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WHAT FACTORS INFLUENCE THE INCREMENTAL CAPITAL OUTPUT RATIO IN 8 ASEAN COUNTRIES?

***Abstract.** This research aims at analysing the effect of Capital per Worker, Average of Schooling Length of Time, Corruption Perception Index, FDI Ratio in GFCF, and Trade Openness on the Incremental Capital-Output Ratio (ICOR) as a measure of investment efficiency in 8 ASEAN countries. This research uses a quantitative method with panel data consisting of 8 ASEAN countries, Philippines, Indonesia, Cambodia, Laos, Malaysia, Myanmar, Thailand, and Vietnam, and it was conducted in the 2010-2019 period. The results of research found that Capital per Worker, Corruption Perception Index, FDI Ratio in GFCF, and Trade Openness have a significant effect on ICOR in 8 ASEAN Countries. While Average of Schooling Length of Time has no significant effect on ICOR in 8 ASEAN Countries. Suggestions in this research to create investment efficiency in 8 ASEAN countries are to maintain and select the growth of Capital per Worker by recognising that increasing investment in the capital-intensive sector is a vital sector with a large spillover effect on the economy, increasing the quantity and quality of education, eradicating corruption, increasing FDI flows by increasing the country's competitiveness through creating a conducive business climate and providing various monetary and fiscal incentives, lowering export trade barriers, and trying to limit and substitute consumptive and high-dependence imported products by developing and producing them domestically.*

***Keywords:** Incremental Capital-Output Ratio, Capital per Worker, Average of Schooling Length of Time, Corruption Perception Index, FDI Ratio in GFCF, Trade Openness*

JEL Classification: A11, B22, C01, C12, E66, F38

1. Introduction

Capital formation becomes an engine of growth that is capable to spur economic activity and produce higher output in a country. The main thinkers of classical economics such as Adam Smith, David Ricardo and Thomas Malthus believe that productive investment and capital formation have a positive influence on the speed of the economic growth process. The formation of capital will provide various new production facilities that may increase the ability to produce the output and the added value, so in the future the output will increase and the economic growth can be realised.

Capital formation can be interpreted as a process of collecting assets from the proportion of income that is currently saved or invested to increase the output or income in the future. In other words, the capital used to increase the production capacity is based on the funds sourced from the income and savings. The higher the income in a country, the more adequate the level of savings as a source of capital formation will be. However, the condition that generally occurs in developing and poor countries is the difficulty of providing the sources of capital formation. People's low income in the developing and poor countries can only be used to meet all their needs, while only a small amount can be distributed as savings and investments.

According to Chenery & Strout (1966), limited sources of capital formation in the developing countries can be seen from the problem of the two gap problems as follows: the condition in which the domestic savings are unable to balance the investment opportunities (saving-investment gap), and the foreign exchange owned is unable to finance the import of capital and semi-finished goods required (foreign exchange gap). Bosworth & Collins (1999) argued that limited capital accumulation is the cause of low output in some developing countries, so that the limited capital will further slowdown the process of economic growth that is very important for the developing countries.

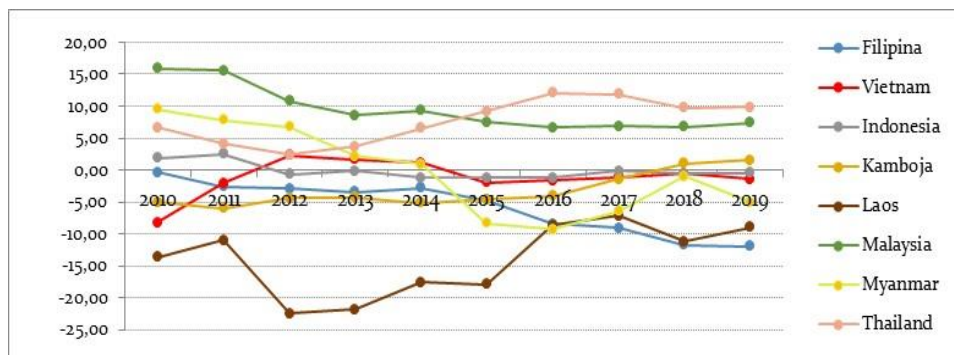


Figure 1. A Gap between Savings and Domestic Investment of 8 ASEAN countries

The Association of Southeast Asian Nations (ASEAN) is an organisation of countries in the Southeast Asia region whose majority members are the developing countries and those classified as having middle income, such as the Philippines, Indonesia, Cambodia, Laos, Malaysia, Myanmar, Thailand, and Vietnam. Meanwhile, Brunei Darussalam has been classified as a high-income country, even though it is still a developing country, and Singapore has become a developed country and has a high income. Based on Figure 1.1, 8 ASEAN countries classified as developing and middle-income countries experienced various conditions of saving-investment gap during 2010-2019. Based on Figure 1, Thailand and Malaysia each has a positive saving-investment gap value respectively, while other countries, Laos, Cambodia, Indonesia, Philippines, Vietnam, and Myanmar respectively, have ever had a negative saving-investment gap value.

The positive saving-investment gap, as occurred in Thailand and Malaysia, indicates a higher saving rate than the investment rate. In other words, the condition of a positive saving-investment gap indicates an unutilised investment potential in the domestic real sector, commonly known as over-saving or underinvestment. The excess funds from these savings can still be used to increase capital formation and economic growth in the country. Meanwhile, the negative saving-investment gap in other ASEAN developing countries such as Laos, Cambodia, the Philippines, Indonesia, Myanmar, and Vietnam illustrates the low ability of domestic savings to meet the required investment needs. So, this has an impact on the limited availability of domestic capital in these countries.

Table 1. Surplus/Deficit Condition of Current Account Balance in 8 ASEAN Countries (%PDB)

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Philippines	3.45	2.41	2.65	4.01	3.62	2.37	-0.38	-0.65	-2.56	-0.81
Indonesia	0.68	0.19	-2.66	-3.19	-3.09	-2.04	-1.82	-1.59	-2.94	-2.71
Cambodia	-8.73	-8.00	-8.63	-8.51	-8.64	-8.86	-8.66	-8.12	-11.78	-15.00
Laos	0.41	-2.36	-7.31	-7.84	-14.50	-15.76	-8.76	-7.48	-9.18	-5.21
Malaysia	10.06	10.90	5.19	3.47	4.39	3.01	2.37	2.81	2.24	3.37
Myanmar	3.18	-2.60	-2.10	-0.64	-3.25	-4.18	-2.64	-6.53	-2.81	0.32
Thailand	-3.37	2.54	-1.23	-2.10	2.86	6.92	10.51	9.63	5.61	7.03
Vietnam	-3.69	0.17	6.05	4.52	5.03	-1.06	0.30	-0.74	2.41	5.00

The problem of limited sources of capital formation can also be seen from the foreign exchange gap, which is known from the current account balance of a country. Current account balance is a record of a country's international transactions with other countries around the world in the form of trade in exports and imports of goods and services, investment income, and transfers. A positive or surplus current account balance indicates that a country's foreign exchange is capable of financing

various kinds of imports of the required capital goods. Meanwhile, a negative or deficit current account balance indicates that a country's foreign exchange is unable to finance the import of the required capital goods. Based on table 1, Cambodia, Indonesia, Laos and Myanmar respectively experienced deficits in the current account balance, while Philippine, Thailand and Vietnam experienced fluctuating conditions during 2010-2019. Malaysia has a current account balance that is always positive even though it has a downward trend. Cambodia is the country with the highest current account deficit with an average of 9.49% of GDP. If totally calculated, the contribution of the current account balance as part of GDP in the 8 ASEAN countries experienced a downward trend and the average contribution of the current account balance to GDP decreased by 0.14% per year during 2010-2019.

Based on Figure 1 and Table 1, it can be concluded that most of the 8 ASEAN developing countries with middle income indicate a double gap condition at the same time as occurred in Laos, Indonesia, Myanmar, Cambodia, and the Philippines, which made the sources of capital formation very limited. The use of foreign capital (capital inflow) such as foreign direct investment (FDI), foreign portfolio investment, foreign debt (ULN), and grant funds are frequently targeted and are generally used to overcome domestic capital problems. Although, on the other hand, the use of foreign funds is also at risk of causing dependence and has a negative impact on the economic stability of a country, especially in the form of foreign debt.

Foreign debt is an investment financing tool that has the highest economic risk compared to other foreign funds because it is vulnerable to causing a debt trap. The foreign debt also carries financial risk arising from movements in exchange rates, interest rates, and economic shocks that may affect the business environment. The history records how Indonesia experienced an economic crisis in 1997 begun with the Thai baht exchange rate crisis that then impacted on the depreciation of the rupiah. As a result, entrepreneurs find it difficult because they have to pay their maturing foreign debt obligations and pay for the necessary imported raw materials at very high prices. The monetary crisis then resulted in an increase in the external debt burden and caused an economic crisis in Indonesia. The ratio of Indonesia's foreign debt to Gross National Product (GNP) at the beginning of the crisis in 1997 was 65.10%, then increased very high to 168.20% in 1998.

Another very serious debt crisis is the case that hit Latin American countries in the 1980s, especially Argentina and Mexico. In addition, recently the term "Chinese Debt Trap" has emerged, which is a new model from China to gain power under the pretext of providing infrastructure assistance and loans to developing countries as members of the Belt and Road Initiative (BRI). China can take over the infrastructure projects it finances if the BRI country fails to repay the loan. As what has happened in which the ports of Sri Lanka and Pakistan have been taken over by China for 99 years because these countries failed to repay their loans (Priangani et al., 2021).

The capital management strategy is a key factor for a country in facing the dynamics of the economy that is full of challenges. In the process of economic development, efficiency in the allocation of existing economic resources is a matter that needs to be considered so that economic growth may provide the optimal results and avoid the waste. In addition, the competitiveness of a country will also increase in line with the increase in productivity and efficiency of its economic resources. The investors will prefer countries with a much higher level of investment efficiency to other countries with a much lower efficiency level to save the costs and to obtain the maximum profits.

Efficiency in production can be defined as a comparison between output and input, or the amount of the produced output from one of the used input. If the ratio of output to input is greater, the efficiency is said to be higher. Likewise, if the ratio of output to input is smaller, the efficiency is said to be lower. Regarding the investment, the Incremental Capital-Output Ratio (ICOR) is one of the calculation indicators that can generally be used to measure the level of investment efficiency in a country or region (Soumaila, 2017). ICOR is a quantity that shows the relationship between the amount of increase in output (ΔY) resulting from a certain increase in the capital stock (ΔK), or it can also be described as $K/\Delta Y$. The lower the ICOR value is, the higher the efficient level of investment will be. On the contrary, the higher the ICOR value is, the lower the level of investment efficiency in a country or region will be.

The ICOR value in developing countries is ideally expected to be around 3. Widodo (1990) in Imelda (2015) also argued that good investment productivity is indicated by ICOR values ranging from 3 to 4. This assumption arises because the developing countries generally tend to consider the number of production factor of abundant labour with the relatively inexpensive wages, while the sources of capital formation are quite limited due to the low incomes and savings. So that the economic sector in developing countries with a surplus of labour will be more labour intensive with a high labour intensity. In such circumstances, any additional capital stock will produce greater output than in developed countries, which are more dominated by capital intensive production patterns. So the ICOR value will tend to be of small value.

Table 2. ICOR value in 8 ASEAN countries (in US Dollar)

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
Philippines	2.71	5.16	3.02	2.99	3.45	3.84	4.03	4.25	4.81	4.86	3.91
Indonesia	5.36	5.54	5.82	6.26	6.87	7.06	6.81	6.84	6.80	6.95	6.43
Cambodia	2.98	2.63	2.79	2.95	3.14	3.26	3.43	3.27	3.09	3.37	3.09
Laos	3.31	3.64	4.42	4.04	4.37	4.66	4.81	4.71	5.18	6.91	4.61
Malaysia	3.26	4.53	4.95	5.92	4.63	5.34	5.96	4.69	5.44	5.48	5.02
Myanmar	2.50	5.55	4.41	4.09	4.29	5.29	5.97	5.22	5.82	6.01	4.92
Thailand	3.46	30.19	3.84	9.56	24.86	8.07	7.52	6.18	6.00	10.25	10.99
Vietnam	4.61	4.11	4.69	4.54	4.26	3.94	4.36	4.13	4.43	4.50	4.36

Table 2 shows the ICOR values in 8 ASEAN developing countries with middle income resulting in an increasing trend and most of them have values above 4 that represent less than ideal investment efficiency in these countries. Thailand is the least efficient with an average ICOR value of 10.99 during 2010-2019. Then it is followed by Indonesia with an average of 6.43, Malaysia is at 5.02 and Myanmar is at 4.92. Of these 8 countries, only Cambodia and Philippines that have an average ICOR value during 2010-2019 below 4, which is respectively 3.09 and 3.91 that illustrates the average efficient investment. However, ICOR in these two countries is also experiencing an increasing trend or towards lower efficiency levels every year.

Capital per Worker (Capital-Labor Ratio) is a ratio measure of the use of capital to the use of labor in the production process. In other words, Capital per Worker explains how much capital is distributed to each worker in a production process. Capital per Worker is also closely related to the productivity of capital and labor. With the increase in capital goods in the form of machinery, equipment, buildings, vehicles, technology and so on, workers can produce greater output at the same time, assuming that labor growth is lower than capital growth. However, when Capital per Worker increases, capital deepening occurs, which means that the distribution of capital among each worker becomes larger and the production process leads to a capital-intensive approach. So the increase in Capital per Worker will cause a decrease in investment efficiency.

Another determinant of investment efficiency is the quality of human resources. The quality of human resources can be a benchmark for good or bad managerial quality. Superior human resources through a good level of education are expected to be able to use and develop technology to utilise the resources owned by a country. So that the results will provide welfare for the community. The use of capital equipment and productive resources will be optimally utilised in countries with good levels of education. So that the obtained output will be greater with the existing capital.

The average of schooling length of time can be an illustration of the average of length of time people in a country take education. The greater the average of schooling, it is expected that human resources will be more educated and qualified. Thus, an increase in the length of time is, the education level of a country will be able to bring efficient investment due to better capital management.

The investment efficiency can also be affected by the level of corruption in a country (Swaleheen, 2007). Corruption is an act against the law by abusing the rights of other parties for profit. Corruption may lead to market integrity and weak implementation of good governance in both the private and public sectors. Khan & Jomo (2000) stated that the practice of rent seeking is a collaborative activity between entrepreneurs and the government to seek profit and enrich themselves by looking for gaps in public policies or budget allocations in government projects, leading to high corruption and making the economy development a high cost economy in Asia. Damanhuri (2010) in Hariyani et al. (2016) also argued that corruption will cause a high cost economy and hinder the process of economic growth through obstacles that occur

in investment. Thus, it is estimated that the more corrupt a country is, the less efficient the investment in that country will be.

Corruption Perception Index (CPI) is an index that measures the level of corruption in a country which assessment is published by an institution called Transparency International. Specifically, the CPI measures the level of corruption in a country based on the amount of abuse of power for personal gain among the government agencies and the integrity of people who have authority in a country. The CPI score ranges from 0 to 100 in which the higher the CPI value is, the lower the level of corruption in the country will be, and on the contrary, the lower or close to zero the CPI value is, the more corrupt the country will be.

