provide loans to persons who, from the point of view of the law, do not directly have signs of connectedness, but are indirectly associated with shareholders or officials of the bank. Some of these loans are non-repayable.

The dynamics of loans with overdue over 90 days (NPL) for the period from the beginning of the crisis to the present in the banking sector of the Republic of Kazakhstan are given below (figure 1).
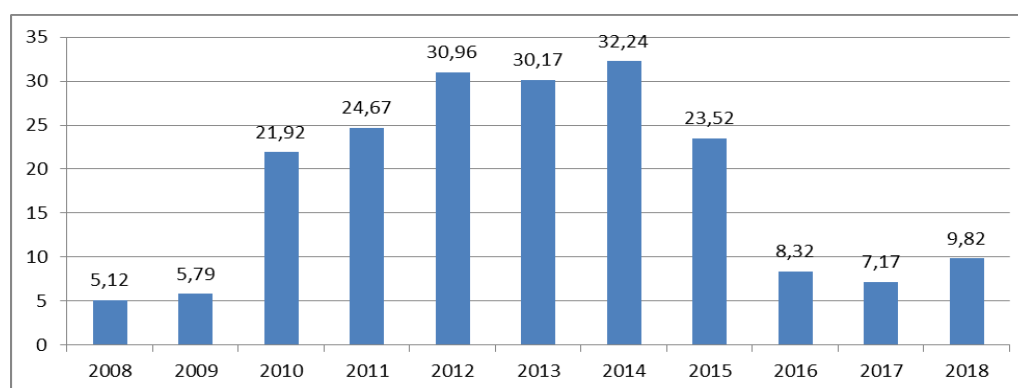
Figure 1. Dynamics of loans overdue by more than 90 days (NPL) in the Republic of Kazakhstan (%) for the period from 2008-2018.
Source: compiled by authors according to the source www.afk.kz

Bad loans with delinquencies of more than 90 days in the system make up 10.0% of the total loan portfolio (9.3% at the beginning of the year). Thus, the growth of recognition of problem loans continues. At the same time, the level of provisioning in the sector showed some growth: the formed provisions in the system increased by 24.6 billion tenge (+ 1.2%) to 2.2 trillion tenge or 161.5% of NPL coverage (90+). Provisions are growing amid banks recognition of bad debt on the balance sheets.

Freezing and delaying the solution of the above problems to a later date, as was observed in previous years, leads to a significant increase in systemic risks in the banking sector. The dissemination of these practices has become possible due to many institutional weaknesses associated with the low responsibility of auditors and appraisers for the quality of reporting, the abolition of supervisory judgments in assessing credit risk and the increasing role of banks themselves in forming provisions in accordance with IFRS.

One of the pressing problems in ensuring the stable functioning of the financial system is the development and use of effective measures to clean bank balance sheets from loans with late payments over 90 days.

The situation with ensuring the quality and optimal structure of loan portfolios of Kazakhstan banks has not changed over the past few years. The practice of developed countries in solving the problem of "bad" loans shows that without an active policy and support from the state, the solution of the issue of "idle" loans can reduce the competitiveness of the banking sector of Kazakhstan, including in integration processes within the framework of the Single Economic Union, and resistance to possible future shocks in world markets (Data of the National Bank of the Republic of Kazakhstan) (table 8).

Table 8. Dynamics of indicators of development of the banking sector of the Republic of Kazakhstan for 2017-2018

№	Name of indicator	Unit of measurement (in national currency)	2016	2017	First quarter of 2018
1	Number of existing credit organizations (KO)	units	33	32	32
2	The number of corporate bonds with foreign participation	units	15	13	13
2.1	- including with 100% share of foreign capital	units	11	11	11
3.	Number of branches of operating KO	units	349	333	331
4.	Own funds (capital) KO	billion tenge	2840,6	3 029,7	3 077,6
5.	CO assets - total	billion tenge	25 556,8	24 157,9	23 768,7
5.1	Loan debt	billion tenge	15 510,8	13 590,5	13 306,3
5.1.1	including overdue	billion tenge	1 042,1	1 265,2	2 181,4
5.2	Loans to individuals	billion tenge	3 766,6	4 259,1	4 492,2
5.3	Loans to non-financial organizations	billion tenge	11 712,1	9 285,1	8 766,0
5.3.1	Including: loans to small businesses	billion tenge	5 002,0	4 664,5	3 038,7
5.4	Loans to banks and organizations engaged in certain types of banking operations	billion tenge	32,1	46,3	48,1
6	Liabilities KO (total)	billion tenge	22 716,2	21 128,2	20 691,1
6.1	Customer deposits, total	billion tenge	17 268,6	16 680,5	16 443,8
6.1.1	Including:	billion tenge	7 144,8	7 383,6	7 266,4
	- deposits of individuals	billion tenge	5 456,6	4 745,0	5 089,4
	- deposits of legal entities	billion tenge	772,8	843,3	821,4
	- current accounts of individuals	billion tenge	3 894,4	3 708,6	3 266,6
6.2	- current accounts of legal entities	billion tenge	418,3	315,6	329,7
6.3	Interbank deposits	billion tenge	956,4	608,9	645,1
6.4	Loans received from other banks and organizations engaged in certain types of banking operations	billion tenge	227,5	150,6	145,8
6.5	Loans received from international financial organizations	billion tenge	52,5	54,0	61,9
6.6	Securities issued	billion tenge	1 778,1	1 321,1	2 005,6
6.7	Securities Repo	billion tenge	432,7	406,0	229,0
6.8	Other liabilities	billion tenge	1582,1	1591,5	830,2
7	Financial result of the banking sector	billion tenge	397,6	-62,3	214,3
8	Minimum amount of capital for existing credit organizations	billion tenge	10,0	10,0	10,0
	For reference:				
9	Base (key) rate of the NBK	% annual	12,0	10,25	9,25
10	Gross Domestic Product per year	billion tenge	46 971,2 (estimation)	51 566,8 (estimation)	55 906,2 (forecast)
11	National Currency to US Dollar	tenge	333,29	332,33	318,31

Source: compiled and calculated by authors

According to the NBK, in January-February 2018 new loans were issued for 1.7 trillion tenge, which is 424.1 billion tenge (+ 33%) more than in the same period last year. At the same time, according to the results of January-March 2018, the second-tier banks' loan portfolio decreased by 284.2 billion tenge (-2.1%) to 13.3 trillion tenge. We note that the share of the loan portfolio in total assets at the beginning of April was 56%, whereas a year earlier it was 60.9%.

On April 16, the NBK announced another reduction in the base rate to 9.25% with a +/- 1% corridor, which led to a drop in the country's money market near the lower limit of the interest corridor (TONIA 8.3%, SWAP 8.38%) , and the yield of weekly notes decreased to 8.35% per annum. If this trend continues, banks will have more motivation to redirect free liquidity to lending. We note that the volume of notes in circulation at the end of March was close to 4.2 trillion tenge (current 4.1 trillion tenge) or about 32% of the loan portfolio of the system. At that, a year earlier, the total volume of notes was close to 3.3 trillion tenge or 21.7% of the total loan portfolio.

The maximum increase in the loan portfolio in absolute terms since the beginning of the year is observed at BCC, whose portfolio since the beginning of the year increased by 6.6% or 60.9 billion tenge. At the same time, KKB showed the maximum decrease in the loan portfolio - minus 169.9 billion tenge (-10.4%) to 1.4 trillion tenge.

The share of loans in foreign currency in January-March tenge decreased by 1.2%, amounting to 3.2 trillion tenge or 25.1% of total loans to the economy. In March, the weighted average interest rate on loans issued in national currency to legal entities amounted to 12.8% (13.2% at the beginning of the year), to individuals - 19.6% (19.2%). The increase in interest rates on loans to the population, including due to the continuing tangible credit risk in relation to the retail segment.

The share of all overdue loans in the system for the first quarter of 2018 increased from 14.6% to 16.4%. Bad loans with delinquencies of more than 90 days in the system make up 10.0% of the total loan portfolio (9.3% at the beginning of the year). Thus, the growth of recognition of problem loans continues. At the same time, the level of provisioning in the sector showed some growth: the formed provisions in the system increased by 24.6 billion tenge (+ 1.2%) to 2.2 trillion tenge or 161.5% of NPL coverage (90+). Provisions are growing amid banks recognizing bad debts on the balance sheets (Association of Banks of the Republic of Kazakhstan "The Problem of Bad and Bad Credit - NPL: as of April 1, 2018, 2018).

Drawing conclusions, the volume of toxic loans with delays of more than 90 days, according to ranking.kz, for the year declined immediately by 29%, and the volume of loans with late payments decreased by 56.4%. The numbers inspire some hope, but I would not be in a hurry to do far reaching conclusions from this. In the last year or two, the situation on the credit market of Kazakhstan looks uneven. So, in the first half of 2017, there was a high growth in lending against the backdrop of a high level of toxic loans - in some banks it exceeded 90%. The state was forced to take measures, and last year the National Bank began to implement the Program to increase the financial stability of the banking sector. It was designed to improve the banking sector, reduce the level of non-performing loans and help create the conditions for economic growth. Within its framework, five largest banks received assistance, accounting for more than 30% of the loan portfolio of the entire banking system.

In addition, the effects of the introduction of IFRS 9 in the country, which entered into force on January 1, 2018, are felt - they demanded a more thorough assessment of risks from banks, since now they have to take into account expected credit losses, rather than actually incurred, as before. As a result, banks are forced to limit the supply of high-risk products, refuse high-risk borrowers and more accurately evaluate the credit rating of customers - otherwise this is fraught with deterioration of assets and sanctions by the regulator. By the way, these measures affected not only a decrease in toxic loans, but also a slight decline in lending - the loan portfolio of the second-tier banks of the Republic of Kazakhstan at the end of the first half of 2018 amounted to 13.5 trillion tenge, which is 13.2% less than in the past year, while in the minus were 10 STB out of 32.

Therefore, the decrease in the volume of "bad" loans is due to the fact that the principles of banks are changing, which allow not to allow a high level of toxic loans, and these actions undoubtedly bring effect, as the numbers show. And yet it's too early to talk about stable long-term results, especially since international rating agencies are cautious in their assessments: for example, Fitch talks about the still poor quality of assets, noting, however, that the regulator's tolerance for problem loans has become much lower.

Considering bad loans in Kyrgyzstan, I would like to note that since January 2018, International Financial Reporting Standards (IFRS) 9 came into force in Kyrgyzstan, according to which commercial banks should take into account expected credit losses, but not actually incurred, as required by IFRS 39. The republic's commercial banks are responsible for predicting the solvency of their customers, calculating expected losses, and creating reserves for the entire duration of the product. Banks may face:
- lack of historical statistics for calculations;
- lack of staff with the necessary skills or trainees;
- toughness of information systems to the automation of new approaches to the calculation of reserves.

At the same time, the transition to IFRS 9 will not make adjustments to the business plans of banks, but standards may affect the level of lending to the economy in the near future. Growth in lending to high-risk borrowers is not expected. Perhaps, there will be a reduction in the terms of lending for individual products, which is associated with the peculiarities of assessing the probability of default. IFRS 9 is expected to create a burden on the profitability of banks, since the assessment of estimated losses entails a greater amount of reserve funds, which creates a burden on capital and reduces profitability. IFRS 9 requires a fundamentally different work with risks. The banking sector of Kyrgyzstan has a sufficient level of KGS liquidity. Between 2010 and 2017, there was a dynamic increase in the volume of loans in the banking system of Kyrgyzstan. In January-March 2018, the total loan portfolio of commercial banks increased by 2.1%, reaching 110.6 billion soms. Catfish loans increased by 1.2% - up to 68 billion soms. According to the National Bank, the weighted average interest rate on all loans decreased from 16% to 15.5%, for som - from 18.8% to 18.5%. Table 9 shows the consolidated statement of profit (Data of the National Bank of Kyrgyzstan for the period from 2014-2018).

Table 9. The consolidated statement of profit / loss of commercial banks in Kyrgyzstan

	2014	2015	2016	2017	2018
A. Profit / loss statement of commercial banks					
Total interest income	13381 519	19 300 445	19 570 080	19 497 034	21 256 946
Total interest expense	5 087 382	8 924 835	9 498 234	7 681 966	7 534 606
Net interest income	8 294 137	10 375 610	10 071 845	11 815 068	13 722 341
Allowance for potential losses and losses on loans	544 963	1 430 547	1 400 026	611 900	1 379 990
Net interest income after deductions to RPPU	7 749 174	8 945 062	8 671 820	11 203 167	12 342 350
Total non-interest income	5 850 866	12 143 904	14 630 679	10 007 335	11 026 503
Total non-interest expenses	1 572 728	7 801 601	10 603 234	5 733 925	6 096 372
Total other operating and administrative expenses	8 216 751	10 406 591	11 241 612	12 507 304	13 455 908
Net operating income (loss)	3 810 560	2 880 775	1 457 652	2 969 274	3 816 574

Provisions for potential losses and losses (not from credit operations)	244 442	212 393	424 647	481 314	356 304
Net income (loss) before tax	3 566 119	2 668 382	1 033 006	2 487 960	3 460 270
Income tax	396 425	302 541	178 562	349 532	456 796
Net income (loss)	3 169 694	2 365 842	854 443	2 138 428	3 003 473
B. Classification of the loan portfolio to customers of commercial banks					
Normal	737 554	15 846 741	33 341 746	49 961 667	60 594 634
Satisfactory	68 169 723	51 238 893	27 775 890	23 356 349	24 302 754
Under control	6 107 647	19 860 136	23 898 429	26 241 963	32 747 534
Unclassified loans to customers, total	75014924	86 945 770	85 016 065	99 559 980	117644 923
Substandard	1 181 476	3 052 750	3 145 934	3 571 823	4 443 751
Doubtful	1 136 879	1 690 327	2 354 725	1 480 700	2 009 874
Losses	1 188 327	1 929 283	2 715 511	3 173 675	3 133 516
Classified loans to customers	3 506 682	6 672 359	8 216 170	8 226 198	9 587 142
TOTAL	78521606	93618129	93232235	107786178	127 232 065

Source: compiled and calculated by authors according to Data of the National Bank of Kyrgyzstan for the period from 2014-2018

The volume of the loan portfolio of the banking sector as of September 30, 2018 amounted to KGS 123.9 billion, having increased by 14.4 percent since the beginning of the year (KGS 108.3 billion at the end of 2017).

In the loan portfolio of the banking system as a whole, the share of classified loans as of September 30, 2018 amounted to 7.4 percent or 9.1 billion soms (as of the end of 2017 - 7.6 percent or 8.2 billion soms).

The indicator of the net total capital of the banking sector, used to calculate the economic standards established by the National Bank, amounted to KGS 35.5 billion as of September 30, 2018, having increased by 5.7 percent since the beginning of the year (KGS 33.6 billion at the end of 2017).

Since the middle of 2013, in the banking system of the republic there has been a gradual increase in unclassified loans of the "under supervision" group, and since the beginning of 2014, there has been a sharp decrease in the performance of the "satisfactory loans" group and an almost twofold increase in the number of "qualified loans".
In the period from 2014 to 2016, there was a decrease in the profitability of the banking system as a whole, with a subsequent recovery along with an increase in lending to agriculture, industry and consumer loans.

This dynamics of decline in financial sector indicators is explained by the increase in bank expenses on loans and the obligatory "nest egg", deferred to cover possible losses.

GDP growth Interest rates on loans are the most significant explanatory indicators of macroeconomic activity (GDP, production, unemployment, investments) and the exchange rate significantly affect the stability of the banking sector.

Under the conditions of the Kyrgyz economy, GDP growth has a statistically significant effect on the decline in the share of classified indicators. Since 2016, the volume of problem loans in the loan portfolio has ceased to increase actively and this is due to the adopted micro-prudential measures and de-dollarization measures, the transformation of foreign currency loans into som, and an increase in the minimum authorized capital of banks.
The National Bank of the Kyrgyz Republic in its policy actively uses financial instruments to maintain the required amount of cash in the market, stimulate the economy, and reduce the discount rate in order to reduce the cost of financial resources. The discount rate is tied to inflation indicators.

A high weighted average interest rate on loans will not be lower depending on the resource base being formed, in particular, deposit rates are about 10-12%, in addition to which include credit risks, operating expenses, a small profit margin. Commercial banks do not have subsidized funds, so the interest rate is formed by the market mechanism.

The resource base of commercial banks is formed by international lenders and depositors. A country credit rating is not in favor of attracting cheap long-term funds from foreign markets to the republic's banking system.

The global financial crisis had an impact on the economies of the nearest neighbors and major trading partners, on the state of the exchange rates of the national currencies of neighboring states - Russia and Kazakhstan, on the availability of external funding, the cost of money, which had an impact on the consumer demand of the population, formed negative economic expectations for Entrepreneurs of Kyrgyzstan, reduced interest in business activity, led to an expected position.

Against this background of a decline in business activity, a decrease in the solvency of debtors is observed. If earlier they managed to accumulate money and repay loans on a monthly basis, then in the emerging economic situation they fell into the category of problem borrowers, and the share of satisfactory loans fell sharply. For this reason, interest and non-interest expenses of banks grew, profitability indicators decreased.

As a result of reduced economic activity, the profitability of the corporate sector and the household sector is reduced; unemployment is growing, which leads to a decrease in the quality of the banks' loan portfolio. Sectors of the economy of the republic actively credited by the banking system such as construction, trade, real estate also showed a decrease in profitability.

The situation of slowdown in business activity forced banks to more carefully select lending facilities. At the same time, interest rates in national and foreign currencies began to decline, which affected the interest rates on deposits downward.

With a low level of remuneration, part of the population does not stop the risk of a possible non-repayment of a bank loan. According to a survey conducted by the Legal Perspective Public Foundation in ayil aimakhs in southern Kyrgyzstan, more often women over 25 take loans and not at all for starting a business. Men rarely take loans because they fear the loss of real estate, as well as the likelihood of putting their own family in a difficult position.

If we consider lending in microcredit organizations, the main users are rural residents. Unemployment forces people to take loans for household and family expenses. Family breadwinners often go abroad to earn money to pay off arrears.

Before making a decision on granting a loan, any bank turns to CIB "Ishenim" for information that shows the credit discipline of a potential borrower. If delays are recorded in the CIB, the borrower has a bad credit history. This gives the bank a reason to refuse to grant a loan in accordance with internal procedures. In many countries, debtors are not released from the country. In Kyrgyzstan, this is not practiced.

From the practice of a bank's loyalty to repaying a loan, one can note the fact that the terms of existing loan agreements by banks are not being reviewed. There were no cases of refusal to recover debt from the bank when livestock bought on credit died, but banks were more likely to repay loans when there were real facts of the death of borrowers or the complete destruction of the property that was in the mortgage.

Some experts believe that the government needs to consider not only the interests of borrowers, but also lenders. If borrowers do not have the skills of competent financial distribution and targeted spending, then this is the fault of the citizens themselves. But there are objective conditions that make it difficult for borrowers to access information. For example, until 2014, the text of the contract with the bank was written only in Russian, while the Kyrgyz-speaking residents of the regions were actively using loans.

In practice, there was a situation where bank employees resorted to unconventional methods of stimulating the repayment of borrowed funds by contacting the heads (akims) of the village council with a request to influence a resident of a given territorial area. There have been cases when aksakals appealed to the courts with a request to exert an effect on the repayment of the existing debt of a local resident.

The existing experience in working with credit risks against the backdrop of new international requirements is updating the skills of forecasting credit risks and generating the demand of the population, the banking sector and entrepreneurs for credit risk databases and related forecasting, consulting products. It seems true that this is the next institutional step for the economy of Kyrgyzstan.

Lending, as you know, the supporting structure of the banking system of Russia: the share of loans in the total assets of Russian banks is slightly less than 70%. At the end of 2017, we can conclude that there are signs of a revitalization of the lending process: compared with 2016, there was an increase in the total volume of loan debt of non-financial organizations and the population.

The main contribution to the positive dynamics of lending was made by the retail segment. The fastest pace was the expansion of housing and mortgage lending, whose share in the total volume of loan debt of the population is approaching 45%. This is a reflection of the recovery in consumer activity in the Russian economy and may be one of the main factors in GDP growth.

The dynamics of lending to non-financial organizations moved into the zone of positive values, but absolute volumes have not yet reached the 2015 level. The weak dynamics of corporate lending is based on several factors:
- shortage of quality borrowers;
- the presence of a significant amount of bad and overdue debt required the formation of reserves, which over the past year increased by more than a quarter;
- the conditions of bank lending, despite their softening, have remained rather stringent both in interest rates and in terms of non-price characteristics.

During the recovery period after the crisis of 2007-2008 the Russian banking sector showed moderate dynamics of problem and bad loans, the share of overdue loans of non-financial organizations and individuals gradually decreased.

Since 2014, under the influence of the difficult macroeconomic situation and the high volatility of the exchange rate, the number of loans of IV and V quality categories in the loan portfolio began to increase sharply. Against the background of a significant increase in interest rates and a decrease in real disposable income, a jump in the share of overdue loans was observed.

The stabilization of the market situation in the middle of 2016 allowed slowing down the negative dynamics and reversing the trend. Moreover, the existing geo-economic uncertainty leaves its mark on the development trends of problem and bad loans in Russia.

The poor quality of portfolios creates barriers to the transition from moderately tight to neutral monetary policy. Clearing "bad" portfolios is a prerequisite for realizing the positive effects of softening the conditions of bank

lending. But this means that the policy to free the banking sector from unscrupulous participants should reach a new level: the emphasis needs to be shifted to the prevention of banking risks, the assessment of the adequacy of the formation of RVPS and the compliance of the business models used by credit organizations with their capabilities.

In the first half of 2018, the main indicators of banks' activity were slowly growing, with the exception of the effect of currency revaluation. According to the Bank of Russia, the assets of the banking sector in the first half of 2018 increased by only 0.1%. For comparison, the growth of assets in the 1st half of 2017 amounted to 2.2%. The Bank of Russia considers the main reason for the reduction in assets is the consolidation of the business of large banks and a decrease in their mutual interbank operations.

The total volume of loans to the economy (loans to enterprises and households) in the 1st half of 2018 increased by 4.1%, doubling in comparison with the indicator of the 1st half of 2017 (1.8%). Including loans to enterprises increased by 1.8%, and loans to individuals increased by 9.3%. The Central Bank told how lending is growing in the context of the types of activities of enterprises-borrowers of banks. Over the past 1.5 years, agricultural lending, mining lending and trade lending have grown faster than the market. After a long recession, lending to construction resumed. Lending to the manufacturing industry after the recovery growth of 2017 slowed down.
Banks again turned their attention to small business - in January-May 2018, the portfolio of loans to SMEs increased by 6.9%. This is due to some improvement in the situation in the economy, which positively affects the incomes of the population - the main client of SMEs. Indeed, most small businesses operate in the field of trade and retail services.

In retail lending, the mortgage is growing steadily - in January-May 2018, the growth was 8.5%. In the total volume of loans to the population, mortgage loans account for 43.2%. At the same time, mortgage loans in rubles are the highest quality asset of banks, the delay on it is only 1.3%.

The portfolio of unsecured consumer loans grew by 7% in January-May 2018. The volume of car loans in January-May 2018 increased by 3.6%.

On the whole, in the first half of 2018, the volume of overdue debts in the corporate portfolio increased by 7.9% in the banking system and decreased by 4.2% in the retail sector. The share of overdue loans to enterprises increased from 6.4% to 6.7%, and for retail loans - decreased from 7% to 6.1%.

The share of overdue debts in the total amount of loans, deposits and other placed funds of the banking sector as of 01.01.2017 increased from 3.8 to 5.2% compared to 2015. By 2018, this indicator amounted to 5.16%. It should be noted that the share of overdue loans and other funds provided to individual entrepreneurs is 15.2%.
Assets of the banking sector, weighted by risk level, in 2018 are estimated at 77,884.2 billion rubles, of which the credit risk for assets reflected in balance sheet accounts is 42.9%

As Tovpenko P.A. notes in his analysis, in 2017, a significant decrease is observed in the number of banks whose share of overdue debt did not exceed 5% of the loan portfolio, from 508 to 272. However, in 60 banks, the proportion of overdue debt exceeds 60% and their number over 2 years increased by 34. The number of credit institutions with no overdue debts amounted to 55 units as of 01.01.2017 (Tovpeko, 2018) (figure 2).
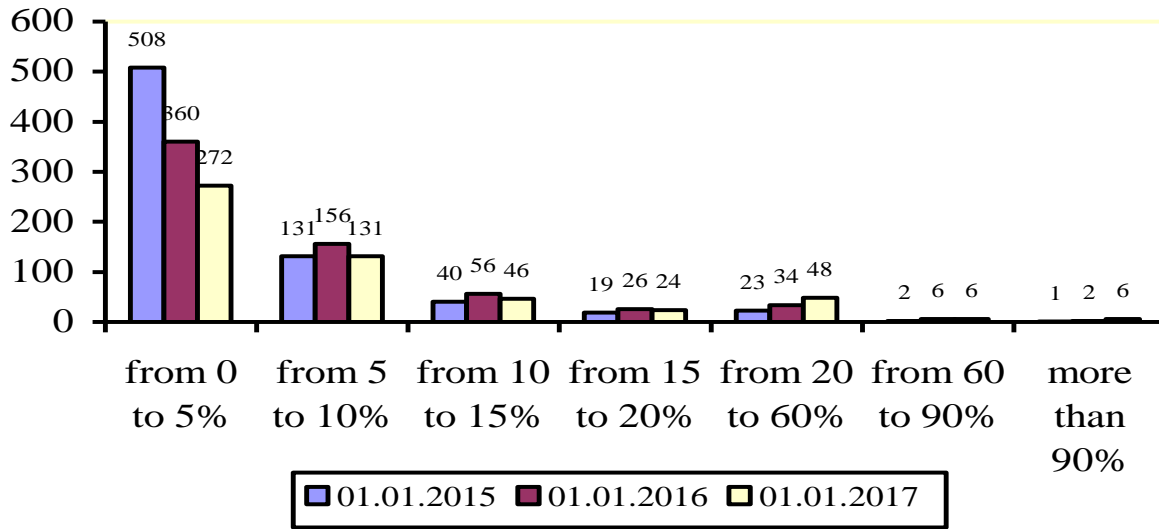
Figure 2. Distribution of credit organizations by the proportion of overdue debt in the loan portfolio of Russian banks.
Source: compiled by authors

The share of overdue loans in loans to non-financial organizations and individuals is observed a similar trend: in 2016, a sharp jump in the share of overdue loans is visible, and by 2017 the growth rate slowed down, and as of 01.01.2017, the proportion of overdue loans in physical loans decreased persons. The increase in the share of overdue loans in loans to individuals in 2017 reached 8.2% with an increase in loans to individuals by 1.1%, which is higher than the maximum of the last crisis - 7.5% on 08/01/2010 (Tovpeko, 2018) (figure 3).
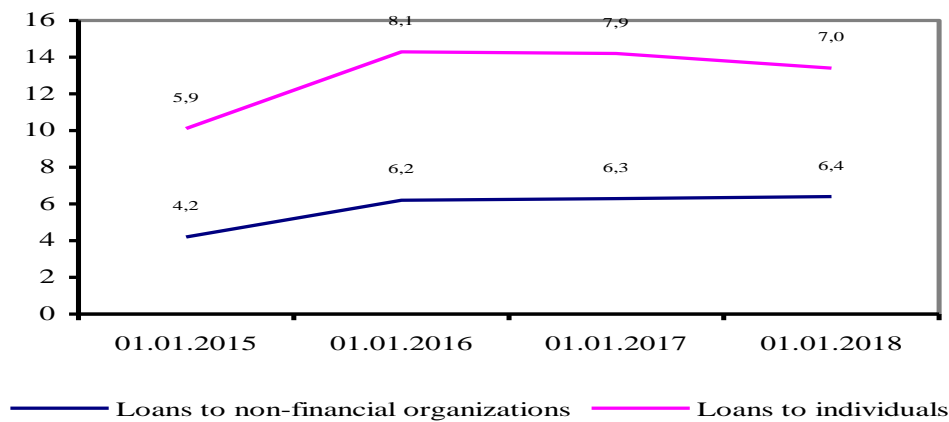
Figure 3. The share of overdue debts in loans and other means to non-financial organizations and individuals in Russia.
Source: compiled by authors

A large share in the debt on loans to individuals is accounted for by mortgage loans - 33.1%, housing loans (except mortgage loans) - 9.4%, and car loans - 5.6%.

The amount of major credit risks in the banking sector in 2016 increased by 17.7% compared to the previous year, and in 2017 decreased by 10%. In 2018, there is a slight increase in this indicator by 1% (21,247.1 billion rubles). The assumption mentioned above about the reduction in the amount of major credit risks since 2016 was confirmed.

You should also pay attention to the quality of the loan portfolio. As of 01.01.2018, the share of loans of the I and II quality categories was 82.5%, the share of loans of the IV and V quality categories (bad loans) over the 2 years increased from 6.8 to 9.5%. In general, in 2015-2018 there is a noticeable tendency towards a decrease in the share of standard and non-standard loans and an increase in the share of doubtful, problematic and bad loans (table 10) (Tovpeko, 2018).

Table 10. Dynamics of the structure of loan debt of the banking sector of Russia

Loan Quality Category	The share of loans classified by quality category, %			
	2014	2015	2016	2017
Standard	46,8	45,2	44,0	44,9
Non-standard	39,5	38,3	38,1	37,6
Doubtful	6,8	8,2	8,5	7,5
Problematic	2,2	2,4	3,0	3,1
Hopeless	4,6	5,9	6,5	6,9

Source: compiled by authors

A positive factor for the period under review is the maintenance at a fairly high level by banks of the volume of reserves formed for possible losses on loans. As of 01.01.2018, the accumulated reserves for possible losses on loans amounted to 9.3% of the total loan debt in 2016 and 2017 this indicator was at the level of 7.8 and 8.5%, respectively.

Thus, currently there is a tendency to increase the share of overdue debt in the banking sector of the Russian Federation. The increase in the share of delinquency in loans granted to individuals is recorded to the greatest extent. By 2018, there has been an increase in the share of large banking risks and the share of loans of IV and V quality categories. All of this generally indicates an increase in credit risk in the banking sector, which in the long run may lead to the inability of the bank to meet its obligations and its further liquidation.

Conclusions

The banking sector in the modern world is one of the leading components of the financial system. For this reason, its stability and efficiency is one of the key conditions for the full and "healthy" development of the country's economy.

A large share in the banking sector is occupied directly by commercial banks, the main goal of which is to make a profit. Each bank independently chooses the most suitable set of tools to achieve its goals. At this stage, a peculiar conflict of priorities arises: for banking, the key is high profitability and the search for ways to achieve it, and for counterparties, the stability and reliability of the bank as a partner. Often, in the pursuit of high profits, banks pursue a rather risky policy, losing their liquidity and solvency, and as a result, their financial stability is reduced.

Thus, summing up, we would like to note that the amount of overdue debt remains an urgent problem for all countries that have been considered in the article over the past few years. Both banks and government agencies are trying to solve it, and certain successes have already been achieved, but stability is still a long way off. More than once, optimistic numbers were followed by another deterioration of the situation, and then it again straightened. The results for 2018 again inspire optimism. Undoubtedly, an improvement in the quality of assessment of borrowers thanks to modern scoring systems has also contributed to changes in the field of lending.

And this is precisely what the state's intervention is affecting, which has repeatedly legislatively limited banks in issuing high-risk loans in order to correct the catastrophic situation that the sector came to several years ago.
Banks are forced to take a more careful approach to assessing borrowers and analyzing risks so as not to be subject to sanctions. And the point is not that the requirements have become more stringent, but that banks more carefully draw up a portrait of the borrower and analyze it before deciding whether to grant or not to issue a loan.

Roughly speaking, the requirements as such do not fundamentally change, simply if earlier, with a superficial analysis of a potential borrower, which was often carried out manually, the picture was favorable for a loan, now that the portrait is drawn in more detail, there are more opportunities to see the pitfalls. This largely explains the fact that the volume of loans issued by STBs in these countries decreased over the year.

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ESTIMATION THE EFFECTIVENESS OF PUBLIC GOVERNANCE OF THE HEALTH SYSTEM IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract. The article is devoted to assessing the effectiveness of public administration of the health system, taking into account the medical reforms carried out in post-socialist countries in the context of sustainable development. During the study, the authors revealed that one of the main problems in achieving the sustainable development goal - "ensuring a healthy lifestyle and promoting well-being for all at any age" is the lack of a sound methodology for assessing the effectiveness of public administration reforms in the healthcare system. On the example of the Republic of Kazakhstan, a comprehensive analysis of the effectiveness of the health system was carried out, based on data from medical and demographic indicators, financing indicators, as well as an integrated indicator of assessing the effectiveness of the health system - the expected life expectancy of the population. Based on economic and mathematical methods in management, a forecast of the expected life expectancy of the population was carried out; the results of forecast calculations show that in the medium term, the indicator of the expected life expectancy of the population will have a slight upward trend. As the main recommendations for improving the effectiveness of public administration of the health system in transformational economies, the authors substantiated the need to determine the key parameters of a unified methodology for assessing the effectiveness of the health system. The use of a unified system of healthcare performance indicators makes it possible to assess the degree to which goals have been achieved to increase the efficiency of resource use and ensure a high level of quality and accessibility of medical services.

Keywords: efficiency; public administration; health care system; sustainable development; life expectancy, health care expenses; health financing

1. Introduction

One of the most important and socially significant areas of public policy, requiring a balanced approach by the government, is the public administration system in the health sector, which has a direct impact on the welfare, life and health of the population. Having come a long way since gaining independence, the countries of the former

socialist space demonstrate various successes in reforming the legacy healthcare system based on state ownership, non-price rationing, centralized planning and control.

A generalization of the experience of medical reforms carried out in European countries (Romania, Poland, Bulgaria) suggests that the modernization of national systems for organizing, managing and financing health care in these countries was based on the introduction of compulsory medical insurance (with centralized collection and distribution of financial resources), which primarily due to the problems of limited budget funding.

Previous studies of the authors on a comparative analysis of medical reforms in Ukraine and Kazakhstan led to the conclusion that the Kazakh and Ukrainian health systems have common features due to the Soviet legacy, and the need to reform the health systems in these countries is due to their low efficiency. At the same time, the main directions of medical reforms in these countries have their own peculiarities related to the reorientation of the national system of financing health care to the patient in Ukraine and the introduction of compulsory social health insurance in Kazakhstan. At the same time, the analysis confirmed that modern health care reforms are a complex process through which post-socialist states goes through with varying speed and degree of success (Grazhevskaya, Aymagambetov, Tyngishev, 2019).

Monitoring achievements and failures in this area, as well as creating a well-thought-out strategy for the further development of the medical industry, is impossible without developing a modern methodology for assessing the effectiveness of public administration of the healthcare system. In this regard, the authors of the proposed study conducted a comprehensive analysis of the performance indicators of the health care system (for example, the Republic of Kazakhstan), based on which the existing problems were identified and recommendations for improving reforms in the healthcare sector were substantiated.

2. Research background

The problems of the functioning and development of the public sector, of which the healthcare sector is an important component, are disclosed in the works of J. Stiglitz, "The Economics of the Public Sector," Specific Properties of Medical Services as an Object of the Normative Economy, Comparative Characteristics of the Medical Services Industry with the Standards of the Welfare Economy, Analysis of the Inefficiency of the Medical Services Market, due to the asymmetry of information, the uncertainty of demand, external health effects have found ix in K. Arrow studies (Organizational and financial mechanism of public management of the health care system in foreign countries, 2019). A fundamental study on the effectiveness of the health system was published in 2018 by experts from the European Observatory on Health Systems and Policies (Cylus, Papanicolas, Smith, 2016).

Theoretical and practical aspects of reforming the systems of organization, management and financing of health care in the countries of the former socialist space are reflected in the scientific works such as"Analysis of the National Health Strategy for 2014-2020" (Popescu, 2015), "The Evolution Of The Medical System And Health Status In Romania" (Maxim, Diaconu, Maxim, 2015).

In Ukraine, the problems of implementing and evaluating the effectiveness of medical reform were reflected in the writings of V. Moskalenko (substantiation of the principles for constructing an optimal healthcare system in the Ukrainian context) V. Lehan, G. Slabkogo, M. Shevchenko (argumentation of the strategic directions of the healthcare system development in the context of market transformation of the national economics). In the context of the problem under study, the monograph "The State Administration of Health Protection of Ukraine", prepared by specialists of the Ukrainian Institute for Strategic Studies of the Ministry of Health of Ukraine, which discloses the theoretical and methodological foundations of the study of state management of the healthcare sector, the impact of the state on the medical and demographic situation and the health status of the population of Ukraine,

deserves attention, regulatory support for the development of the national healthcare industry, financial and economic mechanism of state regulation, as well as ways to improve public policy and public management of the domestic medical industry (Grazhevskaya, Aymagambetov, Tyngishev, 2019).

The problems of organizing the healthcare system in Kazakhstan are the subject of scientific analysis of many famous scientists. A theoretical study of the essence of public health management, the development of scientifically based proposals and recommendations for improving legislation at the initial stage of the formation of the Republic of Kazakhstan were proposed by G. Utibaev. Social and organizational and legal characteristics of healthcare management, issues of legal regulation of permissive and supervisory activities in the field health care were highlighted in a dissertation study by Kozhabek K. "Legal Regulation of public health administration in the Republic of Kazakhstan: problems and prospects (The current state of the healthcare system of the Karaganda region, 2019). Issues of state regulation and management of the health care system of the Republic of Kazakhstan at the present stage of development were investigated by A. Rakhimbekova (Rakhimbekova, 2015) and Ryskulova M. (Ryskulova, 2017). Assessment of the current state and justification of the main directions of reforming the healthcare system in Kazakhstan are reflected in the writings of Orynbasarova S (The current state of the healthcare system of the Karaganda region, 2019). Regarding the organization of public administration in a market economy, this issue was investigated by L. Komekbayevaa, A. Legostayeva, O. Tyan, and Y. Orynbassarova Government Measures for Economic Support in the Conditions of a Floating Exchange Rate of the National Currency (Komekbayeva, Legostayeva, Tyan, Orynbassarova, 2016).

At the same time, despite a significant number of scientific developments devoted to the organizational foundations of public administration in the healthcare sector, the problems of assessing the effectiveness of public administration of the healthcare system are not well developed, which determined the purpose and objectives of this study.

3. Materials and methods

The study is based on modern theoretical approaches (systemic, comparative, institutional), concepts and models of public administration of the healthcare system (mainly state, social insurance, mainly private). The study used economic and statistical methods, as well as a comparative analysis of statistical data. The authors assessed the effectiveness of the healthcare system in the Republic of Kazakhstan for the period 2013-2017 based on the data of medical and demographic indicators, financing indicators, as well as an integrated indicator of the expected life expectancy of the population.

The information base of the study was compiled by the materials of the World Health Organization, legislative and regulatory acts in the field of healthcare in post-socialist countries, as well as official publications, analytical and statistical collections on the activities of healthcare organizations and health indicators of the population of the Republic of Kazakhstan. At the same time, the incompleteness of statistical databases, as well as the lack of a well-established generally accepted methodology for assessing the effectiveness of public administration of the health system in these countries, became a limitation in the proposed study.

4. Results and Discussion

The fundamental role of protecting public health as an integral condition of society is recognized in article 29 of the Constitution of the Republic of Kazakhstan (1. Citizens of the Republic of Kazakhstan have the right to protection of health. 2. Citizens of the Republic are entitled to receive a guaranteed amount of medical care established by law for free) (Grazhevskaya, Tyngisheva, 2018). The Strategic Plan of the Ministry of Health of the Republic of Kazakhstan for 2017-2021 defines specific strategic goals (Strategic plan Strategic plan of the Ministry of Health of the Republic of Kazakhstan for 2017 - 2021). Also, since 2016, the state continued the

practice of implementing the state program in the field of healthcare for 2016–2020, aimed at strengthening the health of the population to ensure sustainable socio-economic development of the country (The State Health Development Program of the Republic of Kazakhstan "Densaulyk" for March 2016-2019, 2010).

Currently, measures are being taken in Kazakhstan aimed at introducing new approaches to public administration in order to improve the availability and quality of the provision of medical services to the population. However, despite the measures taken, today in the health care system there are a number of unresolved problems, in particular, the shortage of personnel medical supplies; low level of social protection and remuneration of medical workers; low amounts of budget financing to provide free medical care to citizens, barriers to the implementation of the system of mandatory medical insurance, etc.

Thus, further improving the efficiency of managing the health care system is one of the main tasks of ensuring sustainable development. The implementation of this task largely depends on the correct choice of appropriate tools, methods and mechanisms and is determined by the available resources and their sources.

One of the key areas of assessing the effectiveness of the health care system is the study of indicators of natural population movement. Analysis of the natural movement of the population allows us to evaluate the basic characteristics of the current state of the health care system, as well as identify key problems of its functioning. In turn, an organized system for managing the health sector can reduce population mortality and increase a key indicator of the effectiveness of the health system in terms of life expectancy. Figure 1 presents a graph characterizing the indicators of natural population movement in the Republic of Kazakhstan for 2013-2017.
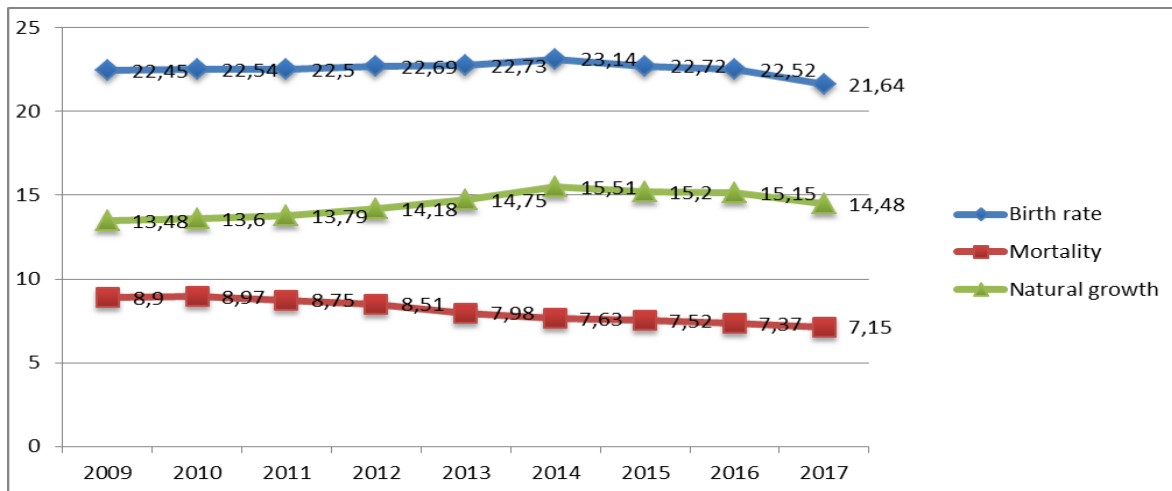
Figure 1. Indicators of the natural movement of the population of the Republic of Kazakhstan for 2013-2017
Source: compiled by authors

In accordance with the above data, in 2017 the birth rate in Kazakhstan amounted to 21.64 per 1000 people, which is 4.7% less compared to 2013. At the same time, the mortality rate at the end of the analyzed period decreased by 10.4% and amounted to 7.15 per 1000 population in 2017 (Statistical collections "Health of the population of the Republic of Kazakhstan and the activities of health organizations" 2013-2017). According to the World Health Organization, on a scale of indicative indicators for estimating fertility and mortality rates (table 1), Kazakhstan has a low mortality rate (7.15) and an average fertility rate (21.64) per 1000 population (Data of the World Health Organization). The analyzed fertility and mortality rates determined the following dynamics of natural population growth: in 2017, the natural population growth rate was 14.48, which is 1.8% less than in 2013.

Table 1. Indicators for assessing levels of vital movement

Grade Level	Birth rate	Mortality
Low	below 15	below 9 ‰
Average	15 - 25	9 - 15
Tall	over 25	over 15

Source: compiled by authors

The state of the effectiveness of the functioning of the healthcare system in Kazakhstan can be judged on the basis of the data presented in table 2.

Table 2. Main indicators of the healthcare system of the Republic of Kazakhstan

	2013	2014	2015	2016	2017	Rate of increase 2017/2013 (%)
Number of hospital organizations (absolute numbers)	1008	911	901	853	877	-12,9
The number of outpatient organizations (absolute numbers)	3796	3163	3149	3126	3273	-13,8
Incidence per 100,000 people of the corresponding population	53954.5	52031,5	52410,7	56773.4	57896.9	7,3
Number of doctors (absolute numbers)	53809	52756	52398	53335	56570	5,1
number of doctors per 10,000 population	31,4	30,3	29,7	29.8	31,2	-0,6
head nursing staff (absolute numbers)	135908	136273	138851	142734	152591	12,3
strength	79,2	78.2	78,6	79,7	84.0	6,1
nursing staff per 10,000 population	68,3	60,4	58,0	55,9	54,8	-19,8

Source: compiled by authors

Thus, over the period 2013-2017, both the number of hospital organizations (by 12.9%) and the number of outpatient clinics (by 13.8%) decreased in Kazakhstan. At the same time, the incidence rate per 100,000 people of the corresponding population increased by 7.3%. With a decrease in the number of hospital organizations, there has been a decrease in the number of hospital beds by 10 thousand people (by 19.8%).

As for the staffing of the healthcare system, the number of doctors in the country over this period increased by 5.1%, but the number of doctors per 10,000 populations has not changed. It should be noted the increase in the number of paramedical personnel in absolute numbers (by 12.3%) and by 10.000 of the population (by 6.1%). It is important to note that a decrease in the number of medical institutions and a decrease in the number of medical beds did not lead to optimization of the human resources for health care, in particular, there is a shortage of doctors per 10,000 people, the reason for which is the low salary and low level of social protection of doctors.

In this regard, it is advisable to consider the situation with financing the health system in Kazakhstan. It is important to note that this system is based mainly on the state budget model. Consider the dynamics of health spending, as the most important indicator of social development and social policy of the state, for the period 2014-2017.

Table 3. The main indicators of financing the health system in Kazakhstan for the period 2014-2017.

	2013	2014	2015	2016	2017
Health expenditures, billion tenge.	1281	1432	1485	1762	1787
The share of health care spending in GDP,%	3,6	3,7	3,6	3,8	3,5
Health expenditures per capita, tenge	77 676	82 890	83 961	70422	97650
Health expenditure per capita, $	501,1	462,9	381,5	289	299,5

Source: compiled by authors

According to the table, in 2017, the total amount of health care spending in Kazakhstan amounted to 1,787 billion tenge. At the same time, per capita health care expenditures amounted to 97650 tenge or 299.5 US dollars ("National Health Accounts of the Republic of Kazakhstan review of health care expenditures for 2010-2016"). The value of this indicator is 12 times lower than the level of per capita spending in OECD countries ($ 3,470). The share of health care expenditures in Kazakhstan's GDP in 2017 amounted to 3.5%. For comparison, in the group of middle-income countries, to which Kazakhstan belongs, the similar indicator is 6.3%, in OECD countries - 9.3% (Temekova, Ishkanova, 2018).

As already noted, in order to increase the efficiency of financing medical care, medical reform is currently underway in many post-socialist countries, aimed at strengthening the financial sustainability of the healthcare system based on the joint responsibility of the state, employer and every citizen. In this regard, in 2015, the Law on Compulsory Social Health Insurance was adopted in Kazakhstan (The Law of the Republic of Kazakhstan "On Compulsory Social Health Insurance", 2018). The transition from the state model of organizing the health care system to the system of compulsory health insurance increases the role and importance of evaluating the effectiveness of managing the health care system, since spending resources on ineffective medical care can reduce the willingness of society to contribute to the financing of medical services.

A representative indicator characterizing the effectiveness of the management of the health care system is the indicator of the expected life expectancy of the population - one of the key indicators included in the calculation of the health system performance index (Nazarova, Borisenkova, 2017).

An analysis of the dynamics of this indicator in Kazakhstan for the period 2008-2017 (Figure 2) indicates that the life expectancy of the population in this country increased by 8.7%: from 67.11 years in 2008 to 72.95 years in 2017.
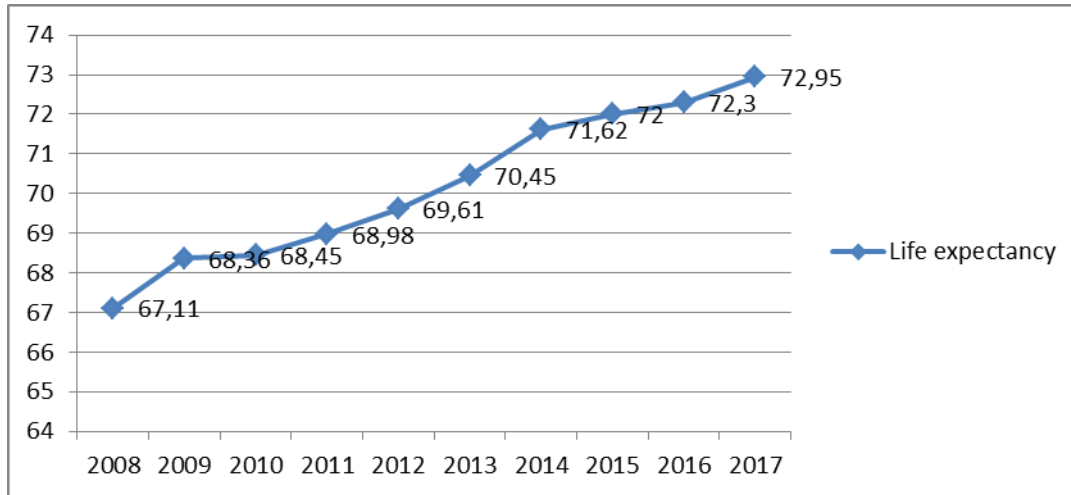
Figure 2. Dynamics of the indicator of life expectancy in Kazakhstan, for the period 2008-2017.
Source: compiled by authors

According to the dynamics of the life expectancy of the population for the period 2008-2017, we will build a forecast for 3 steps forward, i.e., until the end of 2020. The results of modeling and forecasting are shown in graph 3.

According to the first five points of the time series, using the statistical function in Excel, the values were estimated a_0= **66,816**, a_1 = **0,562,** which correspond to a point in time t=0.

Equation is being found:

$$y_t = 66,816 + 0,562t$$

Selected smoothing option $\alpha = 0,3$, then the discount factor $\beta = 1 - \alpha = 1 - 0,3 = 0,7$.

We determined the initial conditions of exponential means by the formulas:

$$S_0^{(1)} = a_{0(0)} - \frac{\beta}{\alpha} a_{1(0)} = 66{,}816 - \frac{0{,}7}{0{,}3} \cdot 0{,}562 = 65{,}5047;$$

$$S_0^{(2)} = a_{0(0)} - \frac{2\beta}{\alpha} a_{1(0)} = 66{,}816 - \frac{2 \cdot 0{,}7}{0{,}3} \cdot 0{,}562 = 64{,}1933.$$

The values of the exponential averages for the following periods were calculated using the formulas:

$$S_t^{(1)} = \alpha \cdot y_t + \beta \cdot S_{t-1}^{(1)};$$

$$S_t^{(2)} = \alpha \cdot S_t^{(1)} + \beta \cdot S_{t-1}^{(2)}.$$

Adjusted model parameters:

$$a_{0(t)} = 2S_t^{(1)} - S_t^{(2)};$$

$$a_{1(t)} = \frac{\alpha}{\beta}\left(S_t^{(1)} - S_t^{(2)}\right).$$

According to the model with adjusted parameters $a_{0(t)}$ и $a_{1(t)}$ we find the forecast for the next time:

$$\hat{y}_t(\tau) = a_{0(t)} + a_{1(t)}\tau = \hat{y}_{(t+1)} = a_{0(t)} + a_{1(t)}.$$ (see table 4)

Table 4. The calculated values

t	Y	S_t^1	S_t^2	a_0	a_1	$\hat{y}_t$
0		65,5047	64,1933	66,816	0,562	
1	67,11	65,9863	64,7312	67,2413	0,53788	67,378
2	68,36	66,6984	65,3214	68,0754	0,59015	67,7792
3	68,45	67,2239	65,8921	68,5556	0,57075	68,6656
4	68,98	67,7507	66,4497	69,0517	0,55758	69,1264
5	69,61	68,3085	67,0073	69,6097	0,55764	69,6093
6	70,45	68,9509	67,5904	70,3115	0,58308	70,1673
7	71,62	69,7517	68,2388	71,2645	0,64837	70,8946
8	72	70,4262	68,895	71,9573	0,65621	71,9129
9	72,3	70,9883	69,523	72,4536	0,62799	72,6135
10	72,95	71,5768	70,1391	73,0145	0,61615	73,0816
$\hat{y}_t(2018)$						73,6306
$\hat{y}_t(2019)$						74,2468
$\hat{y}_t(2020)$						74,8629

Source: compiled by authors

If $t < n$, then the constructed model can be used to predict the future. The point forecast is calculated by the formula:

$$\hat{y}_{(n+\tau)} = a_{0(n)} + a_{1(n)}\tau, \quad \tau = 1,2,\dots.$$

Using this formula, we obtain the predicted values of the life expectancy of the population for the next three years (2018-2020):

- 2018 year

$$\hat{y}_{(2017+1)} = a_{0(2017)} + a_{1(2017)} \cdot 1 = 73{,}0145 + 0{,}61615 \cdot 1 = 73{,}6306 \text{ years;}$$

- 2019 year

$$\hat{y}_{(2017+2)} = a_{0(2017)} + a_{1(2017)} \cdot 2 = 73{,}0145 + 0{,}61615 \cdot 2 = 74{,}2468 \text{ years;}$$

- 2020 year

$$\hat{y}_{(2017+3)} = a_{0(2017)} + a_{1(2017)} \cdot 3 = 73{,}0145 + 0{,}61615 \cdot 3 = 74{,}8629 \text{ years.}$$
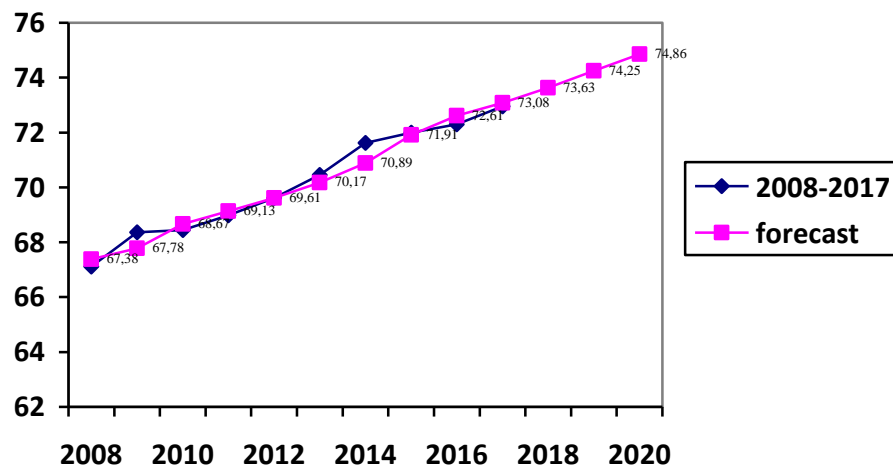
Figure 3. The results of modeling and forecasting the expected life expectancy of the population of the Republic of Kazakhstan until 2020
Source: compiled by authors

As the calculations show, the predicted values of the life expectancy of the population of the Republic of Kazakhstan in 2018, 2019 and 2020 will amount to 73.63; 74.25; 74.86 years respectively (figure 3). The reliability of the forecast data is significant, which confirms the comparison of the actual indicator of life expectancy for 2018 - 73.15 with the forecast - 73.63, with a difference of 0.48. It should be noted that the predicted indicator of the expected population duration in 2020 is 74.86 years, significantly lower than the countries with an effective health care system in the current period (Yemelina, 2015). For comparison, according to a study by the Bloomberg rating agency for 2016, the country with the most efficient healthcare system is Singapore with an average life expectancy of 82.7 years (Bloomberg: Ranking of the countries of the world on the effectiveness of health systems in 2016).

Conclusions

Based on the analysis of evaluating the effectiveness of public administration of the health system in the context of sustainable development, the following results were obtained:

1. Reforming the healthcare sector is an urgent task of improving the system of public administration in post-socialist countries. Health systems in the countries of the post-Soviet space have common features due to the legacy of the Soviet health system. One of the main problems in achieving the goal of sustainable development in healthcare is the lack of a sound methodology for assessing the effectiveness of reforms in this area.

2. An analysis of the effectiveness of the health care system in the Republic of Kazakhstan on the basis of the proposed indicators allowed us to state the following facts: for the period 2013-2017, there is a positive trend in the decrease in the mortality rate by 10.7%. Indicators of resource provision and morbidity show a negative trend, a decrease in the number of medical facilities, reduction of beds did not lead to optimization of health care resources, since the number of doctors per 10,000 population has not changed, the incidence rate per 100,000 people corresponding to the population increased by 7.3% and per capita health expenditure of the population amounted to US $ 299.5, well below the level of per capita expenditure in the OECD countries is 12 times (3470 US dollars).

It should be noted that the results of the analysis of the healthcare system can be used in the future to develop an optimal model of public administration efficiency in this area. Thus, the use of a unified system of healthcare performance indicators makes it possible to assess the degree to which the goals are set to increase the efficiency of resource use and ensure a high level of quality and accessibility of medical services, which in turn will bring it closer to achieving Sustainable Development Goal 3 "Ensuring a healthy lifestyle and promoting well-being for all at any age" sustainable development.

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A HOLISTIC ASSESSMENT OF THE RISKS ENCOUNTERED BY FAST MOVING CONSUMER GOODS SMES IN SOUTH AFRICA

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Abstract. Fast moving consumer goods (FMCG) small and medium-sized enterprises (SMEs) play an indispensable role in the emerging economies by selling products that are often classified as necessities. This paper argues that the traditional classification of risks into mainly operational, strategic, financial, and compliance risk, exposes FMCG SMEs to sustainability issues today. Focusing on sustainability and the associated factors, this paper seeks to offer a broader perspective on the risks that are crucial to the survival of FMCG SMEs in a fast-paced changing environment. The empirical investigation relied on the mixed research methods with the survey questionnaire and personal interviews as tools of interest. Two expert interviews were held to complement the quantitative data that was collected from 289 respondents. The research findings highlight the necessity for FMCG SMEs to look beyond the traditional risk types by incorporating social, economic and environmental risks, which are essential elements of the sustainability framework today. By combining these three components of sustainability into risk assessment, the paper seeks to introduce a more holistic view of risk sources that include evolving risk areas that are of growing importance in a rapidly changing global environment.

Keywords: risks, business survival, sustainability, traditional view, expanded view, Fast moving consumer goods (FMCG), SMEs, South Africa.

1. Introduction and background

The fast-moving consumer goods (FMCG) industry, which caters for products that can be classified as necessities is regarded as one of the largest worldwide (KPMG, 2014). These necessities consist of a wide range of products, with some of the most significant categories being food, beverages, beauty products, toiletries, health care products and home care products (Stahel & Clift, 2015). Because FMCGs products are usually similar within

categories, FMCG SMEs have to compete on price (KPMG, 2014). Of course, fierce competition squeezes profit margins to the lowest levels, and the consequence is that the least efficient FMCG SMEs are pushed out of business (Hubner, Kuhn & Sternbeck 2013). This is further aggravated by the fact that FMCGs are sold quickly and at a low-profit margin (Vaishnani, 2011).

