

Technology Absorption in Entrepreneurial Aspirations and Capabilities

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This study aims to explain the contribution of technology absorption as the main source and determinant in encouraging entrepreneurial aspirations and enhancing global entrepreneurial abilities. The main data source of this research is secondary data from 137 countries from the Global Entrepreneurship Development Index (GEDI). The methods and dimensions of the variables follow the measurement model (GEDI, 2019). The analysis model used the path analysis method, which was deferred from the linear hierarchical regression model of the standard form of the Ordinary Least Squares (OLS) model, to describe interactions both direct, indirect and total. The results of the research show that technology absorption factors are able to provide the most dominant, first and most significant contributions both to entrepreneurial aspirations and global entrepreneurial abilities. Meanwhile, the strongest level of correlation occurred between opportunity start-ups and competition. Attractive policy implications at the international, national and local levels support and create a culture of creative entrepreneurship that is able to absorb technology and innovation as well as a competitive environment to foster the competitive advantage of global entrepreneurship.

Keywords: *Technology absorption, Entrepreneurial aspirations and Entrepreneurship capabilities.*

JEL: L26, L31, O14

Introduction

Technology absorption is an increasingly important fundamental element in encouraging entrepreneurial skills and economic growth in all countries. In addition, technology absorption also has opportunities and threats (Du Preez, 2003; Adam, 2020). Countries must be able to absorb current technology that is friendly to users, especially in digital form that continues to innovate and grow (Acs, 2017, 2019). On the other hand, human capital and institutional factors have played an important role in absorbing new technologies and innovations (Prasetyo, 2020a, 2020c). The development of Information Communication Technology (ICT) has an important role in shaping the absorption of technology by companies, and there is a direct relationship that is positively mediated by the use of IT (Adam, 2020). Furthermore, social and technological challenges play major roles in increasing competitive advantage and sustainable business performance (Haseeb, 2019).

The goal of Science, Technology, and Innovation (STI) policymakers must be to orient the direction of change and innovation towards being more inclusive and sustainable (UNCTAD, 2018). Innovation eventually became part of policy ambitions throughout the world, and there was a positive and statistically significant relationship between economic size and innovation performance (Dutta, 2019). Recently, open innovation and technology absorption have become two increasingly popular concepts in policy change and creativity. To maintain sustainable economic growth, creative cultural policies in China have created a National Innovation System (NIS) and strengthened the company's central status (Jia, 2020). Therefore, efforts to develop a culture of creative entrepreneurship that stimulates and promotes creativity and innovation are an absolute necessity for organisations and institutions to achieve competitive advantages (Prasetyo, 2020c 2020e, Ali, 2016). Furthermore, creativity will go hand in hand with innovation; higher creativity leads to more innovation (Ali, 2016).

At present, the global economy has been in continuous dynamic evolution, so industrial and entrepreneurial companies must keep up with changes and a culture of innovation (Ceausu, 2017). This is why a culture of creativity and innovation is increasingly important and must be had in business and entrepreneurship in today's modern world. Creativity and innovation will create new added values that are increasingly competitive. In the era of the industrial revolution 4.0 and competitive globalisation, human capital and social capital factors that are able to absorb the development of new products and technological innovations are needed to achieve sustainable competitive advantages in entrepreneurship (Prasetyo, 2020b, 2020c). The main problem is that not all entrepreneurship in this modern era has the same capacity to master ICT as the main requirement in competition. The greater the capacity in mastering innovation technology, especially applications in ICT, the greater the capacity to achieve a competitive advantage in a sustainable manner.

In a modern economy, the ability to absorb ICT is becoming increasingly important and a must for entrepreneurs to foster sustainable entrepreneurial development. This is because having ICT capacity is one of the most important elements in business competition in the modern world. ICT plays an important role in economic development (Acs, 2019, 2018). It also has a significant positive relationship with supply chain operations, (Ali & Haseeb, 2019). Therefore, an entrepreneur in the modern era must have aspirations to produce innovative products of their own creativity as a core force of competition. In addition, in the world of modern entrepreneurial business, it is a must to have good and adaptive cultural communication skills by using ICT that is compatible, productive, creative, innovative, effective and efficient. Technology absorption based on technology input-output is the main source of regional economic growth. It can be one of the main mechanisms for achieving sustainable development (Yi, 2019). The absorption of technology has a significant effect on economic growth, driving the regional economy (Yi, 2019).