The type of investment chosen is very influential on the reciprocal results obtained. Private sector investment is believed to be more productive than public sector investment because it has an incentive to bring profits and increase income. So that the higher the composition of private investment types is, the more positive the effect on investment efficiency will be.

Foreign Direct Investment (FDI) is one of the private investments which financing comes from foreign funds. Neoclassical growth theory thinks that FDI is able to increase the economic growth through its role in delivering funds to productive economic sectors that are lack of capital. Some observers agree that the capital sourced from FDI is the most potential one of foreign financing compared to other sources. FDI is an important means of technology transfer and has a greater contribution to the economic growth of a country than domestic investment. Therefore, the larger the FDI ratio in the total Gross Fixed Capital Formation (PMTB) is, the greater the investment productivity will be expected.

Openness in foreign trade (Trade Openness) has positive benefits for a country's economy, especially in providing new investment opportunities and strengthening relations between domestic and international markets. Trade openness means that trade barriers in a country to market goods and services will gradually decrease and disappear. Saidi & Hammami (2018) stated that high Trade Openness in a country is a good indicator of the ease of doing business and represents the simplicity of procedures in carrying out export and import operations for a company. So that investors will benefit from the country's comparative advantages by exporting to international markets and importing production inputs that are cheaper from other countries.

Trade Openness is described by the ratio between trades, exports plus imports to GDP in a country. The higher the ratio is, the more open the country's foreign trade will be. Likewise, if the ratio is low, the foreign trade in the country will be closed. In terms of investment efficiency, high trade openness will provide greater profit for each invested capital because the barriers to trade are decreasing. So that the market share will be wider and the additional costs that must be incurred to market an item will decrease and affect the increase in investment efficiency.

Based on this explanation, some developing countries in ASEAN still recorded less than ideal investment efficiency. Efficient investment is very important,

especially for developing countries that want to create a high level of economic growth so that the level of people's welfare immediately increases. This is also supported by the problem of limited sources of capital formation and high dependence on foreign capital, especially in the form of foreign debt that may threaten the economic stability at any time. Therefore, it is necessary to conduct further research to find out how much influence Capital per Worker, Average Years of Schooling, Corruption Perception Index, FDI Ratio in PMTB, and Trade Openness have on ICOR as a measure of investment efficiency in 8 ASEAN developing countries those are the Philippines, Indonesia, Cambodia, Laos, Malaysia, Myanmar, Thailand and Vietnam.

2. Method of Research

This research uses the quantitative type. Quantitative research is a method of research that has the full intention of testing the established hypothesis. This research uses secondary data type with data collection technique, which is documentation. The variable data used in this research are obtained from data sources originating from various reports and statistical documents that have been published and can be accessed on the official websites of relevant international institutions such as the United Nations Conference on Trade and Development (UNCTAD), the International Labor Organisation (ILO), United Nations Development Program (UNDP), World Bank, and Transparency International (TI). The data analysis technique in this research uses panel data regression with the help of Eviews 9.0 software. This research uses a time series for 10 years from 2010-2019 and a cross section of 8 ASEAN countries. In this research, ICOR becomes the dependent variable while there are 5 independent variables used as follows (1) Capital per Worker, (2) Average of Schooling Length of Time, (3) Corruption Perception Index (CPI), (4) FDI Ratio in PMTB, and (5) Trade Openness.

The panel data regression analysis model in this research is as follows:

$$ICOR_{it} = \beta_0 + \beta_1 MPT_{it} + \beta_2 RLS_{it} + \beta_3 CPI_{it} + \beta_4 RFP_{it} + \beta_5 TO_{it} + e_{it} \quad (1)$$

Description:

<i>ICOR</i>	: Incremental Capital-Output Ratio Variable
β_0	: Constanta
$\beta_1; \beta_2; \beta_3; \beta_4; \beta_5$: Regression coefficient
<i>MPT</i>	: Capital per Worker Variable
<i>RLS</i>	: Average of Schooling Length of Time Variable
<i>CPI</i>	: Corruption Perception Index Variable
<i>RFP</i>	: FDI Inflow Ratio Variable in PMTB
<i>TO</i>	: Trade Openness Variable
<i>e</i>	: Error term (disturbing factor outside the model)
<i>i</i>	: Cross section data of 8 ASEAN countries
<i>t</i>	: Time series data for 2010-2019

3. Result and Discussion

In this research, the independent variables experienced the problem of multicollinearity, which is the existence of a high or perfect correlation between each independent variable. The existence of multicollinearity problems in Independent Variables will make the model have large variances and covariances, large determinant coefficient R^2 (R-square) but statistically many variables are insignificant, and the standard errors are sensitive to small changes in the data (Gujarati & Porter, 2009). Therefore, multicollinearity healing technique using data transformation method is chosen in this research. Data transformation is a fully intentional effort to make the scale of the original data measurement change into another simpler form. So that the observational data in the research can meet the assumptions that underlie the variance. According to Gujarati & Porter (2009), the transformation chosen to treat multicollinearity is first difference or delta.

Then the research model becomes as follows:

$$DICOR_{it} = \beta_0 + \beta_1 DMPT_{it} + \beta_2 DRLS_{it} + \beta_3 DCPI_{it} + \beta_4 DRFP_{it} + \beta_5 DTO_{it} + \varepsilon_{it} \quad (2)$$

Description:

<i>DICOR</i>	: Incremental Capital-Output Ratio Variable in the form of First Different
β_0	: Constant
$\beta_1; \beta_2; \beta_3; \beta_4; \beta_5$: Regression coefficient
<i>DMPT</i>	: Capital per Worker in the form of First Different Variable
<i>DRLS</i>	: Average of Schooling Length of Time Variable in the form of First Different
<i>DCPI</i>	: Corruption Perception Index Variable in the form of First Different
<i>DRFP</i>	: Ratio of FDI inflow Variable in PMTB in the form of First Different
<i>DTO</i>	: Trade Openness Variable in the form of First Different
ε	: Error term in the form of First Different ($e_{it} - e_{it-1}$)
<i>i</i>	: Cross section data of 8 ASEAN countries
<i>t</i>	: Time series data for 2010-2019

After conducting various stages to get the best model for panel data regression, the result is that the Common Effect Model with the Generalised Least Square (GLS) method and the cross-section Seemingly Unrelated Regression (SUR) is the best model. CEM by weighing the covariance coefficient of cross-section SUR is more efficient than the OLS method for estimating data with autocorrelation residuals.

Table 3. Estimation Result of Common Effect Model with GLS and Cross-Section SUR methods

Variables	Coefficient	Std.Error	t-Statistic	Prob.
C	0.727386	0.154341	4.712862	0.0000
DMPT	-0.005798	0.001148	-5.049849	0.0000
DRLS	-0.305466	0.793224	-0.385094	0.7014
DCPI	-0.208243	0.043516	-4.785430	0.0000
DRFP	-0.151771	0.016113	-9.419443	0.0000
DTO	0.067491	0.020240	3.334511	0.0014

Table 3 shows that the estimation results used in this research are the Common Effect Model with the Generalised Least Square (GLS) method and the cross-section Seemingly Unrelated Regression (SUR). The regression coefficient value for each research variable is as follows:

$$\text{DICOR} = 0,727386 - 0,005798(\text{DMPT}) - 0,305466(\text{DRLS}) - 0,208243(\text{DCPI}) - 0,151771(\text{DRFP}) - 0,067491(\text{DTO}) + \varepsilon_{it} \quad (3)$$

3.1. Effect of Capital per Worker on ICOR

Capital per Worker partially has a negative and significant effect on the ICOR in 8 ASEAN countries during 2010-2019. The regression coefficient value of the Capital per Worker variable is -0.005798. So, it can be interpreted that every time there is an increase in Capital per Worker in 8 ASEAN countries in a certain year with the previous year amounting to 1 US\$ per Worker, then the ICOR value in 8 ASEAN countries in that year will experience an increase change from the previous year of 0.005798 with *ceteris paribus* assumption.

The results of research are not in line with the neoclassical growth production function model stating that capital and labour as production inputs have a substitution relationship or replace each other to produce certain outputs. So even though the increase in Capital per Worker illustrating that the use of capital in production inputs is getting bigger than the use of labour inputs, it cannot ensure that the investment efficiency will be lower. So in the results of this research, each addition of capital stock actually produces greater output or has increased investment efficiency. So that the ratio of the use of capital or labour in producing an output is not in line with what is expected in the theory of the neoclassical production function model, especially in 8 ASEAN countries.

The results of research differ from the findings of Lambsdorff (2003). In this research, Capital per Capita is used as a proxy that describes the use of capital rather than the use of human labour. While the productivity of capital described by

Capital per GDP is used as the Bound Variable. The results of research stated that Capital per Capita had a negative and significant effect on capital productivity in 69 countries. The greater the Capital per Capita in a country is, the lower the productivity of capital in that country will be. So that the decline in capital productivity will ultimately affect the efficiency of capital itself.

The results of research are in line with the research of Soumaila (2017) and Vanek & Studenmund (1968), which explain why the increase in the number of certain production inputs does not always result in decreasing efficiency. This research found that the relationship between changes in production input prices in the form of interest rates and labour wages is ambiguous and less convincing to affect the investment efficiency. The amount of capital per worker can be influenced by the availability of production input resources owned and the price of each of these production inputs such as interest rates and labour wages. The interest rate is the price required for each investment, while the wage for labour is the price required for each worker. However, in this research, the relationship between the number of inputs indirectly proxied through input prices does not produce definite results in influencing the ICOR or the investment efficiency.

3.2. Effect of Average of Schooling Length of Time on ICOR

The average of schooling length of time has a partially negative but statistically insignificant effect on ICOR in 8 ASEAN countries during 2010-2019. In other words, the effect of the average of schooling length of time on ICOR resulted in the same direction as expected but statistically insignificant. So it cannot be directly confirmed that the Average of Schooling Length of Time is able to affect the investment efficiency in 8 ASEAN countries during 2010-2019.

The insignificance of the Average of Schooling Length of Time variable is probably due to the growth of education levels in the 8 ASEAN countries that have not experienced significant growth or high levels of education, especially in the workforce, which is seen from the higher Average of Schooling Length of Time that is unable to show the actual quality of education. This may occur due to other problems such as mismatch of skills and jobs. The mismatch of skills and jobs can be in the form of under-education or over-education. Under-education is a situation in which the education of workers who work in certain business fields or types of work is lower than the average of education required in certain business fields or types of work. While over-education is a condition in which a job actually only requires workers with low education, but it is filled by workers who have higher education and skills. This means that the companies do not fully utilise the productive capacity of their workers (Sparreboom & Tarvid, 2016).

In Kampelmann & Rycx (2012) reported that under-education workers interfered with the company-level productivity, but in the case of over-education, a significant positive impact was found on productivity. Based on the research of Velciu (2017), in a short term over-education may have a positive impact on productivity for a company, but in the long term the mismatched workers will affect a decrease in job satisfaction and lower wages. Moreover, at the macroeconomic level, job mismatch means a loss of potential resources and human capital that may bring a negative impact on overall productivity. In the research of Tsang (1987), it found that over-education has a negative impact on job satisfaction. Meanwhile, job satisfaction has a positive and significant correlation with output. So it can be concluded that excess education has a negative impact on worker productivity.

3.3. Effect of CPI on ICOR

CPI has a negative and significant impact on the ICOR in 8 ASEAN countries during 2010-2019. The coefficient value of the CPI variable is -0.208243. So it can be interpreted that every time there is a change in the increase in CPI in 8 ASEAN countries in a certain year with the previous year amounted 1 point, the ICOR value in 8 ASEAN countries in that year will decrease from the previous year of 0.208243 with the assumption of *ceteris paribus*.

The negative effect of CPI on the ICOR generated in this research is in accordance with Schumpeter's theory, which explains that high government intervention in the economy may cause a slowdown in the process of economic growth, especially if this occurs in developing countries. The high level of government intervention will hinder the development of the private sectors that are rich in innovation and limit their freedom in entrepreneurship.

The increase in corruption level also shows that the performance of government offices and institutions as the counterweight of a market failure is getting worse. Based on institutional economic theory, institutions have a very vital role in determining the economic progress of a nation. So with a bad institutional condition, a slow economic rate will be obtained due to the large obstacles. Thus, the high levels of corruption provide a disincentive to entrepreneurship and productivity. So corruption will further worsen the market failures that in turn have an impact on the low investment efficiency.

This research is in accordance with the results of research of Soumaila (2017) and Swaleheen (2007), in which the three conducted research on the effect of corruption on ICOR. The three research bring the same conclusion that corruption has a negative and significant effect on the investment efficiency. Soumaila (2017) chose corruption to measure the impact of institutional quality on the investment efficiency. Soumaila's research (2017) uses the corruption index issued by the

International Country Risk Guide (ICRG) as a variable that represents the level of corruption in a country. According to him, corruption may affect the investment efficiency in both private and public sector investments. Meanwhile, in Swaleheen (2007) research, corruption has a negative impact not only on the investment efficiency but also on the investment choices. This effect is more felt in developing countries where corruption is high. Meanwhile, in Lambsdorff (2003) research, corruption proxied by CPI has a positive impact on the capital productivity.

3.4. Effect of FDI Ratio in PMTB on ICOR

The FDI ratio in PMTB partially has a negative and significant effect on the ICOR in 8 ASEAN countries during 2010-2019. The regression coefficient value of the FDI ratio variable in PMTB is -0.151771. So it can be interpreted that every time there is a change in the increase in the FDI Ratio in PMTB in 8 ASEAN countries in a certain year with the previous year amounted 1%, the ICOR value in 8 ASEAN countries in that year will decrease from the previous year of 0.151771 with the assumption of *ceteris paribus*.

The results of research are in accordance with Schumpeter's growth theory that the capitalist system applied in the developing countries may accelerate the economic development in those countries. The capitalist system emphasises that the role of private sector in the economy will have a positive impact on the emergence of innovation, economic development, and increase in public output. So that the big role of the private sector and the low level of government intervention in the economy will facilitate the creation of new entrepreneurs who bring innovation to the business world. The emergence of new innovations expects that every process and economic activity becomes fast, efficient and generates greater profits. So that the process of economic growth and development will run well.

The results of research are also supported by research of Jayaraman & Ward (2004), which in their study concluded that the ratio of private investment, which is relatively larger than the public investment, has a positive effect on the investment efficiency in Fiji. This result explains that a larger share of private investment in the total investment will result in greater incentives than if total investment is supported by more public investment. As it is known that private investment has a greater incentive to bring profits than public investment. Then the pursuit of profit will lead to a more efficient use of capital resources.

In the research of M. S. Khan & Reinhart (1990), private investment is believed to have a productivity advantage rather than public investment. In this research, it was found that in the long run private investment has a greater marginal productivity than public investment in developing countries. While the research of Abdaljawwad & Sarmidi (2018) also agreed that private investment has a positive effect on the economic growth. Haque (2012) concluded in their own research that private investment has a much larger and important role in the process of economic growth in Bangladesh. Meanwhile, Makuyana & Odhiambo (2019) found that

private investment contributed more to economic growth than public investment in Malawi. The advantages of private investment over public investment in the process of economic growth are also reported in the research of Zou (2006) in Japan and the United States.