Customarily organisations are tempted to align challenges to survival to strategic, operations, reporting and compliance issues (COSO, 2004). While this has been the practice, the fact that companies operate in a continually evolving environment challenges this paradigm and more so in the context of FMCGs. Perhaps this is why proactive organisations consider risk management as an ongoing process that seeks to identify risk exposures, measure their impact and apply the best methods of handling risk.

Today, the sources of risks in FMCG SMEs can no longer be confined to the traditional sources but rather seen through the sustainability lens – economic, social and environmental areas. For example, the World Economic Forum (WEF) Global Risks Report (2019) notes that in 2019, three of the top global risks in terms of likelihood and impact are from the components of sustainability. This is a significant shift from ten years ago when traditional risks like financial risks comprised the bulk of top global risks in terms of likelihood and impact (Irwin & Kennedy, 2017). In support, components of sustainability, environmental, economic and social are increasingly shaping trends in the FMCG industry in terms of risk sources (Calton, 2001; Dietsche 2009; EMF, 2012; Schlierer et al., 2012; Koor, 2018; WEF, 2019; Daniel, 2019).

From the discussion above, it is clear that risks in FMCG SMEs are no longer confined to traditional sources, but are now expanding through the sustainability lens – social, economic and environmental areas. To our knowledge, there is currently no holistic risk management model that explicitly addresses the social, economic and environmental components of sustainability. The traditional risk management approaches, including Enterprise Risk Management (ERM), are inherently internally focused, as they only look at reporting, operational, compliance, and strategic factors. To contribute to filling this gap, this paper offers a broader perspective on risks that are crucial to the survival of FMCG SMEs. In this case, the expanded view of risks includes social, economic and environmental considerations. By incorporating these three components of sustainability into risk assessment, the paper seeks to introduce a more holistic view of risk sources that include evolving risk areas that are of growing importance in a rapidly changing global environment.

2. Literature review

This section of the paper explores the traditional categories of risks and an expanded view of risk categories.

2.1 Traditional categories of risks
Kaplan and Mikes (2012) note that all businesses (regardless of size and industry) encounter some form of risks in their day-to-day operations. Traditionally, these risks are split into five broad categories: operational risks, strategic risks, financial risks, compliance risks, and reporting risks (Deloitte, 2013; Godbole, 2012; Horcher, 2011; Coyle, 2004; Chehabeddine, Tvaronavičienė, 2020).

2.1.1 Operational risks
The Basel Committee on Banking Supervision (2001) suggests that operational risks are linked to failures in people, systems, policies and procedures of a business. For this reason, operational risk is defined as the probability of a loss happening due to human errors, fraud and failed internal controls (Basel Committee on Banking Supervision, 2011). Typical examples of operational risks include theft, fraud, system failures, human errors, and product or service failure, to mention but a few (Risk Management Association, 2017; Ayandibu & Houghton, 2017; Goldberg & Palladini, 2010; Ogbor, 2009). Operational risks are inherent in daily business activities (Hussain & Shafi, 2014), and if not adequately dealt with, they may lead to substantial loss of income.

For SMEs, operational risks like human errors, fraud and failure to recognise a shift in consumer tastes and preferences are the most prominent (Ismail, Othman, Yousop & Ahmad, 2016). Concurring, Pradana and Bandula (2012) concede that operational risk is one of the most significant risks threatening the survival of SMEs today. Yusuf and Dansu (2013) pointed out that the threat to survival is complicated by the fact that the managerial decision-making in SMEs resides with the owner, who in most cases lacks the necessary managerial skills and qualities to manage the operations of the business successfully. Adhering to policies, procedures and internal controls is critical in preventing any undesirable outcome (CGAP, 2009; Bure & Tengeh, 2019).

2.1.2 Strategic risks

Strategic risk refers to threats which materially affect the ability of the business to survive and grow (Allan & Beer, 2006). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2010) such threats arise from: (1) Ambiguous business objectives; (2) Failure to identify threats and opportunities inside and outside the business; (3) Failure to strategically position the company in the international market; (4) Poor governance; and (5) Lack of strategic planning. As noted by Goldberg and Palladini (2010) and the Association of Chartered Certified Accountants (2015), strategic risks include, but is not limited to competition, lousy reputation, governance risk, and shift in consumer tastes and preferences. Such risks influence the achievement of strategic objectives (business's vision and mission) (Taylor, 2012); and the overall performance of the company (Mohammed & Sykes, 2012). As a result, if not adequately dealt with, strategic risks may put the business's continued existence at stake (Tonello, 2012).

Concerning SMEs, authors such as Pradana and Bandula (2012); Ismail, Othman, Yousop and Ahmad (2016) concede that strategic risks which come from mainly planning, business decisions and changes in the business environment are considerably higher compared to the operational and financial risks. These authors believe that the pursuit of a failed business plan, poor business decisions and changes in the business environment constitute significant strategic risks that impact on the SMEs' profits. A potential explanation for this finding might be that of Watt (2007) who found that SME entrepreneurs lack the knowledge of how the business must be run and also have poor leadership styles. It is therefore likely that these entrepreneurs do not clearly define policies and procedures, and also fail to identify threats and opportunities inside and outside the business, which maximises the chances of strategic risk occurrence including governance risk and reputation risk.

2.1.3 Financial risks

According to Coyle (2004), financial risk is a broad term that is used to refer to multiple types of risks relating to credit transactions, liquidity and loans. Previous research by Horcher (2011) has established that the typical hazards that fall within the financial risk category include customer defaults, cash theft, and cash shortage. To Aureli and Salvatori (2013), financial risk is the most critical risks that SMEs face with cash flow risk, credit risk and commodity risk being typical examples in this category. These risk types are known to have a negative and significant influence on the revenue and profitability of SMEs (Nyakang'o & Kalio, 2013). Limited use of funds and financial planning, which result in the accrual of financial risks is a plausible cause of financial risk (Zhao & Zeng, 2014).

2.1.4 Compliance risks

Compliance risks are threats associated with adherence to industry laws and regulations, internal policies and procedures (Sales, 2014). These risks are closely interrelated with the operational loss, legal sanctions and reputation loss which often result from failure to act on laws, regulations and prescribed best practices (Brockett & Rezaee, 2012). Some common forms of compliance risks that may impede FMCG SMEs include violation of Health and safety laws and non-adherence to applicable rules and regulations which govern the operations of the business (Johnson & Johnson, 2013). SBP Alert (2013) identified the compliance burden as a significant setback currently facing South African SMEs. In support, Viviers (2004) indicates that the cost of compliance with legislation is high and is considered to be a significant threat to the South African SME industry.

2.1.5   Reporting risks

According to the Center for Audit Quality (2012) reporting risks are associated with gathering, processing and reporting of information. This information could be financial or non-financial (Von Rossing, 2007). As such, reporting risks influence the reliability and integrity of financial or non-financial information which is reported to the internal and external stakeholders (Wurzler, 2013). Some common examples of reporting risks that may affect FMCG SMEs include the gathering of incomplete information, lack of access to information, information loss through unauthorized users, and gathering incorrect information from the market such as the wrong discovery of the product on demand. Singh, Chakraborty, Roy, and Tripathi (2020) decry the dearth of reporting that occurs in SMEs and the high dependence of narration instead of quantifiable data.

2.2   Expanded view of risk categories

An expanded view of risks looks at emerging risks from the three critical components of sustainability, which include economic, social and environmental factors.

2.2.1   Economic risks

Van Eeden, Viviers and Venter (2003) revealed that economic risks arise from economic factors like inflation, interest rates and foreign exchange rates. Hence, paying little or no attention to economic factors during risk assessments may pose multiple risks to FMCG SMEs during an economic meltdown. For instance, inflation poses risks like an unexpected increase in input costs (electricity, water, fuel, raw material, etc.), which subsequently reduces FMCG SME's profits. Beyond this, inflation erodes the disposable income of FMCG customers. In turn, this makes FMCG customers more price-conscious, resulting in a decline in sales and profits. Apart from inflation, unstable interest rates result in an unexpected increase in expenses which again reduces the earnings of the FMCG SMEs, particularly those that rely on debt capital. Moreover, fluctuations in foreign exchange rates also pose risks to FMCG SMEs.

2.2.2   Social risks

Calton (2001) suggests that social risks arise from the relationship between the business and various stakeholders such as customers and suppliers. For instance, any business without a skilled public relations person or a competent customer service representative to address customer complaints creates an opportunity for customer outrage (Sheehan, 2013). This, in turn, is likely to lead to customers not returning to buy from the business, failure to attract new customers and loss of revenue and profits (Surridge & Gillespie, 2017). It is, therefore, imperative for every SME to implement effective customer relationship management (CRM) to ensure that customers are served in the best possible way. Concerning suppliers, delaying payments to suppliers beyond the agreed credit period tarnishes a good relationship with suppliers (Enow & Kamala, 2016), which leads to the loss of key suppliers. So, bringing on board suitable suppliers and maintaining strong relations with them can be an indispensable tool in the quest for FMCG SMEs success and expansion (Banerjee, Dasgupta & Kim, 2008).

2.2.3   Environment risks

Environmental aspects relate to preserving natural resources and the ecosystem (Ikediashi, Ogunlana & Ujene, 2014). For FCMG SMEs, issues like energy, water crisis and food packaging can have tangible effects on their operations and production, and subsequent commercial performance.

2.2.3.1   Energy

Energy is a prime input for FMCG SMEs, being used in their daily activities like cooking, air conditioning and refrigeration of their products. The Green Restaurant Association (2005) revealed that the FMCG industry, mainly the restaurant sector is the number one electricity consumer in the entire retail industry. If not correctly managed, energy use may result in excessive energy consumption which certainly poses risks such as an increase in municipal costs and a downward spiral for profits. Thus, operating costs often increase as a result of excessive

energy consumption, but market price remains stable, leading to decreased profits. Therefore, FMCG SMEs should act to reduce their overall energy consumption through efficiency and waste reduction or switch to renewable sources.

2.2.3.2   Water
The operating activities of FMCG SMEs, especially restaurants, are heavily reliant on water and use about 5 800 gallons per day of water (Tampa Water Department, 2010). Therefore, the problems of too little water can affect the direct operations of FMCG SMEs or cause supply chain disruption. With Cape Town presently being flaunted around the world as possibly the first major city to run out of the water (Koor, 2018), FMCG SMEs must take a closer look at their water conservation techniques to ensure that they consider the risks posed to them by the water crisis.

2.2.3.3   Packaging
The primary use of packaging has always been to preserve the product. Nowadays, packaging has become an important marketing strategy that is used within the FMCG retail industry to lure attention, describe the product and subsequently achieve higher sales revenue (Coles & Kirwan, 2011). However, the packaging is associated with multiple environmental issues. Thus, it is often mismanaged when the product has reached the final phase of its life cycle. The U.S. Environmental Protection Agency (EPA) (2013) has revealed that packaging generated over 75 million tonnes of US municipal waste. Nearly 48.5% of this waste could not be recovered and ended up in excavated pits. Therefore, FMCG SMEs should pursue sustainable packaging techniques failure of which may pose reputational risks or loss of customers. For example, these days many brands are identifiable through their packaging and customers are now prepared to substitute or boycott certain brands that behave irresponsibly concerning the environmental impact of packaging (Forum for the Future, 2014).

3   Research Methods

A mixed research method that necessitated the use of a questionnaire and an interview guide as tools within the quantitative and qualitative research paradigms was adopted for data collection. The qualitative approach served to validate the quantitive one.

3.1 Population and sampling
The population of interest for this study comprised of all of the FMCG SMEs that operated within the Cape Metropolitan area of South Africa at the time of the study. The sampling frame was limited to FMCG SMEs operating in the retail industry and particularly those operating within the Cape Metropolitan area of South Africa. FMCG SMEs were chosen as they are perceived to be the most critical enterprises in the SME sector because of the nature of their products (necessities and perishables) (Singh, 2014).

To ensure that only participants with sufficient and relevant work experience in the field of risk management were selected during the sampling process, the research population was limited to managers and owners of FMCG SMEs within the Cape Metropolitan area. Managers and owners were chosen as these people are considered to be the decision-makers in their businesses. As such, they are likely to be familiar with their risk management practices.

In the absence of a comprehensive record of all FMCG SMEs within the Cape Metropolitan area, the purposive sampling technique was utilised select the 289 FMCG SMEs that took part in the quantitative component of the study. A questionnaire was used to collect the data. The following criterion was adhered to ensure that the relevant information was collected:
- The businesses had to employ a minimum of 5 people and a maximum of 200 people in terms of the South African Small Business Amendment Act (No. 26 of 2003).

- All respondents had to be owners or managers of their businesses.
- All research participants must have been responsible for sustainability and risk management in their businesses for a minimum of 3 years, to ensure that the participants have gained experience in the business and know the policies in place.

For the qualitative part of the study, LinkedIn was used as a method for recruiting participants for personal interviews. LinkedIn is the leading platform for professional networking, which makes it the optimum choice for this study since the study seeks to reach people in a particular profession - risk experts. In the first step, one of the authors of this paper logged onto LinkedIn with his account and searched for "risk consultants in Cape Town". This approach relied on individuals self-identifying themselves as risk consultants or something similar. In this case, LinkedIn proved fruitful as it returned 5174 results, which was narrowed down to 30 possible participants. A list of 30 potential participants was deemed adequate since the study targeted only 2 participants. To come up with the 30 potential participants, we first vetted the credentials by going through the LinkedIn profiles, only those that we thought would best enhance the study were selected. For each chosen candidate, we noted his or her name, risk experience, location and any other relevant information listed in the profile. This information is already in the public domain and thus, we have implied consent. Each potential participant was then sent a personalised recruitment message explaining the study and how we identified him or her as a possible participant.

Out of the 30 invitations sent out, 27 responses were received, and 3 did not respond at all. Of the 27 responses received, 7 declined to take part in the study for a variety of reasons. For instance, 1 indicated that he was overseas on a conference, 5 indicated that they were not in Cape Town at that time without giving any further information. We then applied the criteria of availability and willingness to participate, resulting in a sampling frame of 14 risk experts. The next step was to draw a sample of 2 interviewees from the sampling frame. To achieve this, we thought of using the order in which the responses to invitations were received. As such, the first two positive respondents were selected.

3.2 Data analysis
Of the 320 questionnaires completed, only 289 were usable. The numeric data collected from the respondents was analysed using SAS software, following three intermediate steps: (1) data preparation; (2) descriptive statistics; and (3) inferential statistics. In the end, the numeric data was summarised numerically and in a table format. These summaries were then comprehensively discussed in the context of this study. To validate the numeric data, non-numeric data collected from participants through interviews was analysed using qualitative content analysis method, following three distinct analytical procedures. In the first step, a list of key themes was generated, and the themes were organised into categories that were identified as critical findings. Then, the non-numeric data was analysed in order to classify it into these categories. Finally, the categories (key results) were analysed to establish commonalities amongst the participants' responses, and conclusions were drawn from the data.

4 Results and discussion

4.1 Themes arising from the personal interviews
The interview questions were in the form of both general and in-depth questions. The general question provided information on the background of the participants. Conversely, detailed questions attempted to understand the participants' perspectives on the variables relating to this study. The business risk experts who took part in this study were labelled as Participant – BRE1 and Participant – BRE2.

4.1.1 General question

In an attempt to validate the information obtained from LinkedIn and ensure that the business risk experts are currently involved in the field of risk management, and have been in this field for at least 3 years as stipulated in the delineation criteria, a general question was formulated to capture such information. Based on the responses from the business risk experts regarding their experience and current involvement in the field of risk management, the following findings were noted (Table 1):

Table 1. Participants' experience and ongoing involvement in the field of risk management

Theme question: Tell me about your experience and current involvement in the field of risk management?	
Theme	**Findings**
Current involvement in the field of risk management	Both Participant – BRE1 and Participant – BRE2 are currently working in the field of risk management as a senior risk officer and risk management consultant, respectively.
Risk management experience	Both participants have been in the field of risk management for at least 3 years.

Source: authors

4.1.2 In-depth questions

To validate the results of the quantitative survey data, two in-depth interview questions were undertaken to capture the relevant information.

4.1.2.1 Traditional view: Major business risks that affect FMCG SMEs' performance

Based on the responses from the business risk experts regarding the significant risks that affect the performance of FMCG SMEs from a traditional perspective, the following findings were observed (Table 2):

Table 2. Major business risks that affect FMCG SMEs' performance

Theme question: Taking into account your experience and knowledge in managing risks: in brief, what would you say are the significant risks affecting the performance of FMCG SMEs in South Africa?	
Theme	**Findings**
Major risks	The business risk experts who participated in this study generally recognise the loss of competitive advantage, cash flow deficit, compliance risks, cyber risks, employee theft, spoiling of refrigerated products due to load-shedding and damage to appliances due to a sudden power surge as the significant risks that affect the performance of FMCG SMEs.

Source: authors

4.1.2.2 An expanded view: Potential risks posed to FMCG SMEs by components of sustainability

Based on the responses from the business risk experts regarding the risks posed to FMCG SMEs by elements of sustainability, the following findings were pointed out (Table 3):

Table 3. Identifying potential risks posed to SMEs by pillars of sustainability

Theme question: *In this study, business sustainability is defined as the management and coordination of environmental, social and economic factors to ensure a responsible, moral and ongoing success.* About this definition, what do you think are the risks, if any, posed to FMCG SMEs by sustainability factors?	
Theme	**Findings**
Risks posed by sustainability factors	In both interviews, it was noted that the risks that the sustainability factors pose to FMCG SMEs include: higher costs for energy, water and other resources, extreme water restrictions due to climate changes, significant loss due to economic circumstances like inflation, public outcry and damage to reputation.

*Source***:** authors' own

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4.2 Results of the quantitative survey

The survey questionnaire constituted the main source of primary data in this study even though personal interviews were also used. Table 4 to 10 show the descriptive statistics for all the questions/statements in the survey questionnaire, with the frequencies in each category and the percentage out of the total number of the specific questions completed. The descriptive statistics are based on the full sample. In instances where there were no answers given, it was shown as unknown in the descriptive statistics (Table 4).

4.2.1 Descriptive statistics for demographic variables

Table 4. Descriptive statistics for all the variables in the survey

Variables	Categories	Frequency	Percentage out of total
business operates as …?	Caterer	28	9.7%
	Retail shop	73	25.3%
	Restaurant	45	15.6%
	Wholesale shop	26	9.0%
	Café	25	8.6%
	Pharmacy	22	7.6%
	Liquor store	17	5.9%
	Convenient shop	41	14.2%
	Other	12	4.2%

Source: authors

According to Table 4, the respondents are not equally distributed in terms of the businesses that they were operating at the time of the survey. It seems that the difference lies in the fact that there are more respondents in the retail (25.3%), restaurant (15.6%) and convenient (14.2%) businesses than they are in the other types of businesses. The respondents who selected "other" businesses that they are operating as, indicated that these businesses are butcheries, chicken and chips shops, fast foods outlets, fruit and vegetable shops, hair salon shops. Very few of the surveyed SMEs were into buying and selling products which are subject to strict regulations like alcohol (5.9%) and medical products (7.6%). As such, the probable characteristics of the SMEs noted in this study concerning the type of business are easy of entry, less regulation and less capital required to set-up and run them (Table 5).

Table 5. Descriptive statistics for all the variables in the survey

Variables	Categories	Frequency	Percentage out of total
How long have you been in your current position?	0-5 years	125	43.2%
	6-10 years	100	34.6%
	11-15 years	35	12.1%
	16-20 years	28	9.7%
	More than 20 years	0	0.0%
	Unknown	1	0.4%

Source: authors

According to Table 5, the respondents are not equally distributed with regards to the period that they have been in their current positions. Thus, 43.4% of the respondents indicated that they have been in their positions for 0-5 years, 34.7% have been in their positions for 6-10 years, 12.2% have been in their positions for 11-15 years, and 9.7% have been in their positions for 16-20 years. It should be noted that this study assumed that the number of years of experience of the respondents could influence their responses. As a result, only questionnaires that were

completed by respondents who have three years of experience or above were included in the survey. This, therefore, means that 43.4% for the 0-5 year group represents respondents with 3-5 years of experience.

4.2.2 Traditional view: Identifying the major business risks that affect FMCG SMEs' performance

Table 6. Descriptive statistics for financial risk

Variables	Categories	Frequency	Percentage out of total
Customer defaults	No effects	171	59.2%
	Minor effects	94	32.5%
	Neutral	4	1.4%
	Moderate effects	12	4.2%
	Major effects	8	2.8%
Theft of cash by employees	No effects	50	17.3%
	Minor effects	33	11.4%
	Neutral	5	1.7%
	Moderate effects	29	10.0%
	Major effects	172	59.5%
Cash shortage	No effects	42	14.5%
	Minor effects	48	16.6%
	Neutral	2	0.7%
	Moderate effects	38	13.2%
	Major effects	159	55.0%
Unexpected increase in finance costs	No effects	135	46.7%
	Minor effects	71	24.6%
	Neutral	7	2.4%
	Moderate effects	26	9.0%
	Major effects	49	17.0%
	Unknown	1	0.4%

Source: authors

The results of the survey questionnaire on financial risks indicate that the risk of customer defaults is relatively low in FMCG SMEs (Table 6). A possible explanation is that most of the FMCG SMEs operate on a cash and carry basis. Furthermore, the survey questionnaire results revealed that theft of cash by employees and cash shortages are the most critical financial risks faced by FMCG SMEs.

This is in congruence with Zhao and Zeng (2014) who assert that SMEs lack adequate internal controls and proper financial planning, which culminate in the accumulation of financial risks. The results of the personal interviews did not show any parallel or new data regarding financial risks (Table 7).

Table 7. Descriptive statistics for operational risks

Variables	Categories	Frequency	Percentage out of total
Product failure	No effects	51	17.6%
	Minor effects	31	10.7%
	Neutral	2	0.7%
	Moderate effects	85	29.4%
	Major effects	120	41.5%
Theft of trading stocks	No effects	53	18.3%
	Minor effects	33	11.4%
	Neutral	3	1.0%
	Moderate effects	26	9.0%
	Major effects	174	60.2%
Employee errors – overpaying/underpaying customers	No effects	57	19.7%
	Minor effects	27	9.3%
	Neutral	4	1.4%
	Moderate effects	22	7.6%
	Major effects	179	61.9%
Systems and device failures	No effects	59	20.4%
	Minor effects	116	40.1%
	Neutral	4	1.4%
	Moderate effects	49	17.0%
	Major effects	61	21.1%

Source: authors

The survey questionnaire results on operational risks disclosed that the operational risk faced by FMCG SMEs is high in the area of employee errors, theft of trading stock and product failure. Likewise, the personal interviews conducted with the risk experts conceded with these findings. Accordingly, below is what one of the business risk experts interviewed had to say:

"....load-shedding which has now been raised to Stage 4 is also posing significant risks to the retail industry especially to small retailers without backup power, for example, the spoiling of refrigerated products, damage to appliances as a result of sudden power surge et cetera…" (Participant – BRE1).

The findings on operational risks are in congruence with the results of Yusuf and Dansu (2013) which revealed that managerial decisions in SMEs are made by the owner, who in most cases lacks necessary managerial skills and qualities to manage the operations of the business successfully (Table 8).

Table 8. Descriptive statistics for strategic risks

Variables	Categories	Frequency	Percentage out of total
Damage to reputation	No effects	53	18.3%
	Minor effects	28	9.7%
	Neutral	3	1.0%
	Moderate effects	45	15.6%
	Major effects	160	55.4%
Employees' disputes	No effects	55	19.0%
	Minor effects	36	12.5%
	Neutral	0	0.0%
	Moderate effects	43	14.9%
	Major effects	155	53.6%
Administrative errors	No effects	66	22.8%
	Minor effects	49	17.0%
	Neutral	0	0.0%
	Moderate effects	20	6.9%
	Major effects	154	53.3%

Source: authors

Table 8, suggests that strategic risk in FMCG SMEs is high in the areas of reputation, employees' disputes and administrative errors. This is in line with Watt (2007) who found that SME entrepreneurs often lack the knowledge of how the business must be run and, they have poor leadership styles. The personal interviews did not reveal any contradicting results but just added loss of competitive advantage as another strategic risk bedevilling SMEs. Accordingly, one of the risk experts made the following comment:

"They face many risks, firstly, there are so many big players in the retail industry and attaining competitive advantage is one of the most challenging issues facing small retailers…" Participant – BRE1).

Table 9. Descriptive statistics for compliance risks

Variables	Categories	Frequency	Percentage out of total
Heavy fines	No effects	0	0.0%
	Minor effects	38	13.2%
	Neutral	100	34.6%
	Moderate effects	83	28.7%
	Major effects	68	23.5%
Withdrawal/suspension of trade license	No effects	0	0.0%
	Minor effects	39	13.5%
	Neutral	94	32.5%
	Moderate effects	87	30.1%
	Major effects	69	23.9%

Source: authors

The survey questionnaire results on compliance risks suggest that FMCG SMEs are not faced with high compliance risk (Table 9). On the contrary, some researchers have different opinions on compliance risks. Thus, the SBP Alert (2013) and Viviers (2004) indicate that the cost of adhering to legislation is relatively high and is regarded as one of the most important risks faced by the South African SME industry. In line with prior research, the risk experts interviewed made the following comments:

".... Lastly, compliance with laws and regulations is a greater hindrance on small and medium retailers than on large retailers; it hinders their formation and growth". (Participant – BRE1).
"...Apart from this, retail SMEs often find regulation challenging mainly because they lack the capacity to deal with regulation requirements making compliance difficult to achieve for them..." (Participant – BRE2).
The aforementioned findings send mixed opinions relating to whether the survey participants who have indicated that compliance is not a major risk area actually meant it or whether it's a matter of lack of knowledge.

4.2.3 An expanded view: Potential risks posed to FMCG SMEs by components of sustainability

Table 10. Risk posed to my business by components of sustainability

Variables	Categories	Frequency	Percentage out of total
Social			
Loss of customers	Strongly disagree	14	4.8%
	Disagree	18	6.2%
	Undecided	18	6.2%
	Agree	25	8.6%
	Strongly agree	214	74.0%
Loss of key suppliers	Strongly disagree	20	6.9%
	Disagree	25	8.6%
	Undecided	26	9.0%
	Agree	52	18.0%
	Strongly agree	166	57.4%
Environmental			
Pollution	Strongly disagree	4	1.4%
	Disagree	20	6.9%
	Undecided	7	2.4%
	Agree	40	13.8%
	Strongly agree	218	75.4%
High municipal cost	Strongly disagree	7	2.4%
	Disagree	37	12.8%
	Undecided	38	13.2%
	Agree	40	13.8%
	Strongly agree	166	57.4%
	Unknown	1	0.4%
Violating water restrictions	Strongly disagree	35	12.1%
	Disagree	11	3.8%
	Undecided	37	12.8%
	Agree	33	11.4%
	Strongly agree	172	59.5%
	Unknown	1	0.4%
Economic			
Unexpected increase in financial cost	Strongly disagree	84	29.1%
	Disagree	100	34.6%
	Undecided	30	10.4%
	Agree	51	17.6%
	Strongly agree	24	8.3%
Decrease in sales and profit volumes	Strongly disagree	23	8.0%
	Disagree	20	6.9%
	Undecided	19	6.6%
	Agree	42	14.5%
	Strongly agree	185	64.0%

Source: authors

Table 10 shows that the components of sustainability, namely; social, environmental and economic factors pose quite a number of risks to FMCG SMEs. However, further analysis indicates that the environmental component of sustainability poses the largest risk on the sustainability of FMCG SMEs. More specifically, aspects such as pollution (75.4% of the respondents strongly agree), high municipal cost (57.6% of the respondents strongly agree), and violation of water restrictions (59.7% of the respondents strongly agree).

The social component of sustainability poses the second largest risk on the sustainability of FMCG SMEs and more specifically relating to the loss of customers (74.0% of the respondents strongly agree) and loss of key suppliers (57.4% of the respondents strongly agree). Lastly, the economic component of sustainability poses the third largest risk on the sustainability of FMCG SME's as a result of decreases in sales and profit volumes (64.0% of the respondents strongly agree).

The foregoing survey questionnaire results suggest that the risks posed to FMCG SMEs by the components of sustainability are multiple. The risk experts interviewed concurred with the foregoing results, as noted in the following sentiments shared:

"All the areas you have mentioned pose many risks to every business, for example, the environmental part may cause the business to experience higher costs for energy, water and other resources, extreme water restrictions due to climate changes may also affect businesses. Then for the economic part, circumstances like inflation and the general government regulations may result in a significant loss for any business. Lastly, for the social part, if the business doesn't properly manage the actions that affect the community around it including customers, it is likely to be faced with public outcry and damage to reputation". (Participant – BRE1).

"A retail SME's economic, environmental and social performance is likely to have financial impacts, legal impacts and reputational impacts. It is important that these factors are understood and considered when preparing a risk management plan and in subsequent risk assessment activities, in order to minimise and manage the risks caused by them" (Participant – BRE2).

5   Conclusion, implications and scope for future research

Drawing on the literature and findings, one could conclude that FMCG SMEs face multiple risks that have been traditionally classified into financial, strategic, operational and compliance risks. Beyond this, the vulnerability of the FMCG SMEs to risks from sources that can be classified under the sustainability factor was eminent. While the latter outcome reiterates the critical importance for risk assessment, the clarion call is for FMCG SMEs to adopt a holistic approach to the assessment and management of the sources of risks to the firm.

5.1 Theoretical implications
This paper contributes to the existing body of knowledge regarding sustainability and risk management in view of evolving risk sources by providing a holistic risk assessment framework for FMCG SMEs (See Figure 1).
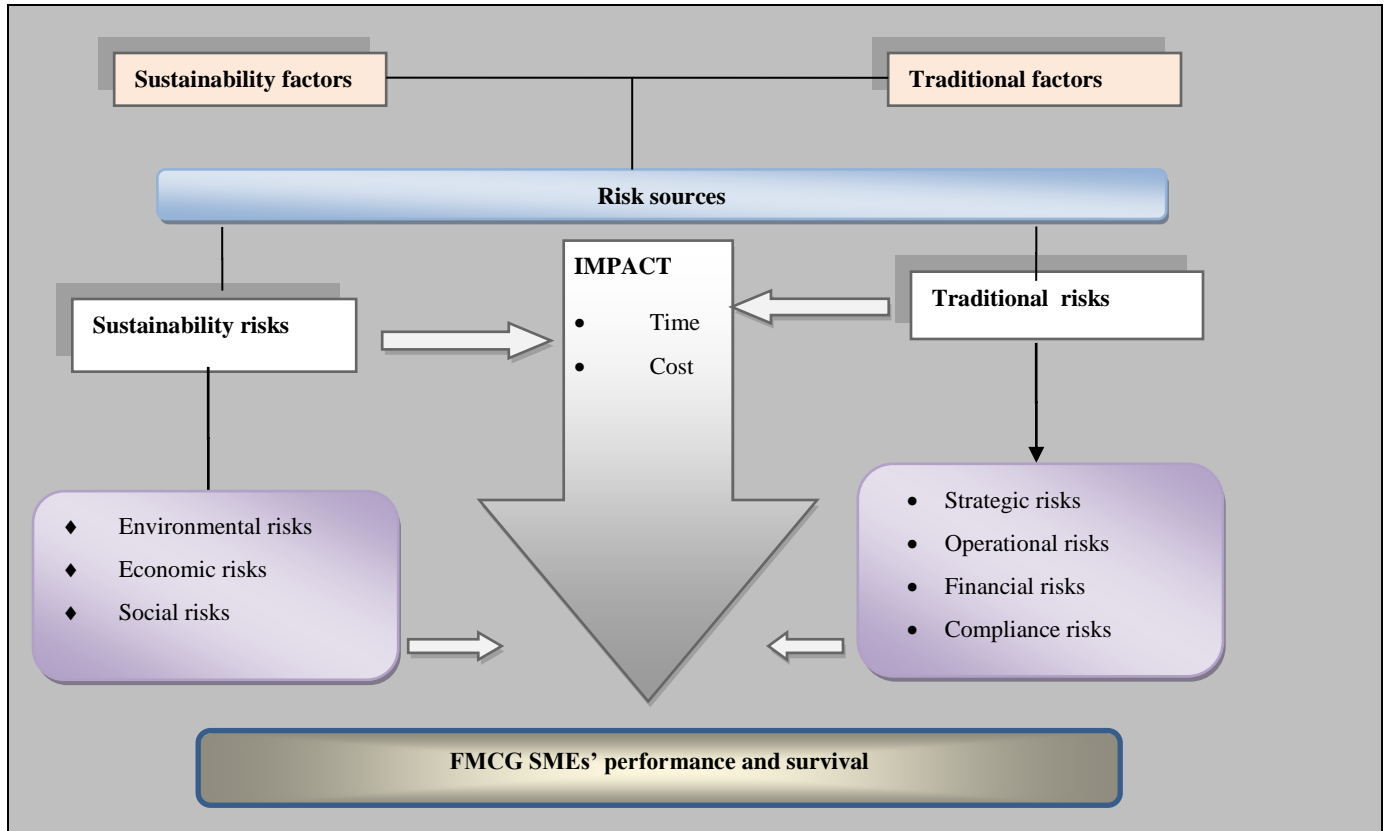
Figure 1. Knowledge map of risk sources within FMCG SMEs

Source: authors

From the literature review and results analysed, it was obvious that two broad categories of risks that may inhibit FMCG SMEs from attaining their objectives:

Firstly, sustainability risks that emanate from environmental, social and economic factors. The key drivers of environmental risks in FMCG SMEs are food packaging, water consumption, and energy efficiency. Then for the social part, the key drivers are human rights violations within the workforce, poor supplier relationships, poor customer service and labour issues. Businesses that have problems with social risk face negative publicity, and a damaged legal standing, and may not be sustainable in the long run. For the economic risks, the key drivers fluctuating interest rates and inflation.

Secondly, the traditional risks associated with normal business operations. As such, the key drivers for traditional risks include weak internal controls, failures in the systems, poor governance, ambiguous business objectives and poor credit policy. Note should be taken that the reporting risks were not included in the knowledge map since the survey results did not show any indication that FMCG SMEs are faced with reporting risks.

5.2 Managerial implications

From a managerial perspective, this paper hopes to broaden the understanding of the potential risks that FMCG SMEs are exposed to using the sustainability lens. In so doing this paper draws the manager's attention to emerging risk areas that might otherwise be missed by existing risk management tools. In practice, this paper suggests that the environmental aspect of sustainability may cause the business to experience higher costs for energy and water, and face extreme water restrictions due to climate changes. In the same token, economic

circumstances like inflation may pose significant loss for any business due to increase in input costs like electricity. Lastly, for the social aspect, if the business does not properly manage its actions that affect key stakeholders such as customers, suppliers and the community around, it is likely to be faced with negative publicity.

Concuring with, Singh, et al., (2020) one may advance that risk managers should capture sustainability factors into their risk management process. By so doing, sustainability issues will be dealt with at the risk mitigation stage. Ultimately, the management will achieve cost reduction while also contributing to the SDGs through reduced energy consumption, improving hygiene, sustainable packaging, and effective water risk management and stewardship.

5.3 Area for further research

In this study, it emerged that FMCG SMEs face an array of risks in their operations. These risks are related to compliance, financial, social, environmental, operational, economic and strategic factors. However, there is currently no holistic risk management model, specifically addressing SME social and environmental factors. The traditional risk management approaches including Enterprise Risk Management are inherently internally focused as they only look at operational, economic and strategic factors. On this basis lay the need to develop a holistic risk management model in future, to address all the key risk areas in FMCG SMEs. The model should capture social and environmental factors into the risk assessment of FMCG SMEs, thus, looking beyond financial, compliance, strategic and operational factors.

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ARE VISITORS INTERESTED IN VOLUNTEER TOURISM? EVIDENCE FROM SLOVAKIA[*]

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Abstract. Volunteer tourism is one of the fastest growing types of alternative travel, highlighting the need for sustainability. It has been studied in a number of researches that focus almost exclusively on the demand for certain projects in outbound tourism. With the aim of a more comprehensive view of the issue, this paper examines and compare the current state of demand for domestic and outgoing volunteer tourism within Slovakia. It is based on a quantitative survey conducted on a sample of 573 respondents who represent a representative picture of the population of Slovakia older than 15 years in terms of age and gender. It turns out that between 18 and 25% of the Slovak population participated in domestic volunteer tourism between 2013 and 2018 (in average 3-4% a year). Outbound volunteer tourism was 4 to 8% (approximately 1% a year). In both cases, potential demand clearly exceeds effective demand. As individuals grow older, participation in volunteer tourism decrease slightly, while participation in the home country is positively influenced by higher education while participation abroad is dependent on the individual's economic status. Participation in domestic volunteer tourism is largely influenced by volunteer-specific motives, this differs from outbound tourism, where tourist specific motives prevail. In the home country. Volunteers sometimes do not realize that they are involved in tourism; the altruistic motive of helping others is paramount. Important information about national volunteer tourism of Slovak residents is obtained mostly from direct sources. Time is the most decisive obstacle to people's participation in volunteer tourism. Comparing the demand of Slovak citizens for domestic and outgoing volunteer tourism shows the possibilities of its further development.

1. Introduction

Tourism is one of the fastest growing and most promising sectors of the world economy, with a vital contribution to the economic strength and social development, and high potential for long-term growth (Chkalova et al. 2019). According to the World Tourism Organization, the European tourism economy contributes between 5 and 11% of the GDP of the European Union and provides between 8 and 24 million jobs, depending on the definition of the sector (Linderová & Janeček 2017). As tourism evolved, its original meaning of traveling to the unknown, to places outside of the ordinary, where visitors experience a sense of excitement by having direct contact with the local community, has changed. It was replaced by traveling and getting to know places from the safety and comfort of sofas, planes, and hotel rooms, without direct contact with local culture. Gradually, the negative economic effects began to emerge, especially on developing countries where the growth of foreign visitors seriously disrupted the community's life and cultural identity (Wearing & Grabowski 2011). As the prosperity of the world increases, more people are able to enjoy trips that were once only possible for the select few. Dream destinations have now become possible for many throughout the world. This has led to too many people trying to visit the "must see" locations of the world creating "tourist ghettos". This inevitably leads to disappointment as people are reduced to a melancholy mass. The rapid growth of mass tourism and the increased interest in the socio-cultural and environmental impact of tourism has resulted in its alternative version. Concerns about global warming are causing some people to question their travel habits. As an example, the recent actions of the Swedish schoolgirl turned environmental activist, Greta Thunberg, has caused a new phenomenon called flygskam or flight-shame where there is a sense of guilt from the carbon emissions of air-travel.

An alternative to mass tourism, in theory, deliver rewarding experiences and promise beneficial economic, environmental, and social outcomes for destination and its communities (Kontogeorgopoulos, 2017). It includes a wide range of different types of tourism. These are often the result of deeper involvement of other scientific disciplines (sociology, ecology, psychology, etc.) into tourism or arise from overlaps of already existing types of tourism. One of the fastest growing types of alternative tourism is volunteer tourism (Hammersley 2014; Miller & Mair 2015; Kontogeorgopoulos 2017; Proyrungroj 2017, 2020), created by combining volunteering and tourism (Tomazos & Butler 2012; Andereck & McGehee 2016).

As Wearing et al. (2020) discuss, volunteer tourism has gained considerable popularity with tourists. Its success depends on the willingness of volunteer tourists to engage in a travel experience that involves assisting a destination community and engaging in the hardship work.

2. Volunteer tourism

The tourism industry of the 21st century is experiencing the expansion and increased prominence of volunteer tourism (Thompson & Taheri 2020). As Qi (2020) stresses, the volunteer tourism is an important branch of tourism academy. Due to the significance of volunteers for the tourism industry, a variety of research on volunteer tourism from around the globe has emerged. The first comprehensive and generally accepted term is the Wearing

(2001) definition of volunteer tourism, according to which it is a travel of persons who organize their leisure time for various reasons, and their stay at the destination includes volunteering aimed at alleviating the material shortage of certain social groups or to research selected aspects of society and the environment. Its focus is relatively narrow. It does not include, for example, the activities carried out by volunteers, the timeframe and the potential to change and develop the personality of the volunteer (Alexander & Bakir 2011). Singh & Singh (2004) evaluate volunteer tourism in terms of the ideals associated with it and, together with Mcgehee & Santos (2005), highlight the altruistic motive of participating in volunteer tourism activities. Chen & Chen (2011) point out the benefits that volunteer tourism also brings to the destination. Inspite of the authors' undisputed efforts to define volunteer tourism more precisely, we did not succeed in creating a definition that would comprehensively express its essence. Volunteer tourism is a multi-dimensional tourism product and therefore the boundaries of its definition are constantly shifting (Benson 2011).

The boom of volunteer tourism has caused ambiguities not only with the definition, but also in defining its context. The relationship between volunteering and tourism has thus been the subject of much research. Available literature includes heterogeneous studies assessing the impact of volunteer tourism on local communities (e.g. Lupoli & Morse 2015; Dilette et al. 2017), sustainability of volunteer tourism (e.g. Dickson 2011; Fee & Mdee 2011), practices of volunteer tourism organisations (ex. Steele et al. 2017), volunteer tourism supply chain (Eckardt et al 2020) etc. However, theorists pay the most interest to the bearer of the demand for volunteer tourism. They simply perceive a visitor in volunteer tourism as an individual who combines travel with volunteer work (Raymond & Hall 2008). They examine his motivation, values and behaviour (e.g. Tomazos & Butler 2012; Mody et al. 2014; Weaver 2015; Sokolová & Žofaj 2017), perceptions of their impacts on communities (e. g. Aquino & Andereck 2018), lessons learned (e.g. Chan 2011; Wilson 2015), but also obstacles to volunteer participation tourism (Trafford Council 2011; Human & Van Graan 2013; Weaver 2015).

Given the roots of volunteer tourism related to the travel of missionaries, doctors and teachers to help other, generally less developed communities, volunteer tourism research focuses almost exclusively on the demand for selected foreign volunteer projects. Domestic volunteer tourism or research into the demand for volunteer tourism at the national level is hardly addressed in the available literature. Our ambition was to fill this gap.

3. Research methodology

The aim of the paper is to examine and compare the current state of demand for domestic and outgoing volunteer tourism using the example of Slovakia. The primary data were obtained through a sociological questionnaire intended for Slovak citizens over 15 years of age. We conducted the survey in 2018 on a sample of 703 respondents who were asked for information on the experience of volunteer tourism over the last years (2013 to 2018). We recoded and processed the data into a data matrix in Microsoft Excel.

We excluded 27 incorrectly completed questionnaires. In order to achieve representativeness of the sample, we subsequently excluded 103 questionnaires. Subsequently, after evaluating the representativeness of the file in question by Pearson's Chi-square test for quality, 103 questionnaires were randomly removed in order to bring the sample closer to the age and gender structure of the Slovak population (χ^2gender=0.389, p=0.533; χ^2age=9.290, p=0.054). The final sample consists of 573 respondents (Table 1).

Table 1. Socio-demographic characteristics of the sample of respondents

Identifying Characteristics	Respondents together		Participants in domestic volunteer tourism		Participants in volunteer tourism	
	N	%	N	%	N	%
Gender						
Male	278	48,52	75	60,00	15	44,12
Female	295	51,48	50	40,00	19	55,88
Together	573	100,00	125	100	34	100,00
Age						
16-17	17	2,97	6	4,80	0	0,00
18-24	71	12,39	19	15,20	10	29,42
25-29	84	14,66	28	22,40	7	20,59
30-34	53	9,25	12	9,60	4	11,76
35-39	70	12,22	9	7,20	1	2,94
40-44	55	9,60	4	3,20	1	2,94
45-49	44	7,68	14	11,20	7	20,59
50-54	47	8,20	14	11,20	2	5,88
55-59	45	7,85	11	8,80	1	2,94
60+	87	15,18	8	6,40	1	2,94
Together	573	100,00	125	100,00	34	100,00

Source: own

The data were evaluated by selected mathematical-statistical methods at the significance level $\alpha = 0.05$. In order to comprehensively evaluate the issue, we will compare our findings with the results of studies of selected theorists.

4. Results

We found that 22.9% of respondents participated in volunteer tourism in the period under review (2013 to 2018). Up to 95.4% of them stated that they were visitors to domestic volunteer tourism, a quarter of them admitted to foreign experience (Table 2).

Table 2. Participation in volunteer tourism between 2013 and 2018

Participation in volunteer tourism	Number of respondents		% of Slovak population (statistical induction)
	No.	In %	
Outside of Slovakia	34	25,95**	4-8
Within the country	125	95,42**	18-25
Together	131	22,86*	19-26

Note: *Percentage of respondents who participated in the survey
** share of respondents who participated as volunteer
Source: own

The most visited countries were in Europe (91.2% of respondents with foreign experience), followed by Asia (8.8%), South America (5.8%), North America (2.9%) and Africa (2.9%). We note that the voluntary tourism of the Slovak population is aimed at helping third parties almost exclusively in developed countries. After generalization, we can say that in the period under review, 19-26% of the Slovak population participated in volunteer tourism (in average 3-4% a year), with a larger proportion showing interest in domestic rather than outgoing volunteer tourism.

Available studies on volunteering activities in Slovakia (without the link to tourism) also pointed to similar conclusions. While the European Union survey (Volunteering in the European Union 2010) ranks Slovakia among the countries with a moderate level of participation of people in volunteering activities (20-29%), the latest national survey on volunteering in Slovakia (Brozmanová-Gregorová et al. 2012) found that 27.5% of the population over 15 years of age participated in formal volunteering. However, it is necessary to note that in our survey we asked respondents about the time period of the last years (2013-2018). Obviously, volunteer tourism is less sought after than volunteering.

68.2% of respondents indicated that they would participate in volunteer tourism in the future with a 64.9% preference for domestic volunteer tourism and 33.5% for foreign countries. After generalizing the results of the sample to the Slovak population, we can say with 95% reliability that 64-72% of the Slovak population showed interest in voluntary tourism, while 61-69% would stay in Slovakia and 30-37% would travel abroad.

4.1 Profile of visitors

We were interested in whether participation in volunteer tourism is differentiated in terms of socio-demographic characteristics of individuals. Many studies have shown that, from a demographic perspective, young people between the ages of 18 and 25 are the most frequent participants in volunteer tourism, with women (70%) being more involved than men (Wearing 2001; Tourism Research and Marketing 2008). Our analysis revealed a lack of dominance of women in outbound tourism, which corresponds to the results of previous studies, but domestic tourism was dominated by men. At the same time, the representation of the young generation is not as pronounced as expected (Table 1). Indeed, young travellers are now refusing to limit the impersonal and non-interactive system of mass tourism and to a varying extent express their attitude towards the social and environmental problems of society. They are more interested in environmental activities, local products and services, gaining new experiences, self-realization and experimentation that reflect their preference for the authenticity of the travel experience. There is a true positive attitude to diversity, flexibility and a strong desire to get to know the local communities, according to Moscardo & Benckendorff (2010) with Generation Y expressing interest in volunteer tourism activities.

When generalizing the results to the population, Phi did not show a relationship between gender and participation in domestic volunteer tourism (p> 0.05). In contrast, Spearman's correlation coefficient showed a weak indirect dependence of participation in domestic volunteer tourism from age (rs = -0.172; p = 0.001) and a slight direct dependence on the highest achieved education of individuals (rs = 0.143; p = 0.001). It means that the participation of Slovak inhabitants in this type of tourism decreased slightly with increasing age. On the contrary, with increasing education of the population their participation increased slightly. The reason may be that up to 36.3% of the surveyed group are students. They have a more free time compared to higher age categories. In this younger age group, people are looking for their place in society and opportunities for self-realization. Having a job or starting a family in old age reduces their free time significantly. Increasing age also affects the health of the population, which significantly affects their leisure activities. This was also confirmed by the respondents' views in the questionnaire survey. When comparing the results of our survey with the study of volunteering in Slovakia (Brozmanová-Gregorová, et. al. 2012), we conclude that these results are unique for this type of tourism.

When examining the relationship between participation in volunteer tourism abroad and gender, the highest educational attainment of the respondents did not confirm the statistical significance of the obtained results (p> 0.05). Thus, the results presented are specific to the study population and cannot be generalized. On the contrary, the relationship between participation in volunteer tourism abroad, age and economic status of respondents proved to be statistically significant. The Spearman test found that there was a low indirect correlation between responder participation and age (rs = -0.155; p = 0.001). The Cramer V test showed a weak relationship between the economic status of the population and participation in volunteer tourism abroad (cv = 0.164; p = 0.009). We can therefore state that the participation of volunteer tourism abroad has decreased noticeably with the growing age of Slovak citizens.

Existing studies (Wearing 2001; Tourism Research and Marketing 2008) have also shown that, from a demographic perspective, volunteer tourism is predominant among the young. Holmes & Smith (2009) show similar results when analysing previous surveys. However, they note that older volunteer participants are an equally important segment, in particular in volunteer tourism, leisure travel and volunteer travel (Holmes & Smith 2009). In the 35-45 age category, which can be described as the second most important target group, families with children appear to be a growing segment in terms of family status, and employee volunteering is at the forefront of economic status. This is evidenced by the wide range of volunteer tourism projects of well-known broadcasting organizations (e.g. International VolunteerHQ, United Planet, Global Vision International, Camps International). The third target group in the foreign volunteer tourism market is the elderly over 50 years of age (Stoddart & Rogerson 2004). Thanks to the available free time and experience they have become a target group for such organizations as International VolunteerHQ, Peace Crops, Projects Abroad, Global Vision International, Love Volunteers and so on.

4.2 Source of information
We investigated from what channel of communication respondents learned about opportunities to participate in volunteer tourism activities (Table 3).

Table 3. Sources of information on volunteer tourism

	Source of information	Domestic volunteer tourism				Outbound volunteer tourism			
		N	%*	N	%	N	%*	N	%
Direct source	- from friends/acquaintances	89	43,63	154	75,49	17	50,00	229	63,04
	- from a family member	31	15,20			5	14,71		
	- at school, lectures, or in class	12	5,88			4	11,76		
	- at school from classmates	7	3,43			1	2,94		
	- contact by an organization (church, club, AIESEC, etc.)	7	3,43			2	5,88		
	at work	6	2,94			0	0,00		
	own experience	2	0,98			0	0,00		
Indirect source	- via social network (advert or a post)	17	8,33	50	24,51	6	17,65	17	36,96
	- searched for information on the internet	16	7,84			5	14,71		
	- read an article about volunteering	7	3,43			5	14,71		
	- own initiative, interested in the field	3	1,47			1	2,94		
	- at school; a flyer/poster on the bulletin board	2	0,98			0	0,00		
	- from television; a show about volunteering	2	0,98			0	0,00		
	- from internet advertising	2	0,98			0	0,00		
	- from radio; a programme about volunteering	1	0,49			0	0,00		
	Together			204	100,00		100,00	46	100,00

Note: Respondents had the opportunity to make multiple responses. The sum of the answers is therefore higher than the number of respondents who participated in voluntary tourism.
* share in the number of participants in domestic/outbound volunteer tourism
Source: own

The key channel of communication was friends and acquaintances. Despite the current trends in marketing communications, the Internet as the most popular interactive medium of the present, was a less important source of information. In both domestic and outgoing volunteer tourism as direct sources dominated. It is therefore essential that volunteer tourism organizations seek to capitalize on the experience and satisfaction of existing visitors in order to gain new ones.

Travel blogs and video blogs (vlogs) are considered as a relatively low-cost resource linking personal experience with the Internet. Vlogs, provide an authentic form of presenting volunteer experience in languages close to the younger generation. They are a source of personal experiences and advice that have a high motivational character. Volunteer tourism organizations can use vlogs to present volunteer activities (experiences, emotions, results of volunteer activities) as a form of summary and regular presentation of events, or to present new volunteer activities in the organization's offer. Although the inserts are popular mainly on the YouTube platform, we consider other social networks that have a significant motivational and informative role in the dissemination of e-WOM. As claim Vetráková et al. (2018), in Slovakia, 89% of generation Z (born after 1995), 67% of generation Y (born 1966–1979), and 53% of the generation X (born before 1979) use social networks every day.

Nowadays, when there is no doubt that innovation is synonymous with success, it is crucial to take advantage of all opportunities to focus more accurately on the right group of people (Štefko et al. 2019). It is also appropriate to explore potential participants in their natural environment - at school and at the workplace. Exchange of experiences, authenticity of narration, engagement, stories and emotions represent the strengths of direct communication of the target groups. Crowd enthusiasm from a good presentation can support a students' decision to engage in volunteer activities. One example of good practice is the Marathon BB (Marathon BB) organizers, who in March 2019 started to address pupils and students of secondary schools and universities in Banská Bystrica.

4.3 Themes

Motivation is one of the most frequently explored areas not only in tourism but also in volunteering. It changes with the influence of current world events, changes in lifestyle and values of society. Respondents in domestic tourism are most motivated by the altruistic motive of helping others (59.0%), but at the same time, volunteer tourism is an opportunity for them to gain new experiences (49.6%) and bring them a sense of usefulness (33.1%). 29.1% of respondents did not mention volunteering in their home country would be more affordable for them (Table 4).

We evaluated the results with Friedman's and Wilcoxon's tests so that we could apply them to the entire set. The Friedman test (F = 268.1; p = 0.001) ranked the motives in a similar order to the average value, with the only difference being in the first and second place. A subsequent Wilcoxon test of statistically significant differences (p <0.05) confirmed this arrangement only on three levels (Table 4).

We conclude that the motives found are consistent with the views of Holmes et al. (2010) and Mody et al. (2014), according to which participants in domestic volunteer tourism are motivated by the desire to enjoy the environment, meet other volunteers, gain new experiences and they see their service as a meaningful use of free time.

Participation in domestic volunteer tourism is mainly influenced by volunteering motives. The Friedman test (F = 19.2; p = 0.001) as well as the Wilcoxon test (p = 0.001) confirmed these conclusions and determined that there was a statistically significant difference between the motives examined (Table 4).

Table 4. Motives for participation in domestic volunteer tourism

Main motives	Partial motives[a]	Average value[b]	Rank[d]	Average ranking (Friedman)[c]	P-value (Wilcoxon signed ranks test[d])
Tourism-specific motives	more affordable travel	3,10	3	1,69	0,00000015
	safe destination	2,92	3		
	no language barrier or cultural shock	2,70	3		
	enjoying free time with friends	2,15	2		
	getting new experiences	1,65	1		
Volunteering-specific motives	I feel it is important to help others	1,61	1	1,31	
	giving back to society	2,21	2		
	sense of usefulness	1,68	1		
	opportunity to use and develop their work skills	2,13	2		
	people I know do volunteer work	2,60	3		
	getting new contacts and friendships	1,90	1		

[a]The questionnaire items report agreement [on a scale of 1 (Extremely likely) to 5 (Extremely unlikely)].
[b]Descriptive statistic shows results only for the researched file.
[c]To generalize results for Slovak population, Friedman test was used. It compares the mean ranks between the related groups and indicates how the groups differed.
[d]As Friedman test does not express if there are statistical differences between the researched items (mean rank values), the Wilcoxon test were used to express this. The significance values produced by SPSS Statistics were manually compared. At the $p<0.05$ significance level, only three ranks were statistically significantly different.
Source: own

The structure of volunteer motives differs slightly from the survey of motivation of volunteers in Slovakia (Brozmanová-Gregorová et al. 2012), although the most important motive (values) is the same. We consider the comparison of motivation of volunteers and participants of domestic volunteer tourism as another possibility of future research.

More than three-quarters (76.4%) of the participants of outbound volunteer tourism are motivated by the opportunity to gain new experience (Table 5). Most (73.5% of respondents) perceived outbound volunteer tourism as an opportunity to meet new societies and to learn about foreign cultures and thus to gain contacts and friendships. More than half (64.7%) of respondents cited a third important altruistic motive of helping others. The least significant reason for volunteering abroad (8.8%) was the idea that people in their neighbourhood have also done this.

We note that participation in outbound volunteer tourism is, from the point of view of respondents, influenced mostly by motives of typical for tourism. The Friedman test (F = 6.5; $p <0.05$) as well as the Wilcoxon test ($p <0.05$) confirmed these conclusions and determined that there was a statistically significant difference between the travel and volunteer motives in the study. Our findings correspond to the conclusions of Wearing (2001) and Zahra (2011), who state that participants in foreign volunteer tourism, unlike volunteers, expect meaningful travel experiences.

Table 5. Motives for participation in outbound volunteering tourism

Main motives	Partial motives[a]	Average value[b]	Rank[d]	Average ranking (Friedman)[c]	P-value (Wilcoxon signed ranks test[d])
Motives typical for tourism	travel and discovery of new areas of the world	1,74	1		
	gaining new experiences	1,32	1	1,29	
	meeting local people and learning about foreign cultures	1,44	1		
	to learn more about myself	1,91	2		
	enjoying free time with friends	1,97	2		0,017
Motives typical for volunteers	I feel it is important to help others	1,50	1		
	giving back to society	2,09	3		
	sense of usefulness	1,53	1	1,71	
	opportunity to use and develop their work skills	1,56	1		
	people I know do volunteer work	3,15	3		
	getting new contacts and friendships	1,94	2		

[a]The questionnaire items report agreement [on a scale of 1 (Extremely likely) to 5 (Extremely unlikely)].
[b]Descriptive statistic shows results only for the researched file.
[c]To generalize results for Slovak population, Friedman test was used. It compares the mean ranks between the related groups and indicates how the groups differed.
[d]As Friedman test does not express if there are statistical differences between the researched items (mean rank values), the Wilcoxon test were used to express this. The significance values produced by SPSS Statistics were manually compared. At the p<0.05 significance level, only three ranks were statistically significantly different.
Source: own

4.4. Obstacles to participation

Respondents who were not interested in volunteering tourism were offered statements pointing out possible barriers to participation. These can be based on the personal attitudes of individuals, while also reflecting the cultural, social, economic or social impact of the external environment.

Many respondents consider the lack of time (61.1%) as a major obstacle in domestic volunteer tourism, which was in line with the views of many researchers (Holmes 2008; Trafford Council 2011; Human & Van Graan 2013). There is also a significant lack of interest in volunteering (40.9%). It was expressed by respondents who do not have volunteering experience (35.6%), but also by those who already have volunteering experience (5.4%). One third of respondents (32.2%) are not interested in such travel in Slovakia and approximately the same share of respondents (30.2%) are lacking information on opportunities to participate. Fear of participation was the least cited obstacle to participation (25.5%).

With increasing age ($rs = 0.488$; $p < 0.001$) and decreasing education ($rs = -0.226$; $p = 0.006$), the perception of leisure time is more sensitive especially for employed respondents. In the other obstacles examined, the relationship with the highest educational attainment and the current economic status of respondents proved to be significant. Secondary school residents especially prefer a different kind of traveling in Slovakia, they are more afraid that they do not have sufficient experience to carry out volunteering activities and are assessing the financial and distance aspects of volunteer tourism.

Similarly, the lack of time (53.0% of respondents) is the most important obstacle to participation in volunteering in outbound tourism. With increasing age ($rs = 0.450$; $p < 0.001$) and decreasing education ($rs = -0.247$; $p < 0.001$) this obstacle proved to be more significant. It is equally important in relation to the economic status of the population ($rcv = 0.304$; $p < 0.001$). The lack of time is particularly felt by employed individuals. We consider this

result logical and justified. Nowadays, it is characterized mainly by the accelerating pace in all areas of life and the pressure of society to do the best possible in everything. Individuals thus review their activities and subsequent priorities, especially in relation to time. Other barriers based primarily on the nature of traveling abroad include the distance of the project organization, activity or event (37.3%) and the language barrier (39.1%). Another important obstacle is the lack of awareness among citizens about the possibilities to participate in this type of tourism (29.1%). Sending volunteer organizations should reflect this by targeting their marketing activities.