Having the capacity to absorb technology both directly and indirectly encourages business aspirations towards better, increased entrepreneurship to achieve sustainable competitive advantages in entrepreneurship. Technological innovation has a positive, direct impact (as the aspirations of entrepreneurs) on the use of new technologies, new services and new products, (Bobera, 2018). The main problem in this research is why the absorption of innovative technology is becoming progressively important in encouraging aspirations and enhancing global entrepreneurial skills. The purpose of this paper is to explain the total impact of technology absorption on entrepreneurial aspirations and abilities. The originality and urgency of this paper are that the absorption capacity of innovative technology has become an important source and main determinant of sustainable regional and global development. Novelty results of this research explain the absorption of technological innovations and aspirations as the main mechanisms in enhancing global entrepreneurial capabilities. Furthermore, the important policy implications for the government are expressed.

Literature Review

In the new growth theory, both the beyond and behind in the Solow model, technology, innovation, and knowledge are important factors in driving modern economic growth. In various literature studies, it was found that the capacity of entrepreneurial ability to produce innovation and the New Products Development (NPD) was greatly influenced by technological factors (Diaconu, 2011; Kim, 2013; Daneshgar, 2014; Bobera, 2018; Acs, 2019, 2018; Haseeb, 2019; Gutiérrez, 2019; Prasetyo, 2020c, 2020e). The capacity of corporate innovation is a key function of the ability to develop coherent strategies and technologies, to acquire and absorb technology, to form and exploit relationships with third parties, and to develop other skills that are useful for innovation (Diaconu, 2011). Regarding



the ability to obtain innovative products and services in the global frontier, technology is used by the most sophisticated methods to become the dominant source of competitive advantage (Gutiérrez, 2019). In this paper, aligning key strategies is still needed and used to increase technology absorption to strengthen entrepreneurial aspirations and global entrepreneurial abilities. Empirical studies of better strategy alignment methods have been able to help SMEs in Malaysia to gain sustainable competitive advantages through social and technological factors (Haseeb, 2019).

In addition to the alignment of technology absorption strategies and aspirations, human capital, social capital and institutional factors are the main determinants of entrepreneurial competitive advantage and economic growth (Prasetyo, 2020a, 2020b, 2019; Neira, 2013). Furthermore, entrepreneurship, innovation and a culture of creativity are considered the main key factors of economic growth. This is because they usually carry behaviour that is in harmony with market developments, productivity, and social cohesion (Neira, 2013). Based on data in the 2011 edition of the Global Entrepreneurship Monitor (GEM) and with the logit model, the results of this research confirm that perceptions of market opportunities and possessing the skills and knowledge needed to create new companies are important explanatory factors of entrepreneurial activity (Neira, 2013). Thus, it becomes increasingly clear and convincing that the absorption of innovation technology becomes increasingly important to encourage entrepreneurial aspirations in efforts to enhance global entrepreneurial abilities. Therefore, it is necessary to measure the potential for absorption of innovation and new technology as well as friendly use in designing good business models to encourage entrepreneurial success and new ventures (Prasetyo, 2020c, Natsheh, 2013).

Zahra's research results (2011), have highlighted the importance of entrepreneurial abilities in changing competitive games through entrepreneurial activities. In this article, it is assumed that the absorption of innovative technology is one of the best ways to increase the technological potential of entrepreneurial abilities in conditioning the value of entrepreneurial market offerings and becoming one of the key instruments for building competitiveness (Glabiszewski, 2015). Specifically, the assumption is intended to facilitate the identification of the most important stages in the process of absorbing entrepreneurial technology, both internally and externally (Glabiszewski, 2015). In general, the overall effect of technology development is the strongest, while the effect of technology transfer is the weakest (Yi, 2019). Technology development is a source of absorption of new innovative technologies that can play important roles in developing new products, new business coverage, and new market share to strengthen the capacity of entrepreneurial competitiveness (Prasetyo, 2020a, 2020c, 2020g; Yi, 2019).

Basically, the dimensions of entrepreneurial ability include several important characteristics of entrepreneurs that determine the extent to which novice entrepreneurs will have the

potential for growth. Some dimensions of the ability are motivation, potential technological intensity, entrepreneurship education level, level of competition, institutions, human capital, social capital, social networks, socio-economic-politics, creative culture, efficiency, and effectiveness (Prasetyo, 2020a, 2020b, 2020e, 2020f; Szerb, at. al 2018; Acs, at.al 2019; Thurik, 2008). Furthermore, in this paper, what is meant by the measurement dimension of the pillar variable of technology absorption is reflecting the technological intensity of the initial activities of a country combined with the capacity of a country's ability to absorb innovation technology at the company level (Szerb, at.al 2018; Acs, at.al 2019). The dimensions of entrepreneurial capacity measurement itself include some important characteristics of the nature of entrepreneurship that can determine the extent to which new novice entrepreneurs will have the potential for growth, based on their needs (Szerb, at.al 2018; Acs, at.al 2019). On the other hand, the dimension of measuring entrepreneurial aspiration variables can be seen from entrepreneurial motivation, socioeconomic variables, and control variables. Furthermore, the entrepreneurial motivation variable itself is measured by socioeconomics and control (Thurik, 2008). However, in this article, the dimension of measuring the factors of entrepreneurial aspirations is used by measuring the pillar variable dimensions of global entrepreneurial abilities (Acs, at.al 2019 and Szerb at.al. 2018).