The results of research are also in accordance with the neoclassical growth theory, which believes that FDI is able to increase the economic growth through its role in delivering funds to the productive economic sectors that are lack of capital. So that with the new source of capital funds, the productive sectors that previously had stopped or grew slowly due to the lack of capital, are able to revive and grow more rapidly. In addition, the flow of FDI entering a country also allows for cooperation between foreign investors and existing local companies or industries, especially to meet the basic input needs required by new multinational companies that arise as a result of FDI. So indirectly, through the existing cooperation, it will affect the demand for capital goods, semi-finished goods, raw materials and other inputs that trigger the economic growth in FDI destination countries.

Another potential benefit is the emergence of new technologies, capital equipment and manufacturing expertise that are carried away by the flow of FDI into a country. FDI entering a country will transfer technology to the local investors through knowledge sharing in new innovations in production, research, development, and also lead to increased competition in trade resulting in industrial efficiency and effectiveness. Thus, the transfer of acquired skills, technology, managerial expertise, and governance practices within a certain time will help create productive and efficient management of the capital resources.

3.5. Effect of Trade Openness on ICOR

Trade Openness partially has a positive and significant effect on the ICOR in 8 ASEAN countries during 2010-2019. The regression coefficient value of the Trade Openness variable is 0.067491. So it can be interpreted that every time there is an increase in Trade Openness in 8 ASEAN countries in a certain year with the previous year amounted 1%, the ICOR value in 8 ASEAN countries in that year will increase from the previous year of 0.067491% with the assumption of *ceteris paribus*.

The results of research are not in line with the theory of economies of scale, which states that the increase in the company's production scale will reduce the average cost of production and generate profits. Through the increase in Trade Openness, business actors should benefit from the convenience of expanding market share due to an increase in economic cooperation on a larger scale. The companies can also take advantage of economies of scale and scope that represent the reduce in firm costs due to the increase in production scale (Becker-Blease et al., 2010; Leal-Rodríguez et al., 2015). However, this does not occur in the 8 ASEAN countries and the opposite is true.

The results of research are the same as those found in Lambsdorff (2003) research that Trade Openness has a negative effect on capital productivity. According to Lambsdorff (2003), different results from the theory occur because the

high Trade Openness in a country can have an impact on the amount of foreign capital that enters the country. So that the stock of capital owned will be greater and affect the lower productivity of capital. Lambsdorff (2003) also states that Trade Openness is wrong in describing a more competitive market because the Trade Openness of a country decreases with its size, for example with the population it has. The greater the population of a country is, the more trade will be carried out for the domestic market and not with foreign countries.

The increase in Trade Openness in a country must be accompanied by an increase in the quality of good human resources so that its function to absorb technological advances from trade liberalisation may run well. According to the research of Grossman & Helpman (1991), the positive effect of Trade Openness on the economic growth may occur depending on the abundance of international knowledge. It is also supported by Grossman & Helpman (1991), which told that imports are an important channel for the transfer of knowledge and advanced technology that triggers the increase in productivity and competition in the domestic economy.

Another reason why the results of research are different from the theory is because the Trade Openness in the 8 ASEAN countries are mostly contributed by high imports rather than exports. So that if the goods imported are consumptive and non-productive goods, the Trade Openness will not have a good impact on the economic growth and the investment efficiency.

Based on the results of research conducted by Vanek & Studenmund (1968), the import ratio in GNP has a positive and significant effect on ICOR or a negative and significant effect on the investment efficiency in underdeveloped and developed countries. Meanwhile, in Swaleheen (2007) research, the effect of the import ratio on GDP can be different depending on the characteristics of a country. The research found that the ratio of imports to GDP has a negative effect on the investment efficiency in countries with high levels of corruption, middle income and high income. While the positive influence is experienced by countries with low levels of corruption and low income. These results show that good quality institutions are able to provide good import policies and countries with low incomes tend to require large capital for their economic development, so that large imports may increase the investment efficiency.

4. Conclusions

Based on the description that has been disclosed in the discussion, some conclusions can be drawn as follows: 1) The Capital per Worker has a negative and significant effect on ICOR. 2) The Average of Schooling Length of Time has a negative but insignificant effect on ICOR. 3) CPI has a negative and significant effect on ICOR. 4) FDI ratio in PMTB has a negative and significant effect on ICOR. 5) The Trade Openness has a positive and significant effect on ICOR.

Suggestions that can be put forward in this research is to create the investment efficiency in 8 ASEAN countries as follows: 1) controlling and maintaining the growth of Capital per Worker by choosing a productive capital-intensive business sector. Governments in the 8 ASEAN countries need to enforce a strong selection and consideration of new investments that enter the capital-intensive sector by considering that the sector is the vital one that has a large spillover effect on the economy given the limited sources of capital formation and the large potential for the high labour. Given that there is still the possibility of the law of diminishing returns on each production input, it is also necessary to maintain a balance in the growth of production inputs, both capital and labour, and to improve the quality of each of these production inputs. 2) Even though statistically the Average of Schooling Length of Time has no significant effect on ICOR, the 8 ASEAN countries still have to increase the level of education by providing easy access to education that is carried out evenly in various regions and community groups. In addition, the 8 ASEAN countries also need to improve the quality of education through the increase in investment in education, both by the government and the private sector, especially in professional education that is oriented to the world of work such as vocational education. In addition, it is necessary to harmonise the educational curriculum with the needs of the labour market. So that unemployment, job mismatches, and weak technology diffusion processes that may occur can be avoided and facilitate the process of investment efficiency. 3) Since the CPI has a negative and significant effect on the ICOR, efforts that need to be made are those that lead to corruption eradication activities, such as the creation of various policies and legal instruments aimed at eradicating and reducing the level of corruption. In addition, reforms are also required to the bureaucratic system that measures performance based on performance targets and achievements, simplification of procedures, and bureaucratic transparency so that the potential for corruption can be reduced. 4) Encouraging an increase in FDI flows into the 8 ASEAN countries, such as increasing promotion and competitiveness through monetary and fiscal incentives and creating investment policies that are more transparent, attractive, and competitive. In addition, it requires regulations to select FDI flows into the economic sectors that are adapted to the needs and potential of the resources they have, require the technology transfer for multinational companies or provide the license agreements so that multinational companies are willing to transfer technology, and improve supervision and protection for business actors to avoid monopolistic practices in the domestic market in line with the entry of multinational companies. 5) Related to the Trade Openness variable, it is necessary to increase the exports and maintain or limit the imports only to imports of productive capital materials and seek to substitute the consumptive imported products and have a high dependence by developing and producing them domestically. Increasing the exports can be done by reducing barriers in the form of tariffs, quota restrictions, and licensing that are difficult for the export-oriented companies and industries as well as increasing promotion and support to business sectors that have the potential in the form of

comparative and competitive advantages to be able to compete in the international market. In addition, it is necessary to increase the absorption capacity of technology both in physical infrastructure and human resources. The government also needs to diversify the export and import partner countries to avoid dependence and spillover effects that may disrupt the domestic economy when the export and import partner countries experience a crisis by increasing the international cooperation bilaterally, regionally and multilaterally to expand the market reach.

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TOURISM VILLAGE CLUSTERS: POTENTIAL FOR DEVELOPMENT AT JEPARA, INDONESIA

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ABSTRACT

The tourism sector is one of the leading national economic sectors in Indonesia and it has developed very rapidly. Efforts to improve the rural economy are also directed at tourism development. Central Java is a province with a number of tourist villages and development in some regions like Jepara Regency has locations that are close to each other. This research aims at identifying the cluster pattern of tourist village development in Jepara Regency, Central Java Province. It applies a quantitative approach using secondary data with a k-means cluster analysis. The results found that there are three clusters of tourist villages in Jepara Regency: (a) cluster 1 has six tourist villages which have high numbers of visitors, easy access, appropriate public and tourist facilities, but have few attractions and their locations are quite far from each other; (b) cluster 2 has eight tourist villages with many attractions, appropriate public facilities, close distances between locations and easy access, but have low numbers of visitors and limited tourist facilities; (c) cluster 3 has ten tourist villages, easy access, but a low rate of tourist visits, limited attractions, long distances between locations, and also limited public and tourist facilities.

KEYWORDS

rural tourism, cluster, regional, economic development

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1. INTRODUCTION

The tourism sector is one of the leading national economic sector in Indonesia and has developed very rapidly. It has multiplier effects that may affect other sectors as well in encouraging regional and national economic development. The tourism sector plays an important role by being a source of foreign exchange earnings,

creating jobs, increasing community and regional income, developing business and infrastructure, and also introducing the nation's culture. The significant role of the tourism sector is increasing.

The contribution of the tourism sector to national economic growth can be identified through the national gross domestic product (GDP), foreign exchange earnings, foreign tourist visits and domestic tourist trips.

In the period 2016–2020, the national tourism sector increased consistently, despite 2020 when it decreased due to the COVID-19 pandemic. The achievement of the tourism sector has made it the leader in contributing the foreign exchange to national economic growth. The following table shows data related to targets and their achievements in this contribution to national economic growth via several indicators during the period 2016–2020.

Table 1 shows that during the period of 2016–2020 the national tourism sector relative to national GDP reached its target. In 2018, the contribution was 5.25%, in 2019 – 4.80%, and in 2020 – 4.1%, but targeted at just 4% due to the COVID-19 pandemic. During 2016–2020, the achievement of the sector as a contributor to foreign exchange earnings also reached its target: in 2018, the sector earned foreign exchange of IDR 224 trillion, in 2019 – IDR 197 trillion, and in 2020 – IDR 41.3 trillion. The achievements exceed their targets and consistently make national tourism the leading sector contributing to foreign exchange earnings in the national economy. This was supported by the numbers of foreign tourist visits and domestic tourist trips also exceeding their targets. During 2016–2020, foreign tourist visits increased: in 2018 there were 15.81 million visits, in 2019 – 16.1 million, while in 2020 – 4.02 million. For domestic tourist trips: in 2018 there were 303.5 million, in 2019 – 290 million, and in 2020 – 129 million. In addition, the competitiveness of the national tourism sector has increased but has not yet reached its target, so it is necessary to improve infrastructure and other supporting factors so that competitiveness may increase and achieve those targets.

The national tourism sector involves both rural and urban tourism. Rural tourism has two components: rural tourism itself and tourist villages. A tourist village is an area with potential and uniqueness as

a tourist attraction including the unique experience of life and the traditions of rural communities with all their potential (Wirdayanti et al., 2021). Tourist villages have a significant role in reducing the burden of urbanization, providing job opportunities and improving welfare, and is used as an alternative strategy for village development. In Indonesia, there are many villages that have been called tourist villages. Based on the 2020 village potential statistics, Indonesia has 1,734 tourist villages on various islands. Java and Bali have the most, namely 857, the island of Sumatra – 355, followed by Nusa Tenggara with 189, Sulawesi – 119, Kalimantan – 117, Papua – 74, and Maluku – 23.

The province in Java-Bali that has the highest number of tourist villages is Central Java Province. According to data obtained from the Youth, Sports and Tourism Office of Central Java Province, in 2020 it had 551 tourist villages. The number had increased significantly from 2019, when it was only 353 (Fafurida et al., 2023).

Figure 1 shows that the number of tourist villages in Central Java is increasing, despite the significant increase of 198 from 2019 to 2020. In Central Java, Jepara Regency located at the northern end of Java Island has drawn the public's attention due to its high tourist attractiveness with many potential and extraordinary tourist attractions. Based on data from the Central Bureau of Statistics of Jepara Regency (Kabupaten Jepara Dalam Angka, 2021), there are about 40 tourist attractions in Jepara Regency. The decree of the Regent of Jepara (Bupati Jepara Provinsi Jawa Tengah, 2020), states that Jepara Regency has 24 tourist villages and each has potential and characteristics that can be developed, such as Tempur with its original hillside charm, Mulyoharjo with sculptures and carvings, Troso with its weaving crafts, and Karimunjawa with its culture and the natural beauty of the underwater world.

Table 1. Tourism sector targets and their achievement in Indonesia: 2016–2020

Indicator	2016			2017			2018			2019			2020		
	T	R	A (%)	T	R	A (%)	T	R	A (%)	T	R	A (%)	T	R	A (%)
Contribution to national GDP (in %)	4.50	4.13	92	5	5	100	5.25	5.25	100	5.5	4.8 ^a	87	4	4 ^a	102
Foreign exchange (trillion Rp)	172	176	102	200	202	101	223	224	100	280	197 ^a	70	48	41 ^a	86
Number of workers (million)	12	12	104	12	13	105	13	13	100	13	15	115	10	14	140
Competitive index (World Economic Forum)	n.a.	n.a.	n.a.	40	42	95	n.a.	n.a.	n.a.	30	40	75	n.a.	n.a.	n.a.
Foreign tourists (million)	12	12	100	15	14	94	17	16	93	20	16	80	4	4	101
Domestic tourists (million)	260	264	101	265	271	102	270	303	112	275	290 ^a	105	120	129 ^a	108

Note: T – target, R – realization, A – achievement; n.a. – competitive index only (conducted twice a year); ^a temporary projection figure.
Source: Presiden Republik Indonesia (2020); authors' analysis.

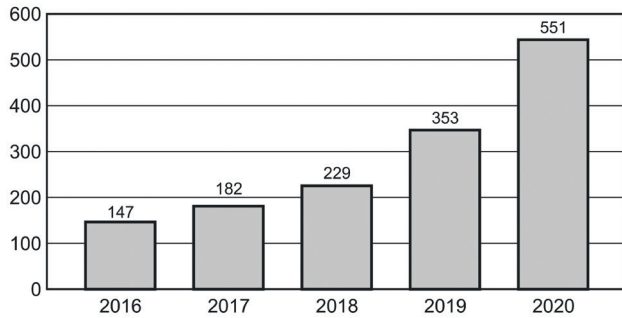


Figure 1. The number of tourist villages in Central Java: 2016–2020

Source: Dinas Kepemudaan, Olahraga, dan Pariwisata Provinsi Jawa Tengah (2020)

The development of tourist villages in Jepara Regency is considered to have had a high success rate, supported by their geographical location in that they tend to be close to each other and also by their variety. In some districts there is more than one tourist village, such as Tahunan that has several: Petekeyan with a carving craft center, Tegalsambi with its 'torch war' culture, and Telukawur and Semat with natural tourist attractions. Based on location several are quite close to each other and have various and interesting tourism potential and it is possible to develop them into a tourist village cluster.

According to data from the Tourism and Culture Office (Dinas Kepemudaan, Olahraga, dan Pariwisata Provinsi Jawa Tengah, 2020), during the last five years there has been an increase in the number of foreign and domestic visits despite a significant decline in 2020 caused by the COVID-19 pandemic and the government's policy to close some tourist attractions to prevent its spread.

Figure 2 shows that several tourist villages are located quite close to each other and have relatively stable increasing trends. This can be seen in Troso, Mulyoharjo and Petekeyan which have the characteristics of the attractiveness of handicrafts and the processing of different handicraft products, so it is possible to develop them into a tourist village cluster. At first, the artisan profession was only used to fulfill daily needs. However, market demand for Troso weaving, carving and sculpture keeps increasing so that craft businesses in the village are growing rapidly, making the village a center for the craft industry and the artisan profession supplies not only a daily need but also longer term to meet market demand.