5. Discussion

Volunteer tourism often intersects with non-volunteer tourism as the efforts of volunteers make attraction to events and places possible. As previously mentioned with the example of the Banská Bystrica marathon, many cultural events rely on volunteers to make these organized activities possible. Volunteers can be a part of large and important events (e.g. The Beijing Olympics - half a million volunteers, Vancouver – 29.5 thousand, London - 60 thousand, Sochi – 25 thousand volunteers), but also events with national, regional or local significance. Volunteers of organized events can be distinguished as so-called core team volunteers, who perform operational tasks necessary to ensure the event. Examples from Slovakia include the Nitra Festival, Pohoda and Uprising Reggae Festival where volunteers play a major role in planning and organizing events in the regions.

Another important role of volunteer tourism is the reversal of neglect of historical objects that have significant cultural value. It would be amiss to not point out some Slovak volunteer tourism projects of the preservation variety and in this regard, we have chosen three projects where the gains from the efforts of volunteers have been incalculable in terms of benefit to society:

- Čierny Hron narrow gauge railway- This railway was used in the forest industry up until 1982 and then abandoned. From 1992, volunteers have been refurbishing and maintaining a 17 km stretch of the railroad between Chvatimech and Čierny Balog. Today, it is a popular tourist attraction during the summer months. It still incorporates volunteers for track and equipment maintenance.
- Pustý Hrad- a 13-century castle ruin that is situated on top of a hill overlooking the city of Zvolen. Much of this castle was overgrown until more recently. Since 2009, ongoing archaeological research with the help of volunteers has been carried out with renovation of sections of walls giving visitors a sense of scale to what once was a very large castle. Today it is a very popular hiking destination and offers an excellent view of the city of Zvolen and its surrounding area.
- Kalvária Banská Štiavnica- This is one of the largest Calvary hills in Europe and was created in the late Baroque style from 1744-1751. It consists of 3 churches and 22 chapels (Stations of the Cross). The complex was damaged in World War II and repairs were attempted even during the time of socialism, but the biggest damage came during the period of 1989-2004 when negligence and vandals did untold destruction to the monuments. In 2007, this complex was listed on the 100 most endangered monuments of the world. Since this time, most of the structures have been renovated to their past glory, much of it with the help of volunteers who come from all over the world.

In all three of the above cases, the efforts from volunteer tourism have helped to save important cultural artefacts. With their preservation, these sites have now become actual tourist destinations in themselves creating economic benefits for the local citizens, not just cultural ones.

Throughout Slovakia, there exist many cultural objects that could be targeted for volunteer tourism. This is especially true of the rural areas where these objects can be found in abundance. This is unlike the urban centres were historical monuments have already been preserved or snapped up by investors and thus there potential for this form of activity has been removed. Sadly, many cultural monuments in Slovakia are in a state of disrepair or

abandonment. This even includes the monuments that are on the official list of culturally protected artefacts. It needs to be said that the official cultural list does not even cover all objects that are culturally significant, such as abandoned train stations, industrial equipment, and older buildings. Often, it is the organization of a volunteer initiative that is the first step to having a historic objects added to the list of culturally protected artefacts. Once restored, these artefacts could serve as a tourist draw to the municipality.

Conclusions

The pervasion of volunteering with tourism has created a new dimension. A need to travel, during free time being in a different place as is habitual residence for purpose of perception, diversion and amusement, cultural and sporting enjoyment has added to visitor´s need to be useful in the visited destination. Volunteer tourism is thus result of a combination of individual interest and desire of visitors to help others through volunteering, which has a positive impact on society, environment and economic background. Voluntarism has become a sought activity in tourism, same on supply as demand. In practice, volunteer tourism has several forms.

The purpose was to examine and evaluate a demand of Slovak inhabitants older than 15 years for domestic and outbound volunteer tourism. We have considered the Slovak inhabitants who have taken part at least once in voluntary activity of domestic or outbound volunteer tourism in Slovakia during survey period (from 2013 to 2018).

Between 2013 and 2018, 19-26% of the Slovak population participated in voluntary tourism; whereas a larger share (18-25) showed interest in domestic rather than outgoing volunteer tourism (4-8%). The voluntary tourism of the inhabitants of Slovakia is focused on aid almost exclusively in developed countries. With increasing age, participation in this type of tourism decreases, while participation in the home country is positively influenced by higher education. Participation abroad also depends on the economic status of the individual.

While participation in domestic volunteer tourism is largely influenced by volunteer-oriented motives, in the case of outbound tourism, tourism-oriented motives dominate. In the home country, due to its size, volunteers often do not realize that they are involved in tourism as the primary incentive is to provide assistance. Abroad, the expectation of a travel experience is evident.

A peculiarity of the national volunteer tourism of the inhabitants of Slovakia is that key information is obtained mainly from direct sources (friends, acquaintances, relatives, classmates, etc.). Their predominance in the case of domestic tourism is more evident. We consider social networks successful in the dissemination of e-Word-of-Mouth as well as lectures at schools as a suitable communication channel for the dissemination of information for young people who represent the largest target group of volunteer tourism.

Time is the most important obstacle to people's participation in volunteer tourism. This is one of the reasons why short-term volunteering activities are currently offered as part of the travel experience, whether in the home country or abroad. We can find an example of good practice from abroad with hotel co-operation with non-profit organizations, allowing guests of accommodation facilities to engage in volunteer activities at a destination instead of traditional leisure activities. At the same time, it is also possible to contribute to the sustainable development of the visited destination during excursions (e.g. to help restore cultural attractions during their visit).

The analysis points to the assumption that there can be benefits in attracting and managing participants, as well as in the development of products for domestic and outgoing volunteer tourism. In particular, cooperation between sending and coordinating organizations and beneficiary organizations and a more intensive campaign in relation

to raising awareness of the benefits and opportunities for participation in this type of sustainable tourism should contribute to the development of volunteer tourism in Slovakia.

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ASSESSMENT THE ROLE OF RENEWABLE ENERGY IN SOCIO-ECONOMIC DEVELOPMENT OF RURAL AND ARCTIC REGIONS [*]

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Abstract. The paper overviews Russian and foreign studies on renewable energy. In view of some economic and environmental premises, namely depletion of the traditional energy sources and growing costs of their exploitation, a new alley is being paved in scientific literature and global practices for displacing traditional energy resources and providing for a substantial contribution of renewable sources to total energy consumption. In this context, the aim of this study is to determine what role renewable energy will play in the socio-economic security of territories, to identify the potential and possible applications of renewable energy. The main tasks for the study were to: identify the socio-economic implications of the transition from traditional to renewable energy sources, study the foreign experience of implementing renewable energy policies, estimate the potential and evaluate the prospects for renewable energy with the focus on rural northern regions. The potential for renewable energy market growth in Russia was estimated, specifically for the Northwestern macroregion. To provide for socio-economic security, the energy policy being developed must have an environmental and economic orientation. Primary focus in the development of renewable energy sources should be on peripheral regions, which have no electrical grids of their own and are energy deficient.

Keywords: renewable energy; energy consumption; energy sources; socio-economic security; peripheral regions

JEL Classifications: A 10; Q 40; Q 42

Additional disciplines ecology and environment; energetics and thermoenergetics.

1. Introduction

The rising interest in renewable energy is driven by several factors. The key ones are depletion of the sources of traditional fossil fuels combined with growing costs of their extraction; heavy environmental impact caused by fossil energy production and use, and the associated demand for treatment facilities and actions. Experts have estimated that with current consumption rates, primary energy sources of coal will suffice for no more than 850 years, natural gas for 270 years, oil for 180 years. The quality of the hydrocarbons' reserves will also be constantly declining (Vylegzhanin 2015; World Energy Council 2016).

An example of a negative environmental impact of fossil fuels is CO_2 and methane emissions, which notably deteriorate the quality of the environment. An emerging, yet underestimated application for solar energy is agriculture. Solar-powered vegetaria can deliver products 1.5-2 months earlier than unheated greenhouses, depending on the crop. The cost of a vegetarium, on the other hand, is commensurate with a regular greenhouse. Vegetaria can be used by large agricultural producers as well as by small-scale farmers, and in private subsistence farming. Thus, the construction of solar vegetaria would enhance food security in terms of some product categories in some regions of Russia. This is of particular relevance for northern regions in the Russian periphery, away from large logistic nodes.

Novelty of this research focuses on studying the northern and Arctic regions, develop new and refine existing approaches to research and development of mathematical models of energy efficiency of the Arctic zone economy; development of methodological approach to formation of mathematical models and scenarios of energy development and socio-economic development, including economic security based on interaction of macro- and meso-level. The research limitations are that not all data was available to all countries from the sample, as primary data were collected through a variety of studies, each conducted on its own sample of countries.

2. Theoretical background

Estimating the potential of renewable energy, researchers assume that the average required energy capacity is two kW per person per day. Each square meter of the earth surface can potentially yield ca. 500 W. With the conversion efficiency of 4%, it takes ten square meters per person. Given the average population density, this amount is quite achievable (Cho 2007). Earlier studies have corroborated the statement that renewable sources of energy are essential for mitigating climate change, in particular when implementing the Kyoto Protocol and 'green credits' trading. Renewable sources can be used in the electric energy sector and as environment-friendly vehicle biofuels (Jäger-Waldau 2007; Li et al. 2018), as well as in space exploration (Komerath et al 2011; Pisacane et al 2005).

It was shown that increased utilization of renewable energy will help reduce the price of non-renewable sources, namely natural gas. E.g., each megawatt hour renewable energy may potentially save end users at least UDS 7.5-20 (Wiser 2007). At the same time, the analysis of marginal cost curves has confirmed that in some countries, such as Spain, renewable energy generation is now inefficient, wherefore its prices cannot be competitive in the electricity market (Paz Espinosa et al. 2018; Hernández et al. 2011). The general demand for a more efficient use of resources was postulated by German economists E. von Weizsäcker, A.B. Lovins and L.H. Lovins. Their ideas and approaches underlie the European sustainable development strategy (Weizsäcker et al 1997).

In some countries, the transition to renewable energy is impeded by influential business groups. In Japan, for instance, in spite of energy shortages, the introduction of renewable energy sees some resistance from the haves. While photovoltaic generation better meets their interests than windmills, solar parks are procedurally easier to deploy. Yet, the country's government policy undertakes to stick to the energy efficiency principle (Moe 2012). There are, however, some economic challenges involved in the transition to renewable energy. Thus, the analysis of data for 24 European countries covering the period from 1990 to 2007 showed that coal hinders economic growth, natural gas has no effect, but the use of oil promotes growth. Hence, abandonment of some natural resources may cause economic growth to slow down (Marques et al. 2012).

The background for research on renewable energy development in Russia is systemic studies of the energy industry at the level of countries and their individual regions (Zheng et al 2019; Pablo-Romero et al 2019; Sarma et al 2019). Energy security issues (Yoo 2003) and the environmental effect of the energy industry (Sun et al. 2019; Dhar et al. 2019; Hájek et al. 2019) have been identified. Proceeding from this identified role, the prospects for renewable energy utilization were evaluated (Proskuryakova et al. 2019; Olkkonen et al. 2016) and recommendations were given on its implementation, regarding both strategic planning and guarantee of some rate of return for investors: by improving the legislative framework, introducing grid connection cost recovery schemes and fixed feed-in tariffs (Sadorsky 2012; Wang 2019; Lanshina 2018). The transition to renewable energy is particularly promising in decentralized power supply systems, where most of the generation today is by diesel power plants with their high operating costs (Velkin 2015).

3. Material and Method

The studies on renewable energy development and the projects implemented so far suggest there is extensive potential for the use of all major types of renewable energy in Russia. The key challenge in drawing up a common methodology for the study of this process is the diversity of applicable formats and methods.

The assessment of the role of renewable sources of energy in the socio-economic development of regions included:
•	comparison of traditional and alternative sources, their comparative strengths and weaknesses;
•	identification of the qualitative and quantitative effects of completed projects in the renewable energy market;
•	estimation of the actual and potential scope of use of renewable energy sources, including for specific most promising types, considering the resources available.
The development potential of renewable energy was estimated both as potential generation capacity and as the share in total consumption.
The results obtained in the study have enabled conclusions to be drawn concerning the current and prospective effects of renewable energy on the socio-economic security of territories.

Renewable energy sources reduce environmental charges and increase economic growth. The hypothesis is an increase in the share of renewable energy leads to a reduction in CO_2 emissions. The one model was built according to the data of the European Union countries from 1990 to 2018 and other – for Belarus, Russia and Kazakhstan (World Bank Statistics, Eurostat and Enerdata, see Table 1, Figure 1, Table 2, Figure 2). We take to the data of the European Union countries, because the share of renewable is a rapidly increase in last years.

Table 1. Renewable electricity output in Belarus, Kazakhstan, Russia (% of total electricity output)

Country Name	Belarus	Kazakhstan	Russian Federation
1990	0,050599605	8,429943121	15,33814104
1991	0,046469601	8,373650912	15,69414031
1992	0,045218779	8,302197071	17,0465566
1993	0,056939075	9,850989102	18,14990447
1994	0,060515336	13,82441978	20,00717812
1995	0,080263264	12,49756229	20,42662271
1996	0,067430883	12,41742606	18,12705781
1997	0,080592547	12,49807692	18,80051466
1998	0,119189511	12,49567606	19,19112939
1999	0,07165485	12,91001726	18,99243743
2000	0,103444312	14,67344712	18,72960564
2001	0,11969836	14,21284978	19,56702383
2002	0,109615966	15,23773611	18,26085783
2003	0,10515642	13,50483826	17,07669458
2004	0,108939442	12,03525282	18,95623747
2005	0,119505184	11,57899391	18,20252976
2006	0,119455534	10,84053198	17,49382461
2007	0,157089447	10,66738035	17,52064093
2008	0,20828578	9,287039227	15,91410503
2009	0,345667632	8,739677296	17,64404648
2010	0,37254621	9,706458873	16,12058881
2011	0,428571429	9,10424318	15,80302393
2012	0,555212832	8,4	15,56373111
2013	0,844256832	8,1	17,17463022
2014	0,722614078	8,7	16,5682512
2015	0,815679831	10,3	15,85579515
2016	0,815679831	12,7	17
2017	2,2	11,3	17,2
2018	2,2	10,2	17
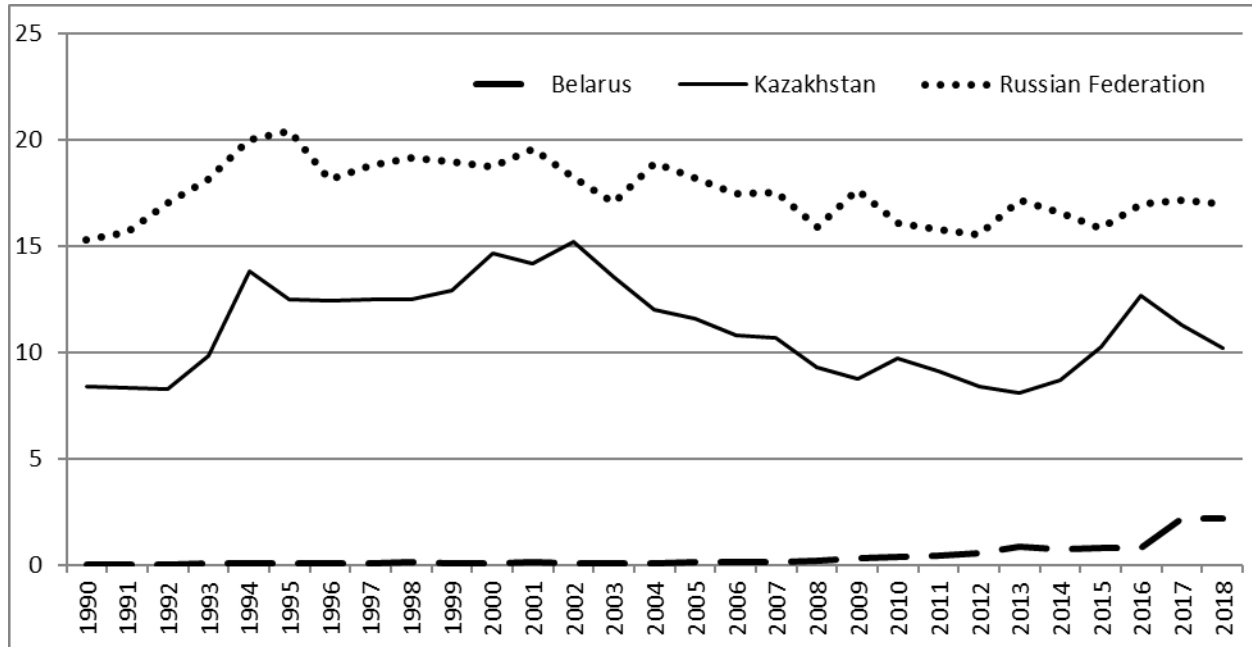
Figure 1. Renewable electricity output in Belarus, Kazakhstan, Russia (% of total electricity output)

Source: World Bank Statistics and National Agencies of Statistics

Table 2. Renewable electricity output in some European countries (% of total electricity output)

Country	Belgium	Czech Republic	Germany	Denmark	Spain	France	United Kingdom	Italy
1990	0,789564	1,864431	3,486351	3,175275	17,21625	13,369879	1,828767	16,37602
1991	0,752957	1,80603	3,168753	2,892325	17,97039	13,220198	1,656439	20,84651
1992	0,864025	2,373978	3,697964	4,398464	12,50925	15,453978	2,005662	20,55392
1993	0,723583	2,608518	3,92737	4,730088	16,16325	14,238354	1,777626	20,57976
1994	0,841031	3,050232	4,461686	4,295431	18,06068	17,058195	2,139842	21,08945
1995	0,908646	3,973586	4,866989	5,035639	14,72016	15,361125	2,066535	17,466
1996	0,746626	3,54261	4,821397	3,880034	23,79085	13,448621	1,62748	19,30801
1997	0,755192	3,414984	4,20831	6,6095	19,54617	13,264534	1,989232	18,743
1998	0,924764	3,068519	4,508169	9,546859	19,07369	12,767857	2,395321	18,32252
1999	1,0196	3,675244	5,197224	11,25128	13,26681	14,46674	2,632717	19,79325
2000	1,261281	3,132586	6,198531	15,45502	15,61373	12,967876	2,663105	18,84819
2001	1,367371	3,471455	6,512444	15,49471	21,15357	14,256372	2,497332	19,98867
2002	1,405997	3,944996	7,6427	17,28053	13,83062	11,597276	2,893173	17,4088
2003	1,426503	2,268885	7,552978	17,49015	21,67904	11,230018	2,684947	16,3708
2004	1,774685	3,271273	9,267474	23,55574	18,1347	11,242989	3,613032	18,21338
2005	2,457152	3,822729	10,15021	27,07057	14,60139	9,8606467	4,283482	16,31822
2006	3,499787	4,207808	11,32201	20,17277	17,64282	10,947576	4,602089	16,45644
2007	3,982726	3,88542	13,93801	26,2107	19,3093	11,690926	5,010293	15,48072
2008	5,285764	4,47926	14,69923	27,57265	19,98309	12,979209	5,677052	18,55119
2009	6,056388	5,701196	16,07855	27,65852	25,38125	13,127164	6,766808	24,01894
2010	6,920806	6,918136	16,72707	31,9824	32,77554	13,857359	6,812813	25,76036
2011	9,410879	8,35254	20,38328	40,25377	30,02164	11,574747	9,489053	27,59473
2012	12,81288	9,303586	23,00046	48,32742	29,58475	14,827354	11,42396	31,02039
2013	14,20939	10,82341	24,07255	45,96034	39,58358	17,045286	14,98848	38,90535

2014	17,08064	10,77841	26,1301	55,90045	40,10526	16,455905	19,26285	43,39161
2015	20,80002	11,40457	29,23177	65,50592	34,94989	15,857667	24,84005	38,67923
2016	17,9	12,7	29,9	60,44681	39,3	18,4	25,4	37,9
2017	18,8	12,4	34,2	70,6113	32,8	17,2	30,1	35,7
2018	23,3	11,9	36	68,85025	38,6	19,9	34	39,9

Table 2. (continuation) Renewable electricity output in some European countries (% of total electricity output)

Country	Netherlands	Norway	Poland	Portugal	Romania	Sweden
1990	1,119942	99,79196	1,095116	34,71526	17,74402	51,00011
1991	1,256991	99,80102	1,136158	33,12365	25,68174	44,30088
1992	1,287909	99,81727	1,238073	18,57003	21,5924	52,33321
1993	1,4347	99,80371	1,175453	30,45499	23,01716	52,92433
1994	1,575119	99,64299	1,338395	37,14495	23,66149	43,02873
1995	1,730999	99,66215	1,42657	28,30075	28,16623	47,57878
1996	2,125891	99,49951	1,461818	45,86106	25,68052	38,40159
1997	2,331172	99,57735	1,512754	41,67936	30,65724	48,27755
1998	2,555013	99,61608	1,799376	36,36107	35,31105	49,18289
1999	2,890913	99,56087	1,679988	20,09135	36,06784	48,27433
2000	3,315817	99,71511	1,628787	29,66891	28,45535	57,24673
2001	3,525405	99,5203	1,936391	34,09504	27,70393	51,56162
2002	4,140403	99,58308	1,941768	21,32092	29,32128	48,49693
2003	4,092214	99,39908	1,49991	38,05378	24,05151	43,38265
2004	5,243346	99,35063	2,102262	27,47005	29,23415	44,94933
2005	7,450886	99,47175	2,4762	17,88343	34,02117	51,29416
2006	8,146065	99,31613	2,66913	32,36578	29,2837	49,6008
2007	7,210574	99,13454	3,420235	34,58291	25,94977	52,0269
2008	8,86176	99,40296	4,271217	32,19791	26,51641	54,30905
2009	9,531097	96,57044	5,742418	36,96496	26,9358	58,41996
2010	9,387943	95,73265	6,931103	52,80773	33,48785	55,30176
2011	10,81228	96,49442	8,053679	46,4751	26,31494	55,9446
2012	12,11446	97,95491	10,43776	42,50044	25,39558	59,06775
2013	11,97511	97,70227	10,40531	58,31915	34,42155	54,0335
2014	11,32105	97,65553	12,51861	60,7402	41,60609	55,83769
2015	12,44208	97,70987	13,8024	47,52637	39,74697	63,26275
2016	12,8	97,8	14	55,5	42,2	57,2
2017	15	97,8	14,5	41	38,3	57,5
2018	15,7	97,9	13	52,2	41,3	55,3

Source: World Bank Statistics and Eurostat
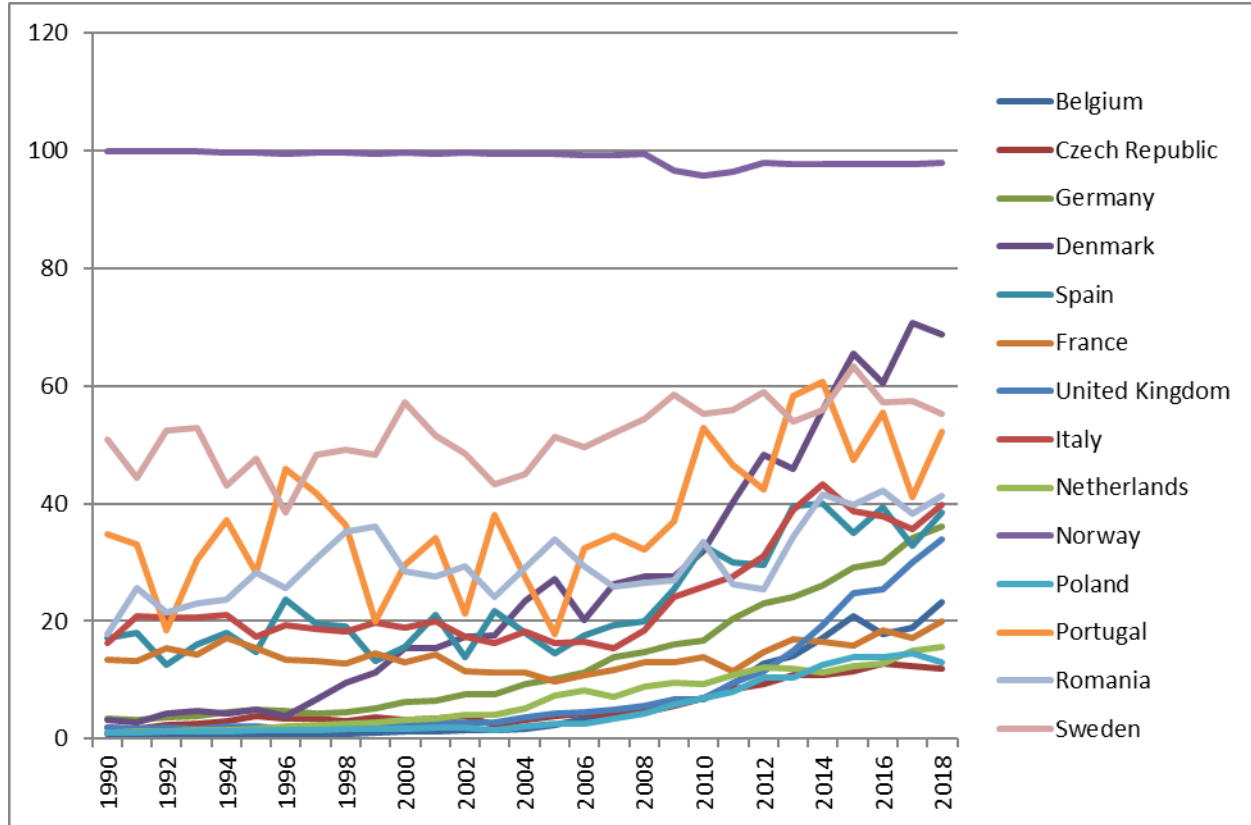
Figure 2. Renewable electricity output in some European countries (% of total electricity output)

Source: World Bank Statistics and Eurostat

To investigate the relationship between CO2 emissions per capita, fossil fuel energy consumption, renewable electricity and GDP per capita, we apply model proposed Ito (2017) and the long-run model is given by the following equation:

$$CO2emmisions = f(FuelCons, Renewable\ electricity, GDP) \qquad (1)$$

Making the log linear form of the both sides of the Equation (1), we obtain the following Equation (2):
$$lnCO2_{it} = \beta_0 + \beta_1\ lnFuelCons_{it} + \beta_2 lnRW_{it} + \beta_3 lnGDP_{it} + \varepsilon_{it}\ , \qquad (2)$$

where:
ln denotes the natural logarithm;
β_1, β_2 and β_3 parameters are the long-run elasticities of CO2 emissions per capita to Fossil fuel energy consumption (% of total), share of Renewable electricity (% of total electricity output) and GDP per capita;
$lnCO2it$ is a logarithmic meter corresponding to CO2 emissions (metric tons per capita);
$lnFuelCons_{it}$ is a logarithmic meter corresponding to the Fossil fuel energy consumption (% of total);
$lnRWit$ is a logarithmic meter corresponding to the share of Renewable electricity (% of total electricity output);
$lnGDPit$ is a logarithmic meter corresponding to the GDP per capita.

4. Results and Discussion

According the econometric analysis, the panel unit root tests are provided for all of the parameters of equation (2). Keeping in mind the basic idea behind cointegration, it is necessary to determine the order of integration of each variable before proceeding to using cointegration techniques. The results of the panel unit root tests for all of variables of equation (2), using the Levin, Lin & Chu test, ADF Fisher, and PP Fisher tests, are presented in Table 3.

Table 3. Panel unit root results

Variables	Test Statistics		Panel data 1 – EU countries		Panel data 2 – Belarus, Russia and Kazakhstan	
			Level	First Difference	Level	First Difference
lnCO2	Levin, Lin & Chu t	Statistic	2.438	-7.278	-0.835	-3.835
		Prob.	0.993	0.000	0.202	0.000
	ADF - Fisher Chi-square	Statistic	17.734	134.559	4.368	21.564
		Prob.	0.933	0.000	0.627	0.002
	PP - Fisher Chi-square	Statistic	22.661	296.535	6.620	33.777
		Prob.	0.750	0.000	0.357	0.000
lnFuelCons	Levin, Lin & Chu t	Statistic	2.052	-7.387	-0.762	-2.260
		Prob.	0.980	0.000	0.223	0.012
	ADF - Fisher Chi-square	Statistic	8.622	145.579	4.708	34.130
		Prob.	0.999	0.000	0.582	0.000
	PP - Fisher Chi-square	Statistic	10.204	286.086	7.586	69.541
		Prob.	0.999	0.000	0.270	0.000
lnRW	Levin, Lin & Chu t	Statistic	1.378	-7.846	2.348	-2.640
		Prob.	0.916	0.000	0.991	0.004
	ADF - Fisher Chi-square	Statistic	11.090	81.445	4.666	25.880
		Prob.	0.998	0.000	0.587	0.000
	PP - Fisher Chi-square	Statistic	21.756	153.196	5.820	52.998
		Prob.	0.793	0.000	0.444	0.000
lnGDP	Levin, Lin & Chu t	Statistic	-2.269	-9.856	0.108	-2.942
		Prob.	0.012	0.000	0.543	0.001
	ADF - Fisher Chi-square	Statistic	13.679	142.515	1.260	15.055
		Prob.	0.989	0.000	0.974	0.019
	PP - Fisher Chi-square	Statistic	12.569	162.261	0.878	23.757
		Prob.	0.995	0.000	0.990	0.000

Source: Computed by this study

The results in Table 3 point out that the hypothesis that the levels of all variables under study contain a unit root is accepted at the 1% significance level. The test results indicate that the first difference variables are stationary. Thus, the results allowed the test for panel cointegration between the GDP, RW, CO2, FuelCons. In Table 4, the results of using the Pedroni panel cointegration tests are presented.

Table 4. Pedroni panel cointegration tests

Variables	Test Statistics	Panel data 1 – EU countries		Panel data 2 – Belarus, Russia and Kazakhstan	
		Statistic	Prob.	Statistic	Prob.
within-dimension	Panel v-Statistic	1.105	0.135	0.546	0.292
	Panel rho-Statistic	-0.719	0.236	-0.258	0.398
	Panel PP-Statistic	-3.564	0.000	-0.954	0.170
	Panel ADF-Statistic	-2.847	0.002	-1.398	0.081
	Weighted Statistic				
	Panel v-Statistic	0.772	0.220	0.475	0.317
	Panel rho-Statistic	-0.893	0.186	-0.163	0.435
	Panel PP-Statistic	-3.853	0.000	-0.993	0.160
	Panel ADF-Statistic	-2.714	0.003	-1.380	0.084
between-dimension	Group rho-Statistic	-0.160	0.436	0.546	0.707
	Group PP-Statistic	-4.609	0.000	-0.868	0.193
	Group ADF-Statistic	-2.988	0.001	-1.153	0.124

Source: Computed by this study

The cointegration reveals that there is a long-run relationship between the variables for EU countries (which is indicated by the panel PP, panel ADF, group ADF and group PP statistics in Table 4) and unclear results for panel – Belarus, Russia and Kazakhstan. According table 4, panel 2 have a cointegration relationship by only ADF-Statistic.

In Table 5, the findings of the use of the FMOLS and DOLS panel cointegration techniques are presented.

Table 5. Results of model

	Methods	lnFuelCons			lnRW			lnGDP			R-squared
		Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	
Panel data 1 – EU countries	Panel Fully Modified Least Squares (FMOLS)	1.483	13.792	0.00	-0.0612	-5.672	0.00	0.0275	1.662	0.097	0.96
	Panel Dynamic Least Squares (DOLS)	1.309	10.870	0.00	-0.046	-4.05	0.00	-0.004	-0.246	0.806	0.98
Panel data 2 – Belarus, Russia and Kazakhstan	Panel Fully Modified Least Squares (FMOLS)	5.856	2.859	0.005	-0.050	-1.307	0.195	0.124	5.520	0.000	0.85
	Panel Dynamic Least Squares (DOLS)	7.190	3.212	0.002	-0.061	-1.237	0.221	0.136	5.050	0.027	0.94

Source: Computed by this study

According results, for European countries the fossil fuel energy consumption contribute the the CO_2 emissions and renewable electricity contributes to reductions in emissions. For Belarus, Russia and Kazakhstan fossil fuel and per capita GDP lead to an increase in the emissions. For European countries, coefficient of FuelCons suggests that a 1% increase in fossil fuel energy consumption will lead to an increase in the CO_2 emissions per capita of 1.5% and the coefficient of RW suggests that a 1% increase in share of renewable energy will lead to a decrease in the CO_2 emissions per capita of 0.06% for FMOLS estimation (DOLS estimation shows 1.3 and -0.05 respectively), the GDP per capita don't influence on emissions (coefficient is statistically insignificant). According results, for Belarus, Russia and Kazakhstan the coefficient of GDP suggests that a 1% increase in per capita GDP will lead to an increase in the CO_2 emissions per capita of 0.12% and the coefficient of FuelCons suggests that a 1% increase in fossil fuel energy consumption will lead to a increase in the CO_2 emissions per capita of 6% for FMOLS estimation (DOLS estimation shows 0.14 and 7 respectively), the renewable electricity don't influence on emissions (coefficient is statistically insignificant).

Thus according to the panel data model, the increase in the share of renewable energy in the long run reduces the CO_2 emission by the example of European countries. For countries of panel 2, renewable electricity don't influence on emissions due to low share of renewable energy in total electricity output compared to Germany or Portugal.

Our empirical findings are as follows: (i) renewable energy consumption contributes to reductions in emissions for European countries, but we don't find relation for Belarus, Russia and Kazakhstan; (ii) fossil fuel energy consumption lead to increase the CO_2 emissions in alll countries in the long run.

Owing to modern techniques, a majority of agricultural enterprises (animal, poultry, breeding farms) can fully satisfy their heat and power demand using their own biogas. In addition, biogas can serve as an alternative fuel for farm machinery.

The biogas production technology should also be applied at large municipal wastewater treatment facilities. The raw material in this case is sewage. Biogas (methane) is a greenhouse gas which, formed under natural conditions, is harmful for the environment, imposing extra burden on the economy (Chang 2017). Since wastewater has to be treated anyway, the use of biogas can help treatment facilities reduce their energy costs and sometimes get extra revenues from selling biogas and its end products out to the market.

Biogas production also proves beneficial in municipal landfills. Methane collection can be organized there. In the process, municipal wastes will be recycled, new energy resources will be generated, greenhouse emissions will be reduced, and environmental improvements will be achieved. Such landfills are quite common in a majority of developed countries, including the USA, China, Japan, the Netherlands, Belgium, and many others. Thus, in the subarctic city of Oulu (Finland), the municipal landfill Oiva Roina has been reconstructed, so that in addition to waste processing it now extracts gas and generates power. Gas is extracted by specialized pumps connected to pipelines running through the body of the landfill. There is a 200 kWh power station in the landfill premises with four power generators operating on methane, 50 kWh installed capacity each. This capacity suffices to cover all energy demands of the company. Excessive gas is sold to nearby enterprises. This recycling technology has proven efficiency and could be applied in Russian municipal waste landfills, considering how pressing the waste recycling problem is today in a majority of large settlements across Russia.

The results are consistent with previous studies. In particular, data from African countries for the period 1980-2014 and 1980-2011 confirmed respectively the existence of a short-run (Adams et al 2019) and a long-run (Adams et al 2019; Inglesi-Lotz et al 2018) relationship between the renewable and non-renewable energy and CO_2 emissions. The study also found a unidirectional causality running from renewable energy consumption to CO_2 emissions (Inglesi-Lotz et al 2018). The existence of a link between the use of non-renewable energy and

CO2 emissions was also confirmed in an earlier study of the Tunisian economy (Cherni et al 2017). At the same time, data from the MENA region (Middle East and North Africa) showed that a transition to renewable energy consumption can only slightly explain changes in CO2 emissions. The reason for this is the weak distribution of renewable energy in the MENA countries (Charfeddine 2019).

Renewable energy development plans should take into account the resources available in a territory. Take the case of Northwest Russian regions. Northwest Russia has good premises for the development of the renewable energy sector, and many regions implement pilot projects, get expert reviews for projects and search for instruments to implement them. An important application for renewable energy sources is the conversion of district boiler houses from coal and heavy oil to biomass, viz. wood wastes, peat, etc. With heavy oil prices in Russia growing constantly, wood residues as feedstock for heat production are gradually becoming competitive. Hence, forest resources in northern regions of Russia (especially Republic of Karelia and Arkhangelsk Region) can be utilized to produce renewable fuels, such as chips and pellets. Boiler houses in all districts of Karelia are getting re-equipped to be converted to local fuels. Some boiler houses in the region are already powered by local fuels such as chips and peat. They are situated in Suojarvi, Veshkelitsa, Porosozero, Harlu, Essoila and many other towns and villages.

Finnish experience deserves special attention. A Finnish company has developed an integrated solution for the heating and hot water supply of private houses where a solar power installation is integrated in the utility system. The main element of this system is a heat accumulator combined with a solar collector. Where needed, the system can be supplemented with a diesel or gas boiler so that the heat and hot water supply of the house is provided by the integrated solar energy-diesel/gas system. In this system, the water heated in solar collectors is supplied to the heat accumulator and then distributed among consumers, with additional heating by a diesel or gas boiler if necessary. The boiler ensures that even when solar energy is in deficit, e.g. in wintertime, the consumer gets adequate heating and hot water supply.

As regards municipalities, the development of their economies is directly dependent on distance to the region's capital city, the only exception being centers of innovation. In Karelia, the latter are represented by the borderland towns of Kostomuksha and Sortavala.

Since the beginning of reforms, Karelian economy has seen a substantial decline, most importantly in industry and agriculture. Employment levels in a majority of municipalities dropped 4-6-fold, and it is only in Kostomukshsky and Sortavalsky Districts that the socio-economic situation is slightly better, owing to the presence of customs and transport infrastructure, active foreign economic contacts, and AO Karelsky Okatysh. The latter, situated in Kostomuksha, accounts for roughly one fifth of the Karelian economy, while a majority of rural municipalities remote from Petrozavodsk contribute no more that 1%. At the same time, the population loss was smaller than the production decline, wherefore the share of unemployed has increased markedly in the periphery.

Reforms have induced economic renovation of Karelia, but little of it has happened in rural areas. The peripheral position and poor infrastructure of rural areas make their industrial revival unlikely. Regional authorities, struggling to save budgetary funds, shut down pieces of infrastructure, leaving the population deprived not only of social facilities, but even of energy supply. One possible solution is to engage renewable energy sources, particularly in agricultural cooperation arrangements.

Conclusions

Green economy and renewable energy have lately been studied as a full-fledged research area both globally and in Russia. In particular, there is an ongoing search for engineering and process solutions for utilizing solar energy and promoting bioenergy; potential applications for green economy techniques are being investigated (Statista 2018). The task to promote alternative energy has been formulated within the UN Sustainable Development Concept, Renewable Energy Development Strategy 2020, a number of other international regulatory documents.
All the countries leading in renewable energy utilization have for a long time been offering targeted support to the developments. The incentives for renewable energy development fall into three main groups: price-, cost-, and quantity-based. Price-based instruments include fixed prices per unit energy or price markup set in law, capacity charges (feed-in tariffs, net metering). These support measures were first introduced in the USA in the 1970's, but became widespread only in the 1990's. At the moment, price-based instruments are the most popular, applied in more than 50 countries. Cost-based instruments include various subsidies, tax abatements, partial reimbursement of investments in renewable energy developments. Quantity-based instruments include renewable energy quotas or green credits, as well as assistance in tendering. As a rule, quantity-based instruments are applied to more mature technologies for renewable energy use.

Furthermore, renewable sources of energy have a substantial environmental-economic potential and contribute to the country's innovative development. Finnish experience, for instance, proves that installations utilizing renewable energy can operate even in the north. To activate the use of renewable energy in Russia, foreign experience needs to be adapted and a systemic approach should be employed in implementing the energy saving and energy efficiency policies. The possible incentives for renewable energy development, given the existing potential and scientific developments, can take the form of support measures of all the three major types: price-, cost-, and quantity-based. However, since the threats for the energy security and, hence, the socio-economic security are higher in northern peripheral regions, they should be treated preferentially within the incentive mechanisms.

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CONCENTRATION OF OIL SECTOR OR DIVERSIFICATION IN SAUDI ECONOMY: CONSEQUENCES ON GROWTH SUSTAINABILITY[*]

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Abstract. Oil sector contributes most of macroeconomic performance in Saudi Arabia. Using a period 1970-2018, we calculate the production, exports, government revenues, investment and employment concentration indices using normalized Herfindahl Hirschman index and test the effects of concentration indices on the economic growth. We find that exports and government revenues are highly concentrated and majorly depend on the oil sector. Employment is more concentrated by public sector and production is majorly concentrated on oil sector. Investment is shown relatively lesser dependence on the oil sector with compare to exports, production and government revenues. In the long run, we find the positive effects of production and government revenue concentrations on the economic growth and negative effects of exports and employment concentrations. Moreover, we find the Granger causality from production concentration to the economic growth, from government revenue and exports concentrations to the production concentration, from investment concentration to the export concentration and from production, investment and government revenue concentrations to the employment concentration.

Keywords: oil sector; concentration and diversification; economic growth; government revenues; investment; exports

JEL Classifications: O13, O11, L25, F14

1. Introduction

Saudi Arabia is an oil rich economy and depends heavily on the oil sector in her income, exports and government revenue. Economic diversification may be initiated by a gradual process to diversify the source of income from oil sector to the other sectors like increasing contribution of industrial and service sectors in the income. Saudi government has targeted the diversification from oil sector in her all development plans since 1970. But, Saudi Arabia could not be achieved acceptable diversification compared to other rentier countries (Merzuk 2013). Moreover, the government of Saudi Arabia is also planning for economic diversification in the long term Vision 2030. Economic diversification from oil sector is an urgent need of Saudi economy due to its heavy reliance on this sector. The fluctuations and low level of oil prices in the world market now-a-day might be considered as a threat to the maroeconomic sustainability of the economy. Government of Saudi Arabia has been targeted the diversification policy in the most of 5-years development plans and have reduced some of oil dependence as well. For example, the contribution of the oil sector in Gross Domestic Product (GDP) fell from 58.5% during the first development plan of 1970-74 to 28.6% during a period of 2015-2018 in tenth development plan (Saudi Arabian Monetary Agency 2019).

Table 1 shows 5-years average contributions of oil sector in the exports, government revenue, investment and production during the ten development plans from 1970-2018. The contribution of oil sector in GDP was observed highest during the first development plan 1970-74 and it gradually decreased to 25.5% till the fourth development plan 1985-89. Afterwards, it showed mostly increasing trend till eighth development plan 2005-09 and fell afterwards. In the last period 2015-18, the proportion 28.6% is found least with compare to all development plans except 1985-89. This sharp decline in proportion of oil sector in GDP may be claimed due to an achievement of government policy toward diversification and may also be due to global oil price crisis. In the non-oil sector profile, the private sector contribution has gradually been increased from 28% during the first development plan 1970-74 to 50.4% during fourth development plan 1985-89. Then, it gradually decreased till the eighth development plan 2005-09 and has positive trend afterwards. The non-oil private sector contribution to GDP has showed an opposite trend to the trend of oil sector contribution in the all development plans. In the same line, non-oil government sector share in GDP has also the opposite trend to the trend of oil sector in most of development plans. Therefore, both private and public sectors are proved to be helpful in diversification process of conversion from oil to non-oil sector in the Kingdom.

In the fiscal domain, the oil sector contribution to government revenue has showed a high dependence in the first development plan 1970-74 but it declined gradually from 90.6% during first development plan to 62% in the fourth development plan 1985-89. Afterwards, it picked a continues positive trend till ninth development plan 2010-14 and stood at same position of first development plan 1970-74 but decreased tremendously in the last development plan during 2015-18. In the exports' market, oil exports contributed about 100% of total exports in the first two development plans during 1970-79 and contributed 98.4% in the third development plan 1980-84. In the fourth development plan 1985-89, a sharp decline was observed and contribution of oil exports was observed around 90% in total exports in the development plans during 1985-2009 with the minute fluctuations. Afterwards, a declining trend has been observed in the last two development plans during 2010-18.

Investment in the oil sector was 25.4% of total investment in the first development plan 1970-74 which was highest compared to other development plans. Then, it gradually decreased till fifth development plan and was observed at 7.2% during 1990-94. Afterwards, it showed a mix of increasing and decreasing trends during 1995-2018. The most proportion of investment was from non-oil private sector during 1985-2018 and the public sector investment share has been found largest during 1970-1984 which tremendously fell during 1995-2004. The oil sector employment data could not be found for sample period so we discuss the employment in the private and public sectors. Private sector shows more employment share than the public sector in the all development plans

and has also showed an increasing trend in most of development plans during 1970-2018. The public sector employment share was found significant in the first six development plans but it declined sharply in the seventh development plan.

Table 1. Evolution of economic diversification or concentration indicators during economic development plans

Development Plan	GDP Share (%)			Exports Share (%)		Govt. Revenue Share (%)		Investment Share (%)			Employment	
	Oil	Private	Govt.	Oil	Non-oil	Oil	Non-oil	Oil	Private	Govt.	Private	Govt.
1970-74	58.5	28	13.5	99.5	0.5	90.6	9.4	25.4	34.4	40.2	61	39
1975-79	56.9	34.4	8.7	99.7	0.3	88.8	11.2	13.2	28.1	58.7	66.6	33.4
1980-84	48.7	38.3	13	98.4	1.6	79.5	20.5	11	33.6	55.4	74.6	25.4
1985-89	25.5	50.4	24.1	87.9	12.1	62	38	7.9	50.3	41.8	63.2	36.8
1990-94	36.4	40.7	22.9	91	9	75.5	24.5	7.2	52.3	40.5	64.5	35.5
1995-99	34.7	41.8	23.5	87.3	12.7	70.7	29.3	10.8	74	15.2	71	29
2000-04	40	39.3	20.7	88.7	11.3	80.9	19.1	11.2	74.2	14.6	89.5	10.5
2005-09	49.5	34.7	15.8	88.2	11.8	88.2	11.8	14.1	62.3	23.6	87.5	12.5
2010-14	47	37.2	15.8	85.7	14.3	90.5	9.5	11.1	51.6	37.3	88.6	11.4
2015-18	28.6	48.6	22.8	76.2	23.8	66.9	33.1	13.7	55.9	30.4	89.9	10.1

Source: Saudi Arabian Monetary Agency (2019)

In summing up, Saudi Arabia is heavily depending on the oil-sector in terms of income, exports and government revenue. The economy has targeted the diversification policy in all 5-years development plans since 1970, but still the diversification level is lesser than the projected level (Al Bakr 2015). Particularly, government revenue and exports are still heavily relying on the oil sector. Before targeting any diversification policy, it is very pertinent to test the effects of income, exports, investment, employment and government revenue diversifications on the economic growth sustainability because the major objective of any economic policy is a sustainable growth. Some studies have been investigated the effects of income diversification on the economic growth of Saudi Arabia with the mix evidences of findings (Al-Tit and Omri 2018; Al-Khatib 2011; Al-Khatib 2014). But, Saudi literature is still silent to test the effects of exports, investment and government revenue diversifications on the economic growth by estimating the concentration indices of these macroeconomic indicators. So, this present study is intended to find major types of macroeconomic diversifications using normalized Herfindahl Hirschman index and tests their effects on the economic growth of Saudi Arabia using a maximum available range of data (raw data is provided in appendix).

2. Literature Review

Economic diversification from oil sector may be assumed a process to reduce the contribution of the oil sector in government revenues, exports, investment and GDP of oil-dependent economies. In general, economic diversification aims to: (1) expand the opportunities and prospects for domestic and foreign direct investment and increase commercial partners and international markets, (2) strengthen ties between economic sectors and thus achieve economic stability, (3) expand and diversify the value added from maximum economic sectors (4) providing opportunities for national employment, and (5) creating the exports substitution industry that contributes to strengthening the forward and backward linkages of existing industries.

The diversification policy may activate the low contributing sectors of an economy to be worked at full potential to contribute in the income and economic growth of the country. In this regard, the testing of the impact of diversification on the economic growth seems important. Literature is available with the studies of economic diversification and its impact on growth and development of the countries. For example, Ghanem and Fawaz (1998) studied the factors determining the allocation of economic and agricultural resources in light of the

targeted structural change in the Egyptian economy. The study indicated that the structural change occurred in the Egyptian economy but could not support to the growth and development. It gave push to the sectors which showed less productivity during the period 1976-1997. Other than economic growth, the role of economic diversification has been tested on the other different macroeconomic performance indicators in the literature. For example, del Rosal (2019) investigated the role of export diversification using Herfindahl index on the export-performance. In contrast, he found that exports' concentration helped in raising export-performance. Ali and Memon (2019) examined the effect of exports' diversification on the human development in the South Asia. They assumed different proxies of exports' diversification and found the positive effect of each proxy on the human development. Cai et al. (2018) explored the role of diversified exploitation and exploration on innovate policy logics and found the positive role in case of Finland and Norway. Nisar et al. (2018) studied the effects of income diversification on the technical and scale efficiencies of the commercial banks of South Asia. They reported that income diversification showed the significant and positive effects on the all types of efficiencies of the banks in the South Asia. Basile et al. (2018) investigated the relationship between exports' diversification and economic development of 114 countries in a sample period 1992-2012, considering the spatial effects. They found the spatial dependence in the exports diversification model through spillovers. Particularly, large countries showed larger diversification effects.

The economic diversification has also been found helpful to reduce the cyclical effects in the times of the crises of the economies. Ji and Mei (2019) inspected the performance of exports' diversification on the fiscal pro-cyclical movements. They found that export's diversification helped in reducing the fiscal pro-cyclical movements. Liu et al. (2018) investigated the role of industrial and global diversification of US firms on the economic downturns/crises. They found that both kinds of diversifications supported the firms to be stabilized in the economic downturn periods through increasing investments and through products' performance of the diversified industries. Adelaja and Akaeze (2018) examined the influence of diversification from oil, oil reserves and exchange rate on the recovery from oil price crisis of 53 oil-producing countries. They found that with an increase in oil price after crisis period, diversification accelerated the economic recovery. Alley (2018) reconnoitered the support of export diversification on the exchange rate crash of Naira. He found that oil price crash of 2014 directly depreciated the Naira significantly which could not be improved after many government policies and initiatives. But, increase in non-oil exports and revenues helped to appreciate the Naira and to be stabilized in the international market. Masood et al. (2019) estimated impact of oil prices on stock return of G7 countries.

There are a number of studies investigating the issue of economic diversification in the context of Saudi Arabia. In the descriptive analyses, Albassam (2015) utilized the percentage contribution of oil sector to GDP, to government revenues, to total exports of Saudi Arabia during 1970-2013. He argued that this economy could not achieve the targeted diversification. After the oil price crisis of 2014, Al Bakr (2015) discussed the need of production-based diversification from the oil sector in the Kingdom of Saudi Arabia in his descriptive analyses. He argued that Saudi Arabia had targeted the diversification policy in each of her five year plans since 1970 but still diversification was found lesser than the targeted expectations. He discussed the demand sided and supply sided issues of diversification policy and suggested that Small and Medium Enterprises (SMEs) with government support might play a significant role in diversification process. He confronted that SMEs were only focusing on the low value-added activities like trade and construction. The foreign investors were also focusing the construction sector majorly. Further, labor was also remitting most of their income to their mother countries which could not benefit the local economy. He recommended the government to divert the FDI and SMEs activities towards high value-added activities to raise productivity and to accelerate the process of diversification.

Jawadi and Ftiti (2019) investigated the relationship between oil-dependency and economic growth of Saudi Arabia. They found the positive effect of oil sector production on the economic growth in the nonlinear settings. Further, the effect of oil price was found different at different oil market conditions (booms or busts) and equity investment played the pleasant effects on the economic growth. Moreover, they favored the diversification policy

according to the Vision 2030. Aker and Aghaei (2019) examined the effects of exports 'diversification and economic performance on the business competitiveness of 11 oil-rich countries, including Saudi Arabia. They found that both exports' diversification and economic performance played the important role in raising business competitiveness. Maalel and Mahmood (2018) investigated the role of oil-income and oil-exports dependency on the economic growth of GCC countries including Saudi Arabia in the asymmetric settings. They find that oil-income has insignificant effect on the economic growth of Saudi Arabia. Further, oil-exports dependency has negative effects on the economic growth with asymmetric magnitude of effects. Both increasing and decreasing oil-exports dependency had negative relationship with the economic growth of the Saudi Arabia but increasing oil-exports dependency had relatively greater negative effects on the economic growth than that of decreasing oil-exports dependency.

Al-Khatib (2011) investigated the role of diversification on the economic growth using a period 1970-2008. He found the positive effect of diversification on the economic growth. Al-Khatib (2014) re-investigated the effect of diversification on economic growth in the Saudi economy during the period 1970-2011. They found that the goal of diversifying could not be achieved as a production-based economy as oil exports majorly contributed the total exports and also contributed the major government revenues as well. Further, he found the insignificant effects of diversification on the economic growth. On the other hand, Al-Tit and Omri (2018) found that economic diversification positively contributed in the job creation, improving the institutional quality and promoting the economic growth of Saudi Arabia. They also found that oil price and trade also contributed in the economic growth.

The literature signifies the importance of economic diversification on the economic growth and on the other macroeconomic performance. The role of production diversification from oil sector has also been tested on the economic growth in case of Saudi Arabia. But, Saudi literature is still silent to investigate the role of exports, government revenue, investment and employment diversifications on the economic growth and this present is highly motivated to fill this literature gap.

3. Methods

First objective of this research is to calculate the diversification indices for production, government revenue, exports, investment and employment in Saudi Arabia. Hirschman (1964) proposed an index to measure the competition or concentration in the industry. Further, United Nations Trade and Development Organization (UNCTAD) utilized a Normalized Herfindahl Hirschman Index (HHI) to measure the exports concentration. Following UNCTAD and Lapteacru (2012), the normalized HHI is as follows:

$$H = \left[\sum_{1}^{N} \left(\frac{x_i}{X} \right)^2 - \frac{1}{N} \right] \bigg/ \left[1 - \frac{1}{N} \right] \tag{1}$$

Where, x_i is value of one sector exports and X is total value of exports. H is an indicator of exports' concentration normalized by number of types of exports (N). The value of the H coefficient ranges from zero to one. Zero represents the perfect diversification in export sector and one represents the perfect concentration on one sector exports. Saudi economy is mostly depending on the oil for exports performance. Therefore, the increasing value of H may represent the oil exports' concentration and decreasing value of H represents the diversification from oil exports. In the same way, the H index will be estimated to calculate the concentration of oil production in the total production, government revenue from oil sector in the total government revenue, investment in oil sector to total

investment and employment concentration in the Saudi Arabia. In all, increasing trend of *H* shows the increasing concentration and decreasing trend of *H* shows the increasing diversification.

After estimating the level of concentration or diversification, we test the effects of all calculated concentration variables on the economic growth through regression analyses. Further, we also aim to find the causality among the hypothesized variables of the model to test the direction of relationships. Before moving to regressions or causality analyses, we test the unit root problem in all the focused series using Dickey and Fuller (1981) methodology as follows:

$$\Delta x_t = \beta x_{t-1} + \sum_{i=1}^{k} \vartheta_i \Delta x_{t-i} + \xi_t \tag{2}$$

$$\Delta x_t = \alpha + \beta x_{t-1} + \sum_{i=1}^{k} \vartheta_i \Delta x_{t-i} + \xi_t \tag{3}$$

$$\Delta x_t = \alpha + \lambda t + \beta x_{t-1} + \sum_{i=1}^{k} \vartheta_i \Delta x_{t-i} + \xi_t \tag{4}$$

In equation 2, null hypothesis of unit root in the series x_t ($\beta = 0$) is tested assuming no intercept and no trend in the series and rejection of it would be an evidence of stationary series. Same procedure would be applied assuming intercept in the series in equation 3 and assuming both intercept and trend in the series in equation 4. After unit root analyses, we move towards Autoregressive Distributive Lag (ARDL) cointegration technique proposed by Pesaran et al. (2001). This technique is chosen due to its superiority on the other techniques. For example, it removes the endogeneity problem in the model by autoregressive process. Secondly, it provides efficient results in the presence of a mix order of integration. A mix order of integration may be expected in the model as some of the economic variables may be found stationary at their level and others on their first differences. Our objective is to test the effects of all concentration or diversification macroeconomic indicators on the economic growth and is also to test the causal relationships among the diversification proxies and economic growth. To test the causality, we need to test the cointegration among the variables assuming all variables as dependent variables one by one in the analyses. For this purpose, a system of ARDL equations is as follows:

$$
\begin{bmatrix} \Delta GDPC_t \\ \Delta PD_t \\ \Delta RD_t \\ \Delta EXD_t \\ \Delta ID_t \\ \Delta EMD_{tt} \end{bmatrix} = \begin{bmatrix} \delta_{01} \\ \delta_{02} \\ \delta_{03} \\ \delta_{04} \\ \delta_{05} \\ \delta_{06} \end{bmatrix} + \begin{bmatrix} \delta_{11}\delta_{12}\delta_{13}\delta_{14}\delta_{15}\delta_{16} \\ \delta_{21}\delta_{22}\delta_{23}\delta_{24}\delta_{25}\delta_{26} \\ \delta_{31}\delta_{32}\delta_{33}\delta_{34}\delta_{35}\delta_{36} \\ \delta_{41}\delta_{42}\delta_{43}\delta_{44}\delta_{45}\delta_{46} \\ \delta_{51}\delta_{52}\delta_{53}\delta_{54}\delta_{55}\delta_{56} \\ \delta_{61}\delta_{62}\delta_{63}\delta_{64}\delta_{65}\delta_{66} \end{bmatrix} * \begin{bmatrix} GDPC_{t-1} \\ PD_{t-1} \\ RD_{t-1} \\ EXD_{t-1} \\ ID_{t-1} \\ EMD_{t-1} \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \varphi_{1i} \\ \varphi_{2i} \\ \varphi_{3i} \\ \varphi_{4i} \\ \varphi_{5i} \\ \varphi_{6i} \end{bmatrix} * \begin{bmatrix} \Delta GDPC_{t-i} \\ \Delta PD_{t-i} \\ \Delta RD_{t-i} \\ \Delta EXD_{t-i} \\ \Delta ID_{t-i} \\ \Delta EMD_{t-i} \end{bmatrix}
$$

$$
+ \sum_{i=0}^{p} \begin{bmatrix} 0\phi_{11i}\phi_{12i}\phi_{13i}\phi_{14i}\phi_{15i} \\ \phi_{21i}0\phi_{22i}\phi_{23i}\phi_{24i}\phi_{25i} \\ \phi_{31i}\phi_{32i}0\phi_{33i}\phi_{34i}\phi_{35i} \\ \phi_{41i}\phi_{42i}\phi_{43i}0\phi_{44i}\phi_{45i} \\ \phi_{51i}\phi_{52i}\phi_{53i}\phi_{54i}0\phi_{55i} \\ \phi_{61i}\phi_{62i}\phi_{63i}\phi_{64i}\phi_{65i}0 \end{bmatrix} * \begin{bmatrix} \Delta GDPC_{t-i} \\ \Delta PD_{t-i} \\ \Delta RD_{t-i} \\ \Delta EXD_{t-i} \\ \Delta ID_{t-i} \\ \Delta EMD_{t-i} \end{bmatrix} + \begin{bmatrix} \psi_{1t} \\ \psi_{2t} \\ \psi_{3t} \\ \psi_{4t} \\ \psi_{5t} \\ \psi_{6t} \end{bmatrix} \tag{5}
$$

Here, $GDPC_t$ is GDP per capita in constant Saudi Riyal. PD_t, RD_t, EXD_t, ID_t, and EMD_t are the H indices estimated through equation 1 to calculate the production concentration, government revenue concentration, exports concentration, investment concentration and employment concentration respectively. All variables are taken in natural logarithm form to estimate the elasticity coefficients. The data on GDP per capita and data to estimate all H indices are sourced from Saudi Arabian Monetary Agency (2019).

The equation 5 would be tested for the cointegration by Bound test procedure of Peasarn et al. (2001) after selection of optimum lag length by Schwarz Information Criteria (SIC) in the system of equations. Null hypothesis of no cointegration ($\delta_{11} = \delta_{12} = \delta_{13} = \delta_{14} = \delta_{15} = \delta_{16} = 0$) would be tested to find the cointegration in the model when $GDPC_t$ is dependent variable and rejection of null would corroborate the cointegration in the model. After confirmation of cointegration, we may estimate the long run effects of independent variables on the economic growth by normalizing δ_{12}, δ_{13}, δ_{14}, δ_{15}, and δ_{16} normalized by δ_{11}. Later, short run effects can be captured with estimated φ_{1i}, ϕ_{11i}, ϕ_{12i}, ϕ_{13i}, ϕ_{14i}, and ϕ_{15i}. To find the cointegration in the other equations, same procedure can be applied on the null hypotheses of ($\delta_{21} = \delta_{22} = \delta_{23} = \delta_{24} = \delta_{25} = \delta_{26} = 0$), ($\delta_{31} = \delta_{32} = \delta_{33} = \delta_{34} = \delta_{35} = \delta_{36} = 0$), ($\delta_{41} = \delta_{42} = \delta_{43} = \delta_{44} = \delta_{45} = \delta_{46} = 0$), ($\delta_{51} = \delta_{52} = \delta_{53} = \delta_{54} = \delta_{55} = \delta_{56} = 0$), and ($\delta_{61} = \delta_{62} = \delta_{63} = \delta_{64} = \delta_{65} = \delta_{66} = 0$), for the models assuming PD_t, RD_t, EXD_t, ID_t, and EMD_t as dependent variables respectively. The cointegtation of these models would be attested to apply the causality analyses. Equation 6 presents a system of equations to conduct the causality analyses through Vector Error Correction Model (VECM) as follows:

$$
\begin{bmatrix} \Delta GDPC_t \\ \Delta PD_t \\ \Delta RD_t \\ \Delta EXD_t \\ \Delta ID_t \\ \Delta EMD_t \end{bmatrix} = \begin{bmatrix} \kappa_{01} \\ \kappa_{02} \\ \kappa_{03} \\ \kappa_{04} \\ \kappa_{05} \\ \kappa_{06} \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \kappa_{11i}\kappa_{12i}\kappa_{13i}\kappa_{14i}\kappa_{15i}\kappa_{16i} \\ \kappa_{21i}\kappa_{22i}\kappa_{23i}\kappa_{24i}\kappa_{25i}\kappa_{26i} \\ \kappa_{31i}\kappa_{32i}\kappa_{33i}\kappa_{34i}\kappa_{35i}\kappa_{36i} \\ \kappa_{41i}\kappa_{42i}\kappa_{43i}\kappa_{44i}\kappa_{45i}\kappa_{46i} \\ \kappa_{51i}\kappa_{52i}\kappa_{53i}\kappa_{54i}\kappa_{55i}\kappa_{56i} \\ \kappa_{61i}\kappa_{62i}\kappa_{63i}\kappa_{64i}\kappa_{65i}\kappa_{66i} \\ \kappa_{71i}\kappa_{72i}\kappa_{73i}\kappa_{74i}\kappa_{75i}\kappa_{76i} \end{bmatrix} * \begin{bmatrix} \Delta GDPC_{t-i} \\ \Delta PD_{t-i} \\ \Delta RD_{t-i} \\ \Delta EXD_{t-i} \\ \Delta ID_{t-i} \\ \Delta EMD_{t-i} \end{bmatrix}
$$

$$
+ \begin{bmatrix} \tau_1 \\ \tau_2 \\ \tau_3 \\ \tau_4 \\ \tau_5 \\ \tau_6 \end{bmatrix} * ECM_{t-1} + \begin{bmatrix} \omega_{1t} \\ \omega_{2t} \\ \omega_{3t} \\ \omega_{4t} \\ \omega_{5t} \\ \omega_{6t} \end{bmatrix}
$$

(6)

The optimum lag length could be selected through SIC in above system. The long run causality can be corroborated by the statistically significant ECM_{t-1} in each single equation of the system of equations 6. Then, we can do short causality analyses by applying the Wald test on the coefficients of lagged differenced variables in the equation with a null hypothesis of no causality. A rejection of null hypothesis would corroborate the direction of causality from one variable to the other in the above system of equations.

4. Data Analyses and Discussions

Table 2 shows the concentration or diversification indices following the equation 1. It is clear from the data presented in table 1 that the fifth and sixth development plans are less concentrated and are more most diversified plans in term of GDP, and then the seventh development plan followed by the tenth development plan are on the third and fourth position in term of production diversification. During these plan periods, government and private sectors contributed significantly in GDP as compare to other development plans. Moreover, the production index shows lowest average index during 1970-2018 with compare to other all estimated indices. So, it shows a lower level of concentration and higher level of diversification throughout the sample period 1970-2018 with compare to other concentration indices. The same story can be observed in case of investment concentration index because its index showed a lower level of concentration and higher level of diversification in most of sample period except two development plans during 1995-2004. During 1995-2004, the private sector investment proportion is found larger than the sum of oil and government sectors' contribution in total investment and is also higher than the its own proportion in the other development plans which is a good indicator for growth of non-oil sector in the economy during 1995-2004. Moreover, the investment index shows second lowest average during the sample period 1970-2018 after the lowest average of production index. As per the government revenue concentration index, fourth development plan is found most diversified followed by tenth, sixth and fifth development plans. But, these plans still carry more than 60% contribution of the oil sector in the total government revenue. Rest of development plans looks significantly concentrated on the oil sector. Particularly, first, second, eighth and ninth development plans are highly concentrated on the oil sector by carrying around 90% contribution of oil sector in the total government revenues. In the exports sector, the average of exports concentration during all the sample period is found highest among all the calculated concentration. Particularly, the oil sector concentration is found very high in the first three development plans during 1970-1984 where oil sector contributed more than 95% of total exports. Even after this period, oil sector concentration index is found very high till 2014 and oil sector contributed at least more than 85% of total exports during 1970-2014. Recently, the exports' concentration index is dramatically fallen in last development plan during 2015-18 but still oil sector is contributed more than 75% in this period. The employment index carries only public and private sectors' contribution in total employment as oil sector employment data could not be found for the sample period. HHI of employment shows a fair concentration which does mean that proportion of public sector employment is high with compare to private sector employment. Public sector employment proportion is around 35% during 1970-1994. Afterwards, the public sector contribution decreased to 15% during 1995-2018.

Table 2. HHI during economic development plans

Development Plan	PD_t	EXD_t	RD_t	ID_t	EMD_t	Average
1970-74	0.1887	0.9797	0.6618	0.0279	0.0482	0.3813
1975-79	0.1812	0.9862	0.6027	0.1676	0.1204	0.4116
1980-84	0.1352	0.9386	0.3825	0.1601	0.2440	0.3721
1985-89	0.0672	0.5813	0.0665	0.1571	0.0704	0.1885
1990-94	0.0270	0.6712	0.2603	0.2005	0.0851	0.2488
1995-99	0.0283	0.5579	0.1933	0.3905	0.2074	0.2755
2000-04	0.0373	0.5996	0.3849	0.3775	0.6244	0.4047
2005-09	0.0914	0.5861	0.5856	0.1988	0.5633	0.4050
2010-14	0.0789	0.5102	0.6570	0.1286	0.5956	0.3941
2015-18	0.0577	0.2753	0.1202	0.1397	0.6357	0.2457
Average	0.0893	0.6686	0.3915	0.1948	0.3195	0.3327

Source: Authors calculation

After observing the concentration and diversification issues, we aim to find the relationships among economic growth and concentration indicators. For this purpose, we investigate the unit root issue in the hypothesized series and table 3 shows the unit root test results. It can be observed that all the variables are non-stationary at levels except RD_t and EXD_t which show the stationary behavior in some of the tested unit root equations. On their first differences, all variables are stationary at 1% level of significance. Unit root test shows a mix order of integration due to some evidences of stationary leveled variables. But, ARDL cointegration gives consistent results in this situation due to Bound testing procedure (Pesaran et al. 2001).

Table 3. Unit Root Results

Variable	C	C&T	None
$GDPC_t$	-2.2542	-2.2182	-0.3443
PD_t	-1.9240	-2.5169	-0.3583
RD_t	-3.3278**	-3.3009*	-1.0587
EXD_t	-0.9752	-3.3732*	0.2007
ID_t	-2.2790	-2.1949	-1.3588
EMD_t	1.5878	-2.3440	-1.6985
$\Delta GDPC_t$	-5.0784***	-5.0201***	-5.1250
ΔPD_t	-6.9006***	-6.8160***	-6.9747***
ΔRD_t	-9.9300***	-9.8205***	-10.0159***
ΔEXD_t	-5.7079***	-5.6389***	-5.6476***
ΔID_t	-6.6212***	-6.6154***	-6.6658***
ΔEMD_t	-4.6734***	-4.6324***	-4.5767***

Note: C and T represents intercept and trend respectively. *** shows are stationary at 1% level of significance.

Source: Authors calculation

After investigating the unit root, we conduct the Bound test on the system of equations mentioned in equation 5 and results are reported in table 4. To validate the cointegration, we follow the critical F-values provided by Kripfganz and Schneider (2018) which are efficient in case of a small sample size. The bound testing results show that null hypotheses of no-cointegration $\delta_{11} = \delta_{12} = \delta_{13} = \delta_{14} = \delta_{15} = \delta_{16} = 0$ and $\delta_{21} = \delta_{22} = \delta_{23} = \delta_{24} = \delta_{25} = \delta_{26} = 0$ are rejected at 1% level of significance and cointegration is proved in these equations ($GDPC_t$/ PD_t, RD_t, EXD_t, ID_t, EMD_t) and (PD_t/ $GDPC_t$, RD_t, EXD_t, ID_t, EMD_t). For the rest equations, the null hypotheses $\delta_{31} = \delta_{32} = \delta_{33} = \delta_{34} = \delta_{35} = \delta_{36} = 0$, $\delta_{41} = \delta_{42} = \delta_{43} = \delta_{44} = \delta_{45} = \delta_{46} = 0$, $\delta_{51} = \delta_{52} = \delta_{53} = \delta_{54} = \delta_{55} = \delta_{56} = 0$, and $\delta_{61} = \delta_{62} = \delta_{63} = \delta_{64} = \delta_{65} = \delta_{66} = 0$ are not rejected and cointegration is not proved in the equations (RD_t / $GDPC_t$, PD_t, EXD_t, ID_t, EMD_t), (EXD_t / $GDPC_t$, RD_t, PD_t, ID_t, EMD_t), (ID_t / $GDPC_t$, RD_t, EXD_t, PD_t, EMD_t), and (EMD_t / $GDPC_t$, RD_t, EXD_t, ID_t, PD_t).

Table 4. Bound Test

Model	F-value
F($GDPC_t$/ PD_t, RD_t, EXD_t, ID_t, EMD_t)	7.1269***
F(PD_t / $GDPC_t$, RD_t, EXD_t, ID_t, EMD_t)	9.4874***
F(RD_t / $GDPC_t$, PD_t, EXD_t, ID_t, EMD_t)	3.7353
F(EXD_t / $GDPC_t$, RD_t, PD_t, ID_t, EMD_t)	2.4431
F(ID_t / $GDPC_t$, RD_t, EXD_t, PD_t, EMD_t)	0.9018
F(EMD_t / $GDPC_t$, RD_t, EXD_t, ID_t, PD_t)	2.5693
Kripfganz and Schneider (2018) Critical Bound F-values	At 1% 2.8515-3.9571 At 5% 2.2611-3.2641 At 10% 1.9806-2.9266

Note: C and T represents intercept and trend respectively. *** shows are stationary at 1% level of significance.

Source: Authors calculation

Table 5 shows the long and short run results in a cointegration equation with a dependent variable $GDPC_t$. The cointegration has already been confirmed for this equation in bound testing results presented in table 4. It is further corroborated with a negative and statistically significant coefficient of error correction term. The diagnostic tests, in the bottom of table 5 and in the figure 1, also show that the results presented in table 5 are stable, reliable and consistent. In the long run, production concentration has positive and significant effect on the economic growth. 1% increase in the production concentration or 1% decrease in the production diversification is increasing the GDP per capita by 0.408%. We conclude that increasing production concentration has pleasant economic growth effects. Table 1 showed that oil sector is carrying a significant proportion in the GDP. Therefore, we may conclude that increasing concentration of oil sector in GDP has positive economic growth effects. In the short run, the effect of production diversification is also found positive with relatively lesser elasticity than that of the long run. 1% increase in the production concentration in short run is increasing the GDP per capita by 0.1878%.

Table 5. Long and Short Results: $GDPC_t$ is dependent variable

| Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long Run				
PD_t	0.4080	0.1268	3.2170	0.0030
RD_t	0.2927	0.1045	2.8012	0.0086
EXD_t	-1.1651	0.5033	-2.3148	0.0272
ID_t	0.0462	0.0993	0.4650	0.6451
EMD_t	-0.4294	0.1619	-2.6528	0.0123
Intercept	11.6534	0.3419	34.0802	0.0000
Short Run				
$GDPC_t$	-0.2309	0.10789	-2.1400	0.0401
PD_t	0.1878	0.0244	7.7104	0.0000
RD_t	0.0332	0.0134	2.4794	0.0186
EXD_t	-0.1416	0.0725	-1.9523	0.0597
EXD_{t-1}	0.2458	0.0561	4.3834	0.0001
ID_t	-0.0255	0.0144	-1.7643	0.0872
ID_{t-1}	-0.0438	0.0148	-2.9654	0.0057
EMD_t	0.0748	0.0290	2.5837	0.0145
ECT_{t-1}	-0.2128	0.0276	-7.6969	0.0000
Diagnostic Tests				
Heteroscedasticity	F-value = 1.3572			0.2302
Serial Correlation	F-value = 0.8639			0.4317
Normality	Chi-square = 0.6155			0.7351

Source: Authors calculation
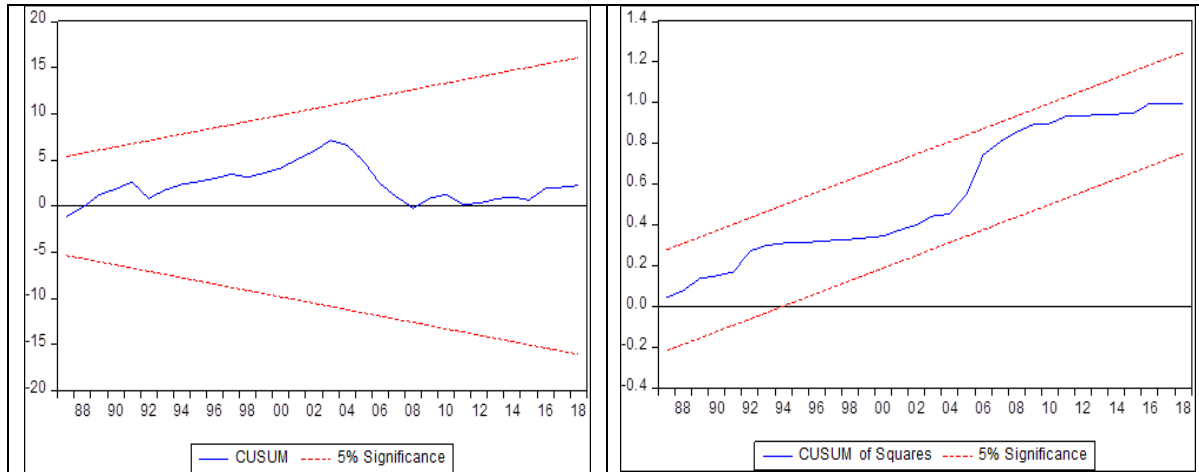
Figure 1. CUSUM and CUSUMsq Tests

The effect of RD_t, government revenue concentration, has positive and significant effect on the GDP per capita in the long run. 1% increase in the revenue concentration or 1% decrease in the revenue diversification is found helpful in increasing GDP per capita by 0.2927%. Government revenues are sole source to invest in the infrastructure of an economy to support the economic activities and economic growth of a country. Saudi Arabia is low tax based economy and oil sector is majorly contributing to its government revenues. Hence, oil sector concentration in the government revenues is not found bad for the economic growth but is found supportive to the economic growth phenomenon. The effect of revenue concentration is also found positive on the GDP per capita in the short run with a minute elasticity. 1% increase in the revenue concentration in the short run is increasing the GDP per capita by 0.0332%.

The effect of EXD_t, exports concentration, is found negative on the GDP per capita and its elasticity is found more than 1. Therefore, 1% increase in the exports concentration or 1% decrease in the exports diversification is depressing the GDP per capita by 1.1651%. Exports of Saudi Arabia are heavily concentrated by oil sector and oil exports are depending on the world oil prices which are highly volatile. Hence, the oil exports are highly volatile because of fluctuation of world oil prices now-a-days. Therefore, we conclude that a high concentration of oil exports in the total exports is responsible for depressing the economic growth in the Kingdom. Moreover, the elasticity coefficients suggest that negative elasticity of export concentration is higher than some of positive elasticities of production and revenue concentration. Therefore, the overall effects of oil sector concentration in the production, revenue and exports may be claimed negative for the economic growth of the Kingdom. Moreover, the effect of export concentration on GDP per capita is also found negative in the short run with a low elasticity with compare to long run elasticity and its lag effects is showing a positive growth effect. The effect of investment concentration is found statistically insignificant in the long run. This insignificant effect can be justified by a reason that investment in private sector is found higher than oil and government sectors but the proportion of private sector in GDP is mostly found lesser than proportion of private sector investment in the total investment. In the short run, the effects of investment concentration and its lag are negative on the GDP per capita. It can be concluded that investment concentration has negative growth effect in the short run.

In last, the effect of employment concentration is found negative on the GDP per capita. 1% increase in the employment concentration or 1% decrease in employment diversification is decreasing the GDP per capita by 0.4294% in the long run. Employment index is developed by the share of employment in public and private sectors. The proportion of private sector is always found more than public sector but public sector has contributed a significant proportion of employment during 1970-1999. Due to a significant employment share of public sector, the employment concentration is found responsible for depressing economic growth because productivity

of public sector employees may usually be assumed lesser than the private sector. Unlike to long run effect, the short run effect of employment concentration is found positive on the GDP per capita.

Table 6. VECM based Granger causality results

Variable	$\Delta GDPC_{t-1}$	ΔPD_{t-1}	ΔRD_{t-1}	ΔEXD_{t-1}	ΔID_{t-1}	ΔEMD_{t-1}	ECM_{t-1}
$\Delta GDPC_t$		8.2608 (0.0161)	4.0375 (0.1328)	0.2986 (0.8613)	0.7413 (0.6903)	4.0076 (0.1348)	21.9507 (0.0154)
ΔPD_t	4.1527 (0.1254)		8.0494 (0.0179)	6.8502 (0.0325)	0.3363 (0.8452)	0.9921 (0.6089)	21.3035 (0.0191)
ΔRD_t	1.6799 (0.4317)	1.5422 (0.4625)		1.0667 (0.5866)	1.1584 (0.5604)	1.3107 (0.5193)	5.6353 (0.8449)
ΔEXD_t	0.4308 (0.8062)	1.3018 (0.5216)	0.2086 (0.9010)		4.7807 (0.0916)	2.0073 (0.3665)	10.6689 (0.3839)
ΔID_t	0.4827 (0.7856)	0.4981 (0.7795)	0.9957 (0.6078)	1.7349 (0.4200)		0.8625 (0.6497)	3.6147 (0.9631)
ΔEMD_t	0.8527 (0.6529)	12.6972 (0.0017)	4.6806 (0.0963)	4.4645 (0.1073)	8.4316 (0.0148)		38.3834 (0.0000)

Source: Authors calculation

In the causality analyses presented in table 6, production concentration is causing to the GDP per capita. Further, government revenue and exports concentrations are causing to the production concentration. These concentration indices are largely influenced by oil sector and have indirect effect on the economic growth through the production concentration. The investment concentration is causing to the export concentration. Lastly, the production, investment and revenue concentrations are causing to the employment concentration.

Conclusions and Implications

Saudi Arabia is largest oil exporter in the world market and her most of macroeconomic performance is heavily depending on the oil sector. This present research calculates the production, exports, government revenue, investment and employment concentration indices in Saudi Arabia using normalized Herfindahl Hirschman Index and discusses the level of concentration or diversification in each calculated macroeconomic domain. We utilize a maximum available time range of 1970-2018 for oil and non-oil contribution in the production, exports, government revenue and investment. We apply the unit root test on the series to test the level of integration, ARDL Bound testing approach to find the cointegration among the hypothesized models and Granger Causality test to find the direction of relationships. We find that level of concentration is very high in the exports and government revenues in most of development plan periods. Moreover, we also find that public sector employment has significantly high in the period 1970-1999. In the regression analysis, we find that production and government revenue concentrations have positive effect on the economic growth of the Kingdom in both long and short run. The production concentration is majorly observed due to the oil sector. Therefore, the oil sector concentration is helpful in accelerating the economic growth. And, the government revenue is also majorly concentrated by the oil sector and oil concentration in government revenue is found helpful for achieving higher economic growth. The export concentration has negative effects on the economic growth both in long and short run. The export sector is heavily concentrated by oil exports and this oil export dependency is found harmful for the economic growth of the Kingdom. From the estimated elasticities, we find that negative growth effect of exports concentration is found larger than the cumulated positive growth effects of production and revenue concentrations. Therefore, we conclude that oil sector concentration in the economy of Saudi Arabia is overall harmful to the sustainability of economic growth of the Kingdom. The investment concentration has statistically insignificant effect in the long run but has negative effect on the economic growth in the short run. Investment is mostly concentrated by public and private non-oil sectors' investment and its insignificant effect realizes the fact and income is mostly contributed by oil sector even with lesser proportion of investment in the oil sector. Lastly, the public sector employment carries a significant share in the total employment and employment concentration has negative effect

on the economic growth in the long run. The Granger Causality test reveals the unidirectional causality from production concentration to the economic growth and unidirectional causality is also found from government revenue and exports concentrations to the production concentration. Though, these concentrations have also indirect effects on the economic growth through production concentration. Further, investment concentration is causing to the export concentration, and production, investment and revenue concentrations are causing to the employment concentration as well.

The results show that production and revenue concentrations by oil sector have positive effect on the economic growth and government has targeted production and revenue diversification policy in the Vision 2030. Therefore, production and government revenue diversification policies should be traced carefully without harming the economic growth of the Kingdom. The exports concentrated by oil sector have more than proportionate negative effect on the economic growth. Hence, non-oil exports sector should have government support to reduce the negative growth effects of oil exports. At first, public sector is sufficiently large in the Kingdom and it can focus the non-oil export promotion. Secondly, tax rebates and other government support should be provided to private sector for the promotion of non-oil exports. The government revenue concentrated by oil sector has positive effect on the economic growth, which is good in the oil prices boom days, but may have adverse effect during oil price crisis period. Now-a-days, the world is facing the lower oil prices and it may have a long term adverse consequences on the government reserve and on the economic growth consequently. Therefore, the non-tax based economy should be shifted to the tax base so government spending capacity should not be affected to support the economic growth sustainability in the times of oil price crisis. The investment is concentrated by public and private non-oil sectors and has statistically insignificant effects on the economic growth. Hence, non-oil sector investment seems less productive and government should provide the advisory services to the private investors to invest in more productive channels to support the economic growth of the Kingdom. Lastly, the employment has a significant share from public sector and has negative effect on the growth. Government should trace the educational and incentive policies to raise the private sector employment which is assumed more productive than that of public sector employment to support the economic growth of the Kingdom.

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Appendix: Data utilized

Years	$GDPC_t$	PD_t	RD_t	EXD_t	ID_t	EMD_t
1970	11.32662	-3.05436	-0.46146	-0.04867	-3.16515	-3.03269
1971	11.46892	-2.23262	-0.59706	-0.01074	-3.13939	-3.0327
1972	11.62857	-1.98053	-0.56394	-0.0156	-5.58358	-3.0327
1973	11.79637	-1.70677	-0.24672	-0.01816	-4.34243	-3.03269
1974	11.89696	-0.75599	-0.25144	-0.00979	-3.28923	-3.0327
1975	11.753	-1.3957	-0.42534	-0.01749	-2.32514	-3.03269
1976	11.86661	-1.50838	-0.4898	-0.01366	-2.16118	-3.029
1977	11.88456	-1.76269	-0.58702	-0.01216	-1.69197	-2.10627
1978	11.77883	-2.15895	-0.57491	-0.01565	-1.48239	-1.7736
1979	11.8362	-1.89828	-0.46487	-0.01037	-1.54292	-1.54049
1980	11.83237	-1.49348	-0.3617	-0.00621	-1.52572	-1.50052
1981	11.78958	-1.57416	-0.48209	-0.03148	-1.65054	-1.29228
1982	11.49367	-2.27808	-1.34228	-0.05246	-1.87998	-1.22466
1983	11.2559	-2.61926	-1.80231	-0.09251	-2.18451	-1.37382
1984	11.14864	-2.67607	-1.75865	-0.13975	-2.06997	-1.74218
1985	10.99071	-2.64171	-2.25356	-0.23959	-2.16919	-2.23893
1986	11.09764	-2.49097	-4.41094	-0.47406	-2.33691	-2.63145
1987	10.98286	-2.70689	-2.41723	-0.54772	-2.11058	-2.7719
1988	11.06373	-2.69608	-3.873	-0.84036	-1.46243	-2.85191
1989	11.01989	-3.04232	-2.25028	-0.71926	-1.50702	-2.93369
1990	11.12575	-3.63662	-1.40928	-0.43082	-1.60849	-2.98916
1991	11.23292	-4.09718	-1.17507	-0.37754	-1.68688	-2.4522
1992	11.24207	-3.39115	-1.31429	-0.3249	-1.64303	-2.33574
1993	11.20091	-3.56811	-1.3924	-0.39332	-1.53953	-2.31938
1994	11.1814	-3.50934	-1.4646	-0.473	-1.56306	-2.36492
1995	11.16049	-3.63942	-1.62663	-0.60283	-1.97552	-2.40874
1996	11.16555	-3.50322	-1.31313	-0.47961	-0.74745	-2.38605
1997	11.1571	-3.74795	-1.17027	-0.55936	-0.85066	-2.14753
1998	11.16643	-3.37911	-4.08273	-0.77996	-0.76355	-1.92144
1999	11.1075	-3.6013	-1.75091	-0.5223	-0.80475	-0.52465
2000	11.13925	-3.29248	-0.82564	-0.37558	-0.92143	-0.52817
2001	11.10133	-3.49452	-0.98151	-0.55273	-0.94718	-0.44738
2002	11.0447	-3.42396	-1.16098	-0.54719	-0.88427	-0.45377
2003	11.12181	-3.36178	-1.10055	-0.53833	-1.19476	-0.46112
2004	11.16873	-2.96071	-0.76421	-0.556	-0.95147	-0.46662
2005	11.19385	-2.47328	-0.47629	-0.47266	-1.28228	-0.58433
2006	11.19311	-2.39824	-0.46002	-0.4871	-1.52622	-0.58006
2007	11.18379	-2.36941	-0.57756	-0.5461	-1.8506	-0.57367
2008	11.21684	-1.99689	-0.48075	-0.46369	-1.76054	-0.58249
2009	11.16778	-2.94491	-0.70122	-0.72489	-1.77016	-0.54982
2010	11.18767	-2.75401	-0.42314	-0.67335	-2.00298	-0.55266
2011	11.25256	-2.31747	-0.3223	-0.59738	-2.15115	-0.51592
2012	11.27435	-2.37305	-0.35635	-0.60818	-1.89137	-0.51631
2013	11.27067	-2.5851	-0.4563	-0.67725	-2.03011	-0.50887
2014	11.27818	-2.75545	-0.5589	-0.82505	-2.21071	-0.49786
2015	11.29286	-2.75055	-1.56493	-1.3766	-2.05074	-0.47239
2016	11.28683	-2.62003	-2.51197	-1.45231	-1.79273	-0.46118
2017	11.25935	-2.87462	-2.68864	-1.25158	-2.083	-0.48798
2018	11.26541	-3.27448	-2.10024	-1.1123	-1.97126	-0.39314

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LEGAL OBSTACLES TO FREEDOM TO CONDUCT A BUSINESS: EXPERIENCE OF THE SLOVAK REPUBLIC[*]

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Abstract. The paper focuses on legal obstacles affecting freedom to conduct a business in the Slovak Republic. It points out the freedom to conduct a business with regards to the Slovak and European perspective and compares it with the legal conditions laid down for starting a business pursuant to the Slovak legal regulation. The analysis especially orientates to define general conditions for natural persons and legal persons to be met in order to start a business, but also to describe special conditions, i.e. the requirements for qualification. The paper focuses on all persons who want to conduct a business in the Slovak Republic. Since the freedom to conduct a business is not necessarily related to citizenship, the paper analyses conditions laid to aliens. The general conditions to conduct a business are: a minimum age, a full legal capacity, and integrity of natural persons or representatives of legal persons. The obstacles to conduct a business are shown through analysis related to the main legislative problems and the article is giving several proposals for more business friendly legal regulation.

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1. Introduction

The European Union faces a number of problems and challenges at present, concerning the economic development too. The fulfilment of fundamental rights can help to achieve the strategic goals set out in the Europe 2020 growth strategy and they should be mainstreamed throughout the most important European Union policies, which include ensuring the free movement of people, goods, services and capital within the internal market. See Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on Services in the Internal Market. The Directive is implemented by Act No. 136/2010 Coll. On Services in the Internal Market that amended Act No. 455/1991 Coll. Trade Licensing Act. The connection between economic growth and the fulfilment of the freedom to conduct a business is considerable (European Union Agency for Fundamental Rights, 2015). Business environment of "Old Europe" is examined (Begovič, B, 2018). He underlined, that economic freedom is somewhat curtailed, and that there are still important legal barriers of the competition policy. Therefore trust in public policy is reexamined by some authors (e.g. Lincényi, Čársky, 2020). As a one of many legal obstacles of economic growth examined also by (Petersen, N., 2007). His analyzes shows whether antitrust law actually has a positive effect on democracy and economic growth. Very inspirative for authors, were results of the specific examination about relationship between law and economic research provide by researcher from Harward Law School (Gurrrea-Martinéz, A, 2018).

The freedom to conduct a business is guaranteed by Article 16 of the Charter of Fundamental Rights of the European Union. The provision is worded as follows: "The freedom to conduct a business in accordance with Community law and national laws and practices is recognised." The freedom to conduct a business is a fundamental right. It is derived from the case law of the Court of Justice of the European Union and it was inspired by the national laws of European Union Member States (Sobihard et al., 2010). Its main aim is to safeguard the right of each person in the European Union to pursue a business without being subject to either discrimination or disproportionate restrictions. See for instance judgement of Court of Justice of the European Union, case 230/78, Eridania and others, 27 September 1979, paragraphs 20-22. It is a complex right and according to the relevant case law of the Court of Justice of the European Union it consists of the freedom to exercise an economic or commercial activity, the freedom of contract and free competition (Vrabko et al., 2012). The right to conduct a business is therefore one of the main rights related to the European Union. Basically, it is one of the cornerstones for existence of this European organisation. We shall focus on how this fundamental right (protected by many international treaties and European Union itself) is perceived in Slovak legislation and weather there are any issues to resolve in order to make business environment more open in the Slovak Republic.

2. Research Process

2.1 Freedom to conduct a business in the statutes of the Slovak Republic

The Slovak Republic protects and supports the freedom to conduct a business via Article 35 of the Constitution of the Slovak Republic (hereinafter only as Constitution). Under the Article 35 (1) of the Constitution everyone has the right to a free choice of profession and to training for it, as well as the right to engage in entrepreneurial or other gainful activities.

Besides the sources of the European law and the Constitution, we have to take into account Slovak national law on the statutory level. Basic legislative conditions for conducting a business stipulate Act No. 513/1991 Coll. Commercial Code as amended (hereinafter only as Commercial Code), Act No. 455/1991 Coll. Trade Licencing Act as amended (hereinafter only as Trade Licencing Act) and several other regulations laid down by special acts (such as various tax related statutes, statutes relating to the accounting systems, etc.). The Commercial Code defines business as a systematic activity carried out independently under a persons' own name and liability with

the purpose of making a profit. Generally, foreign persons can conduct a business in the Slovak Republic under the same conditions and to the same extent as Slovak citizens. Therefore, there are no special regulations laid down to aliens; statutes perceive aliens as citizens (Magurová et al., 2016). However, this applies only to the citizens of the European Union, not to the citizens of non-European Union Member States.

According to the Commercial Code, an entrepreneur is:
    a) a person registered in the Companies Register,
    b) a person conducting business under a sole proprietorship, (A Slovak word „živnosť" could be translated as trade also. However, we believe that the word "sole proprietorship" is more suitable and express better the very meaning of the word "živnosť". On the other hand, the act that regulates sole proprietorship in the Slovak Republic is usually translated as Trade Licencing Act. We will hold this translation when it comes to this act in the text.)
    c) a person conducting a business based on an authorization other than a sole proprietorship pursuant to a special act,
    d) a natural person engaged in agricultural production that is registered in a register pursuant to a special act.

To conduct a business pursuant to the Trade Licencing Act means to conduct a systematic activity carried out independently under a persons' own name and liability with the purpose of making a profit under the conditions laid down in the Trade Licencing Act. An entrepreneur is obliged to carry out the sole proprietorship in accordance with the conditions stipulated in the Trade Licencing Act and by special regulations; obligations such as to carry out the sole proprietorship properly, honestly and with professional care (Škultéty et al., 2008). The sole proprietorship is not carried out properly, honestly and with professional care if low-quality goods and services are repeatedly provided based on breaching special regulations, especially standards and professional practices.

There is only one type of sole proprietorship in the Slovak Republic – notifiable sole proprietorship. The Trade Licencing Act distinguishes three subtypes of notifiable sole proprietorships: a) unqualified, b) vocational, and c) professional.

An entrepreneur according to the Trade Licencing Act can be a natural person or a legal person (hereinafter only as person). A person has to meet all general conditions that are laid towards all groups of sole proprietorships: a minimum age of 18 years, a full legal capacity and no criminal record (integrity of a person). Trade Licencing Act requires meeting special conditions also. They are laid towards vocational and professional sole proprietorship only. They relate with education and practice – professional or other qualification.

To start conducting any sole proprietorship a person (applicant, future entrepreneur) has to notify District Authority and then that person can conduct sole proprietorship pursuant to the Trade Licencing Act (Vrabko et al., 2015). There are 72 District Authorities throughout the Slovak Republic. Recently (since 2010), the Slovak legislation established all District Authority as so-called Points of Single Contact. Thus, organized authorities make administrative proceedings less bureaucratic and lengthy. Decision-making process and administrative proceedings concentrate in one place that is in front of the District Authority and the District Authority provides all necessary formalities needed for issuing authorisation for sole proprietorship. In his notification, applicant provides all the data necessary for a) requesting an extract from the criminal record, b) registration in the system of mandatory health insurance, and c) registration with the tax office.

2.2 Analysis of distinguishing between types of sole proprietorship

There are no significant problems in legal practice when it comes to the proceedings conducted by District Authority. Whether the applicant has met all the required conditions laid down by the Trade Licencing Act or not,

does not cause any considerable problems. However, there are problems that exist in the very procedure of distinguishing between different kinds of sole proprietorships. In several cases, it is very hard to distinguish between sole proprietorship and several other liberal (free) professions, e.g. advocates, executors, artists, architects, etc.

As we already mentioned, there are three types of sole proprietorships in the Slovak Republic: unqualified, vocational and professional. Trade Licencing Act does not list any examples of unqualified sole proprietorships. It only stipulates that the list of unqualified sole proprietorships has to be published via web-page of the Ministry of Interior of the Slovak Republic (Ministry of Interior of the Slovak Republic (2016, 1 September). The List of Recommended Unqualified Sole Proprietorships and Their Descriptions http://www.minv.sk/?zivnostenske-podnikanie&subor=40259)

The List of Recommended Unqualified Sole Proprietorships and Their Descriptions (hereinafter only as the List) is updated regularly, though the last update was conducted in September 2016. This List is not an enclosed list, but is only demonstrative. It is important to notice that the List is not legally binding. It has only a recommendatory character. Applicants therefore face situations in which one District Authority issues an authorisation for sole proprietorship while other one District Authority does not. The legal practice is not certain when it comes to sole proprietorships that fit all the general conditions of sole proprietorships, but as of now are not named on the List.

On the other hand, the Trade Licencing Act itself lists both other types of sole proprietorships (vocational and professional). The list of vocational sole proprietorship (e.g. development and production of weapons or ammunition; optics; dental technology; driving instructor; manufacture of tobacco products, etc.,) and professional sole proprietorship (e.g. stonemasonry; butcher shop; masonry; carpentry; chimney cleaning and inspection, etc.) is stipulated in the appendix of this Act (cf. Škultéty et al., 2002). This list is enclosed which means that a) no other sole proprietorship is professional or vocational and b) if a person's business is not on that list, then his business is unqualified sole proprietorship. In other words, regarding the character of sole proprietorship it is not possible to establish all unqualified sole proprietorships. According to the Trade Licencing Act the unqualified sole proprietorship are all sole proprietorships except for those listed as vocational or professional.

From a theoretical point of view, it is possible to describe this system as clear. However, there are several issues concerning establishing different kinds of sole proprietorships on the base of particular activities of the entrepreneurs.

Let us take an example of a person conducting masonry, which is the vocational sole proprietorship. The person's purpose of business activity is to build houses. In particular, there could be various problems in distinguishing between masonry and another vocational sole proprietorship, such as plumbing, heating, insulation, etc. The problem is that if a person is conducting a business that was not notified, that person is committing an administrative delict that could be punished by a financial fine up to 3319 €.

Conducting unqualified sole proprietorship can also intervene with other types of sole proprietorships. For example, the List lists construction of buildings as unqualified sole proprietorship. According to our opinion, it is very hard to find the line between construction of buildings and the vocational sole proprietorships mentioned above.

It is also very difficult to set the differences between some professions and sole proprietorship. It is possible to find activities which can be the same in more professions. For example, the List names courier services as a

possible unqualified sole proprietorship. This sole proprietorship can involve similar activities as entrepreneurs who conduct postal services under registration pursuant to Act No. 324/2011 Coll. on Postal Services as amended. Therefore, it is important to analyse the scope of activities that belong to the particular sole proprietorship. Another example: the List names administrative services as sole proprietorship. According to our opinion, this term is very general. It is hard to say if this sole proprietorship should include (for example) representation of particular persons in terms of various proceedings in front of state authorities. Representing persons in front of the state authorities could contain legal representation. However, such legal representation can interfere with conducting advocacy. Advocacy is one of the liberal professions and is regulated by the Act No. 586/2003 Coll. on Advocacy as amended (hereinafter only as Act on Advocacy).

The List contains activities that require professional skills. The unqualified sole proprietorships are, for example, provision of services in fisheries, quarrying of minerals, manufacture of wearing apparel, tanning and dressing of leather, manufacture of electrical equipment, etc., where an entrepreneur usually does not need to master professional skills.

We believe that legal regulation of sole proprietorship has to find the compromise between two basic values. The first value is the freedom to conduct a business. The second value is the consumer protection and environmental protection. The consumer protection includes protection of life, health and individual property. The consumer has to have a guaranty that products or provided services are of high quality and safety. Activities of entrepreneurs have to be friendly to environment also. Because of that the legal regulation of sole proprietorship in each state is responsible to its citizens. The legal regulation has to establish professional criteria for entrepreneurs for conducting sole proprietorship.

The criteria that are usually set for vocational and professional sole proprietorships are established in the special acts. For instance, Act on Advocacy establishes competences of attorneys in Art. 1 (2) through precisely defined activities. On the other hand, the Trade Licencing Act indicates only names (titles) of vocational sole proprietorship. Legal regulation of several professional sole proprietorships refers to the particular provisions that can be found in special acts. The List contains only short characteristics affiliated with particular unqualified sole proprietorships. In general, it is possible to say that the Trade Licencing Act identifies different kinds of sole proprietorship in the Slovak Republic only through their titles.

Such legal regulation is in breach with the principle of legal certainty. Entrepreneurs should also have the possibility to know the sole proprietorships not only through their titles, but also through defining particular activities that are "hidden" behind the title of the sole proprietorship. It is important because this issue influences the character of liability for unlawful activities of entrepreneurs. Based on that difference, criminal liability or administrative liability can be applied.

The authorities shall consider whether the activities fall under unqualified, vocational or professional sole proprietorship. The competent state authorities consider sole proprietorships according to their titles. Title of the particular sole proprietorship is important within the deciding-making process relating to liability for crimes or administrative delicts. This means that competent authorities have to interpret titles of sole proprietorships as indefinite terms.

If we talk about the business, we have to take into account many entrepreneurial activities. It would be ideal to make a list of them and define them. However, in legal practice, it is possible with only few of them. The development in this area is very fast and thereof any strict system of regulation would not be able to react to this development at ease. It would be easier to define only the vocational sole proprietorships and professional sole proprietorships. On the other hand, if we would define an exhausted list of unqualified sole proprietorships, it could cause restrictions to the freedom to conduct a business. The fast development is a call for the legislator. The

legislator should be responsible for monitoring the market and should identify new services and products and include them into the list in order to set conditions upon them, or not.

2.3. Analysis of unqualified trade

In this part of the article we are focusing on only one type of sole proprietorships in the Slovak Republic – unqualified sole proprietorship. If a person wants to conduct such sole proprietorship, he needs to fulfil only the general conditions laid down by the Trade Licencing Act and notify District Authority (Kohout, Horzinková, 1998). The professional qualification requirements are not stipulated when it comes to unqualified sole proprietorship (Skulová et al., 1999). The general conditions consist of

    a) minimum age (a person must be 18 years old or older),

    b) full legal capacity (a person fulfils this condition once reaching adulthood) and

    c) being without criminal record (so called integrity; a person must not have committed any crime listed by Trade Licencing Act; these crimes are usually affiliated with conducting a business such as crimes against the right of property and business crimes; these crimes are defined by the Act No. 300/2005 Coll. Criminal Code as amended).

Unlike the unqualified trade, Trade Licensing Act stipulates qualification requirements only for vocational and professional sole proprietorship. Such requirements are a) educational; for conducting a sole proprietorship, one must usually have a bachelor/master degree from university, b) practice; one must have a practical experience in regards of the particular sole proprietorship; a person can gain practical skills under the supervision of a person already conducting the respective sole proprietorship; Trade Licencing Act usually requires a practice consisting of three or more years, or c) a combination of both aforementioned requirements.

We see that the requirements for professional and vocational sole proprietorships are more significant. The legislator stipulates them on a level that is more serious; the reason is that they require more adequate approach based on their respective specialization. This approach is required given the fact that the legislator is trying to protect customers' rights.

Since 1991 all requirements for sole proprietorships have been stipulated only in the Trade Licensing Act. The legislator helped to develop sole proprietorships in the Slovak Republic by doing so. Up until 1989 Slovak Republic was a part of the Czechoslovak Republic. The then state was under communist regime that oppressed and forbade any sole proprietorships or sole ownership therefore sole proprietorship did not exist. As of last year, that is not the truth anymore and requirements are stipulated in other statutes too.

On January 1, 2016, Act No. 246/2015 Coll. on Housing Management (hereinafter only as Housing Management Act) came to affect. Housing Management Act stipulates various conditions for administrators of housing management. According to this Act if a person wants to conduct housing management, he needs to fulfil general requirements stipulated in the Trade Licencing Act and notify his intent to conduct this business to the District Authority. This sole proprietorship is unqualified sole proprietorship as this business is included on the List. According to the List of Recommended Unqualified Trades and Their Descriptions, the housing management is a part of a trade called "Management and maintenance of residential and office premises" that is stipulated under entry No. 68.02.

However, unlike the Trade Licencing Act, the Housing Management Act also requires for the administrators to have a professional qualification. This professional qualification consists of educational requirements that subject to testing by independent educational institution. The educational institution must be licenced by the Ministry of Transport and Construction of the Slovak Republic. The test consists of questions on a) legislation on the housing

management, b) administrative support on housing management, c) professional and technical issues concerning apartments and buildings, and d) management and financial management. A fee for the test is around 700 €.

Now, we are facing a very interesting situation. On one hand, there is a general legal regulation that stipulates all aspects of sole proprietorships. From this point of view, Trade Licencing Act does not allow any exceptions from its regulation. Yet on the other hand, there is a special act that is contradicting the general act in terms of what conditions must be met to conduct a sole proprietorship of housing management.

We believe that this situation is in contradiction with the principle of legal certainty and principle of rule of law. It also represents a great obstacle to freedom to conduct a business not only from legal point of view, but also from business point of view. Legal rules should be clear, certain and understandable. Legal system of any state should be harmonic, meaning that one matter should be stipulated mainly in one statute only. If one matter could not be stipulated in one statue, then different statutes stipulating the same legal matter should be consistent and not in contradiction.

The Slovak Republic is a state that respects all the principles that altogether create a constant state of rule of law. If statutes are in contradiction, we should apply that regulation that is more convenient towards the recipients of the regulation. It is also a silent order for the legislator to amend the contradicting regulation.

3. Conclusion

The legal practice of District Authorities is very varied when it comes to unqualified sole proprietorships. It is a result of unbinding character of the List. Several District Authorities refuse to accept notification of unqualified sole proprietorship, although the sole proprietorship meets all conditions laid by the Trade Licencing Act. They refuse it on the grounds that this particular sole proprietorship is not named on the Ministry's List. On the other hand, several other District Authorities accept such notification. There is a great question of legal certainty when it comes to different legal practice in the same matters. Such legal practice is unacceptable. If legislation produces a state of legal uncertainty, the freedom to conduct a business is at stake. One of the unwanted legal obstacles to freedom to conduct business is when refusal of a notification of sole proprietorship is based on other than legal reasons.

Moreover, e.g. housing management is unqualified sole proprietorship according to the Trade Licencing Act and is included on the List meaning that only general conditions have to be met if a person wants to conduct such business. Nevertheless, the Housing Management Act requires for administrators of housing management to fulfil one special condition also, *in concreto* a special educational training. We believe that this cause unwanted discrepancy between statutes that stipulate the same subject matter. Moreover, in this particular case, these two statutes even contradict themselves. It is again a question of legal certainty. Taking this principle into account, we believe that the Trade Licencing Act should be amended and it should include housing management into a list of either vocational, or professional sole proprietorships.

Based on the analysis, we identified four measurements that have to be taken to prevent mentioned legal obstacles to freedom to conduct a business.
1) Special conditions to conduct sole proprietorship have to be laid down in accordance with the general act, i.e. by the Trade Licencing Act. By accepting this premise, we accept harmony in law also and in other words, we accept principle of legal certainty.
2) Trade Licencing Act should be more precise in defining distinctions between vocational and professional sole proprietorships based on the same reasoning as mentioned sub a).

3) The List of Recommended Unqualified Sole Proprietorships and Their Descriptions on the webpage of the Ministry of Interior of the Slovak Republic should be updated more often; any new unqualified sole proprietorship should be listed based on legal practice of all District Authorities in the Slovak Republic.
4) Based on conclusion under c) Ministry of Interior of the Slovak Republic should organise trainings for District Authorities employees in order to secure consistency in proceedings concerning notifications of sole proprietorship.

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CORPORATE GOVERNANCE MECHANISM AND FINANCIAL PERFORMANCE: ROLE OF EARNINGS MANAGEMENT[*]

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Abstract. The mechanism of good corporate governance is used to prevent the management of the company from engaging in unethical actions, such as the earnings management. It can be an effective way to control management. This study aims to analyse corporate governance, consisting of the size of the board of commissioners, the size of the sharia supervisory board, and the audit committee on financial performance, measured as return on assets (ROA), with earnings management as the mediating variable. The sample used for the study consists of nine Indonesian shariah banks and the period of analysis is 2013-2017. The results of the path analysis show that the size of the board of commissioners has a negative effect on the company's ROA. The study also finds that the size of the sharia supervisory board, audit committee and earnings management do not have significant effects on financial performance. Earnings management has a positive mediating role on the relationship between the board of commissioners, the audit committee and ROA. This finding indicates that the existence of the board of commissioners is effective in supervising the management. Thus the mechanism corporate governance can limit the managers' discretionary behavior and prevent earnings management.

Keywords: board of commissioners; sharia supervisory board; audit committee; financial performance; earnings management.

1. Introduction

Sharia banking in Indonesia has grown significantly. By April 2018, there were 13 Sharia Commercial Banks (SCBs), 21 startups, and 168 People's Financing Banks in Indonesia (OJK, 2018). These numbers demonstrate

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that sharia business activities are playing an important role in the Indonesian economy. Consequently, the competition in the banking industry has intensified. Serious efforts must be taken into action to stay in the market. The industry has large captive market as around 90 percent of the Indonesian population is Muslim. Islamic-based banking should be able to compete and gain trust from the majority of Indonesian people (OJK, 2018).

To be successful in the context of competition a company must have strong corporate governance (Larbsh, 2015). Good corporate governance (GCG) is perceived as a guarantor that a company will be able to survive in tight competition. The company must have a strong commitment to ensuring that good governance practices are part of the life blood of its daily activities. In this context, the company is expected to be profitable as profit is one of the key indicators of successful governance. Profit is the measure which attracts the most attention when assessing the success of a company's management (Arniati et al., 2019; Siddique et al., 2020). Given that profit is commonly used as the indicator of management success, managers may have as strong intention to perform in various ways that will positively influence the reported profits. Earnings management represents one of the possible ways to influence profit. Previous studies show that earnings management is found in sharia banks (Shabri, 2015). This is surprising given that under Muslim beliefs all sharia businesses should comply with the Islamic rule not to intentionally engage in manipulative or unethical actions.

Quttainah et al. (2013) and Abdelsalam (2016) suggest that earnings management occurring in Islamic banking is lower than in conventional banking. Under the Sharia concept, managers in Islamic banking have the stronger responsibility to provide true and relevant information to their users. Islamic banking is based on moral responsibility and it shall have an influence on the quality of financial statements published by Islamic banking. However, another study, Hamdi & Zarai (2013) found earnings management that occurs in Islamic banking is higher compared to conventional banking. Those three studies indicate that earnings management in Islamic banking has not completely disappeared. Islamic banking is guided by religious values and moral values but earnings management practices remain in persistence.

Sharia banks are institutions that operate according to Islamic principles. The Indonesian government has formed a Sharia Supervisory Board (SSB) assigned to supervising the operations of banks or financial institutions from a sharia perspective. The Board is designed to ensure that all activities are based on sharia principles, especially in terms of how they manage their financial reports to avoid fraud including in the area of earnings management.

Looking at the overall performance of the Indonesian sharia banking industry, the ROA over six years (2012-2017) fluctuated. From 2012-2014, the average ROA decreased from 2.14% to 0.14%, although it increased slightly in 2015 to 0.49%. The average ROA experienced a steady increase in 2016 and 2017. The fluctuation and relatively low in ROA over six years indicate that was not gaining competitive profits despite the board requires sharia banks to implement GCG. Likewise, OJK noted that profitability and efficiency improved but that they were still relatively low. In this context, the figures show that the growth of Islamic banking remains slow. As the Islamic banks have existed since 1992, their ability to compete in the banking industry should be improving. The profitability performance has tended to decline, leading to an unfavourable reputation that is not in accordance with Islamic principles (OJK, 2018).

Although research on the financial performance of Islamic banks has been widely carried out in various countries, for example by Ajili (2018), Elghuweel et al. (2017), Farook et al. (2012), Mollah & Zammari (2015), Musibah & Sulaiman (2014) and Muneeza & Hassan (2014), and Adeniran et al. (2020), conditions in Indonesia cannot be compared. For example, in Indonesia there was a unique situation in that, in the period of research, the Islamic banks grew quite rapidly but their financial performance declined. Indonesia is the country with the largest Muslim population in the world. With Islamic banking having a large market share, it is reasonable to expect that sharia banking would be able to increase its profitability. But in the period covered by this study it appears that the profits have declined. According to Muneeza & Hassan (2014), conventional corporate governance is more

focused on protecting the rights of stakeholders, while sharia companies focus on governing according to sharia principles.

The application of GCG can improve corporate financial performance (Prasojo, 2015). GCG is important in every sector of the industry since risks and challenges increase continuously. If the risks and challenges cannot be managed properly, then it can result in losses, especially in the financial industry (Soewarno & Mahyarni, 2018). Corporate governance mechanisms are needed to ensure that a company is performing well without abuse (Arniati et al., 2019).

Good corporate governance has been asserted in Section 34 article 1 of Law No. 21 of 2008 with regard to sharia banking, and Central Bank Rules No 11/33/2009 concerning the implementation of sharia commercial banks and sharia business units. The implementation of corporate governance is expected to have a positive impact on the financial performance and control within companies. Previous researches on the effect of Islamic corporate governance on financial performance are inconclusive. In the current study, earnings management is included as the mediating variable, to see the direct or indirect effects. Earnings management can have a negative impact on financial performance, so it needs an effort to reduce the impacts. We argue that good corporate governance practice could reduce the occurrence of earnings management. Thus, the reduced earnings management is believed to affect the company's performance.

Previous researches report the existence of earnings management in Islamic banking. Under the sharia rule, Islamic banking shall be free from any earnings management actions. Yet, empirical evidence confirms the presence of earnings management practices. Therefore, to prevent the practice of earnings management in Islamic banking, actions that can minimize it are necessary. One of the efforts to eliminate earnings management in Islamic bank is by the strong endorsement of GOCG practice.

Sharia banks are different to other companies in terms of their performance orientation. They are required to follow the principles and ethics of sharia business by implementing transparent and accountable governance. They must comply with Islamic Corporate Governance (Farook et al., 2012). Several measures are frequently used in various studies to assess Islamic corporate governance, such as the size of the board of commissioners (BoC), the size of the supervisory board, and the size of the audit committee.

The company's BoC has a collective responsibility to supervise and advise the directors and ensure that the company implements GCG (KNKG, 2006). Coller & Gregory (1999) state that the greater the number of board members, the easier it is to control the Chief Executives Officer (CEO) and the more effective the board is in monitoring management activities and maximizing profits. But the existence of a BoC does not always determine profitability. For example, one study found that the size of the BoC affects profitability (Taufiq et al., 2014), though Elghuweel et al. (2017) did not find significant evidence on this.

The SSB is a board which advises directors as well as supervising bank activities in terms of following sharia principles (Rustam, 2013). The greater the number of SSB members, the better is the role of SSB, especially in terms of increasing the supervision of sharia bank management, since all use of funds that is not sharia-based can reduce financial performance. Musibah & Sulaiman (2014) found that the SSB has a positive effect on the performance of sharia banks, but Ajili (2018) did not find such effect.

The audit committee is also a part of the GCG mechanism in the company's internal control. The stock exchange authority in Indonesia requires the existence of an audit committee in public companies. The audit committee is responsible for assisting the BoC by providing independent professional opinions to improve the quality of performance and reduce company management deviations. The audit committee is expected to optimise the

supervisory function of the BoC and directors. Taufiq et al. (2014) found that the audit committee had an effect on profitability, but Ajili (2018) did not find any significant effect.

Earnings management is used as a mediation on the relationship between variables upon the reason that it occurs when managers use judgment in financial statements and the preparation of transactions to influence financial performance. It thus could mislead the stakeholders about the company's economic performance or to influence the results associated with contracts that depend on accounting numbers. Islamic banks as institutions based on Islamic principles shall be free of any intention to manage reported profits. Earnings management practice could mislead the users of financial statements leading to poor financial judgement (How et al., 2005).

Soewarno & Mahyarni (2018) report that earnings management actions negatively affect financial performance. This means that the effect resulting from earnings management practices has an impact on declining corporate financial performance. The profit management phenomenon that can occur in Islamic banking can be minimized by applying corporate governance in Islamic banking. So, the application of good Islamic corporate governance can minimize the possibility of earnings management. Minimizing the occurrence of earnings management has an impact on the quality of financial reporting, so investors are interested in the company resulting in improved financial performance.

Mitigation of earnings management is something that must be done by Islamic banking. This is because earnings management carried out by Islamic banking can be detrimental to users of financial statements. The losses borne by the users of the financial statements can have a negative impact on Islamic banking in the long run. Therefore, the decomposition of earnings management mitigation measures in Islamic banking will be the input to Islamic banking management in Indonesia to minimize earnings management practices in bank financial reporting.

Islamic Corporate Governance (ICG) is a concept which has been proposed to improve a company's financial performance through the supervision of management performance and by ensuring management accountability for stakeholders based on the regulatory framework. Corporate governance exists to reduce earnings management. Earnings management can occur as a result of information discrepancy between the agent (manager) and principal (owner). It occurs when managers do not supply owners with all the information they require. In this situation, a control mechanism that aligns the different interests of the two parties is needed, for example, the ICG mechanism. Supervision of the ICG mechanism (SSB, audit committee, the BoC) within a company's management activities can minimise earnings management practices and improve its financial performance.

This study analyses the effect of the size of BoC, SSB size and audit committee size on the company's financial performance both directly and through earnings management as mediation. The originality of this research lies in the existence of SSB and BoC in the SCBs by including earnings management as the mediating variable. Earnings management practices seem to exist among SCB in Indonesia. The actions was performed to affect reported earnings. The sample for this study consists of nine sharia banks registered with the financial services authority in Indonesia. The results show that the size of the BoC affects the financial performance of the banks. The size of the SSB, audit committee and earnings management have no effect on financial performance. Earnings management can mediate the effect of the size of the BoC and audit committee on financial performance but is unable to mediate the effect of the size of the board sharia supervisor on financial performance.

2. Literature Review and Hypotheses Development

Based on agency theory, the owners delegate the management of the company to the agent (managers) and they are unable to supervise the manager's performance. As a result, the manager's decision is sometimes different from what the owners wants (Jensen & Meckling, 1976). The BoC is assigned to conduct general and specific supervision, according to the company's articles of association, and to give advice to directors (Rustam, 2013).

The BoC is responsible for supervising and ensuring that the company implements corporate governance. The BoC supervises the directors' policies in terms of running the company and giving advice. The more members of the BoC, the better is the supervision on directors. Coller and Gregory (1999) state that the greater the number on the BoC, the easier it is to control the CEO and the more effective the BoC is in terms of monitoring management activities and maximizing profits. Taufiq et al. (2014) and Akpey et al. (2016) state that the size of the BoC influences a firm's profitability.

Based on the above descriptions, the following hypothesis is formulated:
H_1: The size of the board of commissioners has a positive effect on the financial performance.