After handicraft industry growth, collaboration can be carried out among village officials, tourism managers and the community to develop an industrial village into a tourist village. In the process of managing and developing a tourist village, a community group is formed called a tourism awareness group (*pokdarwis*) with legal status and local members. The majority

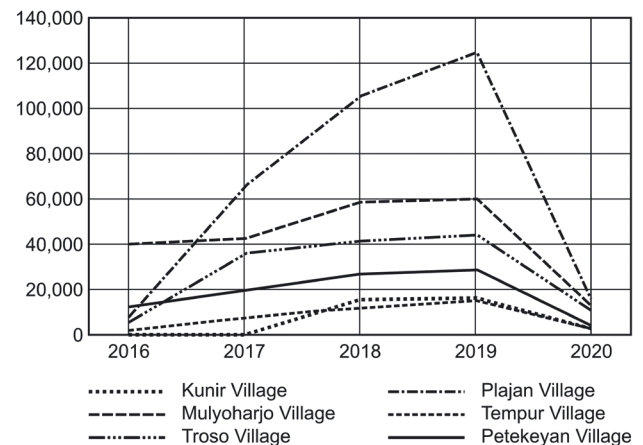


Figure 2. Number of academic articles from 2002 to 2022

Source: Scopus data

of handicrafts in the tourist village are in the form of home-scale industry, so when tourists enter the residential area they will be presented with the process of making handicrafts in almost every house and can see and learn the manufacturing process of the craft. There are many handicraft shops. Every home artisan in the tourist village will be coordinated and integrated by the *pokdarwis*, other community groups and village government officials.

Promotion and marketing of tourist village products is carried out through print and social media by several organisations, including village governments, local government, *pokdarwis*, and others having an interest in it. Therefore, the number of tourist visits has increased every year. During the COVID-19 pandemic, the number decreased from the previous year but was still high enough for the tourist villages to survive. Based on this, the villages in Jepara Regency have a variety of attractions, they tend to be close to each other because each district has one tourist village or more, and the number of visits of foreign and domestic tourists is increasing every year. This shows success in the management and development of such villages with a close geographical location. Therefore, it is considered important to conduct research on the development of a tourist village cluster pattern and this study aims at identifying such a pattern in Jepara Regency, Central Java Province.

2. MATERIALS AND METHODS

This research uses a quantitative approach using secondary data obtained from the Central Bureau of Statistics and the Department of Tourism and Culture of Jepara Regency (Badan Pusat Statistik Kabupaten Jepara, 2021; Dinas Kepemudaan, Olahraga, dan Pariwisata Provinsi Jawa Tengah, 2020). The secondary

data used includes information on tourist villages, their geographical location, the number of tourist attractions, transportation routes, amenities owned by tourist villages, supporting facilities and the number of tourist visits.

The data analysis technique uses cluster analysis according to the k-means method. Cluster analysis is a statistical tool that aims at classifying research subjects based on similar characteristics. Assumptions that must be fulfilled in cluster analysis are representative sampling and multicollinearity. A representative sample is one used to represent the population and here the Kaiser-Mayer-Olkin (KMO) test is used. If the KMO value is 0.5–1, it can be said that the sample used may represent the population (representative). Multicollinearity is the existence of a perfect or definite linear relationship among some or all variables (Gujarati, 1978). Multicollinearity occurs when the variance inflation factor (VIF) value >10 and the tolerance value <0.1 .

This research uses the k-means cluster analysis method to classify tourist villages into clusters. The k-means cluster method is selected because this algorithm has a high accuracy and in processing the research subjects it tends to be more scalable and efficient, and not affected by sequence. This research uses several variables: the number of tourist attractions, the average number of tourist visits, the distance from the tourist village to the city center, accessibility, and available public and tourism facilities.

3. FINDINGS

In the context of tourism, the cluster approach is used to increase competitiveness as a tourism development strategy. Research conducted by Rodríguez-Victoria et al. (2017) finds that grouping has a positive impact on competitiveness. Majewska and Truskolaski (2019) prove that cluster mapping may improve the identification of tourism clusters. Moric (2013) conducts a cluster approach to rural tourism in Montenegro showing that it may overcome its main problems in rural tourism by seeking and increasing competitiveness through the integration of different attractions so as to produce more complex and attractive tourism products.

In the context of tourism, Porter (2000) states that tourism clusters are based on the quality of the visitors' experience depending on the main tourist attractions and tourism complementary businesses, such as hotels, restaurants, shops and transportation facilities. The development of tourism clusters must be supported by the main tourist attractions and supporting factors in the form of public facilities, tourism facilities, institutions and other factors that may increase tourism competitiveness (Fafurida et al.,

2020). The determination of tourist village clusters in Jepara Regency is based on the cluster theory of Porter (2000) and the factors that affect a tourist village cluster using the Porter diamond model are:

1. Factor conditions – the main factors that affect a tourist village cluster: tourist attractions, labor and infrastructure.
2. Demand conditions – factors that allow higher consumer demand to increase competitiveness from the number of tourist visits.
3. Structure, strategy and competition which are seen in the market share of tourist villages, tourism governance structures and tourism village promotion strategies.
4. Related and supporting industries that may encourage tourism development including accommodation, catering and retail.
5. The government which plays a role in providing policies and improving the quality of natural resources and tourism infrastructure.
6. Opportunities and circumstances that are beyond control such as politics, changes in market demand and tourist trends.

The determination of tourist village clusters in Jepara Regency based on the Porter diamond model is in line with research conducted by Saraswati et al. (2019) for building a competitive advantage in the Ngringrejo Bojonegoro starfruit agrotourism area. This showed that the important determinant of competitive advantage there is in line with the model. In addition, it has been used in the industrial sector by Erika (2016) who shows that in the development and strengthening of industrial clusters it is used to formulate an implementation plan for industrial policy.

This research includes the variables of tourist attractions, the average number of tourist visits, the distance from tourist village locations to the center of the capital city of Jepara Regency, public facilities (electricity, water, telecommunications networks, banking, health facilities, places of worship and security) and tourism facilities (shops/kiosks, accommodation and restaurants). The determination of variables used is in line with research conducted by Nurkukuh and Kurniawati (2018) in the use of amenity variables, tourist attractions, institutions, accessibility and supporting facilities as components of a tourist village cluster. The steps in determining the cluster of tourist villages in Jepara Regency are:

1. Determining the data on variables used in the research.
2. Conducting a data standardization process in case of discrepancies in research data.
3. Testing cluster analysis assumptions in the form of a representative sample and multicollinearity tests.
4. Grouping data into clusters using the k-means cluster method, with the following steps:

Table 2. Descriptive statistics ($n = 24$)

Variable	Min	Max	Mean	Standard deviation
Tourist attractions	1.0	12	4.08	2.962
Average number of tourist visits	0.0	234,811.00	31,853.975	54,564.221
Distance between tourist villages	3.6	90	24.725	23.687
Public facilities in tourist villages	13.0	74	38.71	17.706
Tourism facilities in tourist villages	0.0	150	44.79	40.916
Security in tourist villages	7.0	80	36.79	16.272

Source: authors' analysis.

- determining the desired number of clusters,
 - determining the initial cluster center (centroid),
 - calculating the distance of each to the centroid,
 - allocating locations to the nearest centroid,
 - iterating to get a fixed centroid.
5. Interpreting the cluster – an explanation of the results of analysis and labelling to explain it.
- Before conducting the process of grouping data using the k-means cluster method, standardization

Table 3. Representative sample assumption test

Kaiser-Meyer-Olkin (KMO) and Bartlett' test		
KMO measure of sampling adequacy		0.512
Bartlett's test of sphericity	approximately chi-square	35.594
	<i>df</i>	21
	Sig.	0.024

Note: *df* – degrees of freedom, Sig. – significance.

Source: authors' analysis.

of research data is required because there are a high discrepancies among the variables. The following is a descriptive statistical table from the results of data standardization.

Table 2 shows the statistical results: the highest mean value is the tourist visit average of 31,853.975 and the lowest mean value is tourist attractions at 4.08. The results of these calculations are used to overcome data discrepancy by producing z-score values used in the data clustering process. Before clustering the data, it is necessary to test the assumption of cluster analysis using representative sample and multicollinearity tests. The representative sample test is for the sample used to represent the research population and carried out through Kaiser-Mayer-Olkin (KMO) and Bartlett's test.

Table 4. Multicollinearity assumption test

Collinearity statistics		Z-score: Tourist attraction object	Z-score: Average visits	Z-score: Distance	Accessibility	Z-score: Public facilities	Z-score: Tourism facilities	Z-score: Security
Z-score: Tourist attraction object	Tolerance	Constant	0.804	0.809	0.612	0.671	0.762	0.542
	VIF		1.243	1.236	1.635	1.491	1.312	1.846
Z-score: Average visits	Tolerance	0.557	Constant	0.534	0.608	0.595	0.792	0.542
	VIF	1.794		1.872	1.644	1.680	1.263	1.846
Z-score: Distance	Tolerance	0.858	0.817	Constant	0.677	0.632	0.825	0.559
	VIF	1.166	1.224		1.477	1.582	1.213	1.709
Accessibility	Tolerance	0.554	0.795	0.579	Constant	0.593	0.736	0.629
	VIF	1.804	1.257	1.728		1.686	1.359	1.590
Z-score: Public facilities	Tolerance	0.609	0.780	0.541	0.594	Constant	0.704	0.683
	VIF	1.642	1.282	1.847	1.682		1.420	1.465
Z-score: Tourism facilities	Tolerance	0.582	0.873	0.594	0.620	0.593	Constant	0.550
	VIF	1.717	1.146	1.682	1.612	1.687		1.819
Z-score: Security	Tolerance	0.538	0.777	0.524	0.689	0.747	0.715	Constant
	VIF	1.858	1.288	1.910	1.451	1.339	1.399	

Note: VIF – variance inflation factor.

Source: authors' analysis.

Based on Table 3, the KMO value is 0.512 with a significant value of 0.024. This means that the KMO value is in the range of 0.5–1, which means that the sample used in the research may represent the population or a representative sample. Then, the multicollinearity assumption is tested to determine the existence of a linear relationship among the variables by looking at the VIF value and the tolerance value for each research variable.

Table 4 shows that all variables in the research have a tolerance value greater than 0.1 and a VIF value less than 10 which means that all research variables are free from multicollinearity problems. Based on the results this shows that the variables in this research have passed the representative sample test and are free from multicollinearity problems and therefore can proceed to the clustering process. The initial cluster center is determined randomly from the research data shown below.

Table 5 shows a temporary grouping process with a centroid position that could still change so that it is necessary to repeat the process several times to obtain valid data in which the centroid position does not change its position in the determination of the three clusters.

Table 5. Initial cluster centers

Value	Cluster		
	1	2	3
Z-score: Tourist attractions	-0.36570	2.67245	-1.04085
Z-score: Average number of tourist visits	0.73026	-0.43970	1.08811
Z-score: Distance between tourist villages	-0.49498	1.15144	-0.79894
Access to tourist villages	1	2	2
Z-score: Public facilities in tourist villages	0.69419	-0.20943	-1.22601
Z-score: Tourism facilities in tourist villages	1.76481	-0.33708	0.90939
Z-score: Security in tourist villages	2.65537	-0.17156	-1.46212

Source: authors' analysis.

Table 6 shows that data repetition stops at iteration 3 and convergence has been reached because there is no change in the cluster center with a maximum absolute coordinate change of 0.000 and a minimum distance between the initial centers of 4.801. After the clustering process has been determined, the final step to form the three clusters is carried out. This process is used to identify the characteristics of each.

Table 6. Iteration history

Iteration	Change in cluster centers		
	1	2	3
1	1.900	1.887	1.891
2	0.639	0.000	0.401
3	0.000	0.000	0.000

Source: authors' analysis.

Based on Table 7, the characteristics of each cluster are as follows:

1. Cluster 1: tourist attractions and the distance between tourist villages are below the population average, while the average number of tourist visits, accessibility, public facilities, tourism facilities, and security in tourist villages are above the population average.
2. Cluster 2: the average number of tourist visits and tourism facilities are below the population average, while tourist attractions, location distance, accessibility, public facilities and security in tourist villages are above the population average.
3. Cluster 3: access to tourist villages is above the average population, while tourist attractions, the average number of tourist visits, location distance, public facilities, tourism facilities and security in tourist villages are below the population average.

In the final result of the clustering process, the distances between the cluster centers indicates that the greater the value for the clustering, the greater the distance between the clusters will be.

Table 7. Final cluster history

Value	Cluster		
	1	2	3
Z-score: Tourist attractions	-0.25318	1.11118	-0.73703
Z-score: Average number of tourist visits	0.76766	-0.17804	-0.31816
Z-score: Distance between tourist villages	-0.54494	0.84854	-0.35187
Access to tourist villages	1	2	2
Z-score: Public facilities in tourist villages	0.59065	0.60242	-0.83632
Z-score: Tourism facilities in tourist villages	0.55908	-0.15377	-0.21243
Z-score: Security in tourist villages	1.03705	0.18949	-0.77382

Source: authors' analysis.

Based on Table 8, the distance between cluster 1 and cluster 2 is 2.477, and for cluster 3 is 2.765. The distance

between cluster 2 and cluster 3 is 2.808. After knowing the distances between clusters, an ANOVA test is carried out to identify the significance and differences between each cluster.

Table 8. Distances between final cluster centers (kilometer) based on k-means analysis

Cluster	1	2	3
1	x	2.477	2.765
2	2.477	x	2.808
3	2.765	2.808	x

Source: authors' analysis.

Based on Table 9, the results show that the three clusters have in the variables of tourist attractions, distance to tourist villages, public facilities and security significant differences at the <0.05 level, while in the variables of numbers of tourist visits, accessibility and tourism facilities there is no significant difference among the three clusters. After knowing the distance between clusters and the characteristics of each, the final step is to identify the members of each cluster.

Based on Table 10, the members of each cluster are as follows:

1. Cluster 1: Bondo, Mulyoharjo, Troso, Bandengan, Welahan and East Suwawal.
2. Cluster 2: Tanjung, Damarwulan, Plajan, Tempur, Karimunjava, Kemujan, Batelait and Watu Aji.

Table 9. Result of analysis variance (ANOVA)

Value	Cluster		Error		F-test	Sig.
	Mean square	df	Mean square	df		
Z-score: Tourist attractions	7.847	2	0.348	21	22.557	0.000
Z-score: Average number of tourist visits	2.401	2	0.867	21	2.770	0.086
Z-score: Distance to tourist villages	4.390	2	0.677	21	6.483	0.006
Access to tourist villages	0.575	2	0.229	21	2.511	0.105
Z-score: Public facilities in tourist villages	5.995	2	0.524	21	11.436	0.000
Z-score: Tourism facilities in tourist villages	1.258	2	0.975	21	1.290	0.296
Z-score: Security in tourist villages	6.364	2	0.489	21	13.011	0.000

Note: *df* – degrees of freedom, Sig. – significance.

Source: authors' analysis.