Bank Indonesia Regulation No 6/24 / PBI / 2004 article 26 (1) states that there must be at least two members of the SSB and, at most, five people. The size of the SSB refers to the total number of SSB members who conduct sharia supervision in each sharia bank. According to Klein (2002), the greater the number on the board, the better is the mechanism for monitoring company management. Thus, the greater the number of members of an SSB, the more supervision of the bank's management there will be in line with sharia principles. If the number of members of an SSB increases but does not exceed the maximum limit set, then the performance of the sharia bank will increase and this will impact on customer trust. Musibah & Sulaiman (2014) and Mollah & Zaman (2015), in their research, state that the size of the SSB has a positive effect on ROA.

Based on the above descriptions, the following hypothesis is tested:
H_2: The size of the SSB has a positive effect on the financial performance.

According to Arens et al. (2011), the audit committee consists of a number of elected persons with responsibility for assisting the independent auditors. Most audit committees consist of three to seven people who are not part of the company's management. The audit committee must not be influenced by management in order to fulfill their responsibility to evaluate the effectiveness of management control and the role of external auditors as well as internal auditors. The audit committee also functions as a mediator between shareholders and the BoC in terms of control activities by management and by internal and external auditors. The audit committee is expected to optimise the supervisory function of the BoC and directors. Taufiq et al. (2014) and Corrina (2018) find that audit committees have a positive influence on the company's profitability.

Based on the above descriptions, the hypothesis to be examined is:
H_3: An audit committee has a positive effect on the financial performance.

According to Healy & Wahlen (1999), earnings management occurs when managers use judgment in financial statements and the preparation of transactions to change financial statements, thus misleading stakeholders about the company's economic performance or to influence the results associated with contracts that depend on accounting numbers. Kieso (2011) asserts that earnings management is the planning of revenues, expenses, profits and losses to balance earnings fluctuations. Information provided to stakeholders by management cannot reflect the company's actual financial condition. Earnings management is an option available to managers when they choose policies or select accounting methods, but it can have an impact on income and also on achieving the specific objectives of managerial statements (Scott, 2015). Earnings obtained by an entity are often used as a benchmark for users of financial statements in assessing the success of that entity (Shin & Kim, 2019; McNichols & Stubben, 2008; Savitri, 2018). This is one of the reasons for the existence of earnings management. Earnings management actions can reduce the information quality related to earnings and negatively affect the company's profitability. Soewarno & Mahyarni (2018) and Akram et al. (2015) state that earnings management practices have an impact on declining corporate profitability.

Based on the above descriptions, the hypothesis to be tested is:

H4: Earnings management has a negative effect on the financial performance.

The duty of a BoC is to supervise and give advice to the company's directors. Bhatt & Bhattacharya (2015) state that the more members there are on the BoC, the better the supervision of the board of directors because the board of directors will receive many suggestions or options. It can be concluded that the greater the number on the BoC, the more effective the supervision of management activities will be, to minimise the occurrence of earnings management. Reduced earnings management in the company will improve the company's profitability. Afnan & Raharja (2014) and Soewarno & Mahyarni (2018) state that earnings management mediates the relationship of the size of the BoC on financial performance.

Based on the above descriptions, the following hypothesis is proposed:

H5: Earnings management mediates the effect of the board of commissioners' size on the financial performance.

The SSB is a board for supervising bank activities in terms of following sharia principles. The role of the SSB is similar to that of the BoC (Firdaus, 2007). Klein (2002) state that the more boards, the better is the monitoring mechanism of company management. Thus, the greater the number of members on the SSB, the higher is the level of supervision of bank management following sharia principles. If this is so, a subtle earnings management will be effective to manage reported earnings that suit the management's expectation. In short, financial performance will increase as a result of reduced earnings management in the company.

Based on the above descriptions, the following hypothesis is formulated:

H6: The size of the SSB has an effect on the financial performance.

The audit committee must provide formal communication between the BoC, management, external auditors and internal auditors. It will ensure that internal and external audit processes are carried out properly. A good internal and external audit process will improve the accuracy of financial statements and increase trust in financial statements. The audit committee can reduce earnings management activities which will further affect the quality of financial reporting. Makhrus (2013) found that earnings management can mediate the effect of the audit committee on financial performance.

Based on the above descriptions, the following hypothesis is tested:

H7: The audit committee influences financial performance with earnings management as a mediator.

3. Research Method

3.1 Population and Sample

The population for this study is 13 SSBs in Indonesia during the period 2013 to 2017. The selected SSBs must satisfy the following criteria:
1. They must be registered with the Financial Services Authority
2. They must have published annual reports and financial reports
3. They must have complete information on research variables during the observation period and
4. They must present their financial statements in Indonesian rupiah.

Nine SSBs met the sampling criteria. The study uses path analysis to determine the causal relationships, with the aim of explaining the direct or indirect influence between the dependent variable and the independent variables. It

analyses whether there is an influence on the size of the BoC, the size of the SSB, and the audit committee on financial performance through earnings management.

3.2 Operational Definition and Measurement of Variable

Financial performance is an indicator used to assess the efficiency of a company in terms of utilising its resources to earn revenues (Zack et al., 2009). Financial performance is measured using return on assets (ROA). The size of the BoC is the total number of members on the BoC. It is measured by totaling the BoCs stated in the annual report. The size of the SSB refers to the research of Kholid et al. (2015), and it is measured as the number of members of the SSB. An audit committee is a committee formed by the BoC. The audit committee is measured based on the number of people in the committee. Earnings management is measured using discretionary accrual model.

This study measures earnings management using accrual discretion (Nabila & Daljono, 2013). Accrual discretion model was chosen because it is in line with the accounting basis, which is the accrual basis. Total accruals are decomposed of non-discretionary accruals, and discretionary accruals. Total accruals are calculated using the following formula:

$$TACC_{it} = EBXT_{it} - CFO_{it}$$

where $TACC_{it}$ is total accruals, $EBXT_{it}$ is profits before extraordinary items, CFO_{it} is operating cash flow.

Discretionary accruals are measured using Kasznik's (1999) model, where he adds a component of CFO change in the modified-Jones model. According to the Kaznik model, it has the highest adjusted R^2 and the proportion of the coefficient after the prediction. The model is as follows:

$$TA_{it} / A_{it-1} (TACC_{it}) = \alpha1 (1/ A_{it-1}) + \alpha2 (\Delta REV_{it} / A_{it-1} - \Delta REC_{it} / A_{it-1}) + \alpha3 (PPE_{it} / A_{it-1}) + \alpha4(\Delta CFO_{it} / A_{it-1}) + e_{it}$$

where TA_{it} /A_{it-1} is current year total accruals divided by previous year total assets, A_{it-1} is previous year total assets, $\Delta REV_{it} / Ait-1$ is current year changing in income divided by previous year total assets, $\Delta REC_{it} /A_{it-1}$ is current year changing in net account receivable divided by previous year total assets, PPE_{it} /A_{it-1} is current year net plant and equipment divided by previous year total assets, $\Delta CFO_{it} /A_{it-1}$ is current year changing of operating cash flows divided by previous year total assets, and e_{it} is the error term.

The estimation from the equation is used to calculate the nondiscretionary accruals using the following model.

$$NDACC_{it} = \alpha1 (1/A_{it-1}) + \alpha2 (\Delta REV_{it} /A_{it-1} - \Delta REC_{it} /A_{it-1}) + \alpha3 (PPE_{it} /A_{it-1}) + \alpha4 (\Delta CFO_{it} /A_{it-1})$$

Then, the discretionary accruals are calculated using the following formula:

$$DACC_{it} = TACC_{it} - NDACC_{it}$$

4. Results and Discussions

4.1 Descriptive Statistics Results

The descriptive statistics of each variable are shown in Table 1.

Table 1. Descriptive statistics of the research variables (N=39)

Variable	Minimum	Maximum	Mean	Std. Deviation
Size of BoCs	3	6	3.82	0.914
Size of SSB	2	3	2.36	0.537
Total Audit Committee	2	7	3.74	1.208
Earnings Management	-0.13	0.17	-0.02	0.070
Financial Performance (%)	-1.12	2.63	0.80	0.719

Source: the authors' calculations in Path Analysis according to statistical data

Table 1 shows that the average number of members in the BoCs is almost four people. This is relatively big and is in line with Bank Indonesia Regulation Number 11/3/PBI/2009, which requires at least three members for BoCs. The average number of SSB members is two; this is in accordance with Bank Indonesia Regulation Number 6/24/PBI/2004 article 26 (1) which requires at least two members for an SSB. On average, the number of members for each company's audit committee is nearly four. OJK Regulation No.55/ Pojk.04/2015 states that the membership of the audit committee must consist of at least three people including the chair of the audit committee. This shows that there are still companies that have not conformed to the OJK regulations, as it can be seen that the minimum value is two. The average value of earnings management is -0.02. A negative average value indicates that there is a reduction in discretionary accruals. The ROA is 0.80%. The ROA level of SCBs from 2013-2017 is under 1.5%.

4.2 Hypotheses Testing

The results of the testing for the direct influence of the independent variables are shown in Table 2.

Table 2. Results of the analysis testing of the independent variables

Variable	Un-standardized coefficients		t-stat	p-value	Conclusion
	B	Std. Error			
Constant		0.564	2.864	0.007	
Size of the BoCs	-0.374	0.135	-2.779	0.009	Affect
Size of SSB	0.175	0.213	0.822	0.417	Does not affect
Audit Committee	0.040	0.107	0.370	0.714	Does not affect
Earnings Management	-3.202	1.637	-1.956	0.059	Does not affect

Source: the authors' calculations in Path Analysis according to statistical data

Table 2 shows that only the size of the BoC has an effect on financial performance. The size coefficient of the BoC is negative, which means that the greater the number of members on the BoC, the more financial performance decreases. On the other hand, the other three independent variables have no significant effect on financial performance. The size of the SSB and audit committee have a positive coefficient, while earnings management has a negative coefficient.

The effect of the board size, the SSB size, and audit committee on earnings management are shown in Table 3.

Table 3. Results of path analysis testing

Variable	Unstandardized coefficients		t-stat	p-value
	B	Std. Error		
(Constant)	-0.016	0.058	-0.269	0.789
Size of the BoC	0.011	0.014	0.777	0.442
Size of SSB	0.025	0.022	1.144	0.260
Audit Committee	-0.027	0.010	-2.622	0.013

Source: the authors' calculations in Path Analysis according to statistical data

Table 3 shows that only the audit committee influences earnings management. The audit committee coefficient is negative, meaning that the higher the number of members of an audit committee, the higher the decrease in profitability. This is interesting because a greater number of members of an audit committee precisely reduces the company's profitability. On the other hand, the other two variables do not affect earnings management. The size of the BoC and the size of the SSB show a positive coefficient.

The indirect effect test aims to detect the position of mediating variables in a model. It is carried out by multiplying the coefficient values of the independent variable effect with the mediating variable and the coefficient values of the mediating variable with the dependent variable. The results of the indirect effect test are presented in Table 4.

Table 4. Indirect effect testing results

Description	A	Sa	B	Sb	Ab	Sab	t-stat
Size of the BoC →earnings management to financial performance	0.01	0.01	-3.20	1.64	-0.04	-0.01	5.87
Size of SSB →earnings management to financial performance	0.03	0.02	-3.20	1.64	-0.08	0.08	-1.00
Audit committee →earnings management to financial Performance	-0.03	0.01	-3.20	1.64	0.10	0.05	2.00

Source: the authors' calculations in Path Analysis according to statistical data

Table 4 shows that there is an indirect effect of the size of the BoC through earnings management on financial performance. The mediation testing shows that the path coefficient value is -3.20 and (t-stat = 5.87). This shows that earnings management can influence the relationship between board size and financial performance. It can be inferred that earnings management does not mediate the effect of the size of the SSB on financial performance. The path coefficient value is -3.20 (t-stat = -1.00). This is smaller than the t-table, which is 1.96. Furthermore, there is an indirect effect of the audit committee through earnings management on financial performance. The mediation testing shows that the path coefficient value is -3.20 (*t*-stat = 2.00). This shows that earnings management can influence the relationship between board size and financial performance.
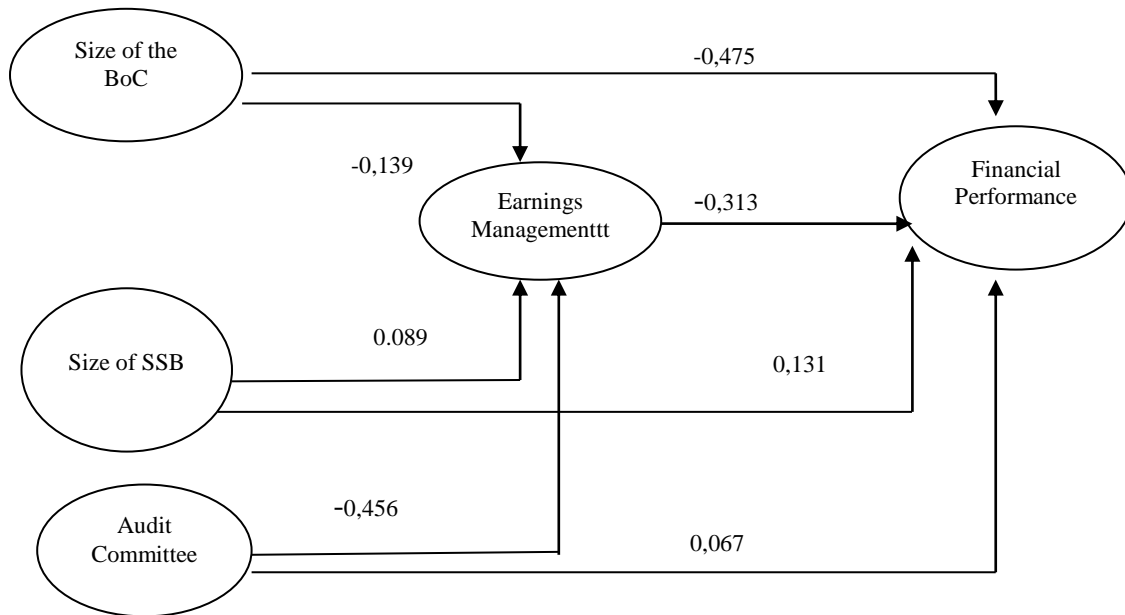
Figure 1. Results of Path Analysis
Source: the authors' calculations in Path Analysis according to statistical data

As shown in Figure 1, the effect between variables is presented both directly and indirectly. The size of the BoC affects financial performance through earnings management. The direct effect of X_1 on Y_2 is -0.475, while the indirect effect of X_1 through Y_1 on Y_2 is 0.044 (-0.139*-0.313). Then the total effect is -0.431 (-0.475 + 0.044). Thus, the value of the indirect effect is greater than the value of the direct effect. The size of the SSB does not significantly affects financial performance through earnings management. The direct effect of X_2 on Y_2 is 0.131, while the indirect effect of X_2 through Y_1 on Y_2 is -0.028 (0.089*-0.313). The total effect is 0.013 (0.131 - 0.028). In other words, the value of the indirect effect is smaller than the value of the direct effect. Audit committee has a significant effect on financial performance through earnings management. The direct effect of X_3 on Y_2 is 0.067, while the indirect effect of X_5 through Y_1 on Y_2 is 0.143 (-0.456*-0.313). The total effect is 0.21 (0.067 + 0.143). Thus, the value of the indirect effect is greater than the value of the direct effect.

4.3 Discussions

The size of the BoC negatively affects financial performance. Too many members on a BoC will reduce financial performance. This is due to the fact that it will slow down the decision-making process, so the number of members of a BoC in an Islamic bank must be appropriate to the bank's needs. Jensen (1993) suggest that large boards can be less-effective than small boards. The idea is that when boards become too big, agency problems (such as director free-riding) increase within the board and the board becomes more symbolic and less a part of the management process. Yermack (1996) tests this view empirically and finds support for it. He examines the relationship between Tobin's Q and board size on a sample of large U.S. corporations, controlling for other variables that are likely to affect Q. Yermack's results suggest that there is a significant negative relationship between board size and Q. The finding of the current study is consistent with Hermalin & Weisbach (2003). Arora & Sharma (2016) suggest that size of boards has strong impact on the effectivensss of monitoring for financial performance of the firm. The results of this study are in line with Taufiq et al., (2014) and Arora & Sharma (2016) who show that the size of the BoC has an impact on the effectiveness of the supervision of the company's profitability. This result is different to that of Elghuweel et al. (2017) who found no effect of the size of the BoC on the achievement of financial performance.

The size of the SSB does not affect a bank's profitability. It is a fact that members of the SSB, in general, are specialist legal experts in Islamic Commercial Jurisprudence. Based on Bank Indonesia regulation Number 11/33/ PBI/2009, the main responsibility of the SSB is to ensure the compliance of transactions and bank operations with sharia principles. Members of the SSB can hold concurrent positions in four out of nine sharia financial institutions. The results of this study are consistent with Ajili (2018) who shows the SSB does not affect profitability in the sharia banking industry. Yet, the current study's results are not consistent with Musibah & Sulaiman (2014) and Mollah & Zaman (2015) who find that the size of the SSB has a positive effect on the performance of sharia banks.

The audit committee does not affect the company's profitability. The number of members of the audit committees does not guarantee the effectiveness of the audit committee's performance in supervising the company's profitability. The number of members of the audit committee will not affect its duty to supervise financial statements, especially in terms of accounting policies adopted by the company. Other duties of the audit committee include assessing internal control, supervising the external reporting system and ensuring the company follows the rules so that the quality of financial statements is ensured. Hence, it can be concluded that the number of members of the audit committee does not affect profitability. This result supports the research of Ajili (2018) and Wild (1996), which states that the audit committee guarantees a better quality of financial statements but it does not improve profitability. However, the findings for this study do not support Corrina's research (2018).

Earnings management does not affect profitability. This indicates that there may be many other factors, such as company growth, company size and assets, which can affect the company's profitability, along with the ability of organisations to manage knowledge and use it to improve both financial and non-financial performance (Luhn et al., 2017). Earnings management practices do not affect the company's profitability, because good profitability will reduce the risk of earnings management practices. This result supports Okafor et al. (2018) who report that earnings management does not affect profitability. However, it is not in line with Soewarno & Mahyarni (2018) and Akram et al. (2015) who document that earnings management has a negative effect on profitability.

The size of the BoC influences profitability through earnings management as a mediator. This finding supports agency theory in regarding the BoC to be the highest internal control mechanism in the company, which is responsible for monitoring the actions of top management. Supervision is conducted to reduce management's earnings management practices. Reducing earnings management practices in companies will improve the company's profitability. This result is consistent with Afnan & Raharja (2014) who report that the size of the BoC influences profitability by reducing earnings management in the company. However, it is not in line with Okafor et al. (2018).

The size of the SSB does not affect financial performance through earnings management as a mediator. Not all SSBs know the criteria that must be fulfilled; there are still many SSB members who do not understand banking techniques and sharia financial institutions. As a result, no matter how many member there are on the SSB, if supervision and other strategic roles are not optimal then it cannot minimise earnings management, so earnings management cannot mediate the influence of SSB size on profitability.

The audit committee influences financial performance through earnings management. The existence of an audit committee can reduce the occurrence of earnings management, and reduced earnings management in the company can improve the company's profitability. This result supports Makhrus (2013) who reports that earnings management mediates the effect of audit committee on profitability. However, it does not support Taufiq et al. (2014) who find that earnings management cannot mediate the influence of the audit committee on profitability.

5. Conclusion and Suggestion

The results of this study indicate that the size of the BoC negatively influences the company's financial performance. The size of the SSB does not affect financial performance, because it only has authority to supervise the operational activities of the bank in accordance with Islamic law. In addition, the fact that an SSB is not effective in one sharia financial institution causes less performance. The audit committee does not have an effect on financial performance. Earnings management has no effect on financial performance. Earnings management is unable to mediate the influence of the SSB on financial performance. The audit committee influences financial performance through earnings management. This means that earnings management is a mediating variable between the audit committee and financial performance, which indicates that the existence of the audit committee suppresses the occurrence of earnings management, the audit committee will directly affect the company's performance, in this case the company's financial performance.

This research has several limitations that can be addressed for future research. First, the sample only included Islamic Commercial Banks, not all banks in Indonesia. Second, the only financial performance indicator analysed was ROA, which does not adequately reflect the state of the company's financial performance. Third, the number of measuring tools used in the calculation of earnings management means that research results between one researcher and other researchers is inconsistent. Therefore, it is recommended that future studies add other indicators into the assessment of the company's financial performance variables so that they can better represent the actual financial performance. Furthermore, researchers could increase the time period considered in the research. Other variables, such as the role of the SSB and the experience of the SSB, could also be used. Additionally, it is necessary to consider using samples from other countries in future research, so that the results can be generalized to countries other than just Indonesia.

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DETERMINANTS OF THE INDONESIA'S CURRENT ACCOUNT BALANCE: AN ERROR CORRECTION MODEL APPROACH

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Abstract. This study aims to investigate the relationship between exchange rate, Domestic Money Supply (M2), real Gross Domestic Product (GDP), and Foreign Direct Investment (FDI) on Indonesia's current account balance (CAB) in the short and long term. For the purpose of this study, the Error Correction Model (ECM) is used. It uses data during the period 2000-2017. The result showed that (a) M2, real GDP, and FDI in the short-term have not significant effect on Indonesia's current account but exchange rate has a significant negative effect; (b) in the long-term exchange rate, M2, and real GDP have not significant effect on Indonesia's CAB, while FDI has a negative significant effect on Indonesia's CAB. Policy recommendation for government as an implication of this study (a) stabilize the exchange rate in order to decrease current account deficit (CAD); (b) improve the investment climate and issue incentive policies for local investor; (c) increase the competitiveness of export-oriented products and reduce dependence on imports.

Keywords: Exchange rate; Domestic Money Supply; real GDP; Foreign Direct Investment; Indonesia's Current Account

1. Introduction

Indonesia, as a developing country, has a chronic problem that has yet to be resolved (Sasongko et al., 2019), namely the current account deficit (CAD). The CAD is a condition when the value of import of goods and services of a country is higher than its exports. This condition indicates that the performance of domestic industries has not been able to compete with other countries. Although the industrial sector is predicted becomes the dominant sector for Indonesia's foreign exchange earnings. The problem of CAD becomes a very important duty for government to immediately obtain a solution so that the performance of Indonesia's national economy gets better. A current account surplus condition is evidence of the strength of a country in establishing economic cooperation with other countries and representing a strong condition of competitiveness in trading on global market.

Based on Figure 1, the Indonesia's current account balance during the period 2000-2017 described fluctuating conditions. Indonesia's current account balance in the 2000-2011 is still in a surplus position. It can be shown by

the value of current account balance (CAB) in 2000 was still a surplus of 7,992 million US dollars, then it dropped very significantly to 4,068 million US dollars in 2004, then it declined again to 126 million US dollars in 2008, and in 2011 CAB at the position of 1,685 million US dollars. The period of 2012-2017 was the position of current account deficit (CAD) with a value of -24.418 million US dollars then it declined again in 2014 to -27,510 million US dollars and in 2017 it reached -16,196 million US dollars.
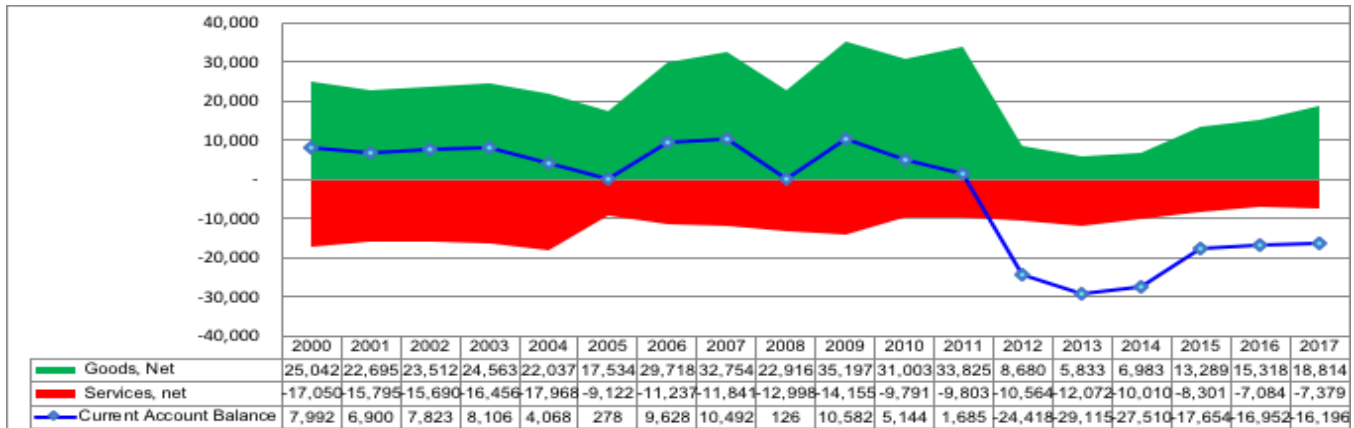
Figure 1. Indonesia's Goods Account, Services Account and Current Account Balance 2000-2017 (Million US Dollars)
Source: Central Bureau of Statistics of Indonesia

Indonesia's CAD conditions starting in 2012-2017 are caused by several things, they are (a) a decline in the surplus in Indonesia's trade balance as a result of declining exports and/or increased imports of goods; (b) There are deficits in Indonesia's services accounts; and (c) there is a deficit in Indonesia's net income.
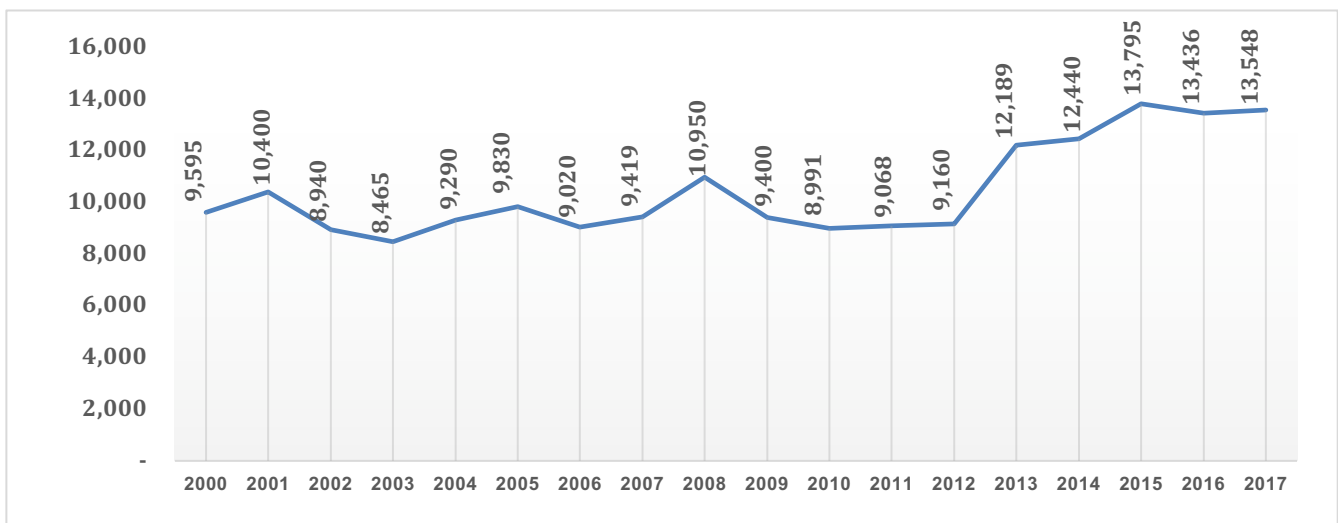
Figure 2. Exchange Rate US Dollar in Indonesia 2000-2017 (IDR)
Source: Central Bureau of Statistics of Indonesia

The condition of the US dollar exchange rate against IDR during the period 2000-2017 has fluctuated with an upward trend. Look at Figure 2, it can be seen in 2000 the US dollar exchange rate to IDR was 9,595, then it increased to 9,830 IDR in 2005, it rose again to 10,950 IDR in 2008, then it reached 12,189 IDR in 2014 and in 2017 it was 13,548 IDR. This increase in the exchange rate of the US dollar against IDR is thought to be a factor that worsened the condition of CAD Indonesia. This is in line with the results of research from several researchers

such as Wanjau (2014), and Bogdan, Cota and Erjavec (2017). They prove that the increase in the exchange rate has a negative influence on current account.

M2 is a domestic money supply that includes narrow money plus savings and time deposits that serve as a supply of money in the economy. The dispersion of M2 in Indonesia during the period 2000-2017 shows a trend that tends to increase. Figure 3 shows that M2 values were still at 747.03 quintillion IDR in 2000, then in 2004 it reached 1,033.53 quintillion IDR, it rose again to 1,883.85 quintillion IDR in 2008, then in 2013 it increased again to 3,737.70 quintillion IDR and it was 5,419.00 quintillion IDR in 2017.
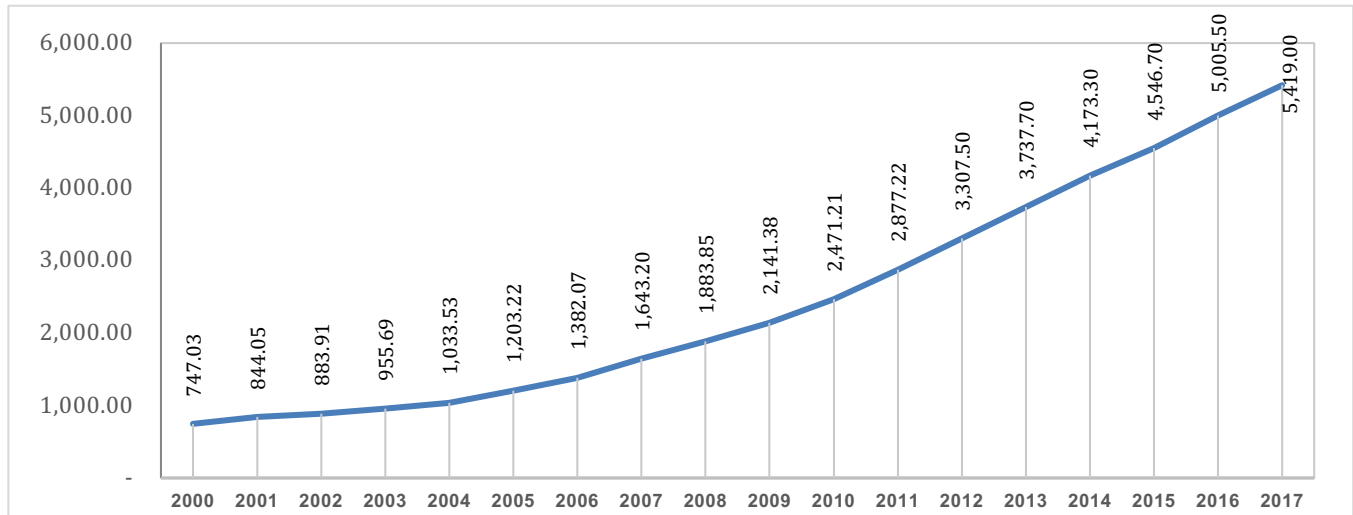
Figure 3. M2 Indonesia 2000-2017 (Quintillion IDR)
Source: Central Bureau of Statistics of Indonesia

The growth of the large M2 increase is interesting to prove whether M2 has a significant effect on Indonesia's current acoount balance (CAB). The thought arose in researchers' mind, considering the composition of M2 consisting of narrow money, deposits and savings that had different levels of liquidity, so the effectiveness of M2 in affecting economic activities that had an impact on CAB in Indonesia was important to study. Some of the results of the study show that M2 has a significant positive effect on CAB as the findings of a study by Danmola and Olateju (2013); Dejeufosse (2015); and Arize, Kallianiotis, Malindretos, Panayides and Tsacanas (2018).

Figure 4 illustrates the growth of real GDP conditions in Indonesia during the period 2000-2017 which tends to increase significantly. Theoretically, the condition of real GDP explains the economic performance of a country that will support the development of trade between countries. In 2000 the value of real GDP was 4,121,726 billion IDR, then in 2004 it was 4,912,834 billion IDR, it rose again to 6,176,068 billion IDR in 2008, then in 2012 it rose to 7,727.083 billion IDR and it reached 9,912,749 billion IDR in 2017. It needs to be proven whether the increase in Indonesia's economic performance reflected by the increase in real GDP has positively affected CAB Indonesia or not during the period 2000-2017. Whether that Indonesia's condition is in accordance with the results of previous studies in several countries such as the findings of a study by Roy (2012) and Eldemerdash, Metcalf and Maioli (2014) which proved that the real GDP of the countries in their study has a positive effect on the current account.
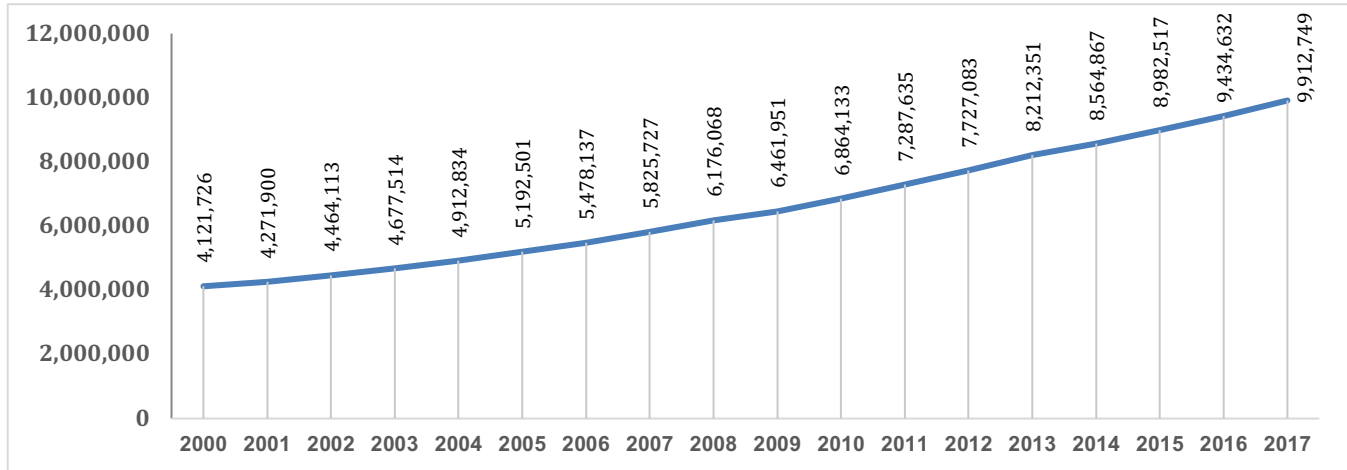
Figure 4. Real GDP Indonesia 2000-2017 (Billion IDR)
Source: Central Bureau of Statistics of Indonesia

Figure 5 shows that the value of FDI in Indonesia during the period 2000-2017 is fluctuated tend to rise. In the period 2000-2006 described that FDI in Indonesia tended to decline. The value of FDI was still at 15,420.00 million US dollars in 2000 and it dropped significantly to 5,977.00 million US dollars in 2006. While in the period 2007-2017 the value of FDI in Indonesia tended to rise. In 2007 the value of FDI was still at the level of 10,341.40 million US dollars, then it rose to 19,474.50 billion US dollars in 2011, it increased again to 28,617.50 million US dollars in 2013 and in 2017 it reached 32,239.80 million US dollars.
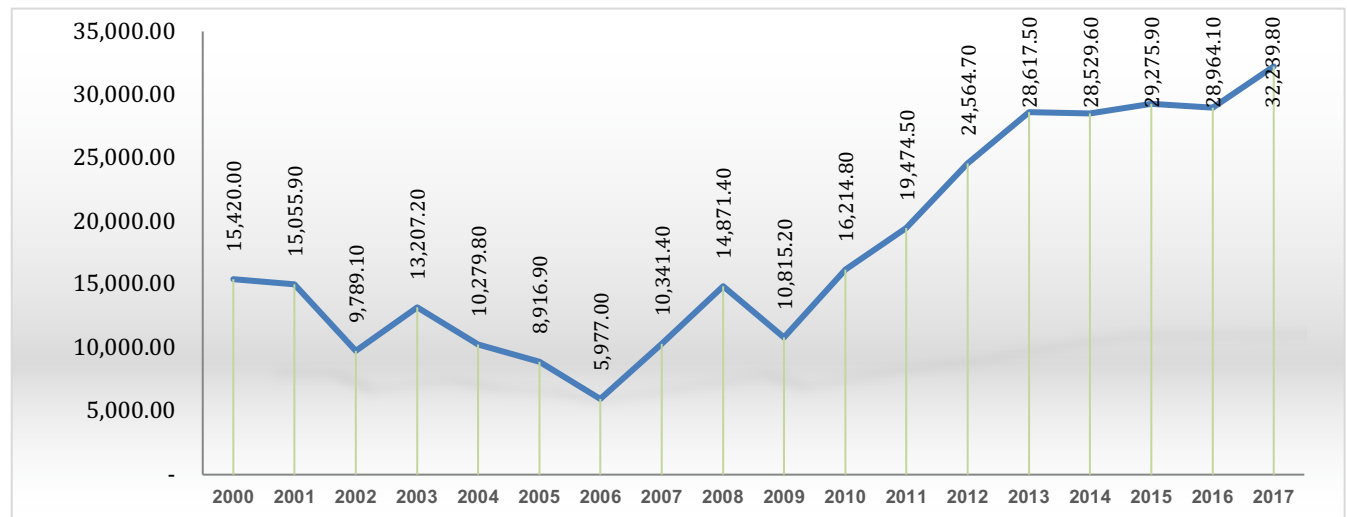
Figure 5. FDI in Indonesia 2000-2017 (Million US Dollars)
Source: Central Bureau of Statistics of Indonesia

The novelty of this study is, first, the research in this section focuses on various problem that are not mentioned in previous study. For example, research by Erdem, Ucler and Bulut (2014) in 15 countries of the OECD members only discuss domestic credit and real exchange rate. Meanwhile Eldemerdash, Metcalf and Maioli (2014) examine gross investment, gross saving and fiscal balance and its effect on CAD. Second, this study uses a particular research methodology ECM (Error Correction Model) analysis. This method is not used in the previous literature. Therefore, this study will focus on four variables (exchange rate, M2, real GDP and FDI) and use the methodology that previously mentioned to respond to research gaps in earlier studies.

2. Literature Review

2.1. Exchange Rate

Insel and Kayikci (2013) have researched the current account balance and the macroeconomic factors that affect it. This study was conducted in Turkey using data from 1987-2009 and autoregressive distributed lag as its research method. The macroeconomic variables in this study are inflation, GDP, trade openness, oil price, and real exchange rate. One of the results indicates exchange rate is able to give a negative significant effect on the current account balance. The researchers assume that the exchange rate has a negative impact on the current account balance through the factor of forming the prices of tradable goods.

A study by Erdem, Ucler and Bulut (2014) also discuss the relationship between domestic credit and real exchange rates on the current account balance. This study was conducted in 15 countries of the OECD members during the period 1986-2010 using the autoregressive distributed lag method. The results show the exchange rate variable has a significant negative effect in long-term on the current account balance. However the negative effect did not occur in short-term, then the researchers also added the J-curve effect in the model does not exist.

Wanjau (2014) has investigated a study about relationship between exchange rate and current account balance. This study was conducted in Kenya during the period 1980–2011 using the ECM research method, the Stationary ADF test and Phillip Perron co-integration test. The results show that the exchange rate can affect the current account (CA), the effect is in the form of a J-curve. The researcher recommends the government can define an exchange rate policy that leads to increased export demand so that the current account deficit (CAD) can be reduced and ultimately economic growth can be achieved sustainably.

Bogdan, Cota and Erjavec (2017) have examined the relationship between current account balance and export performances in new EU countries. This study was conducted in 2017 using a linear regression method by entering exchange rate as one of its independent variable. The results indicate that countries with floating exchange rates have a negative relationship with the current account balance. This study also explains that exchange rate depreciation can increase the current account balance. It is mainly due to the increasing number of exports produced. The researchers then give recommendations to the government and the next researcher to emphasize the importance of non-price competitiveness exports

2.2. Domestic Money Supply (M2)

The impact of monetary policy in order to regulate the amount of M2 in Nigeria was carried out by Danmola and Olateju (2013). The study looks for the relationship between monetary policy and current account balance, taking the 1970-2010 research periods in Nigeria. The research model uses Johansen's co-integration method, OLS and ECM. The results indicate that there is a long-term relationship between monetary policy and current account balance. It explains that monetary policy in the form of M2 increases can positively affect exports, imports and industrial output. Therefore, the authors provide recommendations to the government in the form of monetary policy setting in order to regulate the amount of money supply to establish a good industrial climate so that the industrial output gets bigger, exports also increase and in the end the current account deficit can be minimized.

Meanwhile Dejeufosse (2015) also investigates the same study about monetary policy and current account balance. His research is in the form of model proposals not in the form of empirical research so that there is no country or period of research except as an example of models, is in United State and in Japan. Through the paper, the author describes the relationship between the regulation of money supply setting and the current account balance. The results show that when the central bank determines the optimal monetary policy of interest rate, it will cause the current account disparity to be even greater because production activities are dominated by international corporations rather than domestic corporations.

Then Arize et al. (2018) have compared the current account, monetary theory and exchange rate determination. The type of their research is only an application of a model not an empirical study so there is no information about the country and the period of research. The research model proposed by the authors is about exchange rate determination through two approaches, the monetary policy approach and the current account approach. Through the monetary policy approach, it was found that there is a positive relationship between production, price, and money supply with the current account balance in the research model. Meanwhile the relationship between the exchange rate and the current account is negative. There is no policy recommendations submitted by the authors unless the need for more emphasis on government policies that directly leads to the real sector than the financial sector if the government wants to reduce the current account deficit.

Kasasbeh (2018) also indirectly has studied the relationship between money supply and the current account balance in Jordan during the period 2000-2016. This study uses a comprehensive analysis model of macroeconomic simulation and presents the discussion about domestic, foreign and joint financing and its relationship with the current account balance. The results indicate that domestic financing can reduce the current account deficit. This reduction is due to the impact on the domestic price level, domestic money supply and GDP which continues to increase due to the use of domestic financing. The author then provides recommendations in the form of the importance of diversifying funding sources, including private sector financing because it can affect the current account through the line money supply.

2.3. Gross Domestic Product (GDP)
Roy (2012) has done a study about foreign indebtedness, monetary policy and economic growth. The study was conducted in America using data from 1970-2007 with Simultaneous Equation Model (SEM) as its analysis method. The results show that GDP has a positive effect on the current account balance. It needs more attention from government. It does not mean having to abandon the economic development policy of GDP but rather to understand what factors can cause the current account balance to increase, for example due to the increase in foreign indebtedness.

Eldemerdash et al. (2014) conduct a study of current account balances and fiscal policies in developing countries that have oil production and do not have oil production. The study was conducted during the period 1975 - 2010 using the method of panel data analysis with intercept and error variances. The research variables of this study consist of gross investment, gross saving and fiscal balance. In addition, there is control variable included, namely trade openness, capital mobility, GDP growth, and oil price. The results of the study show that the GDP growth as one of the control variables has a positive significant influence on the current account balance. An increase in GDP of 1 percent can cause current accounts to increase by 0.15 percent. Other variables such as money supply, the results of study explain there is a positive relationship between money supply and the current account balance. This positive effect was found to be greater in oil-producing countries compared to in non-oil-producing countries. Therefore, for non-oil-producing countries, the authors provide recommendations to them to take positions by increasing trading volume.

2.4. Foreign Direct Investment (FDI)
Kandil (2012) has a study about the current account balance and the affecting factors. The study conducted in developed and developing countries during the period 1968–2008 using the error correction model analysis method. Independent variables in this study are national income, tax income, private consumption, private investment, government consumption, public investment and total investment. The results show that investment can give a positive influence on the development of the current account balance. Investment in developed countries is able to support the growth of the current account balance through the line of import cyclicality meanwhile investment in developing countries has the opposite result where investment actually causes imports to fluctuate. The author then provides recommendations in the form of preparing a policy strategy that can attract more investment so that the current account deficit becomes smaller.

Hoque and Rao (2016) have done a research on the current account balance in Malaysia. The study uses the ARDL method during the period 1970 - 2010. The variables of this study are exports, imports and GDP. The results explains that the Malaysian economy is still classified as a sustainable current account, as it is known that since the end of the ASEAN economic crisis until now Malaysia has always experienced a trade balance surplus. Empirical evidence from the study also found that investment has a positive effect on the current account balance position in Malaysia. The thing that needs to be done by the government is how to improve investors' perceptions of investment in Malaysia.

Kovacevic (2017) has conducted a research in 9 of the SECI (Southeast European Cooperative Initiative) countries, consisting of Bulgaria, Croatia, Romania, Moldova, Serbia, Bosnia, Herzegovina, Macedonia, Montenegro and Albania. The study was conducted during the period 2000 - 2015. The study uses panel data analysis model with the FMOLS and DOLS estimator to analyze the relationship between the current account balance and its affecting factors. The results describe that appreciation in the exchange rate can cause an inverse effect on the current account balance. Meanwhile, foreign direct investment has a positive effect on the current account balance. Positive effects are also found in private remittance. The policy recommendation offered by the author is the need to carry out structural change in order to reduce the current account balance deficit and to avoid the exchange rate appreciation of the country as much as possible (see table 1).

Table 1. Research Hypotheses

Title	Statement
Hypothesis 1 (H1)	Exchange rate has a significant negative influence towards Current Account Balance
Hypothesis 2 (H2)	Money Supply (M2) has a significant positive influence towards Current Account Balance
Hypothesis 3 (H3)	Real Gross Domestic Product (GDP) has a significant positive influence towards Current Account Balance
Hypothesis 4 (H4)	Foreign Direct Investment (FDI) has significant positive influence towards Current Account Balance

3. Research Methodology

In this study, a systematic time series econometrics approach is used to investigate the determinants of Indonesia's current account balance during 2000-2017. In order to examine the relationship between CAB and ER, M2, real GDP and FDI in Indonesia, this study uses secondary data from Central Bureau of Statistics of Indonesia (BPS Indonesia). Error Correction Model (ECM) was used to verivy short run dynamics with long run equilibrium.

The empirical model is represented by the Current Account Balance and is assumed to be affected by the rate of Exchange rate, M2, real Gross Domestic Product (GDP) and Foreign Direct Investment (FDI).

$$CAB_t = f(ER_t, M2_t, \text{real } GDP_t, FDI_t) \dots\dots\dots(1)$$

The model becomes:

$$CAB_t = \beta_0 + \beta_1 ER_t + \beta_2 M2_t + \beta_3 \text{ real } GDP_t + \beta_4 FDI_t + \varepsilon_t \dots\dots\dots(2)$$

Description:

CAB_t = dependent variable measured by the Current Account Balance;

β_0 = intercept;

β_1, β_2, β_3, and β_4 = parameter to be estimated ER, M2, real GDP, and FDI;

ER = Exchange Rate Dollar USA

M2 = the domestic money supply that includes narrow money plus savings and time deposits,

Real GDP = real Gross Domestic Product

FDI = Foreign Direct Investment

ε = Error term

Taking the logarithm of both side of the model produces a linear equation of the form:

$$\text{LogCAB}_t = \beta_0 + \beta_1 \, \text{LogER}_t + \beta_2 \, \text{LogM2}_t + \beta_3 \, \text{Logreal GDP}_t + \beta_4 \, \text{LogFDI}_t + \varepsilon_t \, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

4. Research Result

4.1. Unit Root Test and Johansen Test

The resultf of the Augmented Dickey-Fuller (ADF) are presented in Table 2. These results show that are all research variables were not stationary at the level but they were stationary at the 1st difference.

Table 2. Unit Root Test Result

Variable	Probability Values	
	Level	1st difference
CAB	0.6843	0.0161**
Log(ER)	0.7789	0.0058***
Log(M2)	0.2586	0.0432**
Log(real GDP)	0.9922	0.0395**
Log(FDI)	0.82	0.0031***

* stationary at a significance value of 10%; ** of 5%; and *** of 1%.
Source: data is reprocessed by author

The unit root test results show that if all variables are stationary in the same degree, the co-integration test can be used. The Johansen test was used to determine the number of co-integration equations among the variables. The result of the Johansen test is presented in Table 3.

Table 3. Johansen Test Result

Trend assumption: Linear deterministic trend
Series: CAB LOG(ER) LOG(M2) LOG(real GDP) LOG(FDI)
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.998638	205.2295	69.81889	0.0000
At most 1 *	0.960271	99.64447	47.85613	0.0000
At most 2 *	0.887980	48.03371	29.79707	0.0002
At most 3	0.454760	13.00852	15.49471	0.1145
At most 4	0.186576	3.304054	3.841466	0.0691

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.998638	105.5850	33.87687	0.0000
At most 1 *	0.960271	51.61076	27.58434	0.0000
At most 2 *	0.887980	35.02519	21.13162	0.0003
At most 3	0.454760	9.704469	14.26460	0.2321
At most 4	0.186576	3.304054	3.841466	0.0691

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level;
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: data is reprocessed by author

Based on the Johansen co-integration test above, there was co-integration, both based on the trace statistic and the max-eigenvalue statistical test at significance α = 5%. The model above describes that the results were not stationary at the level and were stationary at 1st difference and all variables were co-integrated. The existence of co-integration means that there is a relationship in short-term or there is a short-term balance (see table 4).

4.2. Short-Term ECM Analysis

Table 4. ECM in The Short-Term

Dependent Variable: D(CAB)
Method: Least Squares
Date: 01/07/19   Time: 19:52
Sample (adjusted): 2001 2017
Included observations: 17 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11329.13	13994.64	0.809534	0.4354
D(LOG(ER))	-31245.40	19452.33	-1.606255	0.1365
D(LOG(M2))	16153.41	64924.27	0.248804	0.8081
D(LOG(real GDP))	-275420.6	316048.0	-0.871452	0.4021
D(LOG(FDI))	-3486.351	7807.877	-0.446517	0.6639
ECT(-1)	-0.701365	0.278704	-2.516523	0.0287

R-squared	0.542351	Mean dependent var	-1489.235
Adjusted R-squared	0.334329	S.D. dependent var	8460.776
S.E. of regression	6903.035	Akaike info criterion	20.78787
Sum squared resid	5.24E+08	Schwarz criterion	21.08195
Log likelihood	-170.6969	Hannan-Quinn criter.	20.81711
F-statistic	2.607178	Durbin-Watson stat	2.126467
Prob(F-statistic)	0.086096		

D(CAB) =11329.13 -31245.40 D(Log(ER)) +16153.41 D(Log(M2)) -275420.6 D(Log(real GDP))

-3486.351 D (Log(FDI)) -0.701365 ECT(-1)

R-square = 0.542351   n = 17   F = 2.607178

The error correction term coefficient ECT (-1) was statistically significant, it means the ECM specification model that used in this study is valid. The coefficient value of ECT (-1) was -0.701365. It explains that the difference between the actual value of the current account and the balance is 0.701365 which will be adjusted within 1 year.

Through one-sided test, variable of D (Log(ER)) was statistically significant (the probability value was 0.06825 < $\alpha = 0.10$) and negative. It means when the exchange rate increases by 1 percent, the current account will decrease by 312,454 million US dollars. These results are consistent with the results of study by Das (2016), Gnimassoun and Mignon (2016) and Grubisic, Kamenkovic, and Zdravkovic (2018).

Das (2016) carries out a research on current account imbalances in the global economy. The study uses a dynamic panel analysis of the GMM method during the period 1980–2011 in countries that are categorized as developed, emerging, and developing countries. The results show that in developing countries the exchange rate has a negative effect and GDP also has negative effect on the current account balance, while in developed countries the exchange rate and GDP both have a positive impact on the current account balance. It explains that the factors that affect the current account balance can have different effects depending on which country is studied. In developed countries, the current account usually is surplus but in most developing countries are deficits. Policies issued to anticipate it and also the differences between developed and developing countries.

Gnimassoun & Mignon (2016) have conducted a study on three macroeconomic indicators consisting of the current account balance, gaps output and exchange rate. The study was done in 22 industrialized countries during the study period of 1980–2011. The research method uses panel data analysis of the VAR model. The results tell that each macroeconomic indicator as the research model interacts with each other through causality relationships. One of the relationships seen in the higher exchange rate will cause the current account deficit to be deeper. It means there is a significant negative relationship between exchange rate and current account balance in the 22 industrialized countries that have been studied. Therefore the policy offered by the authors to maintain the balance of the current account needs to emphasize the importance of creating internal balance through reducing the output gap and stabilizing the exchange rate.

Meanwhile, Grubisic et al. (2018) also have concluded that the fixed exchange rate regime can affect the increase in accumulated current account deficits. It means there is a significant negative relationship between the two variables. This study was carried out during the period 1999-2012 in 16 CEECs (Central and Eastern European countries). The research method uses panel data estimation model with variables consisting of fiscal policy, exchange rate and current account balance. The research recommendations from the author are in the form of the need to implement a floating exchange rate policy because it is considered more capable of creating the current account deficit stability.

M2, real GDP and FDI

Based on the results of the research in Table 4, it is evident that the variable D (Log (M2)), D (Log (real GDP)) and D (Log (FDI)) is not significant on the Indonesia's CAB because their probability value of were above $\alpha = 10\%$. It means that in the short-term M2, real GDP and FDI do not have a significant effect on CAB conditions in Indonesia during the study period (2000-2017).

However, through the F-test, all independent variables simultaneously affect the dependent variable (the probability value was 0.086096 < $\alpha = 0.10$). Then the value of R square was 0.542351 or 54.24%. It explains that the independent variable variation is able to explain the variation of the dependent variable by 54.24% and the remaining 43.76 % is explained by other variables outside the model.

4.3. Long-Term ECM Analysis

Table 5. ECM in The Long Term

Dependent Variable: CAB
Method: Least Squares
Date: 01/07/19   Time: 19:18
Sample: 2000 2017
Included observations: 18

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1065163.	1895623.	0.561907	0.5837
LOG(ER)	-10417.90	20180.90	-0.516226	0.6144
LOG(M2)	20398.79	67188.32	0.303606	0.7662
LOG(real GDP)	-62456.14	155462.3	-0.401745	0.6944
LOG(FDI)	-15406.54	7876.503	-1.956013	0.0723

R-squared	0.763767	Mean dependent var	-3341.667
Adjusted R-squared	0.691080	S.D. dependent var	14344.50
S.E. of regression	7972.756	Akaike info criterion	21.03558
Sum squared resid	8.26E+08	Schwarz criterion	21.28291
Log likelihood	-184.3202	Hannan-Quinn criter.	21.06968
F-statistic	10.50761	Durbin-Watson stat	1.082279
Prob(F-statistic)	0.000504		

CAB = 1065163 -10417.90 Log(ER) +20398.79 Log(M2) -62456.14 Log(realGDP)

-15406.54 Log(FDI)

R-square = 0.763767   n = 18   F = 10.50761

Based on Table 5, it was found that in the long-term only Log (FDI) was statistically significant with one-sided test (0.03615<0.05) and negative. It means when FDI increases 1 percent, the current transaction will decrease by 154.06 million US dollars. Meanwhile, the other variables consisting of Log (ER), Log (M2) and Log (real GDP) proved to be insignificant towards CAB because the probability value of ER, M2, and real GDP were above α = 10%. The results are in line with the results of the study by Salman and Feng (2009); Jaffri, Asghar and Asjed (2012); Khan and Saeed (2012); and Kikerkova, Naumvoska, Toshevska-Trpchevska and Disoska (2018).

The results of this study are in line with the findings of the study of Salman and Feng (2009). They explains that FDI has a significant negative effect on the current account balance. The research was carried out in Pakistan during the period 1971-2005 using the impulse response function and Granger causality methods. Their results show that foreign investment has a negative impact on the current account balance and at the same time has a positive impact on economic growth. Foreign direct investment (FDI) is considered to cause a deficit in the current account but can increase economic growth. It will attract other foreign investment and cause account deficits to be wider in the future.

Jaffri et al. (2012) also found the same conclusion. Their study tell that FDI can have a negative influence on the current account balance. It was conducted in Pakistan using data from 1983–2011 with the method of autoregressive distributed lag. Their research variables are FDI as an independent variable and current account balance, income outflows as dependent variables. The results show that an increase in FDI turned out to cause a decrease in the current account balance, on the contrary it could increase income outflows. The negative effect also occurs in both long-term and short-term ECM calculations. As an implication of the policy, researchers

suggested to the government to immediately promote the importance of domestic investment and domestic savings compared to foreign savings. Moreover, if the foreign investment cannot be dammed, the government needs to diversify from the existing sectors to become more diverse, especially in the service sector.

The study by Khan and Saeed (2012) uses current account balance, budget deficits, foreign investment as their research variables. The study was conducted in Pakistan during the period 1976-2010 using the autoregressive distributed lag bound testing method. The results of the study show that both in the long-term and in the short-term, foreign investments are able to have a significant negative effect on the current account balance. The coefficient of foreign investment in long-term is found greater than the coefficient of forein investmen in short-term. It describes the high mobility of capital inflows in Pakistan which can cause the current account balance deficit to be lower.

Kikerkova et al. (2018) conduct a research about the effect of FDI on economy in Republic of Macedonia. Their study uses vector error correction model (VECM) methods during the period 2003-2015. One of the research results shows that FDI has a significant negative relationship on the current account balance in the long-run. An increase in foreign investment can cause a wider current account deficit through import purchases on the company's production equipment. The researchers give recommendations to the government to always ensure credibility and political stability in order to attract more foreign investment, and the use of FDI is directed to produce export-oriented products and reduce imports so that macroeconomic conditions especially CAD can be better.

Using the F-test, all independent variables simultaneously affect the dependent variable (the probability value was $0.000504 < \alpha = 0.05$). While the value of R-square was 0.763767 or 76.38 percent, it means the independent variable variation is able to explain the variation of the dependent variable by 76.38 percent, then the remaining 23.62 percent is explained by other variables outside the model.

5. Discussion

Based on the result of the study in the short-term, it can be seen that the exchange rate has a negative effect on the current account with coefficinet of -31245.404, it means when the exchange rate increases by 1 percent, the current account balance (CAB) will decrease by 312.454 million US dollars. It explains that the rupiah has depreciated, especially against the US dollar which is used as the dominant currency of Indonesian export-import transaction needs. When the rupiah currency depreciates, it will cause the price of Indonesian exported goods to be cheaper but on the other hand there will be an increase in the price of imported goods. The cheaper prices of exported goods should lead to increasing competitiveness of Indonesian goods in the global market. Nevertheless to be remembered, the imported raw materials for producing Indonesian exported goods are still high. As a result, despite the depreciation of the rupiah, it cannot encourage the competitiveness of Indonesian exports in the global market because it is constrained by dependence on imported raw materials whose their prices are expensive. The high cost of imported raw materials will cause production costs to be more expensive and reduce the competitiveness of Indonesian export products. It causes Indonesia's current account tend to deficits due to the weak product exports to the global market because the relatively higher selling prices compared to competitors' products and then it causes a weakening of the competitiveness of Indonesia's export products on the world market.

Beside of that, the reduced competitiveness of Indonesian exports also occurs due to the rapid adjustment of domestic prices which were too high due to the depreciation of the rupiah against the US dollar. It happens due to inflation through imported inflation of imported capital goods, raw materials and intermediary raw materials for domestic production activities. As it is known that the products are produced by companies in Indonesia are still very dependent on imports. In addition, this result is also influenced by the depreciation of the rupiah exchange

rate, which in the short term will have a negative impact on the current account to a deficit (Current Account Deficit).