Table 10. Cluster members

Tourist village	Cluster	Average distance between tourist villages (kilometer)	Tourist village	Cluster	Distance
Bondo	1	1.180	Batealit	2	1.800
Mulyoharjo	1	1.085	Watu Aji	2	0.841
Troso	1	2.032	Gemulung	3	1.041
Bandengan	1	3.197	Tegalsambi	3	1.351
Welahan	1	2.454	Kunir	3	1.377
Suwawal Timur	1	2.269	Petekeyan	3	1.610
Tanjung	2	1.696	Telukawur	3	2.060
Damarwulan	2	1.996	Panggung	3	0.970
Plajan	2	1.957	Semat	3	1.270
Tempur	2	1.887	Banjaragung	3	0.872
Karimunjava	2	3.861	Kendengsidialit	3	1.157
Kemujan	2	2.540	Pule	3	1.535

Source: authors' analysis.

3. Cluster 3: Gemulung, Tegalasambi, Kunir, Petekeyan, Telukawur, Panggung, Semat, Banjaragung, Kendengsidialit and Pule.

Based on the clustering process, there are three tourist village clusters in Jepara Regency. The distribution of locations and members of each cluster can be seen on the map below (Figure 3).

Based on the results of clustering using the k-means cluster method, after iteration 3 there is a minimum distance between cluster centers of 4.801 and a significant centroid of 0.000. The clusters of tourist villages in Jepara Regency are:

1. Cluster 1 has six tourist villages: Bondo, Mulyoharjo, Troso, Bandengan, Welahan and East Suwawal. The advantages of cluster 1 tourist villages are that they have a high average number of tourist visits, easy access, with complete public and tourism facilities. While their weakness is that the attractions are limited and the distances between tourist villages is quite far.
2. Cluster 2 has eight tourist villages: Tanjung, Damarwulan, Plajan, Tempur, Karimunjawa, Kemujan, Batealit and Watu Aji. The advantages of cluster 2 are that they have many tourist attractions,

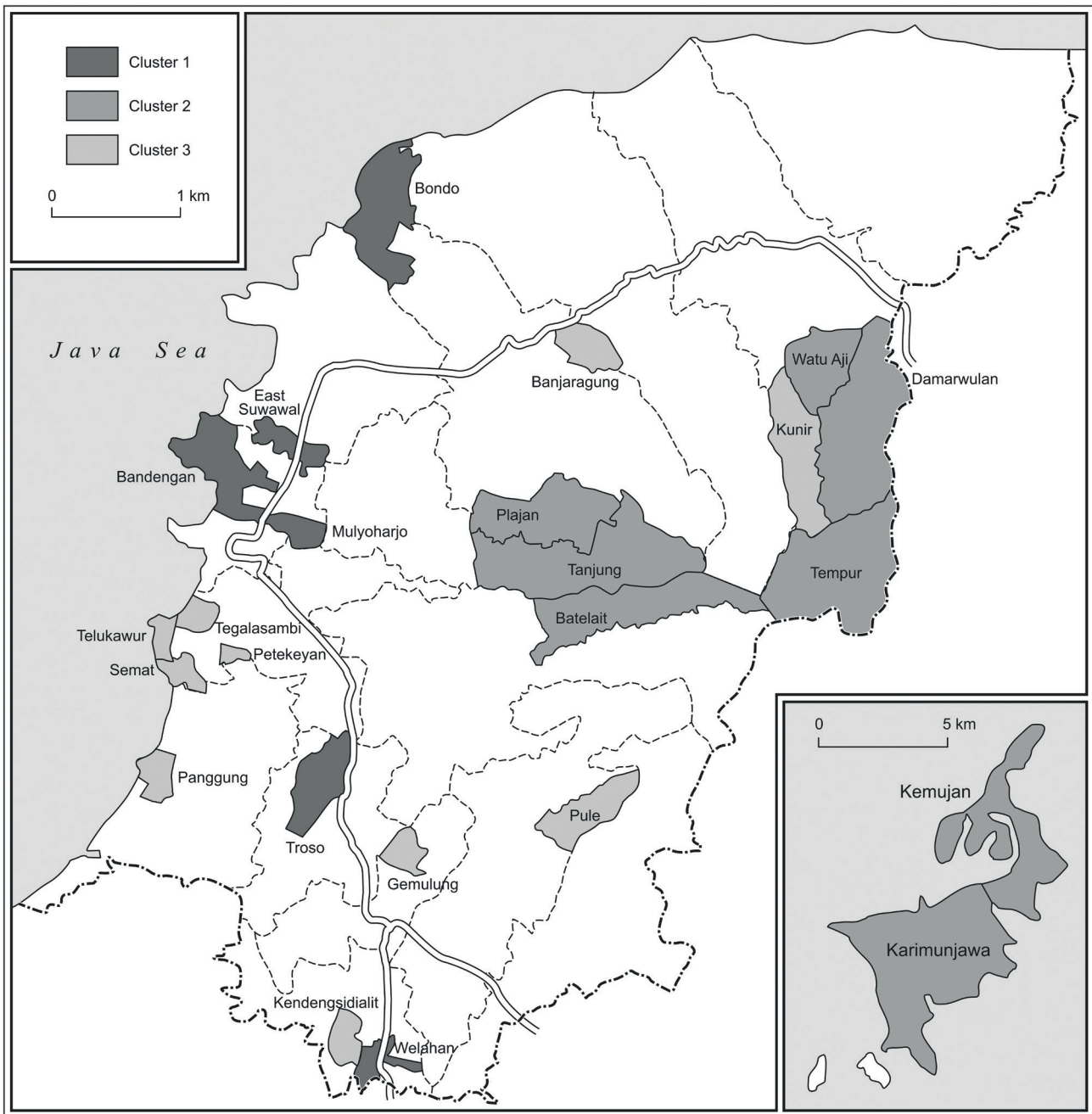


Figure 3. Map of tourist village clusters in Jepara
Source: results of k-means cluster analysis

complete public facilities, distances between tourist villages tend to be close and access is easy. While the weakness is that it has a low average number of visits and there are only limited tourism facilities.

- Cluster 3 has ten tourist villages: Gemulung, Tegalsambi, Kunir, Petekeyan, Telukawur, Panggung, Semat, Banjaragung, Kendengsidialit and Pule. The members of cluster 3 are mostly still pilot tourist villages, so the advantages of this cluster are limited to easy access. While the weaknesses are that tourist attractions are still limited, the average number of tourist visits is low, distances between tourist villages tend to be long while public and tourism facilities are still limited.

The results of this study show that accessibility and facilities are very influential on tourist visits. This is shown in cluster 1 where even though the number of tourist attractions is limited and the distance between tourist villages is quite far, due to good accessibility and facilities, tourist visits are high. However, things are different in cluster 2, where even though there are many tourist attractions, complete public facilities, close distances between villages and easy access, there are a low number of tourist visits. This is due to several factors including that although there are many tourist attractions, they do not necessarily attract tourists. This shows the need to improve quality to encourage tourists to come and enjoy them. In cluster 3, despite conditions for easy access, tourist attractions are still limited, distances between villages are far, and public and tourist facilities are limited. This also leads to the number of tourist visits being low.

The results obtained from the analysis of tourist village clusters in Jepara Regency are in line with previous research using the k-means cluster method in data grouping. That conducted by Mustaniroh et al. (2016) is on the strategy of developing apple processing clusters with k-means clustering and hierarchy analysis, and this produces three clusters of apple processing small medium enterprise in Batu City in iteration 2 with the differentiating variables being the number of workers and the value of investment. The research of Maulida (2018) on the application of data mining in classifying tourist visits to top tourist attractions in Daerah Khusus Ibu Kota (DKI) Jakarta province with k-means, produces three clusters of superior tourist attractions in DKI Jakarta province in iteration 2 in which cluster 3 is a record for DKI Jakarta province. In addition, the research of Perera et al. (2020) using k-means cluster analysis on the grouping of visitors who travel to Rocha results in four cluster groups.

The cluster approach is also carried out in the industrial sector. Research conducted by Raharjo (2012) in classifying industries based on type and location

results in four clusters including the furniture industry in Genuk, Mijen and West Semarang districts, and food processing in Central Semarang. The grouping was carried out using a geographical information system (GIS) method that is different from the k-means method used in this research.

4. CONCLUSION

From the analysis, this research has found that there are three clusters of tourist village development in Jepara Regency:

- Cluster 1 has characteristics of a high average number of tourist visits, easy access to tourist village locations, complete public and tourism facilities, but limited attractions and quite long distances between tourist villages. There are six tourist villages in this cluster: Bondo, Mulyoharjo, Troso, Bandengan, Welahan and East Suwawal.
- Cluster 2 has characteristics of many tourist attractions, complete public facilities, close distances between tourist villages, and easy access to locations, but a low average number of visits and limited tourism facilities. There are eight tourist villages in this cluster: Tanjung, Damarwulan, Plajan, Tempur, Karimunjawa, Kemujan, Batelait and Watu Aji.
- Cluster 3 has characteristics of easy access to locations, but still has limited tourist attractions, low numbers of tourist arrivals, long distances between tourist villages, limited public and tourism facilities. There are ten tourist villages in this cluster: Gemulung, Tegalsambi, Kunir, Petekeyan, Telukawur, Panggung, Semat, Banjaragung, Kendengsidialit and Pule.


The results of this study show that accessibility and facilities are very influential on tourist visits. This is shown in cluster 1 where even though the number of tourist attractions is limited and distances between tourist villages is quite long, due to good accessibility and facilities, tourist visits are high. However, things are different in cluster 2, even though there are many tourist attractions, complete public facilities, close distances between tourist villages and easy access, tourist numbers are low. This is due to several factors; although there are many tourist attractions, they do not necessarily attract tourists. This shows the need to improve the quality of tourist attractions to encourage tourists to come and enjoy them. In cluster 3, there is easy access to the locations, but tourist attractions are still limited, distances between tourist villages are long, and public and tourist facilities are limited which leads to low numbers of tourist visits. In the future it will be necessary to have different strategies for developing each cluster.

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Strengthening Tourist Village Attractions Through Empowerment of Rural Micro, Small, and Medium Enterprises (MSMEs)



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ABSTRACT

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economic performance, micro, rural development, Small and Medium Enterprises (MSMEs), tourism villages

One of the efforts to improve the rural economy can be conducted by developing tourist villages. The attractions of tourist villages that all this time have relied on natural potential are apparently not capable enough to guarantee the sustainability of tourist villages to be existing and favoured by the tourists. There should be innovative attractions so that the tourists have the will to make return visits and increase the length of stay. This research aims at developing a model for empowering the rural MSMEs in strengthening the attractions of tourist villages. This research is the qualitative one, which uses the primary data taken using observation techniques and Focus Group Discussions. The analytical method used in this research is the Delphi method and qualitative descriptive. The Delphi method was used to develop a model for empowering MSMEs by involving experts, while qualitative descriptive analysis was used to explain the mechanism for implementing the model. The implementation of the model has been tested in a tourist village in Central Java. This research has found that the right model for empowering the rural MSMEs to support the attractions of tourist villages can be conducted by establishing partnerships between the owners of rural MSME and the manager of tourist village. In Candirejo Tourist Village this model has been implemented. The production activities of MSMEs become a showcase, and are also able to increase the activities of tourists who stop at tourist villages. The results of implementing the model show that empowering the MSMEs owned by the community as an attraction to be visited by tourists is actually able to significantly increase the income of the owners of MSMEs, and to increase the tourists' interest in visits and length of stay.

1. INTRODUCTION

Inequality is a macro problem that many countries or regions experience. It can be seen from the Gini ratio value based on data from the Central Statistics Agency that Indonesia's inequality has decreased over the past seven years, from 0.408 in 2015 to 0.389 in 2018 and continues to decline to be 0.334 in 2021 or decreased 0.074 from 2015. Although the national inequality continues to improve, the inequality rate of the economic conditions in urban and rural areas is still high enough. The description of this inequality can be seen from the rural and urban poverty data in Figure 1 as follows.

In Figure 1, the comparison of Indonesia's rural and urban poverty rates in 2016-2021 can be seen. Although the trend of poverty has been decreasing every year, the poverty rate is consistently greater in rural regions compared to urban areas. From 2016 to 2021 it can be seen that every year the poverty rate in rural areas is always higher than in urban areas. During the beginning of 2016, rural areas had a poverty rate of 14.11 percent, while urban areas had a lower rate of 7.79 percent. Similarly, in early 2021, rural areas continued to exhibit a higher poverty rate, recording 13.1 percent, compared to the 7.89 percent found in urban areas. This strengthens the

evidence that the problem of economic inequality in urban and rural areas is still relatively high and this problem must certainly be followed up immediately. Viewing such conditions, one of the efforts that must be conducted is economic equality focusing on development not only in urban areas but also in rural areas.

Rural area development can harness the inherent potential within villages. One approach to bolstering the rural economy involves the promotion of tourism in these villages. Presently, the tourism sector is recognized as a catalyst for fostering economic growth in both direct and indirect ways [1]. Tourism plays a pivotal role in augmenting employment opportunities and income levels. When tourism flourishes in a particular region, it tends to generate job prospects for the local community, owing to the emergence of various businesses that accompany tourism development [2]. These employment opportunities subsequently lead to an elevation in the income of the residents living in the vicinity of the tourism development [3].

Indonesia has a wonderful rural nature and an abundant culture in which each region has its own uniqueness so that Indonesian tourism becomes one of the industries in which development is encouraged. According to Teodoro et al. [4],

rural tourism is recognized as a strategic approach to regional development [5]. Tourism is an engagement that directly involves and impacts the local community, as underscored by

Ibanescu's research conducted in rural areas of Romania, revealing tourism's potential to contribute to sustainable growth in these regions [6].



Figure 1. The poverty rate in villages, cities, and poverty average in Indonesia in 2016-2021 (in percentage)

The significance of involving all segments of society, including local communities, in tourism development is emphasized in the Government Regulation of the Republic of Indonesia Number 50 of 2011, outlining the National Tourism Development Master Plan for 2010-2025. This regulation emphasizes "community empowerment" as a means to enhance community awareness, capacity, access, and involvement, both individually and collectively, in improving their quality of life, independence, and prosperity through tourism activities. This perspective is reinforced by Fong & Lo's research [7], which demonstrates that local community participation in decision-making, empowerment, and knowledge about tourism significantly impact the sustainability of rural tourism development [8].

Soekarya points out that the potential for tourism attractions, encompassing natural and cultural elements, is primarily situated in rural areas, coinciding with the predominant rural population in Indonesia [9]. Consequently, efforts are made to develop various potential tourist attractions, with the aim of maximizing the benefits for the local community by transforming these areas into tourist villages.

Some problems experienced by tourist villages today are the attractions of tourist villages that all these time have relied on the natural potential but are not capable enough to ensure the sustainability of tourist villages to be existed and favoured by the tourists. Research that produces a tourism village development model, especially on the attractiveness aspect, is still difficult to find, so this research can add to the literature in efforts to develop tourist villages. There should be innovative attractions so that the tourists have the will to make return visits and increase the length of stay, one of them is by utilizing MSMEs in villages.

The attractions of the village is not only from its natural potential. To strengthen the tourists' interest in enjoying the tourist village, the rural MSME is also one of the potential

alternatives that can be used as an attraction [10]. The rural MSME is an alternative rural attraction that can be used as a magnet for tourists to get to know and learn about the local village products. The large number of the rural MSMEs that produce various handicrafts and special foods can be well utilized in developing tourism attractiveness.