Theoretically in the long-term as Marshall-Lerner theory and the effect of J-curve, the depreciation of the rupiah exchange rate should have a positive impact on CAB, provided the conditions of the foreign exchange market are stable. But in reality, the condition of the foreign exchange market in Indonesia is not stable, as evidenced by very high fluctuations in the rupiah exchange rate against foreign exchange during this study. As a result, improvements in Indonesia's CAD did not occur because the exchange rate did not have a significant effect on Indonesia's current account.

The results of this study are in line with the results of a study by Endegnanew, Turner-Jones and Yartey (2012) about the effect of policies on real effective exchange rate on the current account. Their results prove that the real effective exchange rate does not have a significant effect on the current account. The study was conducted in 155 countries during the period 1970-2009 where 42 countries were classified as microstates. The study used a panel data analysis model and vector auto-regression (VAR). The study results show that for countries with micro state categories, there is a significant lack of relationship between the real effective exchange rate and the current account. It makes researchers offer recommendations to state governments to focus on efforts to minimize the impact of fiscal policies on current account balance positions in their countries.

The relationship between the money supply (M2) both in the short and long term does not affect Indonesia's current account. M2 has no effect due to the component of M2 which is dominated by deposits and savings so it does not affect on Indonesia's the current account balance (CAB). Less liquid the deposits and savings than the cash, causing deposits and savings cannot play a role (insignificant) in encouraging exports and imports of goods and services in Indonesia which rely more on liquid payment instruments or cash.

In the short and long term, GDP also does not affect the current account. It can be explained that Indonesia's GDP over the past ten years has been dominated by the sector of household consumption expenditure (C), not the export sector of goods and services or the import of goods and services, so that it causes no effect on the current account. Component C reaches around 55% of expenditure in Indonesia's GDP, while export imports only range from 20%.

In the short term, FDI does not affect the current account. The entry of FDI into Indonesia in the short term does not affect the current account because FDI is mostly used for investment in imported substitute products which still rely on imported raw materials. It takes time to import raw materials and produce these products so that it does not affect Indonesian CAB in the short term.

However in the long term, it can be seen that FDI has a negative effect on the current account with an elasticity value of 154.06, it means when FDI increases by 1 percent, the current transaction will decrease by 154.06 million US dollars. This is due to FDI is needed to produce imported goods (import substitution) but the import component to produce imported substitutes is still dominant. As a result, the value of the current account in Indonesia then declined and even reached the current account deficit. In addition, the increase in the current account deficit (CAD) could also be caused by a decline in the surplus in the balance of trade of goods that continues to occur because an increase in imports due to the strengthening of Indonesia's need for investment that surpassed exports which was accompanied by an increase in the service balance deficit.

Conclusions

The results show that (a) in the short-term: M2, real Gross Domestic Product (GDP), and FDI have not significant effects on Indonesia's Current Account Balance. But the exchange rate has a significant negative effect on

Indonesia CAB. (b) In the long-term: Exchange rate, M2, and real Gross Domestic Product (GDP) have a significant effect on Indonesia's Current Account Balance. On the other hand, FDI has a negative significant effect on Indonesia's Current Account Balance.

Policy recommendations in overcoming this problem, the government needs to minimize the negative effects of factors that exacerbate Indonesia's CAB and increase factors that can reduce CAD Indonesia. First, the government needs to pay attention to the effect of exchange rate on Indonesia's current account, both short and long term. The government needs to pay attention to the fluctuations in exchange rates that occur and try to take serious efforts to stabilize or minimize fluctuations in exchange rates that occur by influencing the market of forex effectively and efficiently.

Second, the government needs to improve the investment climate and issue incentive policies for local investors, so as to maximize the exploration of sources of funding from local investors so as not to depend on outside investors. It can be done with a policy of providing incentives to institutions that have large funds such as pension funds and insurance to place their investments in government bonds and sukuk.

Third, the government must increase export-oriented product competitiveness and reduce import dependence. The trade balance deficit caused by exports of goods lower than imports, it will burden and encourage CAD. Policies that can encourage the competitiveness of export products in the global market must continue to be carried out so that it will open opportunities for increasing the value of Indonesian exports.

The limitation of this study is that the research was only conducted among 33 provinces in Indonesia for 18 years. For the next research, it can be done in 34 provinces in Indonesia with longer research time so that more complete studies can be obtained. In addition, the next study can add other independent variables that can affect Indonesia's CAD such as inflation and budget deficit so that it is more comprehensive.

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WOMEN ENTREPRENEURSHIP IN COASTAL KERALA: ROLE OF SELF HELP GROUPS IN DEVELOPING A SUSTAINABLE COMMUNITY[*]

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Abstract. The study was intended to examine the role of SHGs in promoting sustainable entrepreneurial competencies among members and to check whether the entrepreneurial competencies among women micro entrepreneurs can be discriminated based on their membership status in SHGs. The study investigated the opinion of SHG members and non-members in order to understand the cognitive part of entrepreneurial competencies among women micro entrepreneurs in coastal Kerala. The field data collected were supplemented with focus group interactions. Discriminant Analysis was performed to identify whether the status of membership in SHGs is a good predictor of their entrepreneurial competency. The results reveal that the prediction model is statistically significant, and that the status of membership in SHGs is capable of predicting the outcome variable.

Keywords: women entrepreneurship; entrepreneurial competencies; self help groups; micro entrepreneurs; neighbourhood groups; sustainable community

1. Introduction

The sustainable development of rural economy is very important as it increases rural employment opportunities, reduces regional income imbalances, prevents rural-to-urban migration, and reduces poverty at its own root. But at policy level, the overarching importance of rural economy has not been adequately recognized (Anriquez and Stamoulis, 2007). For ages, the formal financial system has consistently failed to cater to the credit needs of the

rural women. Due to lack of sufficient credit worthiness and collaterals, the rural women have been branded as sub-prime, and have been denied access to formal financial system. Within the wake of such deprivation, self-initiated action of rural women to join themselves together to meet their credit needs by themselves should be considered to be a monumental effort. The entrepreneurial activities that sprout out from such informal groups can play a critical role in social revolution. In fact, the SHGs can act as a catalyst for the development of entrepreneurial competencies among members, percolating the benefits to the society in general. According to Sixth Economic Census published by the Indian Ministry of Statistics and Programme Implementation, women represent roughly 14% of the total entrepreneurship in India (only 8.05 million out of the total 58.5 million entrepreneurs in India). Among this, 2.76 million women (13.3% of women entrepreneurs) work in agricultural sector whereas 5.29 million women representing more than 65% work in non-agricultural sector. The average employment in women-owned enterprises is reported to be very meager 1.67 (Business Standard, 2018).

It is true that SHGs have been seen mainly as entities for savings and borrowings. This was the thinking of an earlier generation of SHGs, but today, in some parts of the country, SHGs are taking on new roles and responsibilities that lie at the very core of livelihood security for the poor and also developing entrepreneurship. Globalization has imposed severe constraints to sustainable livelihoods for poor women. This needs solutions that go beyond micro-credit. The SHGs play a major role in achieving a sustaining livelihood by facilitating the rural women to enter into entrepreneurial activities. Globally, it is slowly proving one of the most effective strategies to neutralize poverty. There are many instances that rural women form SHG groups but they are dysfunctional quite after their formation. It is due to lack of entrepreneurial skills among rural SHG women. Entrepreneurship amongst women has been a recent concern. However, it is observed that the development of women entrepreneurship is very low in India, especially in the rural areas.

SHGs are considered to be a powerful tool for alleviating poverty through empowerment of rural women. The poor women in coastal Kerala have well understood the possibilities of this and are choosing not to remain poor and curse their fate any more. The SHGs also contribute significantly to the empowerment and entrepreneurial competency development of coastal people. There is a general tendency to consider SHGs as a panacea for all the ills of the rural community. Review of the existing available literature makes it clear that research studies focusing on the role of Self Help Groups in facilitating development of entrepreneurial competencies, among coastal women, especially in Kerala are rare in nature. It is specifically against this setting that the present study was undertaken to critically evaluate the role-played by the SHGs in imparting entrepreneurial competencies, among micro entrepreneurs in coastal Kerala.

Specifically, the research questions in this study are:
- Whether or not entrepreneurial competencies can discriminate between members and non-members of SHGs.
- What is the level of entrepreneurial competencies achieved through participation in various entrepreneurial activities by the members of SHGs.

To find solutions to the research questions, the following hypothesis was tested in this study:
- SHG members and non-members cannot be discriminated based on their entrepreneurial competencies.

2. Literature Review

Siwan Mitchelmore and Jennifer Rowley (2010) had undertaken a literature review of research on entrepreneurial competence in order to provide an integrated account of contributions relating to entrepreneurial competencies by different authors working in different countries and different industry sectors and at different points in time; and, develop an agenda for future research, and practice in relation to entrepreneurial competencies. After a lengthy examination various literature in the field of entrepreneurial competencies, they suggest that although the concept

of entrepreneurial competencies has been used widely by government agencies and others in their drive for economic development and business successes, the core concept of entrepreneurial competencies, its measurement and its relationship to entrepreneurial performance and business success is in need of further rigorous research and development in practice. Many researchers have taken efforts to study the components of entrepreneurial competency and its impact on entrepreneurial performance. Competency is concerned with the long term performance of a firm, an industry or a country related to its competitors says Ramasamy (1995). It is also a multi dimensional concept, including not only performance, but also potential and the process of generating performance (Buckley et al, 1998). Further the qualitative analysis done by Lau, Chan and Man (2000) about "Entrepreneurial competency of SME owners/managers in the Hong Kong Service Sector", revealed the relationship between behavioural bases and competency. The competency approach is a way of studying individual characteristics leading to the accomplishment of job role. It has been widely applied to the study of managerial performance since the work of Boyatzis (1982) and increasingly in the field of entrepreneurial performance. By using various qualitative techniques, many studies have been conducted to identify different entrepreneurial competency in different contexts (Adam & Chell, 1993; Bird, 1995; Thandabhani, 2020). For the purpose of the present study, entrepreneurial competencies are defined as individual characteristics that include both attitude and behaviours, which enable entrepreneurs to achieve and maintain business success. In this study entrepreneurial competency comprised of entrepreneur's motives,traits, self-image, attitude, behaviours, skills and knowledge (Boyatzis,1982; Brophy & Kiely, 2002), measured with the help of 47 variables, which were grouped into four different factors.

By drawing upon the concept of competitiveness and the competency approach, Man et al. (2002) proposed a conceptual model linking the characteristics of small and medium sized enterprises' (SMEs) owner-managers and their firms' performance. In Man et al. (2002)'s model, entrepreneurial competencies play a key role in determining firm performance. Although competitive scope and organizational capabilities still are two determinants of firm performance, they are influenced by entrepreneurial competencies. Empirically, significant relationships between entrepreneurial competencies and firm performance are reported. Chandler and Jansen (1992) find that the founder's self-assessed entrepreneurial competencies are positively related to firm growth. Chandler and Hanks (1994) again find that entrepreneurial competencies are directly correlated with venture growth. Baum et al. (2001) find that CEOs' specific competencies, which consist of industry skill and technical skill, have significant direct effects on venture growth, while CEOs' general competencies, which are composed of organizational skill and opportunity recognition skill, have significant indirect effects on venture growth. In a more recent paper, Sony and Iman (2005) confirm that entrepreneurial competencies which comprise management skill, industry skill, opportunity skill, and technical skill are positively related to venture growth.

Literature review suggests that definitions of competency may be drawn from the domain of knowledge, skill, attitude and performance indicators. The term competency has a number of definitions which depend on the specific task to be performed by individuals under different conditions. These definitions differ on different counts. Competency was first popularized by Boyatzis (1982), who performed a comprehensive study of over 2000 managers and he identified and assessed over a hundred potential competencies. He defined competency as, "A capacity that exists in a person that leads to behavior that meets the job demands within the parameters of organizational environment, and that, in turn brings about desired results". The competency is considered to be an underlying characteristic that an individual brings to a job situation, which can result in effective and/or superior performance in such job. McClelland (1973) claimed that competencies could be used for predicting job performances and further he held that competencies were not biased by race, gender or socio-economic factors. His study helped to identify performance aspects which are not attributable to a worker's intelligence or degree of knowledge and skill.

For Spencer and Spencer (1993) competency is an underlying characteristic of an individual that is causally related to criterion referenced effective and/or superior performance in a job or situation. Similarly, competency is

a set of skills, related knowledge and attributes that allow an individual to successfully perform a task or an activity within a specific function or job (UNIDO, 2002). Although these definitions vary in different forms, some components are found commonly in all the definitions. For Example, Competency is composed of knowledge, skills, abilities and other characteristics, which underlie effective or successful job performance. These competency attributes are observable and measurable; and these attributes distinguish between superior and other performers.

In fact, competency is a wider concept which includes the knowledge, attitudes, behaviors and skills which help a person capable of transforming his/her ideas in to realities with an excellence in performance in a given context. It does not refer to those behaviours, which do not demonstrate excellent performance. Therefore, they do not include knowledge, but do include "applied" knowledge or the behavioral application of knowledge that produces success. In addition, competencies do include skill, but only the manifestation of skills that produce success. Finally, competencies are not work motives, but do include observable behaviors related to motives.

Based on the work of Boyatzis (1982), entrepreneurial competencies are underlying characteristics possessed by a person which result in new venture creation, survival, and/or growth (Bird, 1995). These characteristics include generic and specific knowledge, motives, traits, self images, social roles, and skills that may or may not be known to the person (Boyatzis, 1982). That is, these characteristics may be even unconscious attributes of an individual. Some of these competencies are innate while others are acquired in the process of learning and training and development.

Muzychenko and Saee (2004) differentiate between innate and acquired aspects of competencies of an individual. The former involve traits, attitudes, self image and social roles and are sometimes referred to as "internalised elements" (Bartlett & Ghoshal, 1998) and the latter involve components acquired at work or through theoretical or practical learning (i.e., skills, knowledge, and experience). The 3429 aspects of competencies are difficult to change, whereas the 3429 elements can be acquired through proper training and education programs and need to be practiced (Garavan & McGuire, 2001; Man & Lau, 2005). In the context of a small business enterprise, these competencies are normally studied as characteristics of the entrepreneur, who owns and actively manages the business (Gibb, 2005; McGregor & Tweed, 2002). Stuart and Lindsay (1997) also defined competencies as a person's skills, knowledge, and personal characteristics. Entrepreneurial competencies have also been understood in terms of traits, skills and knowledge (Lau et al., 2000). Sreemoyee et al. (2015) pointed out that during the last 30 years, the focus of rural development practitioners was on the role of SHGs in promoting women entrepreneurs in India. They concluded that irrespective of large numbr of social and economic constraints, there are a number of women entrepreneurs grommed by self help groups. Women are really significant part of the human resource of every nation and hence every state should attempt to develop them as facilitators of economic growth and advancement. Reinforcement of women entrepreneurship is one among the approaches for that (Kumar, 2018; Schouten, 2019).

Sharmina et.al (2008) mentioned the financial management skills and the group identity of the women borrowers have significant relationship with the development of rural women entrepreneurship in Bangladesh. Sujata et.al (2010) mentioned lack of supportive network, financial and marketing problems was the major problem areas for rural women entrepreneurs and major de motivator for other women to initiate entrepreneurial activity. Ashok (2013) pointed out that to alleviate the poverty and to empower the women, the micro-finance has emerged as a powerful instrument in the new economy. With availability of micro-finance, self-help groups (SHGs) and credit management groups have also started in India. And thus the movement of SHG has spread out in India. Though women entrepreneurship is a recent phenomenon in India which came into prominence in late 1970's now one can see that more and more women are venturing as entrepreneurs in all kinds of business and economic activities and service sector. Though at the initial stage women entrepreneurship developed only at urban areas, lately it has extended its wings to rural areas. Entrepreneurship is a process where one person getting himself self employed

provides job to others also. The person is called "entrepreneur". Women entrepreneurship is the process where women take lead and organize a business or industry and provide employment opportunities to others. Entrepreneurship development means all those activities that aim at stimulating the individuals for becoming entrepreneurs. Yadav & Unni (2016) examined the number of papers published on women entrepreneurship in 12 established entrepreneurship journals from 1900 to 2016. They assessed the growth of the field by specifically reviewing literature reviews published from 1980s till 2016 and put forward future research directions and suggested that the lens of feminist theories can be applied in conjunction with the existing entrepreneurship theories to advance the field. Thyagaraj (2017) pointed out that women entrepreneurship must be moulded properly with entrepreneurial traits and skills to meet the changes in trends, challenges global markets and also be competent enough to sustain and strive for excellence in the entrepreneurial arena. Highly educated, technically sound and professionally qualied women should be encouraged for managing their own business, rather than dependent on wage employment outlets. The unexplored talents of young women can be identied, trained and used for various types of industries to increase the productivity in the industrial sector. Ngoasong and Kimbu (2019) examine how embeddedness within a resource-scarce context influences high-growth women's entrepreneurship. Using 16 qualitative cases developed in Cameroon, a factor-driven economy, they identify how entrepreneurial path creation by women entrepreneurs enables their ability to grow. Their study suggests that while highly embedded women entrepreneurs can easily access resources and win legitimacy resulting in high-growth businesses, they can also be locked into existing systems that constrain their growth development paths.

A study undertaken by Hemalatha (2012), with the objectives to analyse the Women Entrepreneurship Development in Hatkanangale Taluka, to know the role played by SHGs in Women Entrepreneurship Development, to analyse income, expenditure and profit of women entrepreneurs, to find the drawbacks and to provide appropriate suggestions to improve women entrepreneurship, concluded that formation of groups and the resultant establishment of micro enterprises give the indication that SHGs could bring in a positive impact in the society. Minimol(2017) analysed the levels of entrepreneurial competency and social entrepreneurship among micro entrepreneurs in Kerala. The study tried to identify the relationship between entrepreneurial competency and social entrepreneurship and develop a theoretical model that explains the linkage between these variables. The study concluded that entrepreneurial competency contributes to social entrepreneurship among women micro entrepreneurs.

3. Materials and Methods

The sample respondents were selected by using multi-stage, simple random sampling technique. Population for the study was taken as the entire women micro entrepreneurs in coastal Kerala, who are divided into members and non-members of Self Help Groups/NHGs. In the first stage, three districts (Alappuzha, Kollam, Thiruvananthapuram) were selected from the entire state of Kerala by considering the number of SHGs functioning there. In the second phase, 10 SHGs (Neighbourhood Groups consisting of 10-20 women members from the same neighbourhood) were chosen from each district, by giving due consideration to the factors such as year of formation, number of members, the amount of savings and loans, number of Income-Generating Activities (IGAs) undertaken and thrift per member. 300 women members of Self Help Groups were selected, using the list of members from each group to constitute the sample in the third phase. Attempt was made to elicit response from all the members of the selected 30 SHGs. However, in very rare cases, where members were not accessible after repeated attempts, one or two members were dropped from the list of respondents. Accordingly, the number of respondent members was 98 from Trivandrum, 103 from Kollam and 102 from Alappuzha, totaling 300. Three responses were excluded from analysis for being incomplete. Thus, the sample size came to 300, made up of 97, 102 and 101 respondents from the three districts. In order to investigate whether or not entrepreneurial competencies can discriminate between members and non-members of SHGs, data were also elicited from 100

non-members of SHGs, from the three districts. Thus, the final sample for the study consists of 300 members of SHGs and 100 non-members of SHGs, totaling a sample size of 400. More than 60 percent of the members belong to 45 years and above age category, while among non-members, 72 percent belongs to this group. 80 percent of the members are having only primary education, whereas 50 percent of the non-members are either graduates or post graduates. 62 percent of the member respondents belong to the lower income strata, while it is 70 percent among non-member respondents. Discrimiinant analysis was used to find out whether or not entrepreneurial competencies can discriminate between members and non-members of SHG.

3. Results and Discussion

Level of entrepreneurial competency. Entrepreneurial competency of the respondents was measured using 49 statements on a five-point scale ranging from Very High to Very Low. Responses were assigned weights ranging from 5 to 1 for each response. Weighted scores of each respondent was summed up and averaged. The average weighted score was then classified into Low, Medium and High.

The level of entrepreneurial competency of member-respondents and non-member respondents are tabulated (Table 1) and presented below. Among the respondents who were members of SHGs, 219 were identified as having Medium Level of Entrepreneurial Competency, while 45 had High Level of Competency. Among the non-member category, 87 had Medium Level of Competency while 13 had Low level.

Table 1. Entrepreneurial Competency: Categorization of Members and Non-Members

Category	Level of Entrepreneurial Competency			Total
	Low	Medium	High	
Member	36	219	45	300
Non-Member	13	87	0	100
TOTAL	49	306	45	400

Source: Primary Data

Statistics reveal that member category of respondents had a Mean Score of 4.023 with Standard Deviation of 1.1037, while the non-member category had a Mean Score of 3.678 with Standard Deviation of 0.2880. See Table 2 for details.

Table 2. Entrepreneurial Competency of Members and Non-Members

Category	Statistical Measures		
	No. of Respondents	Mean	Std Deviation
Member	300	4.023	1.1037
Non-Member	100	3.678	0.2880

Source: SPSS Analysis

Difference in Entrepreneurial Competency between Members and Non-Members. T Test was employed to find the difference in Entrepreneurial Competency levels between members and non-members. Table 3 gives the details.

The Levene's Test for Equality of Variances shows F Value of 46.168, and a Significance Value of 0.00, when equal variances are assumed to exist. Thus, the two categories of respondents differed significantly in Variance of response. T Test [Equality of Variance Not Assumed] shows a T Value of 4.937 with a Significance level of 0.00. The 95 % Confidence Interval of Difference is 0.2078 to 0.4827. Thus, there exists significant difference [at 95 % Confidence level] between the levels of entrepreneurial competency of members and non-members.

Table 3. T Test: Difference in Entrepreneurial Competency (Members and Non-Members)

	Levene's Test for Equality of Variances				
	Equal Variance is:			F	Sig.
	(a) Assumed			46.168	0.00
Entrepreneurial Competency	(b) Not Assumed				
	T-Test for Equality of Means				
	T	DF	Sig.	Mean Difference	95% Confidence Interval of Difference
	4.937	385.1	0.00	0.345	0.2078	0.4827

Source: SPSS Analysis

Entrepreneurial Competency: Members Vs. Non-Members. Discriminant Analysis was also performed to identify whether the levels of entrepreneurial competency exhibited by the respondents was a good predictor of their status of membership in SHGs. Simply, the objective was to see if their entrepreneurial competency levels would help to discriminate the respondents between being a member of SHG or non-member of SHG. Conversely, it examines whether there exist significant difference in the entrepreneurial competency levels of members of SHGs and non-members of SHGs.

Independent Variables   **Dependent Variable**
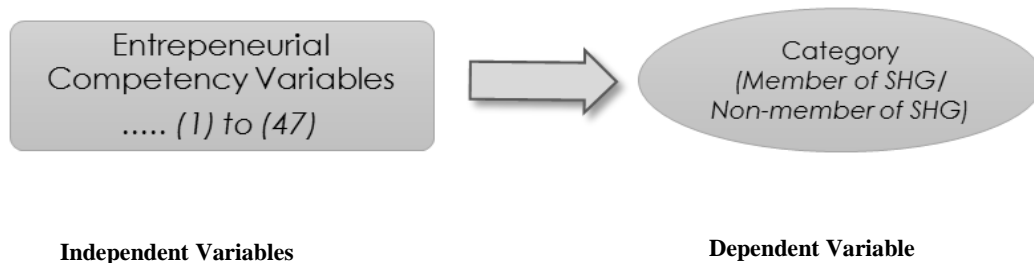
Figure 1. Discriminant Analysis Model
Source: Prepared by the Author

Table 4 shows the Box's M to be a very large 10300.374. The F Value is 7.458, with a Significance value of 0.000. Since the significance value is less than 0.001, it is found that the group covariance is unequal. Thus, the null hypothesis of equal population covariance matrices stands rejected.

Table 4. Box Test of Equality of Covariance Matrix

Box's M		10300.374
F	Approx.	7.458
	df1	1128
	df2	110557.456
	Sig.	0.000
Tests null hypothesis of equal population covariance matrices		

Source: Discriminant analysis results

Table 5 shows the Log Determinant values of the group covariance matrices. All the three Log Determinants are quite very similar to each other.

Table 5. Log Determinants

Category	Rank	Log Determinant
Member	47	22.762
Non-member	47	27.231
Pooled within-groups	47	15.554
The ranks and natural logarithms of determinants printed are those of the group covariance matrices		

Source: Discriminant analysis results

Table 6 shows the Eigen Values and the Canonical Correlation. An Eigen Value of more than one is considered to reveal a good model. The computed Eigen Value is 3.901, showing that the Discriminant Model is a good one.

Table 6. Summary of Group Discriminant Functions: Eigen Values

Function	Eigen Value	% of Variance	Cumulative %	Canonical Correlation
1	3.901	100.0	100.0	0.892
First 1 canonical discriminant functions were used in the analysis				

Source: Discriminant analysis results

The Canonical Correlation is the measure of the association between the groups in the independent variable and the discriminant function. The table shows a very high Canonical Correlation of 0.892, signifying high association between the groups in the independent variable and the discriminant function.

Table 7. Summary of Group Discriminant Functions: Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.204	595.248	47	0.000

Source: Discriminant analysis results

Wilk's Lambda measures the significance of the Discriminant function. The Table 4 shows the Wilk's Lambda to be a low 0.204. The Chi-Square Value is 595.248 and its Significance level is 0.000. The results reveal that the prediction model is statistically significant, and that the independent variables are able to predict the outcome at a statistically significant level.

Table 8. Discriminant Analysis: Classification Results

		Category	Predicted Group Membership		Total
			member	non-member	
Original	Count	member	298	2	300
		non-member	8	92	100
	%	member	99.3	0.7	100.0
		non-member	8.0	92.0	100.0
Cross-validated	Count	member	297	3	300
		non-member	21	79	100
	%	member	99.0	1.0	100.0
		non-member	21.0	79.0	100.0
a. *97.5% of original grouped cases correctly classified.*					
b. *Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.*					
c. *94.0% of cross-validated grouped cases correctly classified.*					

Source: Discriminant analysis results

Table 8 presents the Classification results. It gives information on how accurately the predictor model was able to predict the actual results. In the Original grouped cases, the model correctly classified 99.3 per cent of members, and 92 % of non-members, thereby having a 97.5 % overall correct classification.

In the Cross-Validated grouped cases, 99.0 per cent of members were correctly classified by the model, whereas 79 per cent of non-members were correctly classified. The overall correct classification in the cross-validated grouped cases was 94 per cent.

Thus, the hypothesis SHG members and non-members cannot be discriminated based on their entrepreneurial competencies stand REJECTED.

Research Limitations

The study is based on sample survey method. The finding of the sample analysis is generalized to the population. Thus all the limitations of a sample survey vis-à-vis census survey apply to the study. Though the study is done at the State-level, the data collection was limited only to three coastal districts of Kerala. However, every step had been taken to ensure representativeness of the sample, data, and analysis. Thus, the findings of the study can tolerably be generalized to the entire population. Respondents for the study consisted of coastal women-folk. The precision and reliability of the data elicited from them are bound by their skills of perception and comprehension. Owing to the importance of this fact, sufficient caution (eg. administering the interview schedule in local language with local assistance] was taken to mitigate the adverse effect.

Conclusions

The study was intended to find out the level of entrepreneurial competencies achieved by women micro entrepreneurs (both members and non-members of SHGs) in coastal Kerala. In order to investigate whether or not entrepreneurial competencies can discriminate between members and non-members of SHGs, discriminant analysis was performed. The study revealed that there exists significant difference (at 95% Confidence level) between the levels of entrepreneurial competency of members and non-members. Results of discriminant analysis reveled that SHG member and non-member women micro entrepreneurs can be discriminated based on their entrepreneurial competencies, which implies that SHGs play a catalytic role in contributing the entrepreneurial competency development of their members, who becomes micro entrepreneurs. The findings of the current study indicate that competency matters in describing sustainability of the entrepreneurial venture. The study results may help the academia, trainers and researchers to identify new ways of teaching competency development. It will also help them to focus on innovative training programmes, that focuse on development of entrepreneurial competencies and to come out with tailor-made solutions to the problems of women owned enterprises. The study pinpoints the role Self Help Groups in developing entrepreneurial competency among women entrepreneurs. Policy makers' role is significant in promoting entrepreneurial competency development initiatives and also in creating awareness among women micro entrepreneurs about the importance of entrepreneurial competencies in taking competitive advantage over others in the field, so that they can ensure sustainable business performance.

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PECULIARITIES OF YOUTH UNEMPLOYMENT: A CASE STUDY

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Abstract. The demand for youth employment is increased due to the development of international integration and improving competitiveness of the labor market in Kazakhstan in line with modern requirements. As a result, most young people face obstacles and difficulties in finding a job in their specialty. At the same time, such problems as the youth unemployment arise due to the ignorance of the situation on the labor market, the lack of professional preparedness for a competitive environment, and the lack of professional and life experience, necessary skills, and competencies. The Kazakhstan labor market has been analyzed in the context of the youth unemployment problems issues in this article. Based on the analysis, the main recommendations have been formulated that contribute to improving the situation in the labor market for the youth and reducing their unemployment. The authors have analyzed the dynamics of the self-employed youth and the structure of the youth employment by types of economic activity in the Republic of Kazakhstan.

Keywords: youth unemployment; labor market; employment; recruitment

1. Introduction

Infrastructure in this paper is understood as the sectors of economy, scientific and technical knowledge, social life, which directly ensure the production processes and living conditions of society. Infrastructure is an important component of the labor market determining the trends and features of its operation. Therefore, a more detailed study of the market infrastructure elements and the characteristics of their interaction will allow to highlight and analyze the formal and informal aspects of the relationship between the parties in the labor market and develop a set of measures that will improve the situation in the youth employment.Market infrastructure is a complex of enterprises and organizations that ensure the normal functioning of the market.

Both domestic and foreign authors were used in the study of this topic. The problem of increase fluctuation in unemployment in Europe during the crisis is addressed by the foreign authors (e.g. Bell & Blanchflower (2011),

Boeri, & Jimeno, (2016), Ours, (2015), Barslund & Busse (2014)). Much attention to the problem of the youth employment was also paid in the works of Oreopoulos et al. (2008); Banerjee et al., (2018).

The growth of the youth unemployment and its negative consequences are the contemporaty social problems. The youth unemployment is of interest for the authors. The researchers usually do not regard the youth unemployment as a separate phenomenon of the labor market but rather consider it as a form of general unemployment. For example, R.K. Sabirova considers the youth unemployment as a specific form of unemployment: "these are young people who graduate from higher or vocational educational institutions only to find no demand for their labor due to the lack of qualification or experience and other reasons" (Sabirova, 2016). S.B. Shauenova also discusses the problem of the youth unemployment but does not distinguish it as a separate problem of the labor market (Shauenova, 2013). D.N. Shaikin identifies the youth unemployment as a specific type of unemployment but notes the problems of this unemployment only among young people who want to start their career without field experience, yet with fairly high requirements for the pay rate (Shaikin, 2005). As such, the analysis of the sources reveals that the current youth unemployment is explored in a number of unrelated studies devoted mainly to the problems of unemployment and its individual types, which limits the comprehensive analysis of its specifics and consequences. Accordingly, the youth unemployment can be regarded as a type of unemployment, as a separate problem of the labor market, as a problem within the population group aged 14 to 30, or as a problem of the youth labor market. The vector of consideration leads to various approaches and different emphasis in research issues (Bukanova, 2013). By systematizing the necessary studies of the existing approaches to studying the characteristics of the youth unemployment, Table 1 reveals the problems of unemployment for further research.

Table 1. Approaches to the youth unemployment research

#	Approach to the youth unemployment consideration	Specifics of understanding the youth unemployment
1	Problem of the labor market	1.1. The youth unemployment is regarded as a general phenomenon of the labor market, with due consideration for its trends, phenomena, and specifics, but for a separate category of the population – the youth. The youth unemployment is regarded as a problem and a purpose of the study within the national and regional labor markets, with the identification of signs, types, specifics, etc.
2	Type of unemployment	2.1. The youth unemployment is not described as a separate phenomenon of the labor market, but only as one of the types of unemployment with distinguishing features (frictional, structural, cyclical, institutional, etc.). 2.2. The youth unemployment is regarded as the unemployment among the youth, with the age being the main distinguishing attribute.
3	Problem within the population group aged 14 to 30	3.1. The youth unemployment is regarded as one of the problems of the youth among others, such as crime, drug addiction, etc. 3.2. The youth unemployment is regarded more narrowly through the prism of the category to which it belongs, rather than as a general problem reflecting the entire range of the labor market problems and being a consequence of these problems.
4	Problem of the youth labor market	4.1. The youth unemployment is considered within one of the market segments – labor, which has both general trends and its specific features. 4.2. The youth unemployment is more often considered in the context of the problems of the youth labor market, often not taking general trends into account and reducing the depth and breadth of coverage.

Source: prepared by authors

As such, depending on the goals of the researcher, the identified approaches allow for a systematic study of the youth unemployment as a separate phenomenon, and as part of other phenomena of the labor market, youth labor market, and youth per se, or to consider this unemployment as a problem, as the root cause, or as a consequence of certain events on the labor market as a whole and the youth labor market, etc.

The distinctive features of unemployment should be noted for the **articulation of issue** on the topic under study. Firstly, the unemployment of the young generation generates a huge potential for energy, activity, and health, which turned out to be aloof from social production;
Secondly, the unemployment of the young generation holds back the skilled and cultural growth of the workforce in educational terms;
Thirdly, the unemployment negatively affects the economic well-being of the youth family, which ultimately affects the sociodemographic situation;
Fourthly, the unemployment of young people leads to social apathy and infantilism, which are a factor in the growth of crime among the youth; and
Fifthly, the long-term unemployment can lead to an increase in "social dependency" (Holford, 2020).

Kazakhstan lacks specialized republican and regional programs at the moment that promote the creation of favorable conditions for the youth in the labor market. However, the temporary jobs for minors are being created, while there are some shortcomings in the regulatory framework regarding the mechanism for regulating this differentiation of the labor market, creating conditions for it, and contributing to the growth of employers' interest in the youth employment. Unemployment is indeed a measure of imbalance in the labor market; it measures the mismatch between the employers' demand for various types of labor and the willingness and ability of employees to supply this labor (Jakobsen, 2012). The official unemployment rate simply divides the number of people who do not work, are willing to work, and are actively applying for jobs by the sum of the employed and those identified as unemployed. As such, many people who are unemployed by many definitions are not considered as such in the official state statistics (Verd, 2019). Therefore, the labor market infrastructure in Kazakhstan enables to strengthen measures to regulate the market operation and reflects the results of the state programs implemented on the labor market. A challenge on the labor market is partnerships that regulate the market and their interest in improving the situation with the youth employment, which is developing insufficiently. In this regard, the activities on the labor market and employment are considered as an important element in the labor market.
Hypothesis of the study:
1. The legal and regulatory sources of state regulation of the unemployment existing in Kazakhstan do not sufficiently ensure the implementation of managerial mechanisms aimed at regulating unemployment, especially for the youth.
2. The efficiency of government control over the youth unemployment is achieved through creating and implementing regional models of the state regulation programs addressing the youth unemployment.

2. Methods

General description.
The studies of domestic and foreign economists on analysis of the unemployment problems, regulatory legal acts of the Government of the Republic of Kazakhstan that regulate employment at the state level, as well as scientific publications in periodicals and materials published on the Internet were reviewed within this study.
Methods of calculating the absolute and relative efficiency of the youth unemployment indicators were used to conduct an economic study. The method of graphic images was used to determine the economic dependencies of the main indicators.
The youth unemployment was studied in three stages.
An expert survey was conducted at the first stage, which covered employers from small and medium-sized enterprises and organizations, the heads of Human Resources departments of higher educational institutions, including the youth – 200 people in total. The potential experts were selected taking such requirements into account as competence, level of education, position, and record of service in the position held.
The statistical data for 2010 – 2018 were analyzed by indicators of the state of the labor market and the level of the youth education at the second stage.

The obtained empirical material and statistical data were processed at the third stage. Theoretical analysis and interpretation of the results of the study were carried out in accordance with the purpose of the research into the youth unemployment.

The conclusions are made at the end of the article that the reliability and validity of the research results are ensured by the correspondence of the author's theoretical and methodological position and the applied set of research methods, along with an expert survey.

Expert survey. The expert survey involved the youth of Kazakhstan in the age categories 15 to 19, 20 to 24, and 25 to 28 – 150 people in total (The Youth of Kazakhstan, 2018). Kazakhstani employers from among 50 small and medium-sized organizations and enterprises were also interviewed.

According to the Law of the Republic of Kazakhstan from 9 February, 2015 - "On the state youth policy", the young is referred to as young people aged 14 – 29. People of young age up to 29 years old were interviewed in the survey.

At the same time, employers from small and medium-sized enterprises and organizations were involved to implement the result of the study – for example, Center for Audit and Evaluation LLP and Astana-kurylys LLP.

The results of a quantitative study reveal the views of employers and the youth on the causes of the youth unemployment in Kazakhstan.

The survey was conducted among employers.

The survey was conducted among employers and youth (from 18 to 29 years old) in Kazakhstan using the Survio series service (survio.com) through social networks (Facebook, VK and others).

Question: What is the reason for the youth unemployment in Kazakhstan?

Answer options:
 – experience;
 – professional skills;
 – language knowledge;
 – higher education; and
 – knowledge of software kits.
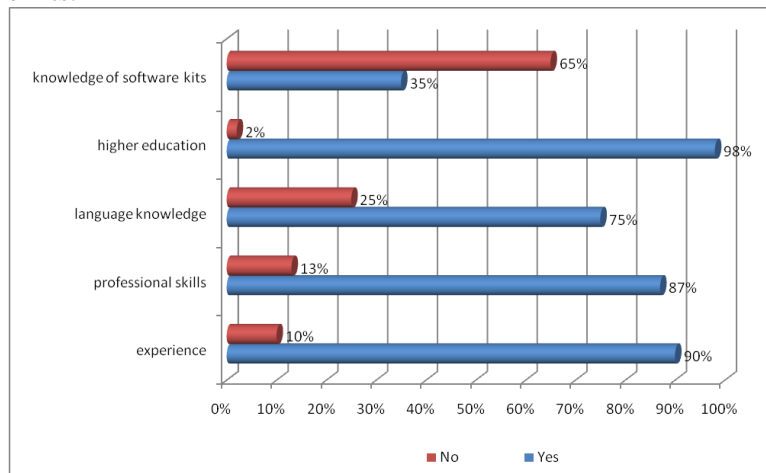
Fig. 1. Employer survey results
Source: survey results

As can be seen from Figure 1, the surveys of employers reveal that 90 % of the young people should have field experience, 87 % indicated knowledge of professional skills, 75 % preferred language knowledge. At the same time, 35 % of the employers gave preference to knowledge of software kits.

The survey was conducted among the youth:

Question: What is the reason for the youth unemployment in Kazakhstan?
Answer options:

– lack of experience;
– lack of professional skills;
– lack of language knowledge;
– no higher education; and
– lack of knowledge of software kits.
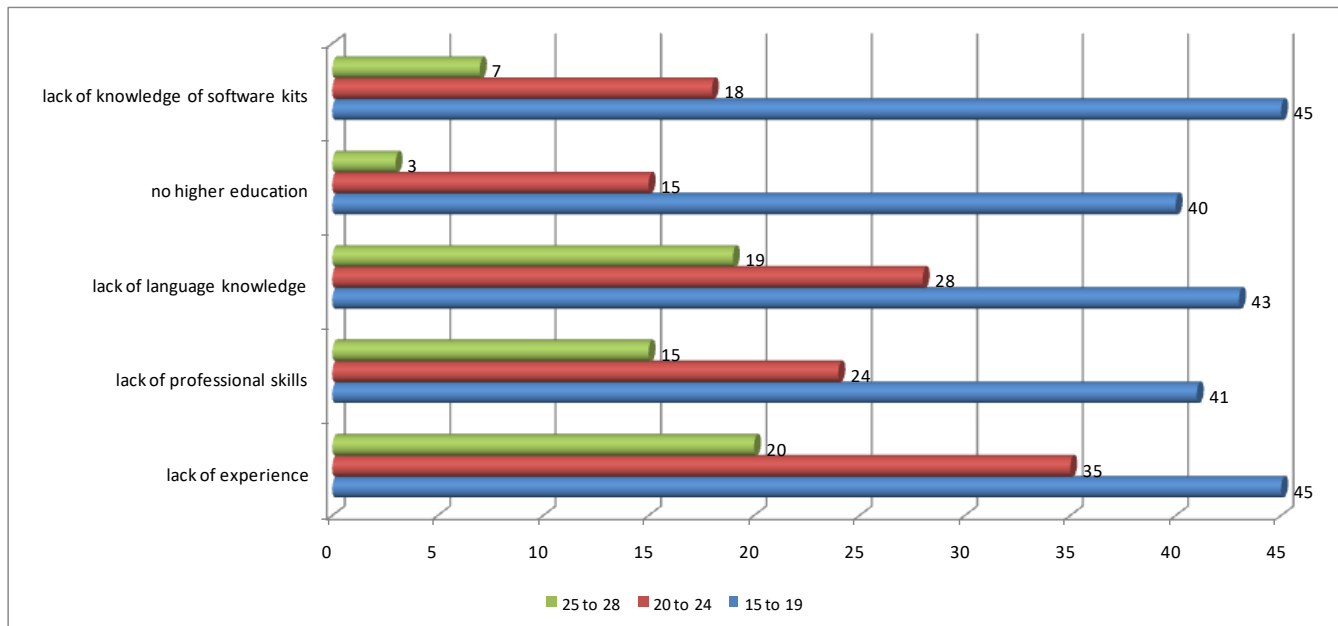
Fig. 2. Youth survey results
Source: survey results

As can be seen from Figure 2, according to youth surveys, 45 people aged 15 to 19 responded that the main reasons for unemployment were the lack of higher education and knowledge of software kits, and the lack of experience and language knowledge.

The survey involved youth from 15 to 28 years old, who are able-bodied youth in accordance with Article 31 of the Labor Code of the Republic of Kazakhstan dated 23 November, 2015.

The main reasons for the unemployment of the youth aged 20 to 24 were the lack of work experience (28 people) and the lack of language knowledge (35 people).

For young people aged 25 to 28, the reasons for unemployment were the lack of experience (20 people) and the lack of language knowledge (19 people).

b) Algorithm

The following analysis algorithm was used in the article:

1. Setting the goal and objectives of the article and determining the type of analysis;
2. Data collection and primary processing;
3. Analysis of the dynamics of indicators;
4. Determination of factors and reasons for the change in the dynamics of the youth unemployment; and
5. Identification of reserves and opportunities to increase the indicator efficiency.

An algorithm using the sample data of the Statistics Committee of Kazakhstan was developed in this study, and it can be concluded that the most common requirements of employers for the youth are the following:

1. Experience;
2. Higher education;

3. Good language knowledge;

4. Knowledge of software kits;

5. Knowledge of office software.

These are the defining qualities for high competition in the labor market in this area of the youth employment.

It was revealed during the analysis of the data on the youth employment at the request of employers that characteristics that were advantages in the recruitment were indicated in the employers' ads.

The above qualities are the main indicator of employees for employers, while also serving as an indicator of unemployment for young people aged 20 – 24.

As such, the following qualities for employers provided for the youth generation were developed based on information about the employers' requirements:

1. Higher education;

2. Good language knowledge; and

3. Knowledge of software kits;

The developed algorithm allows the following:

1. To collect high-quality data about the employers' requirements;

2. To carry out an in-depth analysis of data on the youth employment in Kazakhstan;

3. To analyze the possibility of employing a young specialist in a particular field;

4. To create a personality model of a young specialist in certain ways of social and economic development of the labor market in Kazakhstan.

The above algorithm will allow to identify strengths and weaknesses of the youth labor market.

Internal and external sources of statistical information on the youth unemployment at the present stage were the main sources for the article.

The selection criteria represented the reliability of the information of statistical analyses and data on the problem under study.

No country can make reliable forecasts for the future and determine development prospects and strategic directions on the topic under study without taking its statistical information data into account.

c) Flow chart

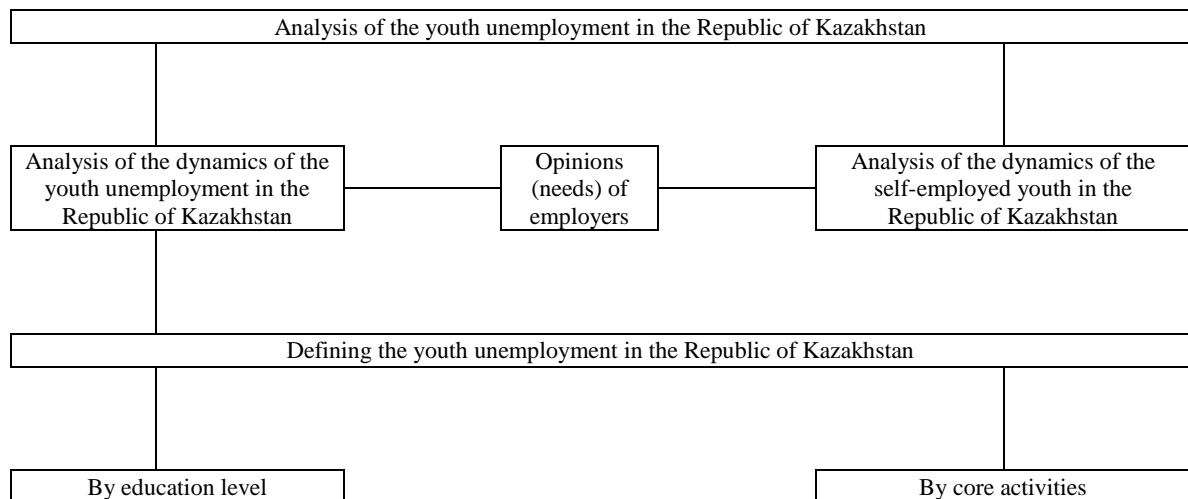The algorithm flow chart is presented below in Figure 3.

Fig. 3. Algorithm of the youth unemployment analysis
Source: prepared by authors

3. Results

According to the Statistics Committee of Kazakhstan, the youth is the most promising part of the economically active population and has certain potential, the development of which can help improve its position in the labor market, which necessitates additional attention from the state when developing specific and targeted measures to ensure employment of the category population among the youth. The dynamics of the youth unemployment in Kazakhstan are reviewed in Figure 4.

	2011	2012	2013	2014	2015	2016	2017	2018
Unemployment rate, %	5,8	5,4	5,3	5,2	5	5,1	5	4,9
Youth unemployment rate, % (aged 15 to 24)	5,2	4,6	3,9	3,9	3,8	4,2	3,8	3,8
Youth unemployment rate, % (aged 15 to 28)	6,6	6,1	5,4	5,5	4,2	4,4	4,1	3,9
Long-term unemployment rate, %	2,2	2,1	2,5	2,5	2,4	2,5	2,2	2,2
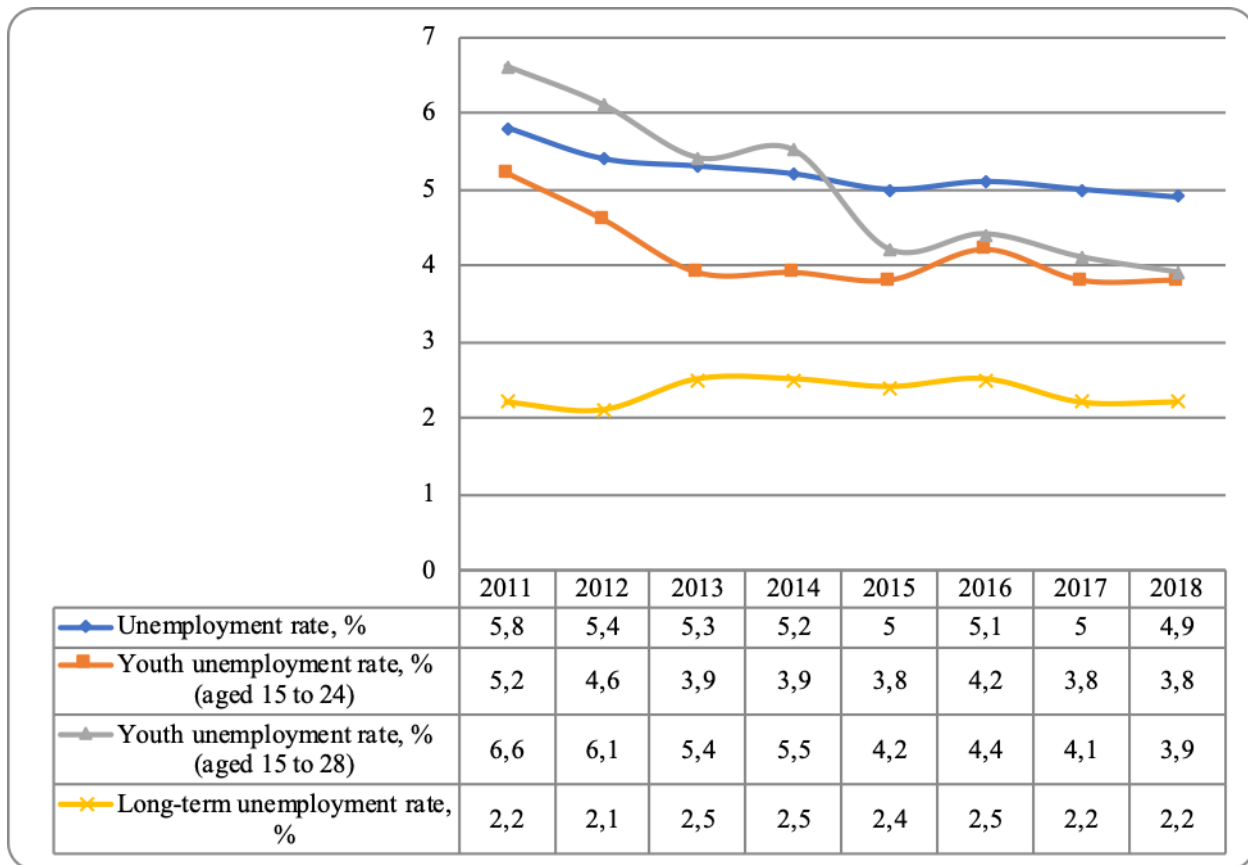
Fig. 4. Total and youth unemployment rates in the Republic of Kazakhstan (2011 – 2018)
Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

The total and youth unemployment rates in the Republic of Kazakhstan for 2011 – 2018 are analyzed in Figure 4. Based on the above data, the overall unemployment rate in the country decreased by 5.5 %, and the youth unemployment rate decreased by 15.3 % (aged 15 – 24) and 12.7 % (aged 15 – 28).

As can be seen from the above table, the unemployment rate in 2011 was 5.8 %, including the youth unemployment rate of 5.2 % (aged 15 – 24) and the youth unemployment rate of 6.6 % (aged 15 – 28). The total unemployment rate in Kazakhstan has been declining annually since 2011 and amounted to 4.9 % in 2018. As such, the unemployment rate in Kazakhstan is annually reduced, and this indicates the proper choice of the state policy in Kazakhstan (The Youth of Kazakhstan, 2018).

The youth unemployment rate tended to decrease until 2014 and was registered by the Statistics Committee of Kazakhstan as 3.8 %, however it increased to 4.2 % in 2015. The youth unemployment rate has remained unchanged at 3.8 % over the past two years (Argandykov, 2017).

An analysis of the comparison of trends in the youth unemployment for people aged 15 – 24 and 15 – 28 yielded the following research results.

For example, the youth unemployment for people aged 15 – 24 has decreased by 3.8 % since 2011, compared with the youth unemployment for people aged 15 – 28, which decreased by 3.9 %.

Two following main reasons for reducing the unemployment rate of young people aged 15 – 24 can be named:

1) The President instructed to increase the salaries of budget-funded staff by an average of 35 % from 2019 in the President's Address to the people of Kazakhstan dated October 5, 2018, "Improving the welfare of Kazakhstanis: improving the quality of income and living standards", which stimulated the Kazakhstani youth to find jobs in the state sector (Address 2018);

2) the young people who were granted the international scholarship Bolashak (Concept, 2017). All this increases the competitiveness of the labor market among young people (Concept, 2013).

The structure of the youth employment by types of economic activity in the Republic of Kazakhstan for 2013 and 2018 is shown in Figure 5.

	Agriculture, forestry, and fisheries	Industry	Construction	Wholesale and retail trade; car and moto rcycle repair	Transport and storage	Accommodation and catering services	Information and communication	Finance and insurance services	Real estate operations	Professional, scientific, and technical activities	Professional, scientific, and technical activities	Public administration and defense; compulsory social...	Education	Healthcare and social services	Arts, entertainment and recreation	Provision of other types of services
2018 year	15,3	10,7	7,2	16,2	6,1	0,3	2,1	3,2	2,4	3,4	3,7	6	10,9	5,1	2	3
2013 year	26,1	10	8,6	15,8	6,1	2	2,1	2,2	1,5	2,3	2,1	0,5	8,1	4	1,7	2,7

Fig. 5. The structure of the youth employment by types of economic activity in the Republic of Kazakhstan for 2013 and 2018, % (aged 15 – 28 years)
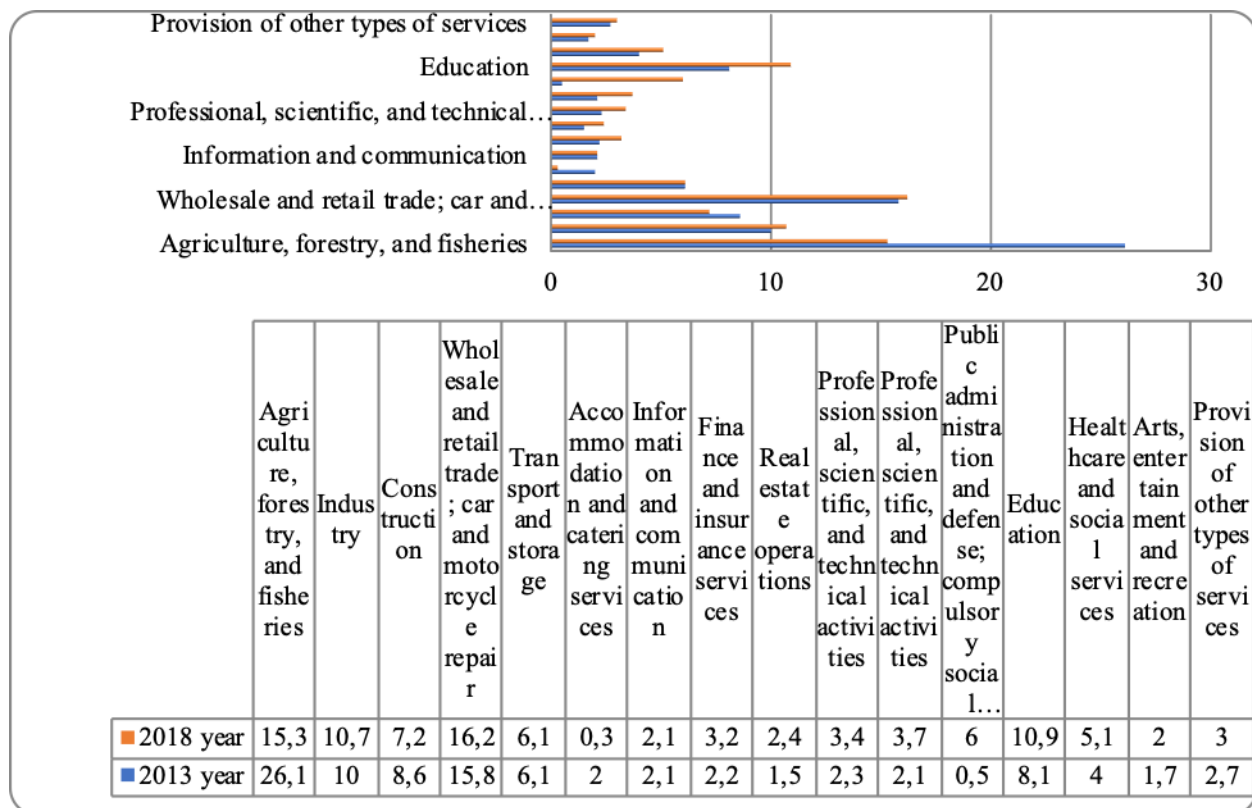
Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

The structure of the youth employment by types of economic activity in the Republic of Kazakhstan for 2013 and 2018 is shown in Figure 5. By types of economic activity, the highest youth employment rate in agriculture, forestry, and fisheries was 26.1 % in 2013, which was by 46.4 % less than in 2018. On the contrary, activities in the field of administrative and support services were 57.2 %, and operations with real estate amounted to 44.1 % during these periods. Professional, scientific, and technical activities increased by 35.3 %, financial and insurance services increased by 31.7 %. There was a youth employment growth by types of economic activity in wholesale and retail trade (16.2 %) in 2018. Activities such as agriculture, forestry, and fisheries (15.3 %), education (10.9 %), and industry (10.7 %) can be tracked. These types of economic activities were lower in 2013. Two-thirds of the employed youth aged 25 – 29 are employed in the financial sector in the labor market, and up to 50 % of the young people are employed in public administration, social insurance, and real estate operations. In addition, there are low youth employment rates in material production, agriculture, forestry, manufacturing, and social infrastructure: education, healthcare, and social welfare (Kazakhstan, 2017). Less than 2 % of the graduates opt for the scientific sector at the moment, which indicates low authority of scientists. All these trends are observed along with rising unemployment, as indicated in Table 2.

Table 2. Dynamics of the self-employed youth in the Republic of Kazakhstan for 2001 – 2018
(in the context of the settlement, aged 15 – 28), thous. people

Indicators	2001	2006	2010	2015	2016	2018	Change 2017/2001	
Self-employed youth	828.2	866.8	851.1	581.6	513.0	492.5	-335.7	-40.5
Urban population	253.5	245.8	199.2	185.5	159.3	161.8	-91.7	-36.2
Rural population	574.8	621.0	651.9	396.1	353.7	330.7	-244.1	-42.5

Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

The total volume and distribution of the self-employed youth aged 15 – 28 across settlements in Kazakhstan from 2010 to 2018 are presented in Table 4. Based on the data of the chart, the self-employed youth in 2018 decreased by 335.7 thous. people or by 40.5 %, compared to 2010. Of them, the rural youth decreased by 42.5 %, and the urban youth decreased by 36.2 %. This suggests that certain programs and state support for self-employment should be developed for the youth (Figure 6)
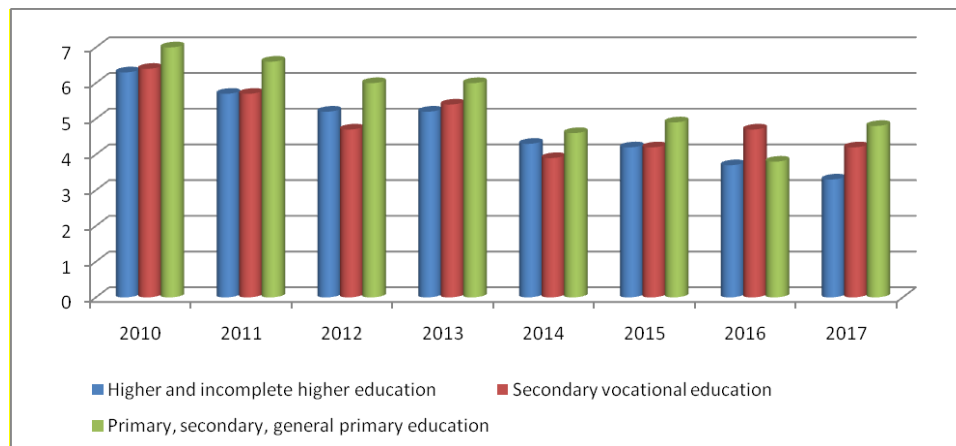

Fig. 6. Self-employed youth in terms of the settlement (aged 15 to 28) in the Republic of Kazakhstan from 2010 to 2018
Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee)

According to Figure 6, the largest share of the self-employed population, 67.1 %, falls on the rural youth for the period under review. This is because the youth are considering the goals of self-employment and have high potential for the development of private households in rural areas due to the lack of permanent jobs there.