In many regions, the government is developing tourist villages with the hope of generating a high multiplier effect on both the villages and the surrounding areas [11]. This aligns with research conducted by Škufli (2011), stating that the tourism industry can serve as a catalyst in addressing economic challenges in a region [12]. Tourist villages and related activities can be considered the main axis of rural development strategies that can protect fragile socio-economic structures in the short term and create sustainable development in the long term [13]. The development of tourist villages is seen as a means to boost the economy of the local community.

To enhance the economy of rural communities, active community involvement in the management of tourist villages, utilizing existing potentials such as SMEs, is crucial. Therefore, the concept of community-based tourism is highly suitable for implementation [14]. The development of community-based tourism has proven to be an effective means of improving the rural economy [15-19]. Community participation in the development of tourist villages is crucial because residents have a better understanding of the region's potential. Additionally, community involvement is essential to garner support and ensure that the benefits align with the needs and interests of the local residents. The implementation of the community-based tourism concept is also in line with the Minister of Village, Development of Disadvantaged Regions, and Transmigration Regulation Number 13 of 2020 concerning the priority use of village funds for the year 2021, which divides villages into 8 typologies and 18 SDGs targets for villages from 2021 to 2030.

The attractiveness of tourist villages can attract both domestic and international tourists, leading to increased economic activity in these villages. The role of community-based tourism in these tourist villages has supported the well-being of the surrounding communities. The management with the concept of Community-Based Tourism (CBT) is consistent with the principles of sustainable tourism due to its small scale yet significant benefits for the local community [20]. The community plays a significant role in managing and providing facilities for the needs of visiting tourists, serving as an excellent example of tourist village management. Therefore, the aim of this research is to develop and implement an appropriate model for empowering Micro, Small, and Medium Enterprises (MSMEs) in the village to strengthen the appeal of the tourist village. The implementation of this model will take place in one of the tourist villages in Central Java, namely Candirejo Tourist Village in Magelang. Candirejo Tourist Village is one of the outstanding tourist villages in Central Java, with a high number of visits from international tourists. Therefore, utilizing village MSMEs as an attraction for the

tourist village is deemed appropriate to attract tourists.

2. METHOD

This study employs a qualitative approach, utilizing primary data gathered through observation techniques and Focus Group Discussions. Observations were carried out by direct observation in the field to see how the tourism village activity process was running. Furthermore, the observation results were strengthened by conducting a Focus Group Discussion to strengthen the formation of the model. The source of data in this research is information from the key persons. The selection of key individuals is determined based on their roles in the development of tourist villages. The key persons in this research are the chairman of the Central Java tourist village community, tourist village managers, government representatives, society representatives, tourists, and academics. The competence of key persons in the FGD activities is delivered in detail in Table 1.

Table 1. Research key person competence

No	Key Persons	Competence
1	Chairman of Central Java tourist village community	Information of existing condition of Central Java tourist villages and their program planning.
2	Tourist village manager	Information of tourist village condition, potential, and obstacles existing in tourist villages.
3	Government	Policy of tourist village development.
4	Society	Information of tourist village impacts.
5	Tourists	Tourists' preference on tourist villages.
6	Academics	Study on tourist village development, concept, and theory.

The analysis used in this research is the Delphi method and qualitative descriptive. Qualitative analysis is chosen as the research method because it offers a comprehensive understanding of how Micro, Small, and Medium Enterprises (MSMEs) contribute to the appeal of tourist villages. The insights obtained from key informants are presented in a flowchart model that elucidates the model's implementation. Additionally, the Delphi method is integrated into this research to examine rural conditions and community life from multiple perspectives within rural communities. The Delphi technique, initially developed by Dalkey and Helmer at the Rand Corporation during the 1950s, is a group-based process designed to survey and gather expert opinions on a specific subject. It serves as a valuable tool for structuring communication within groups that involve interactions between researchers and a panel of experts focused on a particular area of expertise. In the context of this research, the Delphi approach enables rural communities to collaborate, enhance, and analyze their understanding of rural conditions and lifestyles, facilitating the development of plans and actions [21]. The fundamental concept underlying this approach places a strong emphasis on community engagement in all activities, making it a credible method for obtaining reliable information regarding phenomena within the research environment. The steps in carrying out the Delphi method in this research are to establish the purpose, prepare materials to distribute to participants, choose the participants, analyze the feedback and results carefully and build the model. The implementation of the model will be carried out in one of the tourist villages in Central Java, which is Candirejo Tourist Village, Magelang. Candirejo Tourism Village was chosen as the location for implementing the model because this tourist

village is one of the best tourist villages in Central Java which applies the concept of sustainable tourism, but in its development, the attractiveness of this tourist village is still underdeveloped, and requires innovation to increase its attractiveness in order to improve the village's performance.

3. RESULT DAN DISCUSSION

In numerous regions, the government is actively promoting the establishment of tourist villages, anticipating a multiplier effect on both the village itself and its surrounding areas in the future [22]. This aligns with the findings of a study conducted by Škuflić & Štoković, which asserts that the tourism industry can serve as a potent catalyst for addressing economic challenges within a region [23]. Tourist villages and related activities emerge as the central pillars of a rural development strategy capable of safeguarding a fragile socio-economic balance in the short term while fostering sustainable development in the long term [24]. These research findings underscore the notion that the development of tourist villages holds the potential to invigorate the local economy.

In tourism village activities, the community can take a role in actively participating in tourism activities. Job opportunities open when tourist village activities are running. Village MSMEs can be part of the attraction offered to tourists. In the following (Figure 2), a model for developing the attractions of a tourist village is presented, which can be implemented where MSMEs will later have a role in the attractions of a tourist village.

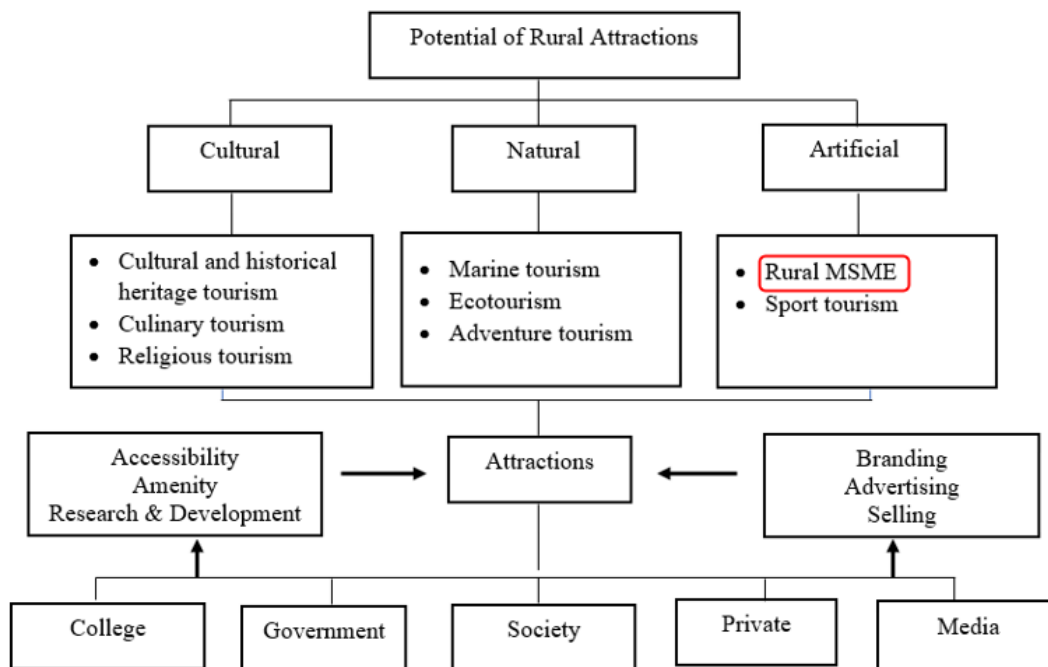


Figure 2. Model of tourist village attraction development

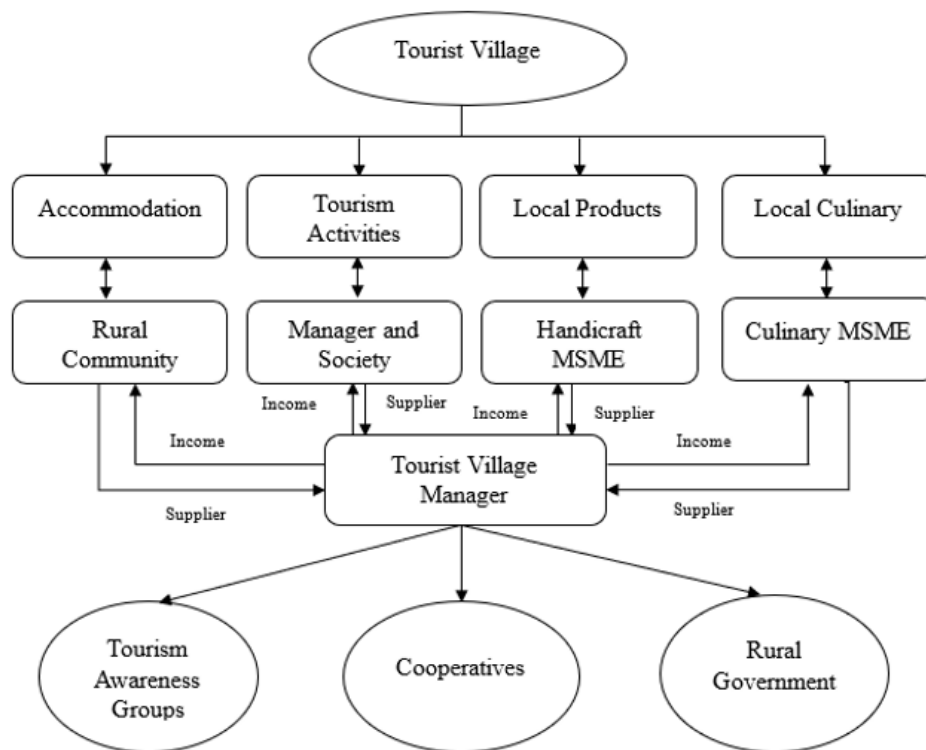


Figure 3. Model of MSME empowerment in strengthening attractions of tourist village

Improving the economy of rural communities can be carried out by actively involving the community in managing tourist villages by utilizing the existing potential such as MSMEs, so that the concept of community-based tourism is very suitable to be implemented [25]. The development of community-based tourism has proven to be one of the efforts to increase the rural economy [26-29]. Local community engagement in the advancement of tourist villages holds significance due to their intimate knowledge and profound understanding of the region's untapped potential. Furthermore, their active participation is vital for garnering support and ensuring that the outcomes align with their specific needs and advantages.

This approach aligns harmoniously with the Minister of Village PDDT Regulation Number 13 of 2020, focusing on the prioritized utilization of village funds in 2021. This regulation categorizes villages into eight distinct typologies and delineates eighteen village Sustainable Development Goals (SDGs) for the period from 2021 to 2030.

The large number of attractions in tourist villages can bring in many tourists, both domestic and foreign ones. This certainly has an impact on increasing the economic activity in the tourist village. Community-based tourism has played a pivotal role in enhancing the well-being of the neighboring community within the tourist village. Implementing a

management approach grounded in the principles of Community-Based Tourism (CBT) aligns seamlessly with the tenets of sustainable tourism. While operating on a modest scale, CBT has the potential to yield substantial benefits for local communities [30]. The community assumes a significant role in overseeing and furnishing the necessary amenities and services for visiting tourists. Undoubtedly, this serves as a commendable exemplar for the management of tourist villages.

The implementation of the model for developing the attractions of a tourist village by utilizing the rural MSMEs has been tested in one of the tourist villages in Central Java Province, Candirejo Tourist Village in Magelang. Candirejo is one of the superior tourist villages in Central Java that has high enough visits from foreign tourists so the utilization of rural MSMEs as tourist village attractions is considered very appropriate to attract the tourists' attention. The following is a model of rural MSME empowerment in strengthening the attractions of tourist villages that have been implemented (Figure 3).

Figure 3 explains that the existence of a tourist village must be supported by the existence of several supporting aspects including accommodation, tourism activities, local products, and local culinary. In order to support the improvement of the village's local economy, the provision of these aspects can be conducted by the local rural community. Accommodation can be provided by the community in the form of homestays, local transportation, village stalls, etc. Tourism activity is the main attractions that are sold to tourists, both in the form of natural scenery, culture, and artificial attractions such as people's markets, picking fruit on community agricultural land, farming activities, etc. The existence of rural MSMEs certainly can also be used as an additional attraction. The tourists can visit the MSME locations to see the production process of local culinary products, or can even practice making these products. The additional attractions will certainly have an impact on increasing the tourists' length of stay in tourist villages, which will finally affect the increase in income of the rural communities.

Besides accommodation and tourism activities, tourists certainly need local products such as crafts and culinary, both for consumption during tourism activities and for souvenirs. Provision of handicrafts or regional specialties can certainly be provided by the rural community or the local MSMEs by partnering with the tourist village manager. Collaborative partnerships in providing accommodation, tourism activities, local products, and culinary between the rural communities and the tourist village managers are proven to be able to increase the income of local villagers. In Candirejo Tourist Village this model has been implemented and proven to be able to increase the income of partner communities by 120%. The increase in income is measured by the difference in income before the implementation of the MSME empowerment model and after the model is implemented. The management of tourist villages in each region still varies. Some of the tourist village managers in general are Tourism Awareness Groups (Pokdarwis), cooperatives, and the village government.

The right model for empowering the rural MSMEs to support the attractions of tourist villages can be done by involving the MSME owners in the village. MSME production activities become a showcase and also are able to increase the activities of tourists who stop at tourist villages. The uniqueness and typical products of the village provide a special attraction for tourists. The results of implementing the

model show that empowering the MSMEs owned by the community as an attraction to be visited by tourists is actually able to significantly increase the income of MSME owners and also to increase the tourists' interest in visits and length of stay.

4. CONCLUSION

Besides focusing on producing local products, the rural MSME can take on the role of an attraction in the development of tourist villages. The tourists can visit the MSME locations to see the production process of local culinary or products, or can even practice making these products. This additional attraction has an effect on increasing the tourists' length of stay in tourist villages which will finally affect the increase in income of the rural communities.

The MSME partnership collaboration in providing tourism activities, local products, and culinary between the rural communities and the tourist village managers has proven to be able to increase the income of local villagers. The results of implementing the model show that empowering MSMEs owned by the community as an attraction to be visited by tourists is actually able to significantly increase the income of MSME owners, and also to increase the tourists' interest in visits and length of stay.

The recommendation that can be given from the results of this research is that developing the attractiveness of tourist villages can be carried out by involving village MSMEs as objects of tourist visits, as well as actively involving the community in tourism village activities which are highly recommended in order to achieve an increase in village community income. For further research, it is recommended to carry out research on tourism village development strategies through other alternatives besides empowering village MSMEs.




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The Economy Behind Tourism: An Input-Output Approach in Measuring Contribution

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ABSTRACT

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Keywords:

tourism sector, input-output, inter-sector relationship, distribution impact, multiplier effects

Central Java Province has the potential with a high number of tourist attractions, however, it has not provided optimal contribution yet to the tourism sector. This research aims to analyze the relationship between the economic sectors, the distribution impact, and the multiplier effect of output, income and labor in tourism sector on the economy in Central Java Province. This research uses secondary data, the Input-Output Table of Central Java Province, published in 2021, which is then analyzed using the Input-Output method. The result of the research indicates that the tourism sector for forward linkage is in the third highest position, and the highest supporting sub-sector of the tourism sector is the information and communication services sub-sector. Meanwhile, for the result of the backward linkage value, the tourism sector is in the third highest position, and its supporting sub-sector with the highest value is the accommodation and food and beverage provision sub-sector. The analysis result of the distribution impact indicates that the tourism sector is a leading sector. For the multiplier effect of output, the tourism sector is in the third highest position, while for the multiplier of income and labor, it is not too high in the sixth and fifth positions.

1. INTRODUCTION

Tourism is an economic activity that has the potential to increase economic growth [1]. According to Hasibuan et al. [2], the tourism sector is one of the opportunities that needs to be fully maximized by the government, because Indonesia's tourism resources may benefit the Indonesian economy. Nowadays, the contribution and existence of the tourism sector are very much required to support the economy [3]. This is in accordance with data on the contribution of the tourism sector to Gross Domestic Product (GDP), foreign exchange, and labor. The following is data on the contribution of tourism to GDP, foreign exchange, and labor in the Indonesian tourism sector in 2018-2022.

Based on Figure 1, the contribution of tourism to GDP in the last five years indicates the fluctuating numbers. In 2018, the contribution of the tourism sector to GDP was 5.2% with foreign exchange earnings of US\$ 16.43 billion and absorbing the labor of 19.46 million people. In 2022, the contribution decreased to 3.6%, but the foreign exchange earnings increased to US\$ 4.26 billion with the labor of 22.89 million people.

The development of Indonesian tourism is also related to the development of tourism in Central Java Province, which has developed in recent years. Central Java Province is one of the provinces in Indonesia with various tourist objects that can be used as a capital in positioning Central Java Province as a tourist destination [4-6]. Tourist attractions are factors that

may attract the tourists to visit the available tourist objects. Susianto et al. [7] state that tourist attractions are places that have beauty, uniqueness, and natural diversity value so that they influence tourists to determine which places to visit.

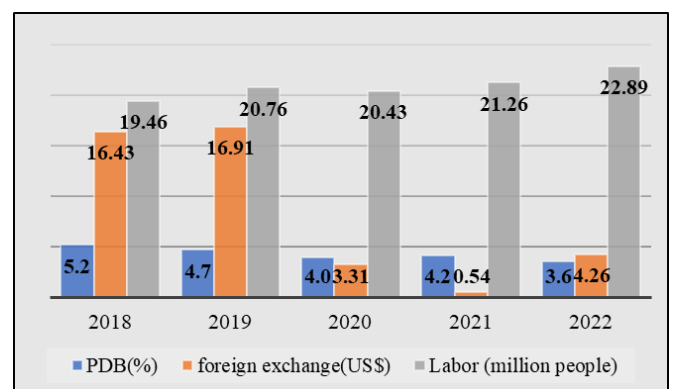


Figure 1. Contribution of tourism to Indonesian economy
 Source: Central Bureau of Statistics and Ministry of Tourism and Creative Economy, 2023

Central Java Province offers tourist destinations that have various tourist attractions, such as natural, cultural, culinary, and artificial tourism that may attract tourists to visit. Compared to other provinces in Java Island, Central Java Province has quite high tourist attractions with 386 tourist objects (Data Indonesia, 2023). However, the average length

of stay of tourists at non-star hotels in Central Java Province is in the lowest average length of stay compared to the other six provinces in Java Island [8].

The average length of stay of tourists is a factor that determines how much tourism income can be obtained by each region. The average length of stay is the number of nights or days spent by tourists outside their residential area [6, 9]. The following is data on tourist attractions in 2022 and the average length of stay in Central Java Province in 2018-2022.

According to Figure 2, in 2018 the average length of stay of foreign tourists in Central Java Province was 1.36 days, then in 2019 it decreased to 1.31 days. The same thing happened in the following year in 2020 to 1.30 days. In 2021 it increased slightly to 1.35 and the same for 2022 to 1.36 days. However, the average length of stay in Central Java Province is the smallest one among other provinces in Java. This condition made the contribution of the tourism sector to the economy in Central Java Province not optimal.

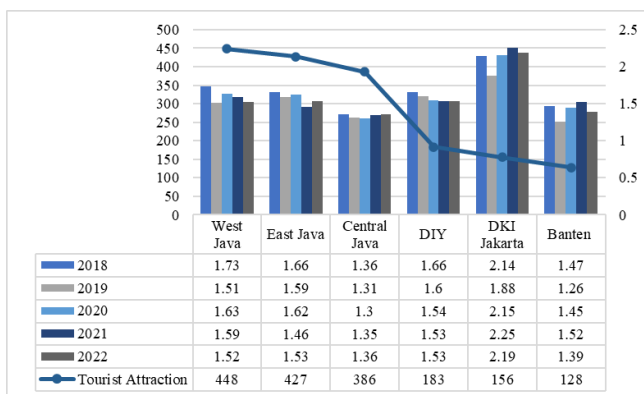


Figure 2. Tourist attractions in 2022 and the average length of stay in six provinces in Java Island in the period of 2018-2022

Source: Central Bureau of Statistics, 2023

As one of the provinces that has the potential to develop the tourism sector and good tourist attractions, Central Java Province will certainly provide benefits and good impacts on the economy, one of which is in its contribution to GRDP. This is in accordance with data from the Central Java BPS for 2018-2022, which shows that the contribution of the tourism sector increased to 1.5 percent from 2018 to 2019. In 2020, the contribution of the tourism sector decreased to 7.8 percent due to the pandemic. In 2021, the contribution of the tourism sector increased to 7.85 percent compared to the previous year, until 2022 it increased to 8.41 percent.

In addition to contributing to the GRDP of Central Java Province, the tourism sector also contributes to the increase in the number of workers in the tourism sector. Tourism has a significant contribution to the increase in employment because tourism sector is included in the labor-intensive industry [10, 11]. Based on the publication of Central Java Tourism Statistics in 2022 that has been published by the Youth, Sports and Tourism Office of Central Java Province, in 2022 tourism sector was able to absorb 23,337 labors. The labors that can be absorbed by the tourist attractions has indicated an increase over the past five years. In 2018 it was able to absorb 17,818 labors. The number of labors in tourist attractions in Central Java continues to increase along with the increasing number of tourist attractions that appear in Central Java Province.

The role of the tourism sector in Central Java Province has become increasingly important along with the development

and contribution made by the tourism sector through Gross Regional Domestic Product (GRDP) and labor [12]. The development of tourism sector has an influence on attracting the tourists to visit Central Java Province, thus increasing the number of tourist visits. The following is data on the number of foreign and domestic tourist visits in central java province in 2018-2022.

Figure 3 shows that the number of foreign tourist visits experienced a significant decline after the Covid Pandemic which began in 2020, from 677.17 thousand people in 2018 to 78.29 thousand people in 2020. The visit of foreign tourists in 2022 increased by 144.69 thousand, while the visit of domestic tourists increased by 46.47 million people. Compared to the previous year, in 2021 there were only 1.79 thousand foreign tourists and 21.33 million domestic tourists.

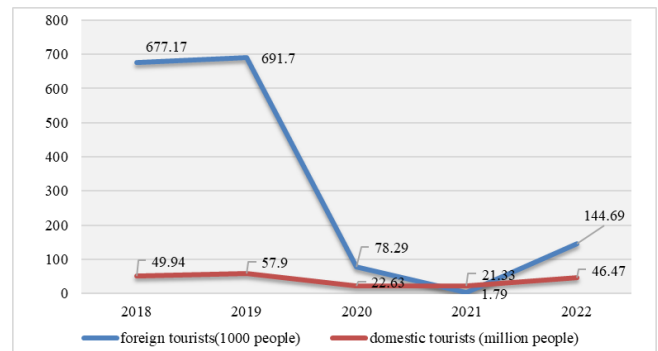


Figure 3. The number of visits of foreign and domestic tourists in the period of 2018-2022

Source: Pocket Book of Tourism and Creative Economy Profile in 2023

Thus, it can be concluded that Central Java Province has a potential tourism sector development with a fairly high number of attractions that have an influence in attracting tourists to visit Central Java Province. However, viewed from the average length of stay of tourists, Central Java is the province with the smallest average length of stay compared to other provinces in Java. This has an impact on the number of tourism income obtained by each region, so the contribution of tourism sector to the economy in Central Java Province is not optimal.

The contribution of tourism sector is not only viewed from the high rate of GRDP growth in tourism sector and the number of tourist visits that always increase every year. It is also to find out and analyze the forward and backward linkages between the tourism sector and other economic sectors in Central Java Province, and how the tourism sector is able to bring impact on the activities of other economic sectors, considering that the tourism sector has a multiplier effect that can drive the economy comprehensively and sustainably.

In general, economic development can be interpreted as a process that causes the real per capita income of a country's population to increase in the long term and is accompanied by institutional improvements. The increase in per capita income may illustrate the existence of additional income and improvements in the people's economic welfare. Economic development is viewed as something that mutually influences and is related to economic development factors.

According to the classical theory of economic growth by Adam Smith, the growth process will occur simultaneously and there is a relationship between one and another. The emergence of performance improvement in a sector may increase the attraction to increase the capital, encourage the

technological progress, increase the specialization, and expand the market. Meanwhile, David Ricardo argues that the number of production factors such as land or natural resources will not increase so they act as limiting factors in the growth process of a society.

The turnpike theory by Paul A. Samuelson in 1955 states that each region needs to identify sectors with great potential that can be developed quickly. Regions with great potential should be developed well in order to encourage the growth of other sectors, so that in general the economy can grow together without a large disparity among other sectors.

The influence of tourism on the economy is through the process of increasing income, opportunities for business and employment for the community and also reducing unemployment and poverty [13]. This is in accordance with the relationship between tourism and economic growth through the Keynesian approach to the multiplier, which considers tourism as part of aggregate demand that has a positive effect on income and labor through the multiplier process [14]. Thus, it will open new business fields in the private sector, so the supply of labor will increase income and reduce unemployment. The increase in income will then increase people's ability to consume so that poverty can be reduced. Tourism activities have an important role along with the development and contribution of the tourism sector to foreign exchange earnings, balance of payments, regional income, regional development, including in the absorption of investment, labor and business development [15, 16].

The inter-sector linkages that occur in input-output analysis can be explained through the theory of general equilibrium that has been initiated in 1870 by Leon Walras, an economist from France. The theory explains that price and quantity of a good are not only determined by the strength of demand and supply of the good, but are also determined by other interrelated markets. The inter-sector linkages can have an impact on each economic sector that may influence the economy of a region and the inter-regional, inter-citizen, and inter-sector inequality that occur can be overcome. This research aims at analyzing the inter-sector linkages, the distribution impact, and multiplier effects of output, the income and labor.

2. METHOD

The approach used in this research is the quantitative method. The quantitative analysis method is an analysis conducted using research data in numerical form, which is then processed using statistical methods. The type of data used in this research is secondary data obtained from the Central Bureau of Statistics in Central Java Province. Secondary data is the data collected by institutions that are then used by the data users. The secondary data used in this research is the Input-Output Table of Central Java Province, which is the Domestic Transactions based on Producer Prices, classification of 17 sectors according to the 2021 publication business field. Then from the 17 sectors, it was aggregated into 10 sectors to find out how much the relationship is between tourism sector and other economic sectors, the distribution impact of tourism sector, and the multiplier effect of tourism sector in Central Java Province.

The analysis method used in this research is input-output analysis. The Input-Output Model was proposed by Wassily Leontief, a Soviet-American economist, and was developed in the 1930s. Leontief's economic model is a model that is useful

for analyzing the input and output of an economic system.

An input-output table is required in using the input-output analysis. Basically, the input-output table is a statistical description in the form of a matrix that provides information on transactions of goods and services and the interrelationships between one sector and another within a period of time in a certain area [17]. In this research, the input-output table was used for several main analyses, including analysis of inter-sector linkages, analysis of the distribution impact, and the multiplier impact.

Linkage analysis is used to indicate the linkages among sectors in carrying out production activity that has an effect on other sectors, which is the effect of increasing demand and supply in an economy. Linkage analysis consists of direct forward linkages, direct backward linkages, and direct and indirect forward linkages, direct and indirect backward linkages.

The analysis of direct and indirect forward and backward linkages is not adequate when used as a basis for determining key sectors. Thus, both indices need to be normalized by comparing the average impact of all sectors. The analysis consists of two analyzes, the distribution power and the degree of sensitivity. The distribution power has the benefit of knowing the ability of a sector to increase the growth of its upstream industry. The following formula is to find out the distribution power:

$$Pd_j = \frac{n \sum_{j=1}^n \alpha_{ij}}{\sum_{i=1}^n \sum_{j=1}^n \alpha_{ij}}$$

where,

Pd_j = Distribution power of sector j
 α_{ij} = Leontief inverse matrix element
 n = A number of sectors

Then degree-of-sensitivity analysis was conducted to determine the ability of a sector to drive the growth of production of other economic sectors that use input from the sector. The following formula is to determine the degree of sensitivity:

$$Sdi = \frac{n \sum_{j=1}^n \alpha_{ij}}{\sum_{i=1}^n \sum_{j=1}^n \alpha_{ij}}$$

where,

Sdi = Degree of sensitivity of sector i
 α_{ij} = Leontief inverse matrix element
 n = A number of sectors

Effect multiplier analysis is one that aims at finding out something occurring in endogenous variables if there is a change in exogenous variables in an economy. In this research, effect multiplier analysis is conducted to analyze three types: output multiplier analysis, income multiplier, and labor multiplier.

The output multiplier is calculated according to the change in output per unit as the initial effect, in the form of an increase or decrease in output by one monetary unit. The following formula is to find out the output multiplier in the Leontief inverse matrix element column:

$$O_j = \sum_{i=1}^n \alpha_{ij}$$

where,

O_j = output multiplier number of sector j
 a_{ij} = Leontief inverse matrix element (I-A)⁻¹

The income multiplier is useful for viewing the increase in income as a result of changes in output in an economy. The following formula is to find out the income multiplier in the Leontief inverse matrix element column:

$$H_j = \sum_{i=1}^n a_n + 1'i \cdot a_{ij}$$

where,

H_j = income multiplier number of sector j
 $a_n + 1'i$ = Leontief inverse matrix element (I-A)⁻¹
 a_{ij} = Leontief inverse matrix element

The labor multiplier indicates the change in labor as a result of initial changes in final demand. The following formula is to see the labor multiplier:

$$E_j = \sum_{i=1}^n w_n + 1'i \cdot a_{ij}$$

where,

E_j = labor multiplier number of sector j
 $w_n + 1'i$ = average output of every laborer
 a_{ij} = Leontief inverse matrix element

3. RESULT AND DISCUSSION

Forward linkages explain the sectors that use a particular output either directly or indirectly per unit increase in total demand. According to Firmansyah [18], the total direct and indirect forward linkages is obtained from the sum of rows of the Leontief inverse matrix (I-A)⁻¹. While the backward linkages explain the sectors that provide input among certain sectors directly or indirectly per unit increase in total demand. The total direct and indirect backward linkages is obtained from the sum of columns of the Leontief inverse matrix (I-A)⁻¹.