According to statistics, despite a significant improvement in the youth employment in recent years, there is reliable information that is not officially displayed.

In accordance with the Law of the Republic of Kazakhstan dated April 6, 2016 № 482-V ZRK "On employment", the definition of the category of unemployed citizens in Kazakhstani practice differs from the method adopted by the International Labor Organization (Law of the Republic of Kazakhstan, 2016). In this case, the difference between the unemployed and the officially registered unemployed, determined by the method of the International Labor Organization, reflects the size of concealed unemployment.

The number of unemployed was estimated at 442 thous. people in November 2018, the unemployment rate was 4.8 %. By the end of November 2018, 142.3 thous. people were officially registered with the employment authorities. The share of the registered unemployed amounted to 1.6 % of the workforce. The level of concealed unemployment in Q3 of 2018 amounted to 0.3 % of the workforce (23.8 thous. people) (Kazakhstan, 2017).).

The problem of hidden unemployment can be objective, because according to Kazakhstan legislation, if a citizen applying to the employment service does not satisfy any characteristic of an unemployed citizen (has no job, is actively seeking for a job, is registered with the employment service), they will be classified as an economically inactive population but not recognized as an unemployed citizen. The problem can also be subjective, when the employee either does not want to register with the employment service as unemployed or is employed in the informal economy, works part-time, laid-off, etc.

According to the Statistics Committee of Kazakhstan, up to 80 % of the youth are not registered in employment services. In a situation of unemployment, this is associated both with the reluctance to acquire the status of an unemployed, distrust of this institution of the labor market, and the lack of knowledge of support and employment mechanisms.

Table 3. Youth unemployment groups in Kazakhstan by the 3-year criterion, % (Yu.K. Shokaman, 2017).

year	15 – 19 years old	20 – 24 years old	25 – 28 years old
2012	3.7	4.0	7.1
2013	2.5	4.1	7.1
2014	3.9	3.8	4.7
2015	4.1	4.1	4.5
2016	3.2	3.9	4.3
2017	2.4	3.9	4.0

Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

The youth unemployment rate in accordance with age criteria is presented in Table 3. It can be noted that the youth unemployment rate at the age of 25 – 28 is reduced at a stable level: unemployment by this criterion was 7.1 % in 2012 and 4.0 % in 2017, i.e., decreased by 3.1 %.

At the same time, it can be seen that unemployment remains stable for a group of young people aged 20 – 24. In this case, the inconsistent lack of unemployment among young people under 20 is due to several reasons. Firstly, they continue school education for admission to higher educational institutions or get vocational and special education. Secondly, young people with vocational education are included in the unemployment category and increase the number of unemployed after registering with employment centers (Isabaeva, 2013). Therefore, young people in this unemployment group are an unstable part of the labor market. Let us consider the youth unemployment by the criterion of their level of education in Figure 7.
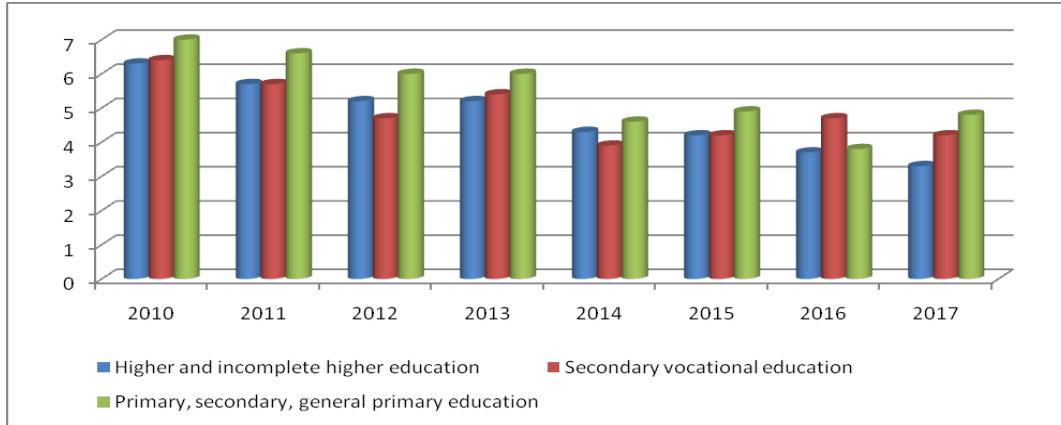
Fig. 7. Population structure by the level of education in Kazakhstan for 2010 – 2017 (aged 15 – 28), %.
Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

According to the data for 2010 – 2017, if unemployment is reviewed by the criteria of the level of education in Figure 7, the most affected group of young people is those who received basic, general secondary education. At the same time, the low unemployment rate among young people with basic secondary education (or without basic secondary education) is due to the fact that education is one of the main requirements of the modern labor market, and therefore young people aim to get education and start working only after that (Bishimbaeva, 2016). According to statistics, there was an increasing trend in the educated population from 2007 to 2012. The peak in the increase in the educated population fell on 2014 and amounted to 2,445.0 thous. people. The educated population decreased from 2015 to 2017 and amounted to 2,379.9 thous. people, 2,275.5 thous. people, and 2,141.0 thous. people, respectively. This indicator reveals that the population of Kazakhstan aged 15 – 28 prefers to get better education. A group of young people with higher and incomplete higher education tended to increase from 2010 to 2014. In the context of the structure in Figure 8, the population with higher and incomplete higher education amounted to 15.8 % in 2010 and to 42.9 % in 2018. The main reason is that the employer most often hires people with higher education (Figure 8).
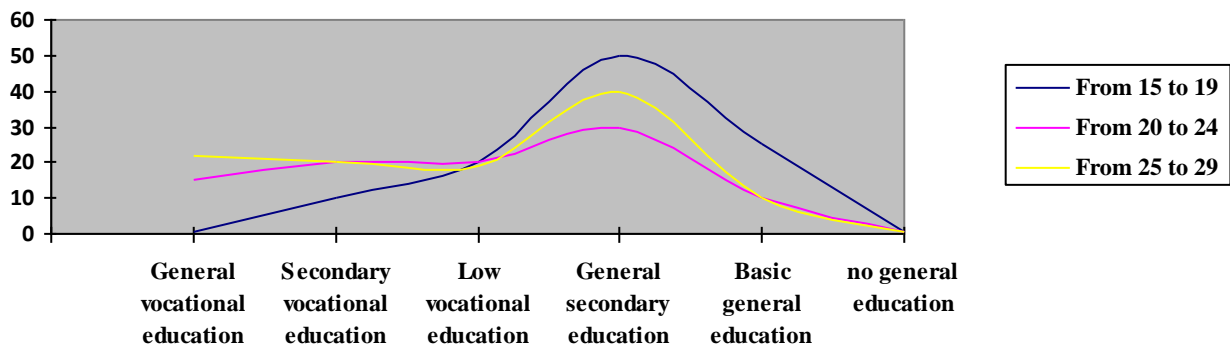
Fig. 8. Youth unemployment in Kazakhstan by the level of education in 2018, as a percentage in the corresponding age group

Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

Analysis of the general trends in the labor market in Kazakhstan for reasons of unemployment reflected in Figure 8 can help to reveal that the largest share of the unemployed is made up of citizens who lack field experience, and

the situation associated with bankruptcy, dismissal, and staff reduction is especially aggravated during the crisis period.
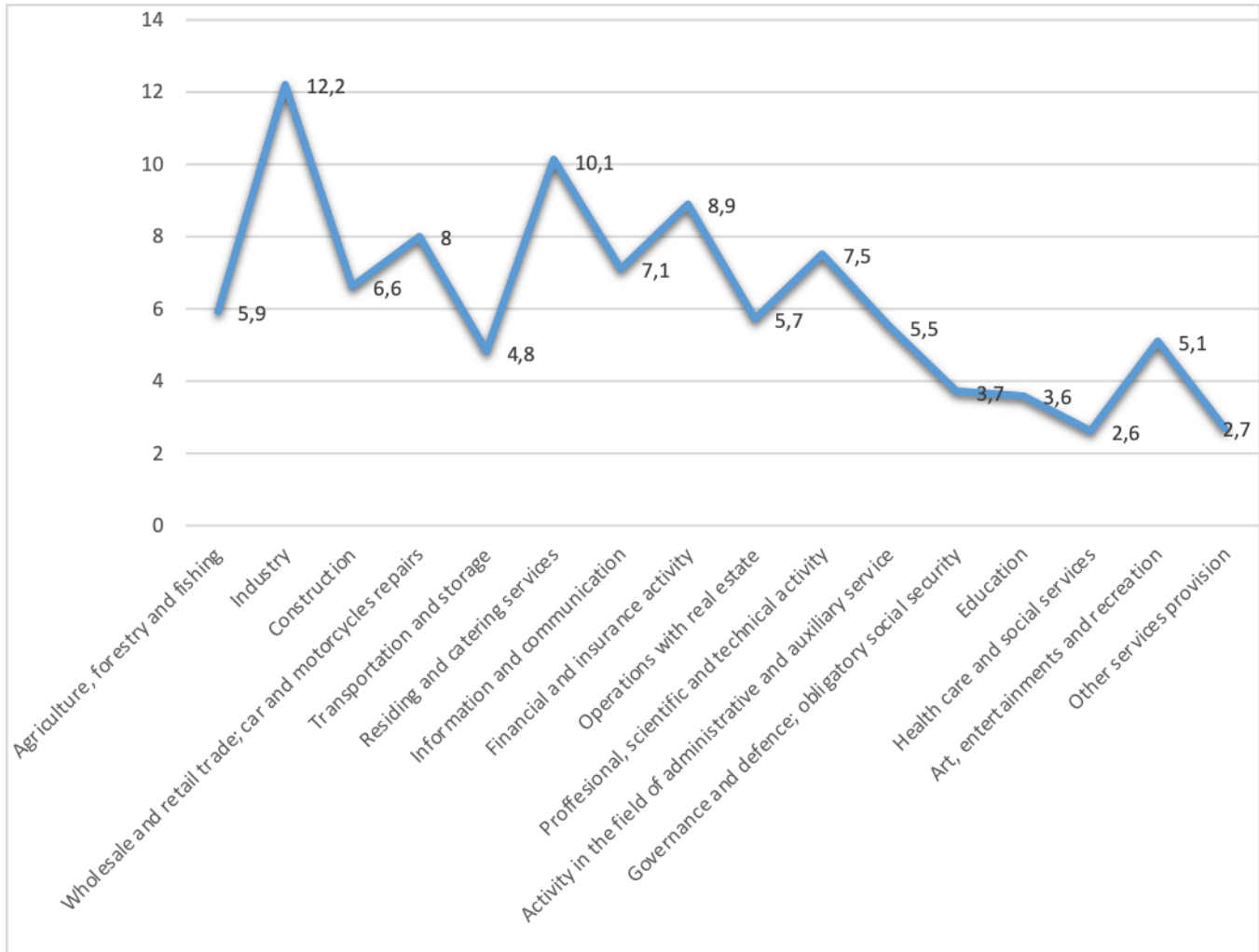
Fig. 9. The unemployment rate in Kazakhstan by core activities in 2018.
Source: compiled by the authors on the basis of data from the Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee

As can be seen from Figure 9, the sector of services, agriculture, and construction were the most affected areas of activity in 2018, which had negative impact on employment. At the same time, the youth category is one of the groups most vulnerable to dismissal and, as a consequence, unemployment. Another separate acute problem is employment and unemployment among graduates of the vocational education system (Kamerova, 2013).

According to the Minister of Education and Science of the Republic of Kazakhstan, about 50 % of the graduates are not engaged in their specialty: graduates from economics (30 %), humanitarian (11 %), and pedagogical (7 %), agricultural (6 %), and construction (5 %) sciences are especially acute at risk of being unemployed in 2016, which is also associated with general economic trends (Proceedings, 2016).

Analysis of the structure of the unemployed by the level of education and age criteria has resulted in the following trends in the current labor market:

• The greatest share in the structure of youth unemployment by age and availability of the higher professional education is held by young people aged 25 – 29; young people aged 20 – 24 are the most vulnerable group in terms of all levels of the educational system.

• The highest growth among the poorly educated category of youth is observed among young people under 20, which is associated with one of the most important requirements of the labor market: availability of appropriate education and qualification of the workforce.

• Young people under 20 have the least experience, but their representation in the status of unemployed is the smallest due to the fact that young people aim to get education at this age.

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• Young people under 20 have the least experience, but their representation in the status of unemployed is the smallest due to the fact that young people aim to get education at this age.

4. Discussion

During the analysis of the situation on the labor market of Kazakhstan, a comparative analysis of the labor market models of some foreign countries was also carried out. The results of international practice indicate that there are various ways to implement and develop youth policy in Europe, the CIS, America, Japan, China, India, and Turkey. The main goal of the youth policy in all countries is to help young people integrate into society and increase self-development. It is desirable to use the methods and practices in modernization of the state youth policy in Kazakhstan that have been used with great success abroad. The experience of the US indicates the development of self-government in educational institutions in order to increase youth involvement in decision-making. They also provide opportunities for social, cultural, communication, and management skills. The public-private partnership model is actively involved in the implementation of youth policy programs and projects in the US, including private charitable organizations and mechanisms for interacting with the commercial sector (Park, 2020). The Japanese approach to the implementation of youth policy is based on a clear division of responsibilities between public authorities and state institutions and responsibilities between them. The methods of state support for special youth centers, bureaus, and services are widely used. For instance, there are information and cultural youth centers in large cities in Turkey, and information and consulting bureaus in Germany. These centers are connected to networks, have a standard service base, information exchange, and network modernization (Van, 2018). Social and community services are provided to young people in Portugal and Spain. A special structure was recently created to coordinate the activities of state bodies in the development and

decision-making process in Sweden (Banerjee 2018). The youth policy in Russia is implemented as part of a large-scale project in socioeconomic and sociopolitical fields. The structure of the federal and regional level of the youth policy has been strengthened in recent years. In comparison with foreign countries, employers in Kazakhstan are often less interested in employing young people in the labor market; almost 60 % of the large companies are not interested in young specialists. This is primarily due to the lack of skills and experience that young professionals need. At the same time, for example, Kazakhstani business structures lack active cooperation with higher education institutions in comparison with the US practice. For example, according to a study, only 50 % of the employers work with higher education institutions. 24 % of the companies do not provide internships for young people, and 13.3 % of the employers do not need such programs.

Conclusions

Following the analysis of the main channels used to seek for a job by the youth, it can be noted that due to the heterogeneity of the youth subgroups, the existing differences in value orientations in the workplace and behavioral aspects, it is necessary to develop various methods for various youth unemployment subgroups not only towards the optimization of the channels used to seek for a job, but also the development of both personal and professional potential of the youth (Nunley, 2017).

Summarizing all the above, the following specifics of the youth unemployment in Kazakhstan can be listed:

1. The largest share in the youth unemployment belongs to the subgroup of young people aged 20 – 24, in accordance with the age criterion;

2. The largest share in the youth unemployment belongs to people with higher education, in accordance with the educational criterion, which is associated both with expectations and values in the labor market and with imbalances of the vocational qualification structure of the structural unemployment and the education sector;

3. The main reasons for the development and growth of the youth unemployment include the lack of field experience (skills) in the specialty acquired and the discrepancy between the vocational qualification structure of the labor market needs and the deformation of core values for the youth in the labor market;

4. The phenomenon of the youth unemployment is widely regarded by researchers as a form of unemployment, but it must be considered not narrowly as a type of unemployment or as a phenomenon of the youth labor market only, the problem of the youth, but rather more broadly as a separate phenomenon of the labor market, which is systemic and requires a multifaceted research approach;

5. The unrealized potential of the youth entails some negative consequences, both for the labor market and for the entire socioeconomic system of individual countries and the entire world community.

As such, the analyzed data give grounds to underline the relevance of drawing attention to the problem of the youth unemployment. Identification of the main specifics of the youth category, their attributes and trends in the youth unemployment indicates the reasons for its growth and requires further analysis of the infrastructure in the field of measures aimed at increasing the youth employment, addressing youth unemployment, and public policy. This, in turn, will allow to determine the weaknesses and strengths of the current state of the youth labor market in order to understand the existing youth employment model. This is necessary for the development of measures aimed at prevention and reduction of the youth unemployment.

Limitation of the research: the studies were conducted on the territory of Kazakhstan, covering unemployed youth who have secondary and secondary technical education (applying for any job). Excluded are youth who have higher and postgraduate education (applying for high-paying jobs), and youth who study and work.

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MICRO FINANCE IN SHARIA RURAL BANKS IN INDONESIA: A CASE STUDY[*]

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Abstract. This paper aimed to identify the implementation of micro finance in sharia rural banks in West Java province, Indonesia. Furthermore, this study attempted to investigate issues found and the solution to them. Six out of 13 sharia rural banks in West Java, Indonesia were selected to be the subjects of the study. The selected banks were claimed to be able to represent urban and rural areas of the bank location. In addition, several experts and practitioners in related fields were also invited to be interviewed and attend a Focus Group Discussion (FGD). Based on the results of the study, it was found that the sharia rural banks found funding resource to be their ultimate issues in dealing with micro finance causing the shift in selecting customers from all people from low social class to those with fixed income. In addition, sharia rural banks also faced a tough competition with conventional banks, sharia banks, and sharia business units in having micro finance activities. There have been several efforts made to increase the quality of implementation of the micro finance yet the support from the government is still low. It is expected that the government creates such an effective system so that micro finance run by the sharia rural banks can be more effective.

Keywords: micro finance; Sharia Rural Bank; entrepreneurship; welfare

JEL Classifications: G2, G21, G23

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1. Introduction

An inclusive business model, micro finance for instance, is proven to be able to enhance the economic potentials of developing countries (Husaeni and Dew, 2019), Indonesia is included. Micro finance has a positive impact towards poverty and social gap which are two of the biggest constraints of the growth of sustainable economy, (Kraemer and Conforti, 2009). Even though micro finance is not an absolute solution to eradicating poverty, it is, as long as it is well-structured and has optimum support in fulfilling specific needs of customers, believed to bring radical economic changes for poor population such as what happened in Nigeria (Fatukasi, 2005). Furthermore, there is a part of micro finance namely Islamic or sharia micro finance which also plays an important role in building socio-economic developments, particularly for micro businesses since it has no interests (or the so-called *riba*). The scheme of sharia micro finance is proven to have moral and ethical attributes which are effectively able to motivate micro businesses to develop. Both sharia banking and micro finance have close relationship since there are some elements of micro finance that can be synergized with the purposes of sharia banking (Rahman, 2007). In relation to this, policies made properly will be able to help the society have access to financial institutions (Allen et.al, 2012; Siddique et al., 2020).

Previous studies on finance and sharia micro finance commonly focus on the characteristics of the business runners as the financing objects and the sharia micro finance institutions' mindset which are influenced by the notion of the difficulties of financing the poor. The studies revealed that the biggest factors of lack of effectiveness of micro finance in decreasing poverty are the poor customers and the financial institutions' mindset (Fatukasi, 2005), (Obaidullah, 2008), (Van Rooyen, Stewart and De Wet, 2012).

Other studies put more focus on the perceptions and preferences of microfinance institutions on the services which are not optimum performed by Masyita and Ahmed (2011), Handayani, Haniffa and Hudaib (2018), Nasution and Ahmed (2015) and Nurfadilah, Samidi and Subagja (2018). And the institutions which are related to other institutions and associations such as zakat, wakaf, women empowerment, and so on. In general, the previously-related studies discuss more of the performance of the financial institutions, either banks or non-banks, including their micro financing using default level variables (measured by NPF), operational ratio efficiency (measured by REO), profit sharing margin, convetional bank interest rate, profitability ratio (measured by ROA), and luquidity ratio (measured by FDR, with recommendation of sharia financial industry; one of which is that sharia banking should enhance its performance). This research was conducted by Al Arif and Rahmawati (2009), Husaeni and Dew (2019), Trinugroho, Resfandy and Ariefianto (2018), and Afandi and A'yun (2018).

This study; however, focuses on the implementation of micro finance by sharia rural banks as well as its challenges and efforts made to cope with them in Indonesia. Therefore, this study aimed to describe the implementation of micro finance in sharia rural banks in Indonesia, its challenges faced, and efforts made to cope with them.

2. Theoretical background

Micro finance is defined as financing services for people with low income. This type of loan helps people have income, create an asset, manage risks, and fulfill their household needs (Husaeni and Dew, 2019). In this context, Islamic or sharia micro finance shares the same notion; the difference lies in that sharia finance does not only aim to have prosperity not only in the world, but also in the hereafter with the values of justice, benefit, volunteerism, and equality (Hassan and Kayed, 2009). Thus, in the practical level, sharia micro finance avoids some forbidden actions by Islam, such as *riba* (Khan, 2012).

Sharia micro finance institutions have two primary functions; social and business. Those two functions enable the institutions to strengthen community-based economy (Oktafia, 2017). In Indonesia, sharia financial institutions show quite rapid growth. In the 1960s, the majority of Muslim Indonesians chose conventional financing; only a few of them, and they were usually from low income families, had financial transactions referring to sharia (Wilson, 2007). The growth of Islamic financicl insitutions in Indonesia is considered good in comparison with other countries with similar characteristics. This leads to the possibility of Indonesia in becoming the benchmark of sharia finance since Indonesia shows signfianct enhancement of funding and financing (Nengsih, 2015). The growth also has a positive effect to the development of small and medium enterprises indicating that capital investment plays an important role (Sobana and Husaeni, 2019).

In Indonesia, small and medium enterprises have quite huge contribution to the economic growth. The percentage is increasing from 1.67% in 2014 to 3.1% in the early 2017 (Pramono, 2018). Some of the strong factors to the increase are the high level of employment and low level of capital investment needed (Orlando and Susanto, 2019). Table 1 shows the total amount of funding of sharia rural banks based on the credit grouping:

Table 1. Total of Funding for Sharia Rural Banks Based on Credit Grouping

(in IDR)

Remarks	2013	2014	2015	2016	2017
Small and medium enterprises	2.620.264	3.005.856	4.215.989	3.570.603	3.919.714
Except small and medium enterprises	1.813.228	1.999.053	2.390.184	3.091.951	4.158.522

Source: Indonesian Financial Services Authority, 2013-2018
(https://ojk.go.id/en/kanal/syariah/data-dan-statistik/statistik-perbankan-syariah/Default.aspx)

In general, Table 1 shows that the funding by sharia rural banks has increased since 2013. It is supported with the easy access of the program. However, sometimes fluctuation happens due to the decrease of the society's economy (Hidayat, 2018). Financial inclusion is a process of giving a formal financial access to unbankable people. Sharia banking has a big potential to touch this area and has been proven to grow signfianctly (Nengsih, 2015). The development of sharia banking has given positive impacts for financial development in Islamic and Muslim-majority countries (Lebdaoui and Wild, 2016). It has been proven that the development of a country depends on the banking sector to help either individuals or groups (Orlando and Susanto, 2019). In Indonesia, there are three types of sharia banking including sharia banks, sharia business units, and sharia rural banks. Each type actually has its own purposes and functions. However, as time goes, some of their programs are overlapping (Buchori, Himawan, Setijawan, and Rohmah, 2003). In addition, Indonesia also has micro financial institutions specifically established to give funding to small and medium enterprises as well. All the Islamic and sharia micro finance institutions in Indonesia basically have two purposes; providing funding and promoting social motives (Baskara, 2013). Therefore, Indonesia has a quite complete series of financial institutions, particularly those having micro finance attempting to help low class people develop their business (Afkar, 2017).

3. Methodology

This qualitative phenomenologic study (Prastowo, 2011) aimed to explain the implementation of micro finance in sharia rural banks in Indonesia (Sekaran, 2006). The implementation of micro finance in sharia rural banks contained the requirements, procedure, and agreement used. Respondents of this study were employees of six (three were located in Bandung, the capital city of West Java province and the other was from Garut, Cianjur and Purwakarta, a developing city around 60 km away from Bandung whose rural banks have the second highest assests in the province) out of thirteen sharia rural banks from West Java, Indonesia, representing a total number of 160 sharia rural banks in Indonesia. The selection of West Java was due to the fact that it has been awarded as the top-six national sharia banking as reported by the Financial Fervices Authority (OJK) in 2017

(https://ojk.go.id/en/kanal/syariah/data-dan-statistik/statistik-perbankan-syariah/Default.aspx). OJK stated that the growth of sharia banking assets in West Java is much as 15.8%. This number actually exceeded that of the national growth which is 10%. Thus, the six selected banks were purposively chosen since they meet the following three criteria: 1) all sixth are located in Regional 2 West Java with the highest assests and various non-financing performance (NFP) comprising the low, the moderate, and the high NFP and with various micro financing activities for small and medium-sized enterprises (SMEs).

The selected sharia rural banks were represented by the comissariat board and the chief of Indonesia Sharia Bank Association. In addition, there were several customers and academic invited to FGDs and interviews to confirm other types of data acquired. The FGD took place one time for five hours involving eight participants from the delegates of sharia banks, sharia rural banks, sharia bank association, academics, OJK, and customers. Each party was represented by one person except for the academics; there were six people representing. The interview was administered two months after the FGD (to the participants of the FGD) to go more deeply on the issue. The questions asked to the interviewees including issues related to the agreement, requirements, and procedure of micro financing in sharia rural banks as well as the challenges faced withing the banks and efforts made. Some of the interview was continued through emails when there were some points missed in the face-to-face interview session. The last type of data in this study was documents in relation to the topics being studied deriving from research results, websites, products, and implementation of good corporate governance of the banks. The data were triangulated and confirmed to three academics and relevant references (table 2).

Table 2. List of Sharia Rural Banks Selected as Respondents (Finance Director)

NO	Name of the Bank	Location	Respondents
1	Bank A	Bandung	1
2	Bank B	Garut	1
3	Bank C	Bandung	1
4	Bank D	Bandung	1
5	Bank E	Cianjur	1
6	Bank F	Purwakarta	1

4   Results and Discussions

4.1. The implementation of micro finance in sharia rural banks in West Java, Indonesia

The implementation of micro finance in six rural banks in West Java which are the samples of the study uses four types of *akad* namely *musharakah, mudarabah, murabahah,* and *ijarah*. All the four types of *akad* are in accordance with the costumers' needs and consequently have different administrative requirements. All of the *akad* types are also in agreement with the fatwa from the National Sharia Board (*Dewan Syari'ah National*, DSN) under the supervision of Indonesia Ulama Council (*Majelis Ulama Indonesia*, MUI). Such *akad* schemes as *qard al-hasan* (capitals need), *murabahah* (tool needs), and *ijarah* (tool rental) have the potentials to be easily managed for the finance for the poor. In the meantime, such participating schemes as *mudarabah* and *musharakah* have the potentials for the main purpose of micro finance since the scheme is able to fulfill the needs of risk distribution of micro businesses (Rahman, 2010).

In terms of *akad*, the most frequently applied are *murabahah*, followed by *musharakah*, *mudarabah*, and *ijarah*. For *musharakah* and *mudarabah,* the requirements are a filled form with several other required documents including a copy of ID card, a copy of family card, a copy of marriage certificate, and the recent photos of husband and wife. There are also additional document requirements covering a copy of business legality certificate, a copy of saving or checking account of the last three months, a copy of certificate of projects take, a copy of projects to be funded including the projection of funding of the projects, and a copy of guarantee. Regarding the business legality certificate, some of the banks require the costumers to have the business run for at

least a year. For the *akad* of *mudarabah*, the obligatory administrative requirements ar the same and added with a copy of balance sheet of the past two years for employers and income statement for employees, the latest appointment decree for employees, a copy of guarantee, and the list of necessary goods. The costumers for the type of *akad* are then requested to submit the proposal of the goods they are buying and the dawn payment as much as 25% of the price set by the banj. *Murabahah akad* for comsumptive goods such as cars and home rennovation are mostly addressed to employees with fixed income such as certified teachers and lecturers.

Last but not least, the *ijarah akad* requires such additonal documents such as a copy of business legality certificate, a copy of saving and checking account of the last three months, a copy of balance sheet of the last two months, a copy of the latest income statement for employees, the latest appointment decree for employees, and a copy of guarantee. The costumers are going to rent the goods and finally own them since this is how the *akad* works. Those four different types of *akad* bring different types of profits for the banks as well. For instance, in the case of *mushakarah* and *mudarabah,* the banks are benefited from profit sharing. As for the *murabahah*, the banks are benefited from the margin setting and for *ijarah*, they receive the benefit from the rental fee. In addition, all the four types of *akad* are categorized into *tijari,* whose main purpose is to have profit. Thus, the requirements usually request for a guarantee to the customers.

The costumers are either individuals or groups. In Islam, this is not something new since ibn al-Khald stated that it is a part of social solidarity so that sharia banks offer a variety of products of sharia finance without questioning the sustainability of the groups (Dusuki, 2006). It has been found that some of the requirements of the micro finance are actually difficult for the poor people; in fact, the ideal purpose of the finance is to fund micro small and medium enterprises. In the meantime, it is shown that the rural banks with low assets are concerned with facilitating the society yet those with high ones focus more on consumptive funding. This indicates that micro finance has a stroght economic basis. This is in line with a study in Africa proving that micro finance has a positive impact towards eradicating poverty (Van Rooyen, Stewart and De Wet, 2012).

There is a shift of the function of sharia rural banks from helping low social people to helping those with secure income. This is due to empirical data showing that traditional financial industry claimed that small loan is related to big risks and vice versa. In Africa, for instance, small and medium enterprises have difficulties to access micro finance. Some of the contributing factors to this phenomenon are commercialization and private investor involvement (Li, Hermes and Meesters, 2019). Micro financing is such a difficult task to do since the institutions have to be able to provide funding for small enterprises without having too much loss. One of the strategies to deal with it is collaborating with other institutions. In Nigeria, micro financing has been more effective when combined with other activities, particularly women empowerment activities. In Indonesia, it has also been proven that women empowerment plays an important role in enhancing employment and export (Sobana and Husaeni, 2019).

An integrated model combining Islamic financial institutions and philantropic bodies are very feasible to implement in Indonesia. Both the institutions are able to complete each other (Hassan, 2010). Thus, the implementation of micro financing in sharia rural banks is not limited to loan with sharia interests. Some other programs such as zakat, waqf, and sadaqah are applicable as well. In terms of asset growth, there is a fine increase even though quantitatively, the percentage is 62% in the last three years. With the percentage of refund as much as 92-93%, the fluctuating non-performing finance ranges from 2%-5%. Thus, it can be inferred that sharia rural banks have a potential to the country's financial contribution (Kara, 2013). Globally, Islamic financial industry is developing; however, there needs to be an upgrade of innovation and an additional feature accommodating such instruments as zakat, infaq, sadaqah, and waqf to be better organized. The mindset of the difficulty to differentiate the low social and economic class people is changed by the success of sharia rural banks in micro finance.

4.2. Constraints in Sharia Rural Bank micro finance in West Java

Generally, there are three main obstacles of the implementation of micro finance in sharia rural banks in West Java. *First* is the financial resource. According to the head of Indonesia Sharia Bank Association, this is the prioritized issue in micro finance since the financial resources from deposit saving or the third party do not meet the needs (Purba and Teriana, 2017). One of the possible solutions is by having loan from other sharia banks. However, a new problem arises as the cost of fund (COF) is pretty high. *Second* is the existence of competition between sharia rural banks, sharia banks, and sharia unit which share the same program in having micro finance. It has been found that some of the programs they have are overlapping; in fact, the amount of funding they have is totally different. Sharia rural banks tend to have smaller amount in comparison with the other two competitors. Costumers usually are more interested in proposing to have micro finance services to banks with easy access. Thus, sharia banks should improve their performance and learn a lot from conventional banks (Masyita and Ahmed, 2011). This is a possible solution since basically there is no huge difference between both banks in poverty eradication (Obaidullah, 2008). *Third* is the economic stability. Small enterprises usually cannot maintain their business when what they trade is seasonal meaning that their income is not stable. However, the most important factor in the early stages of small enterprises is capital investment, followed by technological innovation (Li, Hermes and Meesters, 2019). It is found that one of the challenges of micro finance is low penetration of the business, lack of funding mobilization and high administrative cost (Rahman and Dean, 2013).

Governments are in need of making policies in relation to micro finance particularly in sharia rural banks. It is inevitable that the changes in the banking world such as tight competition and private investment are big constraints (Oktafia, 2017). In Islamic countries or countries with Muslim majority, most of the community members are unfortunately categorized poor. Thus, sharia finance should be well organized (Rahman and Dean, 2013). Some of the ways to cope with this are developing a central sharia bank, researching on important issues, and inreasing the people's awareness to invest in micro finance (Rahman, 2013). In Indonesia, the government needs to reevaluate the policies of sharia banks having a right to conduct micro finance since it has a negative impact to the sharia rural banks.

4.3. Efforts made to increase micro finance in Sharia Rural Banks in West Java

The first effort made is related to the cost of fund. The sharia rural banks have attempted to have fast responses and easy requirements for micro finance. However, the feasibility analysis should still be paid attention. Another effort is by having the supervisors come to the customers' house no matter how small the finance is. This is beleived to create psychological bonding as well. Unfortunately, some of the banks have an issue of the human resources. Micro finance is defined as financial activities for low social and economic class people who have limited access to the banks. Thus, this type of costumers usually do not have guarantees, fixed income, and any other administrative requirements (Baskara, 2013).

In relation to the issue of capital investment, the government should make a policy supporting the small and medium enterprises. In addition, the development of human resoures also plays an important role in improving the quality of micro finance (Saragih, 2019). Based on the findings of a study by Nugroho (2019), human resource development is a priority in comparison with poverty eradication. More specifically, a segmentation of customers between sharia rural banks, sharia banks, and sharia business units is urgently required. Banking-related institutions are to provide financial services and voluntary institutions are to have such programs as zakat, infaq, waqaf, etc (Rahman, 2013). It is believed that integrating those two kinds of institutions are a great weapon to reduce poverty in such developing countires as Indonesia, Malaysia, and Bangladesh (Haneef, Pramanik, Mohamed, Muhammad, and Amin, 2015). The principles of social and Islamic finance should be maintained to have solid micro finance aiming at reducing poverty. Using zakat funding to have more social programs is a great notion to have a more efffective way of poverty reduction (Yumna and Clarke, 2011). In Indonesia, some policies

actually contradict with others. For instance, a policy on who has the right to conduct micro finance activity is quite controversial.

Conclusions

Micro financing, particulalry one conducted by sharia rural banks in West Java, Indonesia, is intented to be able to help people from low social and economic class to develop. It is commonly known in Indonesia that those people do not have an easy access to banks, either conventional or sharia ones. Thus, sharia rural banks are expected to cope with this. However, in the implementation, there is a slight change. Sharia rural banks whose main purpose is to help the government reduce poverty by giving easy access of micro finance to the poor are now focusing on having customers with fixed income. One hand, it is understandable since the funding resource is still the number one problem in the development of sharia rural banks. On the other hand, however, this cause to lesser chances of the poor of getting financial help. Unfortunately, in terms of policy, Indonesian government seeems to be too loose since there are several policies contradicting with each other. Thus, it is expected that there is a systematic change leading to an integrated model of micro finance in Indonesia.

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GOODS AND SERVICES TAX SHOCK ON SMALL AND MEDIUM ENTERPRISES WORKING CAPITAL IN INDIA

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Abstract. Goods and Services Tax (GST) reform introduced by the Indian government in 2017 was considered as the utmost radical and comprehensive indirect tax regime undertaken since independence. The new tax reform had creataed a shock wave among the Indian business houses, especially to the Small and Medium Enterprises short term working capital requirements. This research paper analyzes the working capital constraints created by the implementation of GST on the SMEs. Three research models have been developed by including the major working capital components namely average collection period, average payables period, inventory conversion period and a dummy variable to capture the effect of GST. The mathematical model presented in the paper has been tested using Random effects GLS method. The results of the study reveals that during the sample period the SMEs production capacity had deteriorated, collections and payments were delayed, profit margins were diminished and the credit requirements had escalated. This research outcome will provide an insight to the policymakers and financial institutions in India to implement and revamp strategies that will enable the SMEs to revive from this challenging environment successfully.

Keywords: SME; working capital management; Goods and Services Tax

1. Introduction

The Indian GST tax regime was aimed at replacing a range of taxes with a new, unified system of indirect taxation nationwide proclaimed as "One Nation One Tax". The transition has already been embraced by the Indian firms and its two-edged impacts have been perceived across the nation. The key positives of GST include removal of complexities with multiple tax structures for better compliance, fixed tax rates to reduce tax evasion, facilitating efficient logistics across state borders, and the like. On the other edge, the GST regime had created a big, direct impact on the working capital of business houses especially to SMEs. SMEs with low financial reserves are compelled to reassess and realign themselves from the line of credit, taxation levels, and timelines. With a revamp in the timelines of availing line of credit under the new GST regime, SME's short term cash flows was affected significantly and forced the firms to look for new sources of working capital finance. This results in

increased operating expenses and decreased liquidity which indirectly impacts the financial and operational sustainability of SMEs. Against this backdrop, this paper aims to explore the GST shock on SMEs working capital in India.

2. GST in India

Overview**:** GST as a concept was initiated in the year 2000. Based on the recommendations received from the Fiscal Responsibility and Budget Management committee in 2004, the GST movement was articulated in 2007 with the proposal to implement in 2010. The report proposed to restore all existing indirect taxes both at the central and state-level value-added taxes as shown below.

1. Central Excise duty: an indirect tax imposed by the central on the goods manufactured in India for domestic consumption

2. Central sales tax: collected by the state Governments these taxes were collected in case of inter-state sale or purchase transactions.

3. Service tax: charged to the service providers for service transactions which exceed Rs. 10 lakhs in a financial year.

4. Countervailing duty: charged on the import of specific goods to offset the domestic goods price.

5. Special Additional Customs Duty: levied at 4% on indigenous goods imported into India.

In addition to the above taxes at the central level, the following taxes were levied if the goods move to another state, and for sales within the state.

6. Value-added tax: introduced to restore general sales tax in April 2005 is a value addition at every phase of production to the distribution chain. Each India has its legislation, tax slabs and list of taxable goods.

7. Octroi/Entry tax: imposed by the State and local municipalities on the goods moving from one state to another.

8. Entertainment tax: levied on any form of entertainment as listed in Article 246 of the Indian constitution.

Value-added taxes were collected by the State Governments for sales within the state whereas Central State Tax was levied by Central Government in case of interstate transactions. In addition to CST, Excise duty and VAT were levied again by the states for the interstate sale of goods which creates a cascading effect on taxes and increased the tax burden, production inefficiencies, and distortion of resource allocation in businesses.

With the introduction of GST as a comprehensive, multistage destination-based tax the above-mentioned taxes at both central and state levels were subsumed into GST into four as shown in table 1 below.

Table 1. Components of Indian GST

Type of transaction	Applicable Tax regime	Tax levy Authority
Transactions within the Indian states or Union territories	CGST	Central Government
Transactions within the Indian states	SGST	State Government
Transactions within Union territories without legislatures	UTGST	Union territory
Transactions carried on between Indian states and imports	IGST	Central Government

Source: Goods and Services Tax Council www.gstcouncil.gov.in/

The broad objectives of the GST regime include harmonization of indirect taxes, mitigate the tax burden on business, improve production efficiencies and logistics all directed towards fostering international trade and economic development. GST is levied at each stage when there is a monetary value-addition to the product right from the materials procurement to end sale to consumers which makes it a multi-stage tax. GST is a destination-based tax arrangement. As GST is levied at the end sale, in case of interstate transactions the tax revenue goes to the government of the state where the product is consumed.

Proclaimed as one nation one tax, GST has replaced a series of 14 indirect taxes so far in India including the most prominent Central Excise duties (except for certain Non-GST goods for some exclusive transactions) purchase and sales taxes, Value added tax at state levels, Luxury tax and the like. The cascading effect of taxes (i.e paying tax for taxes) which increases the tax amount and product price at each stage of the production process has been removed with GST practice. The tax liability moves with each stage of the transaction and the taxpayers can claim credit for this amount of tax when the tax is submitted. This action eventually reduces the cost price due to reduced taxes. To facilitate intrastate transactions, E-way bills can be generated by using a common portal which benefits the manufacturers, traders, transporters and tax authorities.

3. Impact of GST on the SMEs Working Capital

SMEs occupy a significant fraction in Indian economic development in terms of production, exports, employment, wealth creation and development of entrepreneurial base. Table 2 provides a snapshot of SMEs role in the economic development of India according to recent statistics.

Table 2. Contribution of SMEs to Indian Economic Development

Metric	Contribution
Estimated number of units (in lakhs)	633.88 (31% in Manufacturing, 36 in Trade and 33% in other services)
Employment opportunity	11.10 crore jobs (360.41 lakh in Manufacturing, 387.18 lakh in Trade and 362.82 lakh in Other Services and 0.07 lakh in Non-captive Electricity Generation and Transmission (Murugesan and Manohar, 2018, p.50).
GDP Contribution	28.77 % to the total national GDP
SME Output	45% of manufacturing output
SME Exports	40%
Deployment of Bank credit(in billion Rs)	26370.52
SME Growth Rate	6.43% of annual compound growth rate in terms of number of units and 3.63 % growth in employment opportunities

Source: Central Bank of Bafrain https://www.cbb.gov.bh/ and Ministry of Micro, Small and Medium Enterprises https://msme.gov.in/

Short term working capital plays a significant role in the firm performance of any firm and is of paramount importance for SMEs due to its nature of the limited source of funds and access to additional financing channels. As short term working capital decisions of SMEs profoundly impact on the firm liquidity and profitability, efficient management of current assets and current liabilities remains pivotal for SMEs at any given point of time. Throughout the SMEs daily operations, funds continuously move from inventory to receivables. Once the receivable is collected, funds are released from operating working capital as the cash account is increased. This movement of funds from inventory to receivables and receivables to cash is referred to as the operating cycle. Accounts payable help fund the inventory and receivables tied up in the operating cycle. But in most cases the business size and curbed access to formal capital raising channels reinforce many SMEs to greatly depend on timely cash receipts and bank balances for their short term working capital requirements (Sunday, 2011). When GST was introduced the SME manufacturers have to file their tax returns when the goods are passed on next stage much earlier before the proceeds of sale are collected. In simple terms, the SMEs have to pay their tax first and claim refunds later till the time the goods reach the end consumer. The problem intensifies more in case of delays in trade credit arrangements which is a common industrial practice in SMEs. Any impeded credit collections on one side and the claim refund delays of GST creates an adverse effect and constraint on manufacturing sector SMEs working capital. This mechanism will lengthen the cash conversion cycle and reduce the SMEs meager short term cash balances and cash burn rate. On reaching the threshold limit, the SMEs are compelled to rely on

external financing for short term working capital requirements. The escalating operating cost and insubstantial channels of external financing make it a less preferable choice for SMEs to raise their capital.

Realizing the seriousness of this issue, the Government of India had initiated a series of strategies to revamp the working capital shortage created by GST. Some of the significant initiatives are

- Trade receivables discounting system (TReDS): discounting of trade receivables with corporates, Government treasuries and public sector undertakings which facilitates the SMEs to raise short term working capital. According to the RBI report as on 31st October 2018, there were 1878 MSMEs, 235 corporates and 57 banks have been registered under this mechanism are gaining ground.
- Formalizations of MSMEs: into a formal financial system to alleviate the cash flow problems during the transition.
- Access to credit: A 59-minute loan portal has been designed for quick access credit to MSMEs up to 1 crore rupees which connects the MSME to the bank branch for loan approval. In reality, this portal remains inaccessible most times by MSMEs. The Hindu Business Line dated 14th Feb 2019, reported that the portal has received 1.31 lakh applications, approved 1.21 lakhs and loans were sanctioned to 40669. The article also added that the high approval ratio and low sanction ratio indicates that the need for its deeper integration of this portal with bank processes
- GST grievance redressal mechanism: This channel includes help desk services, self service mechanism where firms can submit their queries related to GST laws, procedures and information technology realted issues. The status of their queries can be track down using help dest or web ticketing services.

In addition to the above many other initiations were proposed by the Government of India. Nevertheless the lack of outright timely information, initial startup hiccups, and reluctance to accept new reforms had created a negative apprehension on GST. In addition lack of awareness on the benefits of this tax regime, inadequate support from concerned authorities, lack of IT support, late cash refunds intensified the apprehensions among the business firms in India.

4. Review of Literature

GST as a topic of great interest has attracted the attention of academicians, industrial practitioners and professionals at large within a short span of time. Pandey and Banwet (2018) tried to examine the impact of key innovations to reform the Indian financial system including liberalization, demonetization, digitization, and the implementation of GST. The impact of these key innovations on economic growth was measured using key macro-economic factors over a period of 1970-2014. The impact of GST on the Indian economy was discussed only as theoretically, due to paucity of the empirical data. The study concluded by highlighting that the implementation of GST as a highly disruptive innovation to the Indian economic growth at least in the short run. Stressing the same point, Banerjee and Prasad (2017) highlighted in their article that reforms must bring simplicity not disruption. Expected that GST as an opportunity to reform the cobweb indirect taxation structure, it has turned out to be burdensome on small businesses that curtail their growth. Highlighting the same point Kawle and Aher (2017) in their study found that that in the limelight of achieving the broad based tax structure, the threshold limit adds significant tax burden on Small and Medium enterprises. The authors stressed the need for an effective robust IT network that supports successful implementation and process of GST including registration, filing of returns, payments, and settlements on IGST for the successful implementation of the new tax reform. Agarwal et.al (2017) reported that frequent crash of the GST website creates an increased discontent among businesses including transitional tax rates, complex input tax credit systems, and increase in the number of returns filed with added compliance costs. The study concluded that GST has imposed a big threat to SMEs in terms of compliance costs which accelerates the prices of end products. Considering the potential drawbacks researchers had started proposing strategies for the success of GST in the long run as well. Mehta et.al (2018) constructed a logistic regression model that forecasts the possibility of a business entity to turn to be a potential return defaulter for the forthcoming tax-filing period. This model was developed for the commercial taxes department of Telangana region of Hyderabad state in India to reduce the level of tax evasion in the future.

There are few researches that attempted to analyse the impact of GST on Indian firms and households. Shukla et.al (2018) quantitatively analyzed the impact of GST on the financial performance of 192 companies listed in Bombay stock exchange the value of total assets was significantly different in post GST period. The study employed three financial parameters namely total assets, profit and market capitalization including two demographic variables size and age of the companies. The age and size of the firms were also found to be significant factors in influencing the firm performance after the implementation of GST.

Srivatsava and Bisaria (2018) studied the sector-wise impact of GST on the real estate industry which contributes to nearly 9 percent of national GDP concluded that the sector is expected to well perceive GST even at a higher rate than the current rate. The RERA and GST together are expected to eliminate the past falling expenses structure, promote easy compliance, creates uniform assessment rates and structures and reduced extra taxation rates. These cumulative benefits of GST are passed on to the end buyer in the form of the reduced cost of properties which serves its prime purpose.

Another sector-wise psychographic study of the top executives in the shipping industry by Rengamani (2018) reported the respondents' preference for having single GST enactment and a single rate for CGST and SGST across India. The study highlights the discrimination of taxability of outbound freights for Indian shipping lines as against the foreign companies in case of cargo transports. The EY report 2018 also emphasized the same indicated that this could result in reduced competitiveness and business loss to Indian shipping companies. Towards that end, an amendment to Sec 128 (8) of the IGST was made by the Government of India, yet the EY report claims the provisions as unfulfilled. These actions set a clear picture that GST reform is shaping itself by the amendments when required. The GST council meetings at frequent intervals revise, recommend and approve amendments on composition levies, GST rates, update and publish GST rates approved by the council from time to time.

Notwithstanding the amendments provided by the Government, a thorough understanding of the benefits of GST among Indian households and industries remains insufficient. The lack of awareness could also lead to negative apprehensions about GST in India. A study by Kumar et.al (2018) identified that the level of awareness about the rates and related features of GST found to be very low in the Pharma industry of Guntur district. A study conducted by Rao and Babu (2018) also reported a knowledge gap among engineering faculty who are bound to develop future entrepreneurs for the nation. A similar study by Madan et.al (2018) used twitter for data mining and sentiment analysis to examine the perception of Indians using lexicon-based methodology. The data collected on 10000 datasets found that 33% were positive and 54% remained neutral towards the implementation of GST. The results of lexical based sentiment analysis clearly indicate that the addition to the positive side purely depends on the successful compliance of GST in the future.

Most of the researchers have attempted to analyze the GST qualitatively or broad-based effect of GST on the Indian economy as a whole. Though the implementation of GST had created shock wave on the overall performance of large businesses, it is imperative to study the working constraint created by GST on SMEs. The short term financing decisions of SMEs highly diverge from large firms in terms limited sources of funds, limited accessibility to financing avenues and high dependence of daily cash flows. For a sector that has been hammered by demonetization and the chaotic implementation of the GST had created a substantial working capital constraint and uptick in demand for credit for SMEs. The GST enactment which creates a cash flow gap between receivable and payables of SMEs requires an empirical analysis.

5. Research Methodology

Panel data is employed to test our prediction that the implementation of GST affects the working capital management of SMEs. According to Baltagi (2005) panel data controls individual heterogeneity which is missed in time series and cross-sectional data which runs the risk of the biased result. The variability nature, less collinearity and more degrees of freedom of the panel data makes it more efficient and informative in scoring more reliable estimates. A sample of 28 SMEs listed in Bombay Stock Exchange has been selected for this study based on the continuous data availability during the sample period. A strong, balanced panel was constructed by including 29 firms' data for pre and post GST periods of the sample SMEs. The financial statements of the SMEs for 4 years (pre GST 2015-2016 years and post GST 2017-2018) were collected from the Thomson Reuters database.

Research Models: Three research models have been developed by including the major working capital components as stated in literatures namely ACP, APP and ICP as independent variables. To examine the effect of GST on SMEs working capital a dummy variable is included in all the three models to capture the effect. ROA and WCSG were used as dependent variables and QR, CR, DE, CCC, NPM, and TOTE were used as control variables in the models.

$$ACP_{i,t} = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 QR_{i,t} + \beta_3 DE_{i,t} + \beta_4 CCC_{i,t} + \beta_5 Dummy + \beta_6 WCSG + \varepsilon_{i,t}$$
$$APP_{i,t} = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 QR_{i,t} + \beta_3 DE_{i,t} + \beta_4 Dummy + + \beta_5 WCSG + \varepsilon_{i,t}$$
$$ICP_{i,t} = \beta_0 + \beta_1 ROA_{i,t} + \beta_2 CR_{i,t} + \beta_3 TOTE_{i,t} + \beta_4 NPM_{i,t} + \beta_5 Dummy + \beta_4 WCSG_{i,t} + \varepsilon_{i,t}$$

Variables of the study

Average collection period (ACP): represents the average number of days it takes for a supplier to collect the proceeds of credit sales. It is computed by accounts receivables scaled by daily credit sales. Delayed cash collections interrupt the cash cycle and firms will be forced to raise external or internal financing. This, in turn, will increase the operating expenses and reduce the firm profitability.

Inventory conversion period (ICP): Inventory is essential to revenue generation and market share growth especially in manufacturing firms. The ICP represents the number of days elapsed in between the acquisition of inventory and the date on which the item is sold. In other terms, it illustrates the number of days the inventory sits idle in the firm. The delayed ICP increase the associated costs in holding the inventory and interest expense, and loses opportunity cost. Technically ICP is calculated as ending inventory divided by the daily cost of goods sold.

Average payable period (APP): termed as supplier financing most recently, it scales the number of days passed in between the receipt of inputs and when the payment is made to the suppliers. Firms use the APP to evaluate their payment performance to measure the average length of time the firm takes to pay for its suppliers. APP is calculated by accounts payable over the daily cost of goods sold.

Dummy Variable: To capture the effect of GST this study has employed a dummy variable indicating 0 for pre GST period and 1 for post GST period.

Return of Assets (ROA): estimates the comprehensive operational efficiency of the firm in utilizing its total assets in generating returns. In other words, ROA measures the efficacy of the total assets in generating profit on each dollar of sales. ROA is computed by earnings over the total assets of the firm.

Working capital turnover (WCT): measures how efficiently the firm is utilizing its working capital in generating sales. In other terms this ratio indicates how much of every dollar of sales is used in meeting the firm's operational expenses and short term obligations. The WCT ratio of a firm is computed as periodic sales over its average working capital.

Control Variables

Total Assets to Total Equity (TOTE): represents the proportion of total assets funded by the shareholders of the firm. A high TOTE indicates that the firm had raised a large sum of debt in financing its total assets whereas a low TOTE shows that either the firm is conservative or experiencing difficulty in raising external debt.

Debt to equity ratio (DE): termed as leverage ratio in the finance world shows the percentage of debt and investor financing. A lower DE shows less creditor financing including bank loans and a higher DE tends to indicate high

risk to the shareholder. For highly levered firms, the decline in sustained earning leads to financial distress or bankruptcy in the long run.

Net profit margin (NPM): as an indicator of the firm's financial health NPM estimates the percentage of each sales dollar remaining after the firm has paid for its expenses. Investors use NPM to evaluate the firm's ability in generating ample profits from its sales

Current ratio (CR): termed as liquidity ratio CR quantifies the ability of the firm to meet its short term obligations with its current assets. CR is scaled as current assets over current liabilities over a period of time.

Quick ratio (QR): also known as absolute liquid/acid test ratio, QR shows the ability of the firm to pay its short term obligations with least liquid assets. Firms with high QR have rapid inventory turnover and cash conversion cycles. QR is calculated by Current assets minus inventory over its current liabilities.

Cash Conversion Cycle (CCC): it measures the number of days it takes for the firm to collect cash from the sale of inventory. CCC is computed by adding the ACP and ICP minus APP. The shorter the CCC the more efficient working capital policies that maximize shareholders' wealth.

6. Data Analysis

Summary of GST effect on SME: The descriptive statistics provide a snapshot of the changes in the working capital and other firm performance indicators during the pre and post GST period using the dummy variable is shown in Table 3.

Table 3. Summary of GST effect on SME

GST EFFECT = 0					
Variable	Obs	Mean	Std.Dev	Min	Max
ACP	56	82.16607	48.76679	11.7	272.5
APP	56	54.59643	42.90733	2	195.4
ICP	56	107.6411	199.2594	20.9	1327.3
TOTE	56	3.554464	1.964676	1.38	12.06
NPM	56	0.031036	0.042942	-0.083	0.197
QR	56	0.830179	0.353715	0.26	2.49
CCC	56	135.5107	223.7458	8.5	1484.5
DE	56	1.611607	1.239478	0.03	5.68
ROA	56	0.063804	0.069222	-0.125	0.391
CR	56	1.299643	0.380392	0.27	3.01
WCT	56	0.0466	0.2879	-0.096	2.142
GST EFFECT =1					
ACP	56	164.7839	293.696	16.3	1812.3
APP	56	81.12857	129.9826	0.7	773.8
ICP	56	143.3911	263.5181	28.9	1316.6
TOTE	56	2.919286	1.65115	0	12.82
NPM	56	-0.05093	0.370465	-2.337	0.158
QR	56	0.938393	0.334581	0.23	1.64
CCC	56	227.0518	376.997	9.2	1764.4
DE	56	1.197857	1.140086	0	7.53
ROA	56	0.055804	0.12352	-0.503	0.328
CR	56	1.450536	0.453794	0.31	3.08
WCT	56	-0.0307	0.4070	-2.724	0.65

Source: STATA output

Table 3 provides clear evidence that the SMEs have seen an unprecedented increase in their ACP from 82 days to 164 days in post GST period away longer than usual. The average number of days to collect credit sales outstanding of the SMEs almost doubled within a short period. This increased ACP lengthens the cash flow cycle as the firms are forced to pay their GST beforehand. Besides, the increased number of days the inventories held in the post GST period from 107 to 143 days adds to the cash-flow gap. Due to this credit crunch, the APP also has extended from 54 days to 81 days. The overall working capital turnover has decreased by 0.03 in the post GST period. Eventually, the SMEs' total asset turnover also gets affected by these activities which are reflected by a reduced TOTE to 2.9 times after the implementation of GST. In nutshell, the decreased ROA as an indicator of the firms' overall efficiency in providing returns also reflects the shock created by GST to SMEs.

Cross-Correlation of Variables
As a further step to proceed to OLS the Pearson correlation coefficient is employed to identify the correlation between the selected variables of the study. The correlation table 4 demonstrates a strong and statistically significant relationship between the selected variables of the study.

Table 4. Cross correlation of Variables

	APP	ACP	DIH	ROA	WCT	TOTE	NPM	QR	CCC	DE	CR
APP	1										
ACP	0.263* (0.0049)	1									
DIH	0.707* (0.000)	0.310* (0.0009)	1								
ROA	-0.205* (0.0298)	-0.359* (0.0001)	-0.4042* (0.000)	1							
WCT	-0.518* (0.000)	-0.089 (0.350)	-0.4256* (0.000)	0.192* (0.042)	1						
TOTE	-0.066 (0.4837)	-0.042 (0.659)	-0.1525 (0.1084)	-0.277* (0.003)	0.0039 (0.967)	1					
NPM	-0.312* (0.0008)	-0.400* (0.000)	-0.5350* (0.000)	0.7220* (0.000)	0.4988* (0.000)	0.0606 (0.5256)	1				
QR	-0.265* (0.0046)	0.0306 (0.7485)	-0.3088* (0.0009)	0.5546* (0.000)	0.0973 (0.307)	-0.237* (0.0116)	0.2586* (0.005)	1			
CCC	0.398* (0.000)	0.834* (0.000)	0.7397* (0.000)	-0.484* (0.000)	-0.217* (0.021)	-0.119 (0.2083)	-0.577* (0.000)	-0.127 0.1794	1		
DE	-0.108 (0.254)	0.0609 (0.5237)	-0.1001 (0.2938)	-0.359* (0.000)	-0.010 (0.913)	0.9224* (0.000)	-0.016 (0.861)	-0.214* 0.0234	0.0025 (0.979)		
CR	-0.374* (0.000)	-0.155 (0.1023)	-0.2070* (0.0285)	0.451* (0.000)	0.1244 (0.191)	-0.239* (0.0109)	0.2522* (0.007)	0.679* (0.000)	-0.145 (0.127)	-0.207 (0.028)	1

Source: STATA output

The ACP is positively correlated with APP, ICP, CCC, DE and QR; and negatively correlated with ROA, NPM, WCT, CR, and TOTE. The results indicate that increased ACP interrupts the cash cycle and eventually delays the ICP and sales. As a result, increased external financing increases the DE ratio. Limited cash availability due to increased ACP also delays the average length of time the firm takes to pay for its suppliers. Such late payments adversely affect the firm's ability in obtaining further supplier financing results in lengthened ICP. Eventually, the firm's profitability and overall performance decreases. Taking into account the presence of multicollinearity with variable correlating 0.9, the research models were framed accordingly.
Test for Serial correlation in Panel data

Presence of serial correlation in panel data biases the standard error and produces less efficient outputs. So it is imperative to identify serial correlation in the idiosyncratic error term in panel data models. (Drukker, 2003). For this reason, the Wooldridge test was employed and the results are shown in Table 5.

Table 5. Wooldridge test for Serial correlation in panel data

	Model 1	Model 2	Model 3
F (1, 27)	1.977	3.335	3.962
Prob>F	0.1711	0.0789	0.0567

Source: STATA output

The p values greater than 0.05 indicates that the three models are free from serial correlation within the panels. As a further step, test for multicollinearity among the dependent variables was conducted. Multicollinearity is a case where the independent variables are highly correlated which will reduce the precision of the estimate coefficients (Paul, 2006). So, the Variance inflation factor test was employed to identify the degree of correlation among our predictor variables and the results are shown in Table 6.

Table 6. Variance Inflation Factor (VIF) of Variables

Variable	Model 1	Model 2	Model 3
ROA	2.27	1.70	3.40
QR	1.57	1.52	
DE	1.24	1.20	
WCT	1.07	1.05	1.52
CCC	1.45		
NPM			3.61
CR			1.36
TOTE			1.36

Source: STATA output

The estimated VIF statistics of each explanatory variables are less than 4 (Pan and Jackson, 2008) we can conclude that the statistics are within the limit and the absence of multicollinearity in the research models.
Test for heteroscedasticity
As a further step, the Breusch-Pagan / Cook-Weisberg test was conducted for the three models to test for heteroskedasticity in panel data. The test results were above 0.05 percent indicated the presence of heteroskedasticity. When dealing with working capital components impact on firm performance indicators the presence of heteroskedasticity in the disturbance term could normally be expected. In the possible presence of heteroskedasticity one should compute robust standard errors to obtain efficient regression coefficients and unbiased standard error of the estimates (Baltagi, 2005). Literatures of White (1980, 1984); Huber 1967; Arellano 1987; Froot 1989; Rogers 1993 quoted in Hoechle (2007) also highlights that the assumptions of relaxing independently distributed residuals. Their generalized estimator produces consistent standard errors even if the residuals are correlated within. So based on these assumptions, this study adopted random-effects GLS with robust standard errors and the results are shown in Table 7.

Table 7. Results of Random effects GLS

	Model 1	Model 2	Model 3
Dependent variable	ACP	APP	ICP
Wald Chi2(5)	730.20	43.05	192.05
Significance	0.000*	0.000*	0.000*
R^2	0.79	0.2574	0.4139
Constant	3.624364 0*	3.95414 0*	4.209165 0*
Dummy	0.118044 0.002**	0. 2218613 0.006**	0.091315 0.195
WCT	-0.0273 0.181	-0.3271643 0.002**	-0.57602 0.001**
QR	0.483446 0*	-0.5115709 0.070***	
ROA	-1.135259 0.000*	.0569875 0.913	-2.36367 0.04**
DE	0.046949 0*	0.0462395 0.037**	
CCC	0.001567 0*		
CR			0.228941 0.147
TOTE			0.04174 0.132
NPM			-0.666801 0.088***

Source: STATA output

Model 1 includes ACP as an independent variable regressed against four dependent variables QR, ROA, DE, and CCC. The dummy variable (pre-GST period =0 and post GST period= 1) is employed to capture the effect of GST on SMEs number of days of sales outstanding. The coefficient value of the dummy variable at 0.118 with a p-value of 0.002 indicate that GST has significantly increased the ACP of SMEs. This leads to a net increase in the firm's working capital, operating cycle and CCC which requires additional credit to offset the balance in the firm's cash cycle. The positive significant association between ACP, CCC, QR, and DE reinforces the same findings. The negative association between ACP and WCSG indicates that increased ACP reduces cash in hand and longer cash conversion periods. This creates a sizeable gap between cash inflows and outflows as the firms. These firms are required to pay the tax first before it is collected from the accounts receivables or a claim of refund of GST. To fund the cash flow gap the SMEs are forced to raise external financing which is very much limited. Nevertheless, the fact that the credit requirements of SMEs escalate anomaly on one side and the liquidity crunch from banks after the non-banking ecosystem created high strain on SMEs short term working capital needs.

This liquidity squeeze also creates default or delayed average payment periods of SMEs. The dummy variable in model 2 which is employed to capture the effect of GST also reflects this attribute. The positive significant coefficient value of the dummy variables at 0.22 with a p-value of 0.006 reveals that the APP of the SMEs also

has significantly increased during the sample period. Any such delayed payments might increase late payments costs such as penalties, interests which adversely impact on revocation or curtailment in obtaining additional credit from the suppliers (Enow and Kamala, 2016). Any dishonors on agreed-upon terms of payment by SMEs will breach the trust, confidentiality and strong relationships with the suppliers. As accounts payable is a major source of short term financing for SMEs this will impact their cash flow and liquidity at greater levels (Mbroh and Attom, 2012).

The extended APP sooner or later affects the inventory conversion period as reflected through the dummy variable in model 3. The positive coefficient value at 0.09 reveals that GST had elevated the number of day's inventory held in the firms. Aforesaid/such extended ICP disrupts the timely release of cash, hinders the repayment to supplier financing and other financial obligations leading to financial crises. To refrain from such longitudes firms usually, raise/employ more their leverage (positive coefficients of TOTE and DE) despite realizing the fact that such acts decrease the firm profitability (negative coefficients of NPM) in the long run as shown by depicting in model 3. The statistically significant coefficient of ROA with ACP and ICP shows that an increased operating cycle reduces the overall efficiency of the SMEs in utilizing its total assets in generating profits. The results of this study in nutshell indicate that the SMEs' production capacity and sales have reduced, collections and payments were delayed and eventually the firm profit margin also decreased with the introduction of GST.

Pesaran's Test of Cross sectional Independence

The presence of cross sectional dependence in panel data will lead to efficiency loss for least squares and invalidates F test and could result in inconsistent estimators (Baltagi, 2007). To obtain reliable parameters in our research model residuals we applied pesaran test to check for cross sectional independence. The results of pesaran test is shown in Table 8.

Table 8. Pesaran's Test of Cross sectional Independence in the Panels

	Model 1	Model 2	Model 3
Pesaran's test of cross sectional independence	-0.653	-0.957	-0.533
Pr	0.5135	0.3384	0.5943
Average absolute value of the off-diagonal elements	0.516	0.526	0.516

Source: STATA output

The findings in Table 8 illustrate that the null hypothesis of no cross sectional dependence within and between panels is accepted. Give that the p values of the test are above 0.05 in all the three models, likely to exhibit no cross sectional dependence in the error terms.

Conclusion

The empirical findings of this study indicate that GST has a hard hit on SMEs short term working capital needs in the short run. The credit requirements have escalated anomaly on one side and the limited avenues of credit, on the other hand, had created a liquidity squeeze to SMEs. This situation has to be revamped soon to refrain the transformation of this credit crunch to credit risk which would turn to be a major catastrophe for the Indian economy. The efficacy of the series of strategies implemented by the Government of India to revamp the SMEs' working capital needs to monitored, evaluated and amended periodically. The potential areas of improvement in specific sectors, if implanted successfully is expected to reap big benefits in the future to make India a vibrant and dynamic economy. The research outcomes will provide an insight to the policymakers and financial institutions about the working capital strain created by the introduction of GST. Realizing the inevitable role of SMEs in the economic development of India, financial institutions should relax lending guidelines by rescheduling and restructuring the loans. In such a challenging operating environment, the Government of India can advance more

subsidies to SMEs to revive from this short-run effect. The SMEs ought for new avenues technology-infused platforms like crowdfunding in raising additional credit at a minimized cost.

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JUSTIFICATION OF THE CHOICE OF THE CONCESSION MECHANISM FOR PROJECTS ECONOMICALLY EFFICIENT FOR THE INFRASTRUCTURE OWNER

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Abstract. In modern economic realities, the state is playing an increasingly important part, managing the economy to achieve greater social efficiency. From this standpoint, the crucial aspect of efficient application of the concession mechanism is the selection of project proposals that have socio-economic practicality. The purpose of the paper is to justify the choice of the concession mechanism for projects economically efficient for the infrastructure owner. The authors conclude that upon justifying the choice of the concession mechanism, it is important both to analyse the economic efficiency with the benefit of the best analytical practices of investment management in conjunction with budget efficiency evaluation and to assess the specific risks and probability deviations, factoring in the specifics of projects on creation of public railway infrastructure in order to evaluate and subsequently monitor the comparative advantages of the concession over the state law and other PPP tools.

Keywords: infrastructure project; public-private partnership; state contract; economic efficiency

1. Introduction

Upon preparing any infrastructure project, it is prudent to compare the efficiency of application of different methods of its implementation to select the most suitable one, which would be effective both for the state and for the investor (business) (Flyvbjerg, 2014; Naumenkova et al., 2019). Without delving into the discussion of the concept of "efficiency", we shall note that the most common approach to describing economic efficiency is its expression through the "economic effect" as the difference between income and expenses for the estimated type of activity (Panina, & Popov, 2016; Rogova, & Yalyalieva, 2016; Ivanov et al., 2019). With this approach, efficiency is mathematically expressed as the proportion (share) of the effect in costs, which in Western science and practice is determined by the ROI indicator.

By all means, the array of relevant indicators characterizing the economic efficiency is much wider. Furthermore, the logic of the selection of relevant indicators is to a large extent connected both with the specifics of the evaluated object, and with the position of the subject in whose interests this evaluation is performed – in the context of the subject matter of this research, it is the owner of the public railway infrastructure. For example, to conclude a state contract, it is necessary to have the entire amount of funds in the budget for the planning period, whereas the application of public-private partnership (PPP) mechanisms is also possible in the absence of the necessary resources in full in the budget (Iossa, & Martimort, 2016; Van Buiten, & Hartmann, 2015; Mishchenko, & Mishchenko, 2016; Shtal et al., 2018). It is also important to consider the availability of budget funds at a certain stage of the project. For example, in projects with an "availability fee", the provision of a "capital grant" by a public partner (concession grantor) to a private partner (concessionaire) in the amount of 20-30% of the total cost of creating an object can reduce the amount of fixed payments at the stage of operation (concession grantor payment) by an average of one third and, as a result, reduce the total overpayment.

A comparative evaluation of the possible ways of implementing the infrastructure project does not replace the procedure for selecting the most effective (necessary) project for the state from the possible (considered, under development), it is performed primarily to determine the best legal, financial and technical conditions for the implementation of a specific, already selected project (Goloshchapova et al., 2018; Zatsarinnyi et al., 2017).

With regard to concessions, in particular, it is evident that upon assessing the economic efficiency from the perspective of the owner it is hardly advisable to evaluate it solely proceeding from the volume of paid services (the conventional approach to concluding concession agreements in previous practice) (Shi et al., 2018). It is noteworthy that the current legislation of the Russian Federation on public-private partnerships contains a peremptory requirement to assess the economic efficiency of the project (Sergi, 2019; Herasymovych, 2019; Herasymovych, 2018), which is performed at the stage of its consideration, the general evaluation algorithm is displayed in Figure 1.
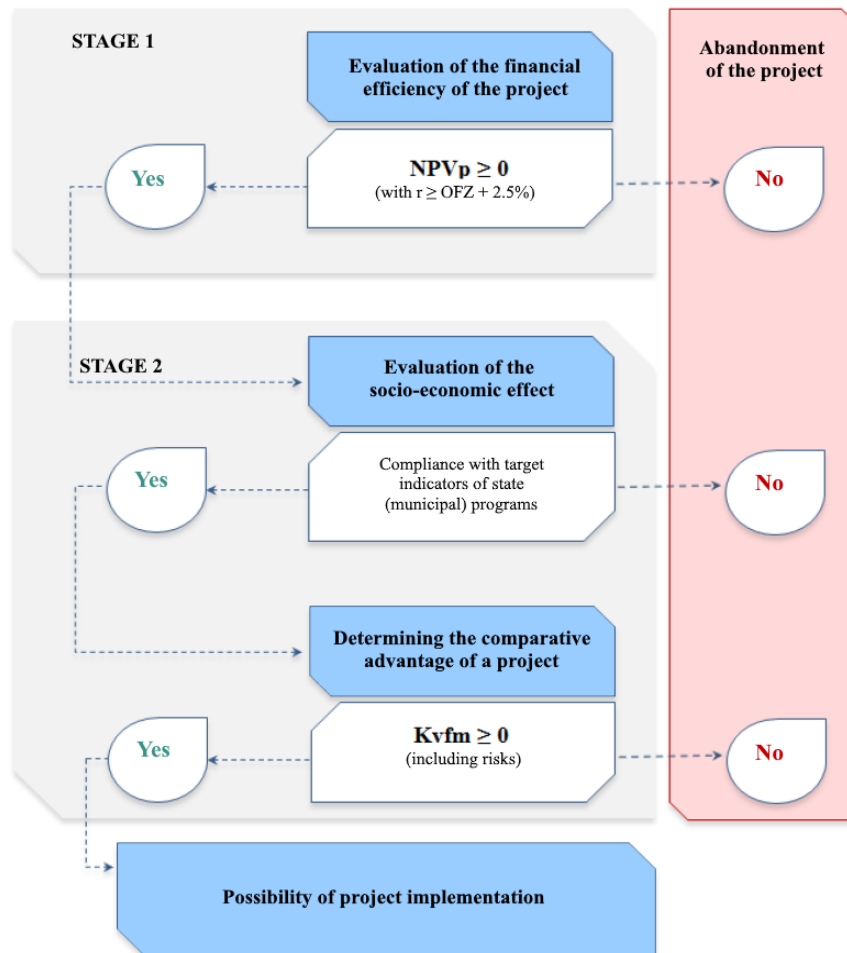
Fig. 1. Algorithm for assessing the effectiveness of a PPP/MPP project and determining its comparative advantage
Source: Recommendations on the implementation… (2016)

It should be noted that this algorithm, in general, corresponds to the basic concepts of assessing the project efficiency in investment and project management (Gribov and Nikitina, 2013; Holovach, & Holovach, 2020; Lakhmetkina, 2018; Mazuret et al., 2017), although it rouses certain censure from analysts (Justification of the effectiveness…, 2017), who suggest that the large-scale use of the relevant evaluation procedures without their detailed algorithmization and a clearer selection of evaluation criteria can actually lead to a paralysis of the public-private partnership system in the near future. At present, the procedure for justifying the choice of PPPs as a form of implementing an infrastructure project, stipulated by federal legislation on PPPs, does not have a wide law enforcement practice and is characterized by market participants as unsustainable and requiring improvement (Tkachenko et al., 2019; Tkachenko et al., 2020).

Proceeding from periodical publications, the establishment of a procedure for justifying the choice of PPPs as a form of infrastructure project implementation, which is stipulated by federal legislation on PPPs, to a large extent, truly was a response to negative realities – often PPP projects are accepted for implementation in cases where, from the standpoint of the state, a toolkit of public procurement would be considerably more efficient (Mereminskaya, 2017; Iossa, & Martimort, 2015; Rudenko, 2018; Rudenko et al., 2016; Levchenko, 2015). With that, a process has been launched to introduce this non-tested institution into the concession legislation, which raises concerns among market participants (Justification of the effectiveness…, 2017). Studying international

experience in this field also does not provide an unambiguous answer to the question of effective ways to solve the issue of substantiating the efficiency of the application of PPP mechanisms, including concession ones, for the implementation of infrastructure projects.

2. Analysis of the Basic Methodology for Evaluating the Efficiency of Concession Projects

In most countries that actively use PPP mechanisms, the procedure for substantiating the comparative advantage (VfM) of the selected form of project implementation in a certain form is mandatory and involves both preliminary qualitative and a more detailed quantitative analysis. As a rule, the principles of such an evaluation are enshrined in legal acts, and the methodology is advisory in nature. With that, in most countries there is a tendency to reduce the role of quantitative evaluation of VfM upon making managerial decisions. Moreover, in countries with the most developed practice of applying PPP mechanisms, the VfM principle is applied to any projects involving budget participation, including those implemented through public procurement. International practices also indicate that upon performing a quantitative evaluation of the comparative advantage of a particular form of an infrastructure project implementation, it is prudent to factor in a number of features of those forms under consideration that affect costs, for example, transaction expenses, non-financial benefits, etc. (Justification of the effectiveness…, 2017).

Experts at the National Centre for Public-Private Partnerships believe that introducing provisions in the concession legislation, which would provide for an evaluation procedure concerning the efficiency of concession agreements, and determination of their comparative advantage, is premature and in the current situation would only create additional barriers to attracting private investment in infrastructure development (Justification of the effectiveness…, 2017). According to the said experts, the current methodology for assessing the effectiveness and determining the comparative advantage of PPP and MPP projects, approved by Order of the Ministry of Economic Development of Russia No. 894 dated November 30, 2015, requires improvement in the following parts (Order of the Ministry of Economic Development…, 2015):

1) approaches to determining the prerequisites for assessing risks and the values of probable deviations of costs (risks);
2) consideration of the specifics of application of PPPs and public procurement in methodology (transaction expenses, the availability and possibility of attracting budget financing, "competitive neutrality");
3) expansion of the list of criteria for a qualitative analysis of the possibility (prudency) of PPP application in relation to the public procurement;
4) changes in approaches to the analysis and monitoring of performance indicators and the comparative advantage of PPP projects.

The integration of the justification of comparative advantage into concession legislation should be based on the following principles:

1) introduction only on market readiness, improvement of the methodological base and the formation of the methodology application practice upon evaluation of the PPP projects;
2) selective mandatory application, primarily in relation to projects with significant budget participation;
3) should not apply to the utilities sector and small projects;
4) the purpose of implementation is to assist at the stage of structuring, and not efficiency control at the implementation stage;
5) criteria, procedure and principles are enshrined in the legislation, the methodology is approved in the form of recommendations (guidelines).

We shall further turn to the basic efficiency evaluation methodology of concession projects, and note that its basis is the conventional methodology for efficiency evaluation in investment design (Kolankov et al., 2013). In modern conditions, the methodology for investment project evaluation includes several key sections: evaluation of the project concept, including technical, legal and marketing analysis; evaluation of the need for investment resources and financial solvency of the project; evaluation of the economic efficiency of the investment project; evaluation of project risks, sensitivity of key indicators to implementation scenarios (Podshivalenko et al., 2017). From the evaluation results, the information can be obtained on: the possibility of project implementation; the required amount of investment; profit margin at a certain risk level.

The statutory and methodological basis for evaluating investment projects is the UNIDO standards (Manual for Evaluation of Industrial Projects, 1986) and the domestic statutory and instructional documents developed on their basis. The legal basis for the assessment is the federal legislation on investments and investment activities. We shall further outline the key points in evaluating an investment project, the general scheme of which in its basic version contains three stages, namely:

– Studying the concept and the proposed sequence of investment project implementation (Kabir, 2016). It is important to understand that upon evaluating a greenfield project, the final efficiency will be expressed in cash flows from the company's activities, while with a brownfield project and a project within the company it is important to calculate the indicators of additional profit, return and ROI (Kostina, 2015). For most investment projects, fair is the rule, according to which the performance indicators increase along with the planning horizon, since each project requires a certain time to reach 100% capacity, and long horizons account for longer periods of generating positive cash flows (this period only ends at the time of the need to update equipment, which rarely occurs earlier than 10 years) (Orlova, 2016).

– The marketing evaluation of the project also serves as an important component of the evaluation, as it allows to confirm the feasibility of sales plans, including various aspects of product selection (in our case, services for using public railway infrastructure), its positioning and promotion. In a significant number of cases, conducting only "desk" research for marketing evaluation is insufficient; in any case, an appropriate assessment requires a combination of several alternative sources of marketing information with a high relevance of research. The first stage of investment project evaluation also requires evaluating the stages of project implementation and its budget structure. This provides an understanding of the essence and concept of the project, and budget structure. In the absence of detected fatal flaws and system errors, the second stage of the investment project evaluation commences, otherwise, its concept is returned to the authors for revision, or a decision is made to abandon the project without finalizing its concept.

– Analysis of the source data. This stage involves a detailed study of project indicators by implementation stages, and allows to identify the feasibility of key indicators, including both the concept of the project and time. For example, the profitable side of an investment project is considered in conjunction with the marketing component. The expenditure side – from the standpoint of feasibility and elaboration of costs, their completeness, formation of reserves, etc. It is extremely important to verify whether the need for financing is fully defined, whether there will be cash gaps at any time period, and whether there are resources to cover them under adverse scenarios. In this regard, the availability and correctness of the calculation of the operating working capital of the project should be verified, in combination with the payment calendar for settlements with contractors, personnel and the budget (Prokopyeva, 2018). The given stage often requires a legal examination of the project. The result of the second stage of the investment project evaluation is the identification of flaws in the financial model, their materiality, and, as a result, the need and feasibility of adjusting the financial model.

– Stage of project interpretation. At this stage, the efficiency of the project, its financial viability, as well as risk are evaluated. It is important to consider the differences in evaluating the investment project efficiency from

the perspective of the subject of information; corresponding recommendations for consideration of differences and their reflection in the evaluation methodology are provided in Table 1.

Table 1. Net cash flow from the positions of various participants in the investment project

Cash flow budget	Concessionaire	Concession grantor	Bank
Operating cash			
Gross proceeds	✓	✓	✓
Material costs	✓	✓	✓
Wages	✓	✓	✓
Aggregate expenditure	✓	✓	✓
Taxes and fees paid	✓	✓	✓
Bank loan interest paid	✗	✓	✗
Investment cash			
Investments in fixed assets	✓	✓	✓
Financial investments (investments in financial assets)	✓	✓	✓
Asset sale proceeds	✓	✓	✓
Finance cash			
Attraction of equity (funds from shareholders)	✗	✗	✓
Borrowing proceeds	✗	✓	✗
Repayment of borrowings	✗	✓	✗
Dividends paid	✗	✗	✓

Source: adapted by the authors from the model presented in (Belyakova, 2006).

As for the risk analysis of the project, it is performed according to one of the conventional schemes, usually including an assessment of the project's sensitivity, scenario analysis, and break-even point determination. Statistical methods (simulation modelling), including the Monte Carlo method, can also be applied. Corresponding methods (sensitivity evaluation, scenario analysis, simulation modelling) should complement conventional project efficiency meters (NPV, IR, PI), with that, to evaluate a large investment project with immanent high risks, it is prudent to use appropriate methods in combination with each other. Particular attention should be paid to risks that cannot be accurately measured – legal, administrative, technological and other similar risks.

The third stage of evaluating the investment project consequentially facilitates the conclusion on whether it is efficient to participate in the project, which is carried out with consideration of the investment policy of the subject of investment activity, its existing investment portfolio, the availability of available funds, and also the compliance of the final calculated indicators of project efficiency with expectations, regulations, etc. To evaluate the investment project efficiency, a target set of indicators is applied, with that, net profit serves as the main indicator of business performance in many cases; it is intermediate upon evaluating the investment project efficiency and extremely important as it affects the system of key indicators of investment project efficiency, but not crucial.

3. Features of the Use of Specific Tools and Indicators for Evaluating the Efficiency of Investment Projects

Among the common key indicators of an investment project efficiency evaluation are the following (Maté et al., 2017): net present value (NPV); internal rate of return (IRR); profitability index (PI); discounted payback period for investments, and/or discounted profitability index for expenditures. It is also noteworthy that one of the issues in investment project evaluation in modern conditions is the choice of the appropriate combination of key performance indicators, as well as their improper interpretation from the standpoint of deciding on the feasibility of the project implementation. The first of the abovementioned issues is connected with the fact that the specified indicators relate to different periods of time, which complicates their comparison and procurement of adequate conclusions, and also requires consideration of many additional criteria with varying degrees of relevance

(inflation, refinancing rates, planning terms, etc.). To a certain extent, the correctness of the performed comparisons depends on the qualifications and mastery of the analyst.

In practice, the question arises of how substantially the appropriate methodology for evaluating the investment project efficiency should be modified in relation to concession projects for creating public railway infrastructure. With that, the toolkit for evaluation of economic efficiency of concessions for infrastructure projects, proposed in the dissertation research by E.S. Charkina (2015), is considered to be rather full-fledged. Proceeding from the theory and practice of general investment analysis, the authors propose the following methodology for infrastructure project evaluation with use of a concession mechanism. For convenience, we have summarized the methodology in Table 2.

Table 2. Elements of a comprehensive methodology for an infrastructure project evaluation with use of a concession mechanism

Methodology Section	Estimated Performance Indicators	Methodological basis	Performance criteria	Regulatory framework
Financial model (financial efficiency)	Rate of return for equity Weighted Average Cost of Capital (WACC) Net present value (NPV) Internal Rate of Return (IRR) Payback Period (PBP) Discounted Payback Period (DPBP) Profitability Index (PI) Red Flag Assessment (RFA).	Cash flow discounting using weighted average cost of capital (WACC)	NPV>0 IRR>WACC PI>1	Methodology for calculating indicators and applying performance criteria for regional investment projects applying for state support at the expense of budgetary allocations of the Investment Fund of the Russian Federation
Budget efficiency	Performance Index for Budget (PIB)	The project budget performance indicator is defined as the ratio of discounted tax revenues to the amount of budget allocations	PIB>1	
Economic efficiency	Integral indicator of economic efficiency of an investment project ET	An integral indicator characterizing a part of the total for all years of the forecast period of the predicted value of the real volume of gross regional product that can be provided by the project	ET in the forecast period > 0,012%	

Source: compiled by the authors by Charkina (2015).

The above methodology is seen as characterized by exhaustive completeness and complexity, including in terms of the set of applied financial project efficiency ratios, as well as the availability of an appropriate regulatory and methodological basis, as well as practical testing, which can therefore be taken as the basis in evaluating the effectiveness of the concession project from the standpoint of the state. At the same time, the estimation algorithm should be refined and supplemented. Firstly, in terms of determining the comparative advantages of the project (including in order to ensure compliance with antitrust legislation). Recommendations for improving the procedure for evaluating comparative advantages are presented above. Secondly, it should consider the attributes and criteria of investment projects that are economically inefficient for the infrastructure owner in order to prevent violation of state interests by concluding concessions for such projects with state guarantees.

In particular, in the event of adverse consequences during the operation of the infrastructure associated with design defects, deviations from regulatory and design requirements during the construction and subsequent operation of the public infrastructure, negative environmental impacts, unforeseen circumstances and other similar facts, the economic indicators incorporated into the project may fail to be performed. We believe that the relevant

risks can (and should) be considered upon calculating the discount rate, which is an indicator that serves as the basis for calculating financial performance indicators of investment projects, in particular the ones provided in Table 2. Another reason for the non-performance of indicators is the overestimation of their values compared to actual ones. Ultimately, all the available methodologies for evaluating the efficiency of parameters laid down in projects mediated by concession agreements are aimed at evaluation of specific indicators, rather than at their verification. As a result, the distortion of certain indicators, both intentional and resulting from an error, can lead to an incorrect project efficiency evaluation and its erroneous acceptance for implementation.

The theory and practice of investment analysis has developed many recommendations to prevent such kind of error (Tolstonogov, 2010; Cheremushkin, 2013). One of the key recommendations, in this case, is the mandatory presence of a detailed marketing analysis that underlies investment design (we shall recall that in our case, there is an investment project, which in terms of the distribution of financing, property rights and obligations, is structured precisely via a concession mechanism and indirect concession agreement). In addition, an audit of an investment project can be of significant benefit, the results of which, by all means, would enable a more reliable judgement on the feasibility of the parameters adopted as the design basis.

An important aspect of such an audit is the audit of the planning methodology, in the course of which experts specify the degree of reliability of the methods used to obtain the corresponding planned indicators. Surely, preference should be given to complex justifications with calculations supported by analysis using several of the most relevant methods with mandatory justification for the final choice of a particular forecasting (planning) methodology for project performance indicators. Finally, to assess the viability of projects, a comparative analysis of the key (both qualitative and quantitative) project parameters with analogues can be applied. The results of the comparative analysis will not only complement the idea of the expected economic efficiency of the project for the infrastructure owner, but are also a simple and fairly effective tool for identifying evident deviations in the planned indicators. Summarizing the above, it appears to be prudent to propose the following algorithm for substantiating the choice of the concession mechanism for projects that have economic efficiency for the infrastructure owner, presented in Figure 2 below.
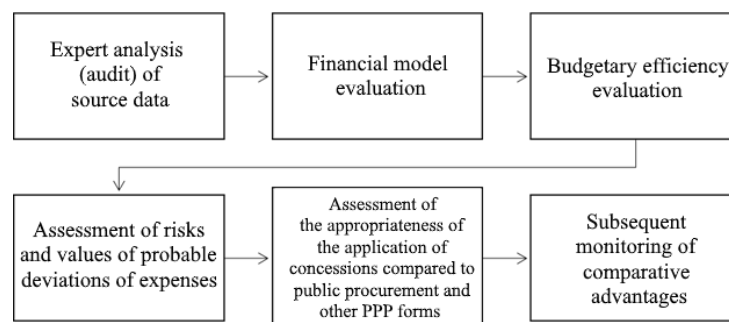

Fig. 2. Algorithm for substantiating the choice of the concession mechanism for projects with economic efficiency for the infrastructure owner

Source: authors' development.

Conclusions

Application of specific tools and indicators for evaluating the investment project efficiency largely depends on the purposes and objectives of the evaluation, and the evaluation subject (the recipient of the evaluation results). It is in accordance with specific purposes and objectives that it appears to be advisable to select an evaluation toolkit and its practical application, as well as target milestones – because, by and large, it is by comparing the

expected values of key performance indicators of the investment project with the target milestones that the investment project appraiser receives information for adoption of final decision on the feasibility of its implementation. For example, the indicator of internal rate of return (IRR) of the project, as a rule, is set individually by the investor, factoring in, in particular, the cost of borrowed capital and other indicators. In general, the procedure for evaluating investment projects requires a thorough study and application of a calibrated methodology, combined with appropriate analytical skills.

Thus, upon substantiating the choice of the concession mechanism, it appears to be important both to conduct an analysis of economic efficiency, relying on the best analytical practices of investment management in combination with an evaluation of budgetary effectiveness, and to evaluate specific risks and probabilistic deviations, with consideration of the specifics of projects for the creation of a public railway infrastructure for the purpose of evaluation and subsequent monitoring of the comparative advantages of the concession over state law and other PPP tools. Such an approach will facilitate the selection of a concession mechanism for projects that have economic efficiency for the infrastructure owner.

In order to formulate a coherent and predictable national policy regarding the implementation of new procedures in the preparation of PPP projects, a phased plan agreed upon with the market is required. It should include measures for the development of the methodological and statistical basis for effective justification of the efficiency of PPP application, as well as for their testing and gradual implementation in regulatory framework.

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TOWARDS ENVIRONMENTAL SECURITY VIA ENERGY EFFICIENCY: A CASE STUDY[*]

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Abstract. The article is devoted to the features and problems of the formation of economic mechanism for ensuring environmental safety via energy efficiency in the process sustainable development at the regional level. The focus on environmental risk, which is considered as one of the components of the environmental safety system. In modern conditions, close attention is paid to issues of finding economic mechanism in ensuring environmental safety via energy efficiency; development of directions for implementation of green strategy in the regions and countries. Features of the economic mechanism in ensuring environmental safety and energy efficiency held back in sufficient development of theoretical issues, methodological and regulatory framework. The relevance of the study lies in the fact that sustainable development analysis of the current situation, problem analysis optimization prospects play an important role in improving economic mechanisms for regulating the market for petroleum products, oil and gas industries, economic mechanisms of energy regulation, etc. There is a need, on the one hand, for quantitative assessment the probability of occurrence of processes and phenomena that reduce the quality environment, and on the other hand, quantification of possible damage from their manifestation at the regional level. The aim of the study is to elaborate the economic mechanism for ensuring environmental safety of the region. Authors conduct analysis using observations, reports and comparative official statistics; formulate original insights, which can have policy implications.

Keywords: economic mechanism; environmental safety; region; efficiency; development

JEL Classification: H23, R11, Q56, Q57

1. Introduction

The presented study was conducted in a predetermined sequence. At the first stage, the articles are obtained by searching in the Scopus database, Web of Science. The following keywords and key combinations of words were used: environmental safety, mechanism, programs, environment, region, energy efficiency. Articles were limited to those published in English-language journals and on the basis of the International journal of energy Economics and policy. At the second stage, annotations and Discussion of materials on topics related to research on the economic mechanism for ensuring environmental regional security and energy efficiency in sustainable development were reviewed and studied. In the third stage, analyses were carried out using observations, reports and comparative official statistics.

Notable that sustainable development is the development of society on the basis of inexhaustible environmentally sound environmental management, providing a high quality of life for people of all generations, namely human health, high life expectancy, favorable habitat, environmental safety and others. Targets can be determined by indicators, characterizing the quality of life, the level of economic development and ecological well-being in the regions. Analysis of the search for materials on the research topic revealed that environmental impact include air pollution, noise pollution, water and soil pollution, agricultural degradation resources and loss of agricultural land and vegetation. Types mining, included as small-scale mining, sometimes called "Galamsi" (illegal mining of minerals by local residents), which is conducted on a small scale using a small quantities of tools and equipment, and large-scale mining (legal), mining, commonly exploited by foreign companies conducted on a large scale using heavy equipment. Most environmental and health risks, quantities of tools and equipment, and large-scale mining (legal), mining, commonly exploited by foreign companies conducted on a large scale using heavy equipment. Most environmental and health risks, associated with mining, widely distributed to all production sites from an economic point of view of environmental research security, in particular the economic mechanism.

2. Literature review

Many studies address issues regarding the effectiveness of policy towards economic mechanism in ensuring environmental safety (Aslanturk, Kıprızlı, 2020; Ilyinova, 2018; Imangozhina et al., 2019). There is a point of view whose advocates point to significant benefits of developed policies and opportunities to accelerate development economies through the use of various economic mechanisms Support (Zonn et al., 2016; Tvaronavičienė, Razminienė, 2017, El Idrissi et al., 2020; Eddelani et al. 2019; Tvaronavičienė, Ślusarczyk, 2019).

The essence of the study is that the authors reflected a dynamic view of the features of the economic mechanism for ensuring environmental security of the region and energy efficiency in the process of sustainable development (Gagarina et al., 2019; Sarma et al., 2019; Chehabeddine, Tvaronavičienė, 2020).

The official statistical reporting for the 8-year period served as the informational basis for the study to ensure comparability, where the sample was taken for 2010-2017. In accordance with the methodology of comparative analysis (Smelser, 1976), data was grouped, which helped to conduct a comparison.

As it is mentioned above, questions of energy efficiency and environmental safety are thoroughly discussed in many works. Today, in the economic literature, the concept of "environmental security" is inextricably linked with the socio-economic development of society. Moreover, some scientists do not even distinguish it as a special

issue but define it as an integral part of environmental protection.

We aim to reveal additional subtleties of environmental efficiency and environmental safety via examining case of separate rgions in Kazakhstan.

3. Methodology

The methodological basis of the study became fundamental provisions in the field of environmental safety. Scientific papers of scientists in areas of economics, environmental performance review results activities of the Republic of Kazakhstan. In science, certain development methods in the field of environmental safety in sustainable development. However, to identify directions of the country's regions need various integrated approaches. In the course of studying the issues of ensuring the economic mechanism in the field of environmental safety in the context of sustainable development, we analyzed data for a number of years "investments in environmental protection in the context of activities" and "Current expenditures for environmental protection in the regions of the Republic of Kazakhstan" (Energoprom, 2020).

It should be noted that the analysis focused on the disadvantages of observation methods inherent in many studies. Human perception is limited, so researchers may have missed or overlooked important manifestations of the topic. The limitation of the study is that a lot is determined by the measurement of influences such as lack of time, technical facilities, incomplete data for a thorough analysis, etc. Note that these restrictions may have influenced the results of the study. Therefore, we had to approach our conclusions more carefully.

4. Application functionality

Energy-saving is an integral part of resource-saving, involving the effective use of critical factors reduce energy intensity of production. Relevance of the direction due to the presence of symptoms of an energy crisis.

An intensive energy-saving policy is paramount in containing the growing deficit of fuel and energy resources and reliable provision of all sectors of the national economy of the regions. The impact of resource supply and resource conservation problems on social society's progress is intensifying in a number of ways. One of areas of impact of rational resource consumption is associated with ecology and public health.

Country experience indicates the need to create a mechanism for efficient resource consumption and resource saving in sustainable development, as well as their regulation. There are five regions in Kazakhstan: the Eastern region, Western region, Northern region, Central region and Southern region. We intend to present the regions and cities as part of the above regions (table 1).

Table 1. The regions and cities as part of the above regions

	Regions															
	Western Kazakhstan	Nothern Kazakhstan				Central Kazakhstan						Southern Kazakhstan	Western Kazakhstan				
Region	Eastern Kazakhstan	Aktyubinsk	Atyrau	Western Kazakhstan	Mangystau	Nur-Sultan (city of the Republican significance)	Akmolinsk	Pavlodar	Nothern Kazakhstan	Kostanay	Karagandy	Almatinsk	Almaty city(city of the Republican significance)	Kyzylordinsk	Zhambyl	Turkestanskaya	Shymkent (city of the Republican significance)

Most regions lack domestic financial means to independently solve the problems of socio-economic development. Every year, the dependence of local on subventions increases from the republican budget. In Kazakhstan, each region seeks to improve its position in nationally and internationally.

A big role is played not only by the quality of services, the cost of products and services, but also the management of natural resources, environmental impact control at all stages production cycle and the range of services provided. All set goals are achieved through voluntary environmental certification, implementation of an environmental management system in compliance with international standards. The environmental management system plays an important role in enhancing environmental safety, energy efficiency and stability. System environmental management when transporting gas and oil in full brought in accordance with the new requirements.

The main areas of environmental protection Kazakhstani enterprises are: compliance with established environmental legislation requirements; environmental monitoring environment; planning and organization of environmental work; improvement and improvement of environmental measures; emergency prevention and containment; diagnostics environmental impact; providing conditions to reduce emissions of harmful substances into the atmosphere, water and energy consumption, reduce the amount of waste generated and other negative environmental impacts; development, acquisition and implementation technologies, materials used in pumping oil, the most safe for the environment and the public; mandatory environmental examination of projects of newly built and reconstructed objects, raw materials, used equipment; preparation and provision of conditions for repair and maintenance of trunk pipelines; increase employee culture and environmental literacy Kazakhstan enterprises in the regions. Improving the competitiveness of the enterprise, its reliability work dictates its conditions. It is the need to replace obsolete equipment; transition to a new level of pumping process control oil, expanding the tank farm, increasing through put the ability of the pipeline.

The Republic of Kazakhstan is developing strategic plans, environmental management programs; compliance measures are included environmental standards, reduce energy consumption, reduce pollutant emissions and waste generation, improving environmental education, system improvement environmental management, the implementation of which is absolute requirement for regional enterprises.

Energy efficiency, environmental and economic sustainability of the region is a sustainable balanced development and increase environmental image in an effective and efficient environment management aimed at minimizing negative economic and environmental consequences of its functioning as part of environmental and an economic system characterized by sustainable damage reduction environment. Improving pipeline energy efficiency through system approach to energy conservation of fuel and energy resources should be considered as an actual direction of development on enterprises. In order to achieve maximum fuel efficiency of energy resources, a system of energy management has been introduced in the regions and at Kazakhstani enterprises. The main advantages of the system implementation are the possibility of more efficient use of fuel and energy resources, a systematic approach to energy saving, which allows you to make more effective decisions based on the analysis of statistical and actual data. Held certification audit of the energy management system, after the audit certificate of conformity is issued, which confirms that implemented energy management system for oil transportation through oil pipelines. In the regions, akimats developed and implemented energy policies, reflective organization energy management strategy that Includes regulatory commitment requirements and continuous improvement in efficiency. Energy policy is implemented by achieving the set goals and objectives in the field of energy management.

In recent years, Kazakhstan has become one of the leaders in application green economy approaches. With the adoption in 2013 of the Concept for transition to a green economy, Kazakhstan defines a green economy as a clear strategic goal. At the same time, the expansion of scale mining and fossil fuel production is national priority. Kazakhstan is a country with rich oil reserves, coal and mineral resources - in search of opportunities to ensure long-term growth based on climate-friendly technologies, measures to increase energy efficiency and rational use natural resources, reflecting both ups and downs along the way (see table 2, figure 1).

Table 2. Investments in environmental protection by sector activities for 2010–2017, million KZT

Years	2010	2011	2012	2013	2014	2015	2016	2017
Total	**90325**	**70539**	**75149**	**77500**	**103492**	**82883**	**43937**	**86962**
Air pollution	44289	21991	28829	26815	27056	24936	18128	22764
Water resources	13509	18478	20119	18775	41812	15186	10129	5966
Wastes	13340	13464	10777	8026	16941	14131	8 464	6210
Soil, groundwater and surface water	10780	12658	7597	10612	13436	10448	4 278	8826
Noise	-	1	22	5	126	-	4	-
biodiversity	169	618	379	135	164	688	461	420
Radiation protection (with the exception of protecting the public from external exposure)	2985	429	451	197	71	192	90	81
NIOKR	1154	278	454	722	790	333	621	129
Other services on the environment protection	4099	2622	6522	12213	3096	16969	1762	42568

Source: developed by the authors according to the Ministry of National Economy of the Republic of Kazakhstan. Statistics committee, 2018.

Investments in environmental protection by sector activities for 2010–2017, million KZT (figure 1).
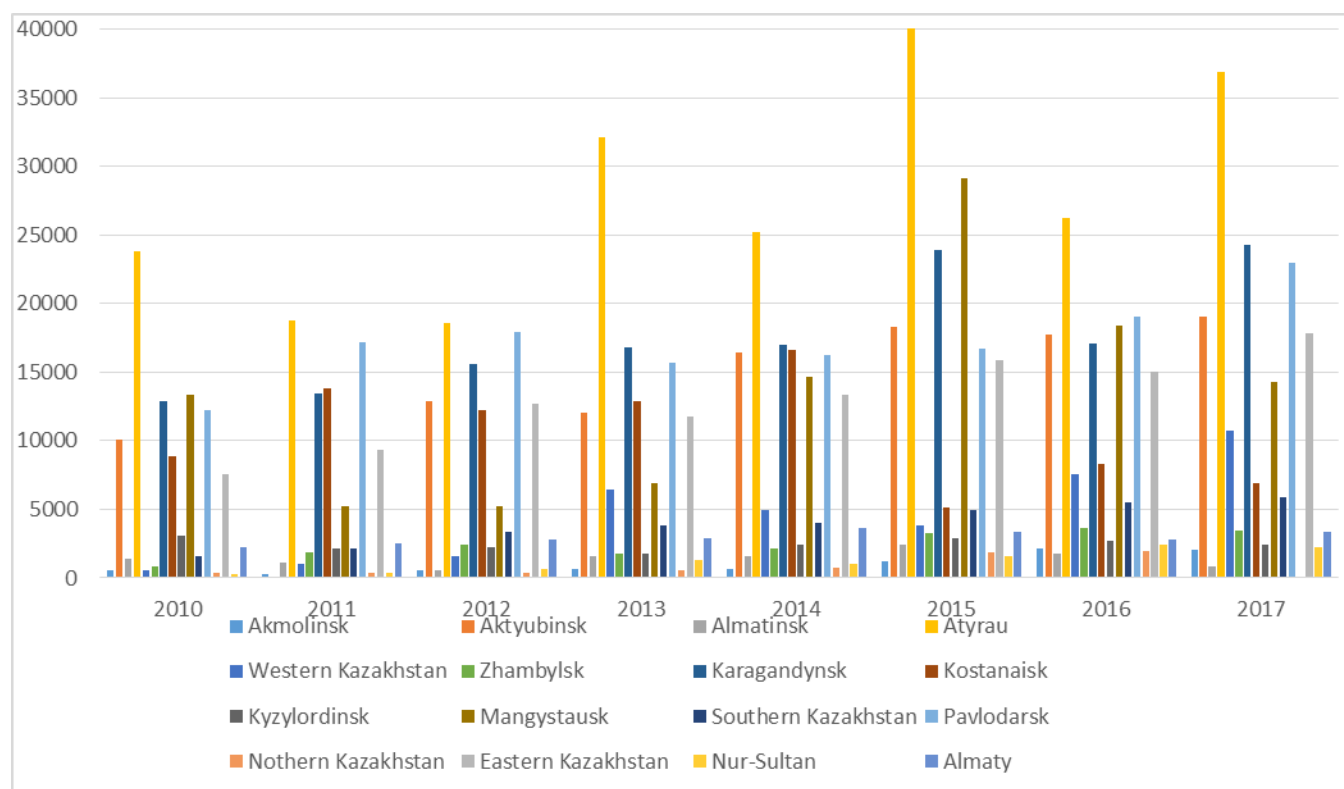
Figure 1. Investments in environmental protection by sector activities for 2010–2017, million KZT

Source: developed by the authors according to the Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018.

For investments in measures to reduce air pollution throughout the last few years accounted for the largest share of investment in environmental activities (table 3,4, figure 2) - about 40% of the total investments in 2016 and 26% in 2017. The total cost of investments fluctuates from year to year: 50 billion tenge in 2008 (0.3% of the nominal GDP), 90 billion tenge in 2010 (0.3 % of nominal GDP), 103 billion tenge in 2014 (0.3 %) and 44 billion tenge in 2016 (0.1 %).

Table 3. Current expenditures for environmental protection in the context regions of the Republic of Kazakhstan for 2010–2017, million KZT

Years	2010	2011	2012	2013	2014	2015	2016	2017
Total	99653	99213	109438	129094	140579	174650	152206	175445
Akmolinsk	550	255	566	694	604	1201	2129	2049
Aktyubinsk	10075	9 709	12865	12063	16382	18309	17711	19018
Almatinsk	1371	1152	526	1623	1608	2432	1793	844
Atyrau	23756	18777	18551	32071	25159	40254	26218	36828
Western Kazakhstan	552	998	1553	6450	4964	3794	7533	10744
Zhambylsk	816	1880	2388	1780	2182	3245	3599	3424
Karagandynsk	12848	13448	15560	16798	16969	23881	17040	24231
Kostanaisk	8893	13823	12263	12878	16573	5171	8303	6946
Kyzylordinsk	3074	2138	2222	1754	2429	2905	2709	2402
Mangystausk	13363	5209	5184	6870	14651	29093	18427	14266

Southern Kazakhstan	1619	2138	3329	3860	4046	4988	5462	5912
Pavlodarsk	12251	17152	17927	15690	16266	16696	19016	22983
Nothern Kazakhstan	397	387	330	570	772	1865	1 995	2 488
Eastern Kazakhstan	7548	9285	12720	11771	13317	15838	15063	17783
Nur-Sultan	267	382	688	1302	992	1585	2425	2211
Almaty	2273	2479	2766	2918	3664	3393	2781	3315

Source: developed by the authors according to the Ministry of National Economy of the Republic of Kazakhstan. Statistics committee, 2018.

Current expenditures for environmental protection in the context regions of the Republic of Kazakhstan for 2010–2017, million KZT (figure 2).
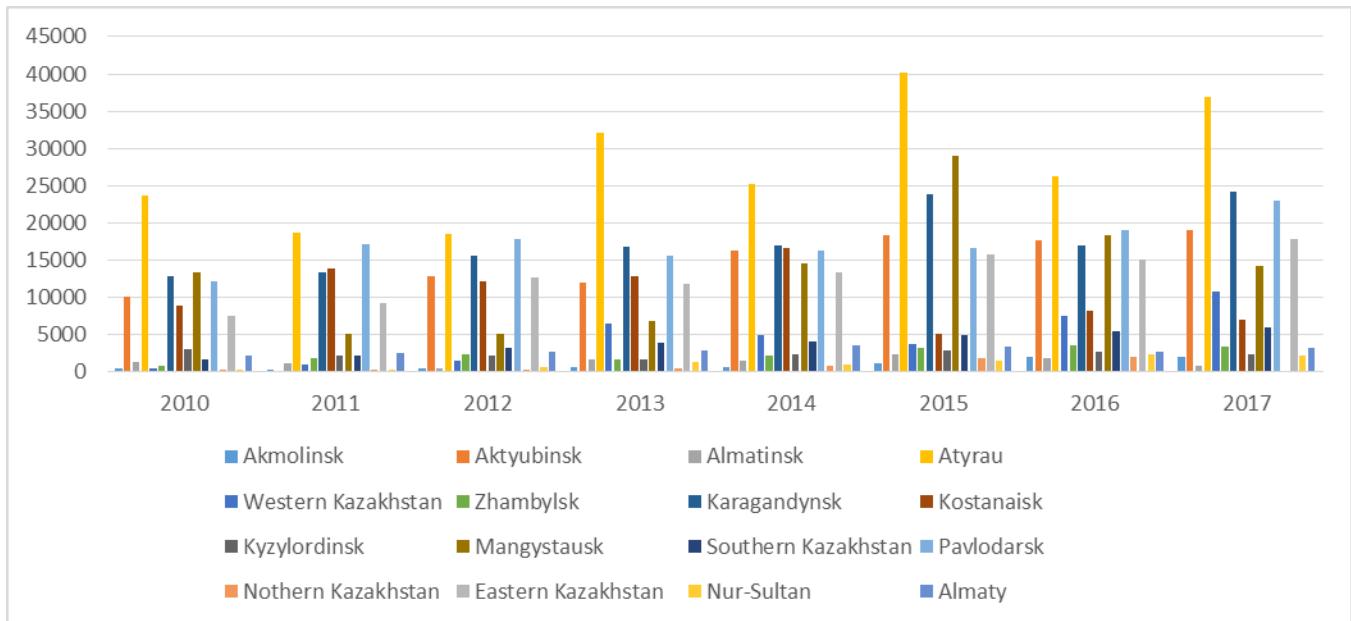

Figure 2. Current expenditures for environmental protection in the context regions of the Republic of Kazakhstan for 2010–2017, million KZT.

Analysis of table 3 showed that environmental protection costs differ significantly by region. Aktobe, Atyrau, Karaganda, Mangistau and Pavlodar regions have relatively high levels of environmental expenditure, especially in the Atyrau region, where current environmental expenditure in 2015 exceeded the level of 2012.

This is due to the relatively large scale and structure of these economic zones. If we talk about the structure of the economy, then in the gross regional product (GRP) of the Atyrau and Mangistau regions, a relatively large share belongs to industrial, mining and extractive industries. Manufacturing and energy industries account for a relatively large share of the GRP in the Karaganda and Pavlodar regions. The GRP of Aktobe region is characterized by a relatively large share of mining and energy industries.
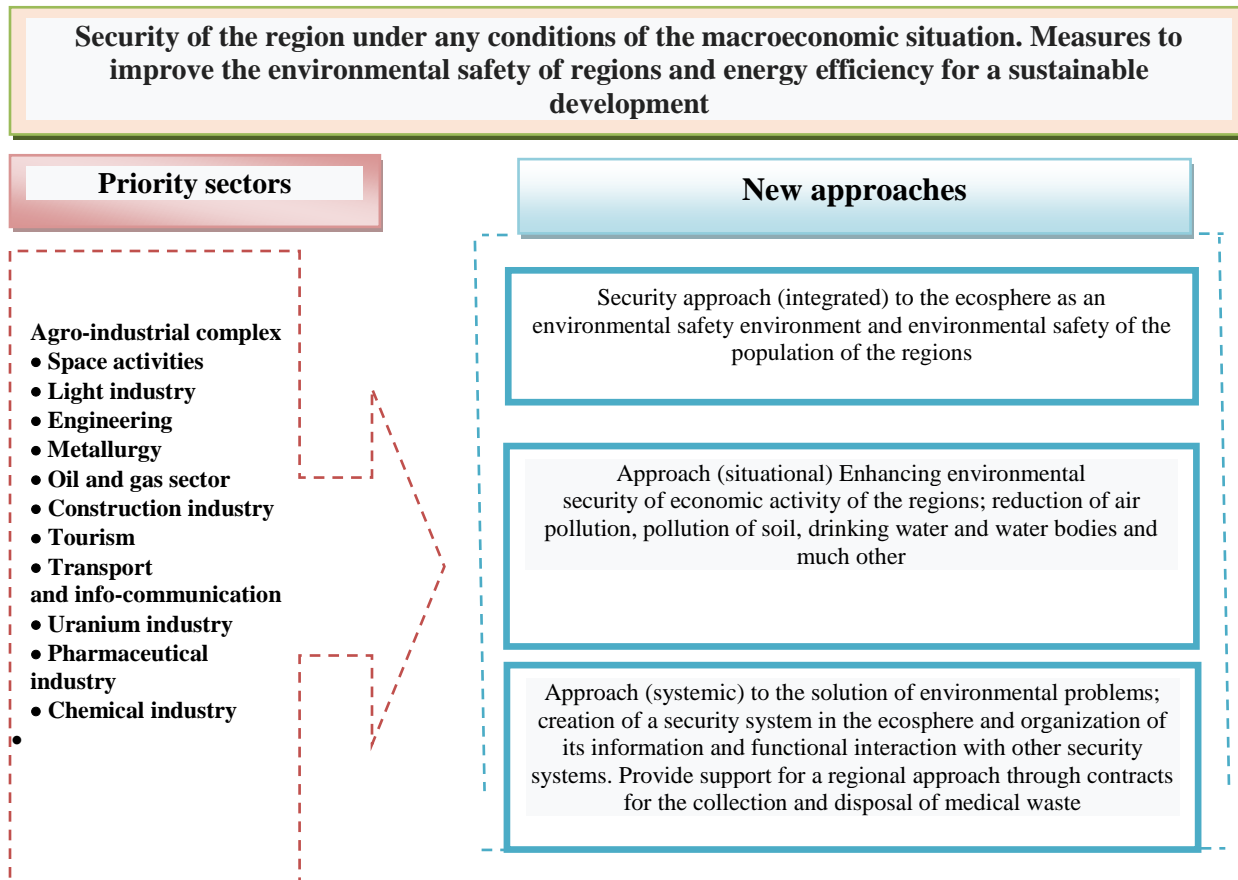
Figure 3. Measures to improve environmental safety regions and energy efficiency in sustainable development
Source: developed by the authors

Figure 3 shows that the proposed improvement measures environmental safety of regions and energy efficiency in sustainable development may be different. The largest contaminated sites and territories are located in Almaty, Eastern Kazakhstan and Karaganda regions. These territories are characterized by high salinity, water hardness and high concentration of sulfates and chlorides in excess of the MPC.

Groundwater pollution is observed in the Western Kazakhstan, in the Northern Kazakhstan, i.e. in oil producing and mining regions where water pollution is observed by iron, manganese and hexavalent chromium. Separate sources of water supply in rural areas (rural wells) are often polluted and unsuitable for due to over-application agricultural fertilizers in such waters have high levels nitrates despite strict rules that require organization sanitary protection zones around water intakes. In general, according to available data, bacteriological pollution of water in wells in rural areas found in 40% of cases, and chemical pollution - in 16 % cases.

Kazakhstan seeks to increase the share of processed resources. Solid waste sorting facilities with a total design capacity of 1 million tons of solid waste per year have been established in eight regions, including Almaty and the capital of the state. However, the return of such waste sorting complexes to processed raw materials is extremely low. The waste disposal fee does not cover the operating costs of sorting facilities. Investment in this infrastructure is almost not wasted. East Kazakhstan, as well as its Eastern and South-Eastern mountains, is subject to natural disasters: landslides, mudslides, avalanches, floods, hurricane-force winds, hail, precipitation,

frost, and droughts. The rapid development of other manufacturing industries, such as the oil and gas and metallurgical industries, creates favorable conditions for the growth of the chemical industry. They are located in Aktobe, Atyrau, South Kazakhstan and Zhambyl regions. Approach (situational) to improving the environmental safety of economic activities of regions; reducing air pollution, soil pollution, drinking water and water bodies, and much more by various chemical plants that produce nitrogen, phosphorous, potash and complex mineral fertilizers.

Enterprises are located near industrial areas and regions where qualified labor resources and scientific research centers, for example, manufacturing enterprises household chemicals in East Kazakhstan, Karaganda and Pavlodar regions and the city of Almaty, caustic soda in Pavlodar region, sulfuric acids in Akmola, Kyzylorda and Zhambyl regions and rubber products in the Karaganda region.

In connection with the above, the following solutions are recommended:

1. Strict adherence to international and national norms and rules, reasonable consumer requirements in the areas of production.
2. Customer focus - continuous study of requirements and customer satisfaction with the quality of services provided regional level.
3. The consumer is an important figure. Improvement planning and enterprises of all production processes for minimize negative impact on workers and the environment.
4. Ensuring the safety and health of workers and people, living in areas of activity of enterprises in the regions.
5. Minimizing risks and preventing production risks injuries and occupational diseases.
6. Ensuring the functioning of monitoring and control systems quality of service. Occupational health and safety.
7. Improving competitiveness in the market for services transporting oil and gas by achieving recognition in regional, national and international levels as competent and reliable partner.
8. Personal participation and responsibility of regional leaders enterprises in quality assurance activities. Clear distribution duties and powers of staff.
9. Improving the training of each employee; aspiration constantly reduce the negative impact of the enterprise on environment and natural resource management.
10. Compliance with environmental obligations. Introducing environmentally friendly effective energy-saving technologies and modern technologies, rational use of material, labor and financial resources.
11. Continuous improvement of the quality management system, occupational safety management systems, environmental management systems in compliance with the requirements of standards.
12. Maintaining contacts with government bodies and the public, as well as the desire for a constructive dialogue with all stakeholders on issues related to politics and eleven activities of regional enterprises in the field of quality, health and the environment.

Conclusion

Thus, in the course of studying the research topic, the following conclusions and recommendations
1. Close attention in the Concept for the transition to "green economy" focuses on social and regional development and investment needs. Particular importance is attached to sustainable use of water resources, development of sustainable and high-productivity agriculture, energy conservation and improving energy efficiency, developing the energy sector, improving waste management, reducing pollution atmospheric air, as well as conservation and effective management ecosystems.

2. In various regions of the Republic of Kazakhstan, Aarhus centers whose mission is to promote the three fundamental principles of the Aarhus Convention. Their activity decreases due to a lack of financing.

3. Kazakhstan has significant fossil fuel resources. According to proven reserves of oil, coal and uranium, the country is among twelve leading countries, and in terms of natural gas reserves - in the first twenty. Kazakhstan is the world leader in annual volumes uranium mining, ranks tenth among the countries of the world in coal mining and Twentieth in terms of oil production. Fuel and energy reserves resources are unevenly distributed across the country: large coal deposits are located in the northern and central regions, Uranium reserves are concentrated mainly in the southern and central regions countries, oil and gas fields are located in the western region, and insignificant gas and coal resources are available in the southern region. Kazakhstan poses enormous primary energy resources. It belongs to a group of countries, which are capable not only to satisfy domestic demand for energy resources, but also export them in significant volumes. Ensuring the environmental safety of the region and energy efficiency in sustainable development requires implementation of prudent energy management, requires the adoption of environmental standards safety, assessment and analysis of various learned economists and managerial decision making.

In the study, an attempt was made to develop activities created as part of the study, in terms of directions, contexts, paradigms, etc., which would identify inconsistencies in existing areas of analysis of environmental safety. This, in turn, contributed to a more objective picture of reality. This study has developed a neutral and reasonable tool that is equally useful to any economic factors, regardless of their scientific views and positions. All of this allowed us to get convincing and objective results.

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