Table 1 explains the forward and backward linkage value of the economic sector in Central Java Province. It is visible that tourism sector has a high forward linkage value (value > 1.502) of 1.611, which means that when final demand increases by one unit of money, the output of economic sector including tourism sector itself will increase by 1.611 units of money directly or indirectly. In accordance with this value, it can be interpreted that the output of tourism sector is used as an input for other economic sectors in Central Java Province. This is in accordance with the theory of Leon Walras about general equilibrium, in which the theory explains that each economic sector of a region is interrelated in buying and selling transactions, in which the output of a sector is sold to other economic sectors in order to meet the demand for input from other economic sectors.

Table 1. Forward and backward linkages of economic sector in Central Java Province

No.	Sector	Forward Linkage			Backward Linkage		
		Direct	Indirect	Total	Direct	Indirect	Total
1	Agriculture, Forestry, and Fisheries	0.220	1.219	1.439	0.203	1.092	1.295
2	Mining and Excavation	0.101	1.060	1.162	0.268	1.141	1.410
3	Processing Industry	1.118	1.582	2.700	0.375	1.171	1.547
4	Procurement of Electricity and Gas	0.481	1.338	1.819	0.498	1.390	1.888
5	Water Supply, Waste, Waste and Recycling Processing	0.014	1.000	1.015	0.345	1.191	1.537
6	Construction	0.145	1.044	1.190	0.429	1.210	1.640
7	Wholesale and Retail Trade; Car and Motorbike Repair	0.395	1.204	1.599	0.268	1.137	1.405
8	Tourist	0.426	1.185	1.611	0.399	1.1197	1.597
9	Finance and Insurance, Real Estate, Corporate, Government and Social Security	0.271	1.114	1.386	0.187	1.095	1.282
10	Services	0.077	1.021	1.099	0.276	1.142	1.419
	Average	0.325	1.177	1.502	0.325	1.177	1.502

Source: Input-output table of Central Java Province, Publication in 2021, processed

Meanwhile, the total backward linkage value of tourism sector is high (value > 1.502), which is 1.597. This can be interpreted that when final demand increases by one unit of output money from tourism sector, the demand for its input will increase by 1.597 units of money directly or indirectly from other sectors including the tourism sector itself. This is in accordance with the theory of Leon Walras about general equilibrium, in which the theory explains that each economic sector of a region is interrelated in buying and selling transactions, in which the output from other economic sectors is purchased to meet the input of a particular sector. In addition, the results of analysis in this research are in accordance with the research conducted by Muryani and Siswahto [15] entitled Analysis of the Tourism Sector and the Impact of Tourist Spending on the Economy of North Sulawesi Province. The research explains that the tourism sector has a fairly high backward linkage value among other economic sectors.

Table 2 describes the results of analysis of the total forward

and backward linkages of the tourism sub-sector in Central Java Province. In this table, tourism sector for the total forward and backward linkage value is divided into three supporting sectors, which are the transportation and warehousing sub-sector, the accommodation and food and beverage provision sub-sector, and the information and communication services sub-sector. This is because the tourism sector is a sector that cannot stand alone but is supported by several other economic sectors related to the tourism sector.

Table 2 indicates the total value of forward and backward linkage of the supporting sectors of tourism sector. The information and communication sub-sector has the highest forward linkage value of 1.623. This means that when there is an increase in final demand of one unit of money, the output of the information and communication services sub-sector increases by 1.623 units of money used by other sectors and the information and communication services sub-sector itself, both directly and indirectly. The information and communication services sub-sector has an important role in

supporting the tourism sector, which is required in conveying information about tourist destinations through social media. The results of this research analysis are different from the research conducted by Nilam [4] entitled Analysis of the Role

of Tourism Sector in Central Java (Input-Output Approach). The research explains that tourism sub-sector with the highest forward linkage value is the entertainment and recreation services sub-sector.

Table 2. Forward and backward linkages of tourism sub-sector of Central Java Province

No.	Sector	Forward Linkage			Backward Linkage		
		Direct	Indirect	Total	Direct	Indirect	Total
1	Transportation and Warehousing	0.327	1.131	1.458	0.397	1.204	1.601
2	Provision of Accommodation and Food and Drink	0.172	1.040	1.213	0.470	1.218	1.689
3	Information and Communication Services	0.434	1.189	1.623	0.287	1.128	1.415
	Average	0.311	1.120	1.431	0.384	1.183	1.568

Source: Input-output table of Central Java Province, Publication 2021, processed

Meanwhile, the accommodation and food and beverage provision sub-sector has the highest backward linkage value of 1.689 (value > 1.568). This means that when there is an increase in final demand of one unit of money, the output of the accommodation and food and beverage sub-sector requires input of 1.689 units of money directly or indirectly from other economic sectors including the accommodation and food and beverage sub-sector itself. The accommodation and food and beverage sub-sector has a high total backward linkage because this sub-sector is directly related to consumers, such as selling services or goods in the form of final goods as final consumers. In addition, the accommodation and food and beverage sub-sector is also a sub-sector that cannot be separated from basic human needs in meeting food and shelter needs. This is different from research conducted by Nilam [4] entitled Analysis of the Role of Tourism Sector in Central Java (Input-Output Approach). In this research, the supporting tourism sub-sector that has a high backward linkage value is the travel agency services sub-sector.

The distribution power explains the ability of a sector to increase the growth of its upstream industry through the input market transaction system. The distribution power of sector *j* is said to be high if P_{dj} has a greater value than one, and vice versa if P_{dj} has a less value than one. Meanwhile, the degree of sensitivity explains the ability of a sector to increase the growth of its downstream industry through the output market transaction system. The degree of sensitivity of sector *i* is said

to be high if S_{di} has a greater value than one, and vice versa if S_{di} has a lower value than one.

Table 3 indicates that tourism sector has a distribution power value of 1.063 (> 1), which can be interpreted that tourism sector is able to stimulate more than one production growth. Thus, tourism sector is included in the strategic sector that can help the growth of its upstream sector.

According to Table 3, the sector that has a sensitivity degree value (> 1) is the manufacturing industry sector of 1.797. Furthermore, the electricity and gas procurement sector is 1.210, followed by the tourism sector of 1.072 and the wholesale and retail trade sector, car and motorcycle repair with a value of 1.064. From the four sectors including the tourism sector, it can be interpreted that the sector has the ability to encourage the growth of its downstream sector.

According to these results, it is visible that tourism sector has a distribution power value of 1.063 (> 1) and a sensitivity degree value of 1.072 (> 1). Thus, it can be interpreted that tourism sector is included in the category of leading sectors. This is in accordance with research by Muryani and Siswahto [15] entitled Analysis of the Tourism Sector and the Impact of Tourist Spending on the Economy of North Sulawesi Province. The research contains the conclusion that tourism sector is a leading sector in North Sulawesi Province because it has a distribution power and sensitivity level above average or more than one.

Table 3. Distribution power & degree of sensitivity of economic sector of Central Java Province

No.	Sector	Spreading Power	Spread Sensitivity
1	Agriculture, Forestry, and Fisheries	0.862	0.958
2	Mining and Excavation	0.938	0.773
3	Processing Industry	1.030	1.797
4	Procurement of Electricity and Gas	1.257	1.210
5	Water Supply, Waste, Waste and Recycling Processing	1.023	0.675
6	Construction	1.091	0.792
7	Wholesale and Retail Trade; Car and Motorbike Repair	0.935	1.064
8	Tourist	1.063	1.072
9	Finance and Insurance, Real Estate, Corporate, Government and Social Security	0.853	0.922
10	Services	0.944	0.731

Source: Input-output table of Central Java Province, Publication 2021, processed

Table 4. Distribution power & degree of sensitivity of tourism sub-sector of Central Java Province

No.	Sector	Spreading Power	Spread Sensitivity
1	Transportation and Warehousing	1.089	0.992
2	Provision of Accommodation and Food and Drink	1.148	0.825
3	Information and Communication Services	0.962	1.104

Source: Input-output table of Central Java Province, Publication 2021, processed

In accordance with Table 4 that indicates the distribution power value of the supporting sub-sectors of tourism sector, the sub-sector with the highest distribution power value is the accommodation and food and beverage provision sub-sector, which is 1.148. This is followed by the transportation and warehousing sub-sector of 1.089. Both sub-sectors have a value (> 1), which means that the sub-sector can drive the growth of its upstream sector and is included in the potential sub-sector. This is in accordance with research conducted by Yusroni and Chadhiq [5] entitled *The Influence of Tourism Sector on the Economy and Spatial of Bukittinggi City (Input-Output Analysis Approach)*. The research explains that the supporting sectors of tourism sector included in the potential sector are hotel, restaurant, entertainment and recreation sectors because they have high distribution power value or more than one but a low sensitivity degree value or less than one.

Meanwhile, the sensitivity degree value of the supporting sub-sectors of the tourism sector is in accordance with Table 4. The sub-sector with a high sensitivity degree value (> 1) is the information and communication services sub-sector of 1.104, which can be explained as a supporting sub-sector of the tourism sector that can drive the growth of its downstream sector. It is visible that the sub-sector has no ability yet to drive growth in input sector production but has a high sensitivity to

external changes to its downstream sector. According to the opinion of Nuryadin and Purwiyanta [19] with research entitled *Multiplier Effect of Tourism Sector in Yogyakarta: Input-Output Analysis*, this research is not in accordance with the author's research because communication sub-sector is included in the leading sector.

Multiplier impact analysis is an analysis that aims at finding out something that occurs in endogenous variables if there is a change in exogenous variables in an economy. In this research, effect multiplier analysis was carried out to analyze three types, which are output multiplier analysis, income multiplier, and labor multiplier.

Output multiplier analysis aims at showing the impact of changes in final demand in a sector on the output of all sectors in the economy. The income multiplier is useful for viewing the increase in income as a result of changes in output in an economy. The income multiplier shows the number of household incomes generated due to increased final demand in the sector. The labor multiplier shows changes in the workforce as a result of initial changes in final demand. The labor multiplier is not obtained from the input-output table because the input-output table does not contain elements related to labor. The following is Table 5 regarding the results of analysis of output, income, and labor multipliers of the economic sector of Central Java Province.

Table 5. Output, income, labor multipliers of economic sector of Central Java Province

No.	Sector	Output Multiplier	Income Multiplier	Labor Multiplier
1	Agriculture, Forestry, and Fisheries	1.295	0.905	0.027
2	Mining and Excavation	1.410	0.865	0.005
3	Processing Industry	1.547	0.717	0.011
4	Procurement of Electricity and Gas	1.888	0.359	0.008
5	Water Supply, Waste, Waste and Recycling Processing	1.537	0.758	0.093
6	Construction	1.640	0.690	0.010
7	Wholesale and Retail Trade; Car and Motorbike Repair	1.405	0.850	0.019
8	Tourist	1.597	0.783	0.014
9	Finance and Insurance, Real Estate, Corporate, Government and Social Security	1.282	0.888	0.009
10	Services	1.419	0.833	0.017

Source: Input-output table of Central Java Province, Publication 2021, processed

Table 5 indicates the output, income and labor multiplier values of the economic sector of Central Java Province. It is visible from the tourism sector that places the output multiplier value in third place with a value of 1.597. This can be explained that the tourism sector has an effect on increasing final demand by one unit of money, then it will increase output by 1.597 units of money in all economic sectors of Central Java Province. In accordance with research conducted by Nilam [4] entitled *Analysis of the Role of the Tourism Sector in Central Java (Input-Output Approach)*, the research concluded that tourism sector is one of the sectors that has the largest output multiplier from other economic sectors.

Meanwhile, for the income multiplier value in Table 5, the tourism sector is in sixth place among other economic sectors in Central Java province. This indicates that tourism sector has an income multiplier value that is not too high of 0.783. This value means that if the final demand for the tourism sector

increases by one unit of money, income will increase in all economic sectors by 0.783 units of money. This can be interpreted that the agriculture, forestry and fisheries sectors are able to help increase the income of other economic sectors in driving the economy in Central Java Province. The results of this analysis are not in accordance with research of Annas [20] entitled *Analysis of Input-Output of the Tourism Sector in Banyuwangi Regency*. The research explains that the highest income multiplier effect is the manufacturing sector.

Furthermore, the labor multiplier value in Table 5 indicates that the tourism sector is in fifth place among other economic sectors in Central Java Province. The labor multiplier value in the tourism sector is not too high, only 0.014 when compared to other sectors. This value can be interpreted that when the final demand for the tourism sector increases by one unit of money, it can increase employment by 0.014.

Table 6. Output, income, labor multipliers of tourism sub-sector of Central Java Province

No.	Sector	Output Multiplier	Income Multiplier	Labor Multiplier
1	Transportation and Warehousing	1.601	0.749	0.010
2	Provision of Accommodation and Food and Drink	1.689	0.790	0.022
3	Information and Communication Services	1.415	0.825	0.006

Source: Input-output table of Central Java Province, Publication 2021, processed

Table 6 indicates the output, income and labor multiplier values of the supporting sub-sectors of the tourism sector in Central Java Province. The highest output multiplier value in the accommodation and food and beverage provision sub-sector is 1.689, which means that when the final demand for the output of the accommodation and food and beverage provision sub-sector increases by one unit of money, it may increase output in all economic sectors by 1.689 units of money, so that the accommodation and food and beverage provision sector is able to increase the growth of other related economic sectors.

Meanwhile, the sub-sector with the highest income multiplier value is the information and communication services sub-sector of 0.825, which means that if the final demand for the information and communication services sub-sector increases by one unit of money, it will increase income in all economies by 0.825 units of money. The information and communication services sub-sector has great potential in supporting sub-sector of the tourism sector to increase community income, the economic sector and regional income. This is not in accordance with research conducted by Nilam [4] entitled Analysis of the Role of Tourism Sector in Central Java (Input-Output Approach). In this research, it is concluded that the income multiplier effect of the sub-sector with the highest value is the restaurant sub-sector.

Furthermore, the sub-sector with the highest labor multiplier value is the accommodation and food and beverage provision sector with a value of 0.022, which means that if the final demand for the accommodation and food and beverage provision sub-sector increases by one unit of money, it may increase employment by 0.022. This sub-sector is able to support the tourism sector to increase the labor in other economic sectors to encourage the economy of Central Java Province. This is in accordance with a research conducted by Nilam [4] entitled Analysis of the Role of Tourism Sector in Central Java (Input-Output Approach). In this research, it is concluded that the restaurant sub-sector has the highest value in the labor multiplier effect.

4. CONCLUSION

The result of research indicates that the tourism sector for forward linkage is in the third highest position, and the highest supporting sub-sector of tourism sector is the information and communication services sub-sector. While for the result of the backward linkage value, the tourism sector is in the third highest position, and its supporting sub-sector with the highest value is the food and beverage accommodation provision sub-sector. The result of distribution impact analysis indicates that the tourism sector is a leading sector because it has the value of distribution power and a degree of sensitivity of more than one. For the output multiplier effect, the tourism sector is in the third highest position, while for the income and labor multipliers, it is not too high in the sixth and fifth positions.

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