Research Method

Data Sources and Variables

Technological advances make it easier for data to be archived and accessed and used by other researchers. Utilising existing data for current research is becoming increasingly common (Johnston, 2014; Martins, 2018). In this study, secondary data sources are used for the main data obtained from the global entrepreneurship index: (GEINDEX), GEDI & RIERC data sources (Acs, at.al 2019), and FIRES (Szerb, at.al, 2018). This data regards 137 countries that are used as samples. The structure construction index integrates 14 pillars that are deviated into three super indexes: entrepreneurial attitudes, aspirations and abilities and a large index of GEI itself. In this research paper, only two super indexes are used: Entrepreneurial Aspirations (ASP) and Entrepreneurial Abilities (ABT). Furthermore, the ABT variable is devolved back into the dimensions of the four main pillar variables: Opportunity Start-up (OS), Technology Absorption (TA), Human Capital (HC), and Competition (Cpt) (Acs, at.al, 2019; and Szerb, at.al, 2018).

Opportunity start-up (OS) measures entrepreneurial motivation in starting a business as an important signal of quality dimensions. Measuring dimensions (OS) include indicators: readiness, superior skills, ability to deal with bureaucracy, and taxation. Pillar variables (TA) measure the ICT absorption capacity and the diffusion of new innovative and potential technologies to grow. High-quality human resources are essential for highly competitive and innovative businesses. The pillar variable (HC) is measured using the dimensions of

education level, labour market, investment in training staff and quality employees, and labour freedom. The pillar variable (Cpt) measures the percentage of businesses from products produced, NPD, business market uniqueness, services, market power, and the effectiveness of anti-monopoly regulations. In this paper, the pillars are the basic building blocks of the sub-indices used: ASP and ABT. Sub-index values for any country are the arithmetic mean of the pillar, so the formulation can be measured as follows (Acs, at.al, 2019; and Szerb, at.al, 2018):

$$ASP_i = 100 \sum_{j=10}^{14} h_j \dots \dots \dots (1)$$

$$ABT_i = 100 \sum_{j=6}^9 h_j \dots \dots \dots (2)$$

h_{ij} and h_{jj} are the modified j -pillar and post-researcher values in the country. $i = 1, 2, 3 \dots n$ is the number of countries and $j = 1, 2, \dots 14$ is the number of pillars. The maximum value of the sub-index is 100 and the minimum potential is 0, both of which reflect the relative position of a country in a particular sub-index. This means that the greater the absorption approach one the better and the smaller it approaches zero the weaker it is.

Research Analysis Model

This study aims to explain the contribution of technology absorption as the main source and determinant in encouraging entrepreneurial aspirations and enhancing global entrepreneurial abilities. In accordance with the objectives of this research, this paper can be explained and analysed by the path analysis method. The advantage of this path analysis method is it uses standard regression coefficients and can be used to determine direct effect, indirect effect, and total effect. In econometrics, this path analysis method is one of the methods for reducing multicollinearity cases.

The concept of this path analysis model is based on the basic concept of thinking that entrepreneurial ability (ABT) can be formed due to entrepreneurial aspirations and the four main pillar variables of the entrepreneurial ability itself. In addition, the aspiration variable itself (in this paper) can also be measured and analysed using the four main pillar variables of the ABT. Based on this basic concept of thinking, the structural equation model of mathematical functions can be written as follows:

$$ASP = f(OS, TA, HC, Cpt) \dots \dots \dots (3)$$

$$ABT = f(ASP, OS, TA, HC, Cpt) \dots \dots \dots (4)$$

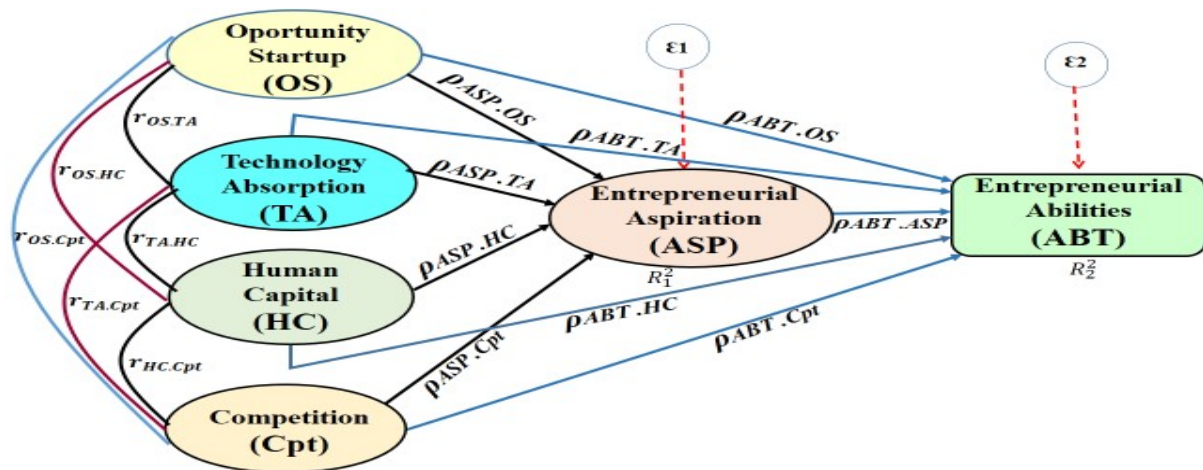
Based on the similarities in functions 3 and 4, it can be stated that entrepreneurial aspirations will be influenced by opportunity start-up (OS), technology absorption (TA), human capital (HC), and competition (Cpt). Furthermore, entrepreneurial aspirations (ASP), together with the four pillar variables, will affect entrepreneurial ability (ABT). Furthermore, the mathematical equation function model can be deferred to the equation structure of the path analysis model as follows:

$$ASP = \rho_{ASP \cdot OS} \cdot OS + \rho_{ASP \cdot TA} \cdot TA + \rho_{ASP \cdot HC} \cdot HC + \rho_{ASP \cdot Cpt} \cdot Cpt + \varepsilon_1 \dots\dots\dots(5)$$

$$ABT = \rho_{ABT \cdot ASP} \cdot ASP + \rho_{ABT \cdot OS} \cdot OS + \rho_{ABT \cdot TA} \cdot TA + \rho_{ABT \cdot HC} \cdot HC + \rho_{ABT \cdot Cpt} \cdot Cpt + \varepsilon_2 \dots\dots\dots(6)$$

Then, based on the structural equation form models 5 and 6, the path diagram model path analysis can be made as follows:

Figure 1. Path analysis diagram model for increasing entrepreneurial skills



Findings and Discussion

The absorption of technology and innovation in this paper is interpreted as the utilisation and capacity of the development of new and renewable technologies by entrepreneurs. The core capabilities include technology adaptation, so that businesses can be adaptive and compatible in the market. The purpose of the absorption of technology and innovation is to utilise existing technology that can be obtained and used for business development to achieve competitive advantages sustainably. The absorption of the technology certainly raises costs, but entrepreneurs are certainly able to manage them well. Consequently, there will still be more benefits obtained than the costs incurred in the future, both in the short and long term. Thus, technology absorption, in this case, does not have to be owned. More importantly, it must be utilised and developed to achieve a competitive advantage. Therefore, in the current

era of globalisation, the ability to absorb this technology is the centre of strength in the main reflection of entrepreneurial aspirations and global entrepreneurial abilities.

Based on the results of the study in table-1, both in model-1 and model-2, it seems increasingly likely that positively and significantly, the contribution of standard coefficient standardisation of the technology absorption pillar variable (TA), is able to make the most dominant contribution first. It does so with by 40.6 per cent of entrepreneurial aspirations and 29.8 per cent of entrepreneurial abilities. In principle, many factors influence any endeavour both internally and externally. When referring to the research model in this paper, it has been determined that there are four main pillar variables that can influence entrepreneurial aspirations and global entrepreneurial abilities: OS, TA, HC, and Cpt. The results of the research in table-1 show that all of these variables make a positive and significant contribution to entrepreneurial aspirations and global entrepreneurial abilities. Furthermore, the factors of entrepreneurial aspirations themselves also have a positive and significant influence on global entrepreneurship ability. Meanwhile, both model-1 and model-2 are also positive and significant, and each contributed large amounts of 92.10 per cent and 99.40 per cent.

Table 1: Results of the path analysis model for increasing entrepreneurial skills

Model		Unstandardised Coefficients		Standardised Coefficients	t-stc.	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	2.305	1.484		1.553	.123			
	OS	15.778	5.616	.204	2.810	.006	.847	.238	.095
	TA	29.631	4.242	.406	6.986	.000	.848	.520	.237
	HC	21.072	3.834	.258	5.496	.000	.745	.432	.187
	Cpt	17.262	6.034	.174	2.861	.005	.794	.242	.097
2	(Constant)	.721	.407		1.773	.078			
	OS	19.493	1.571	.264	12.410	.000	.929	.735	.119
	TA	20.818	1.349	.298	15.435	.000	.898	.803	.149
	HC	16.438	1.155	.210	14.236	.000	.795	.779	.137
	Cpt	20.268	1.689	.213	11.996	.000	.877	.724	.115
	ASP	.125	.024	.131	5.298	.000	.932	.420	.051

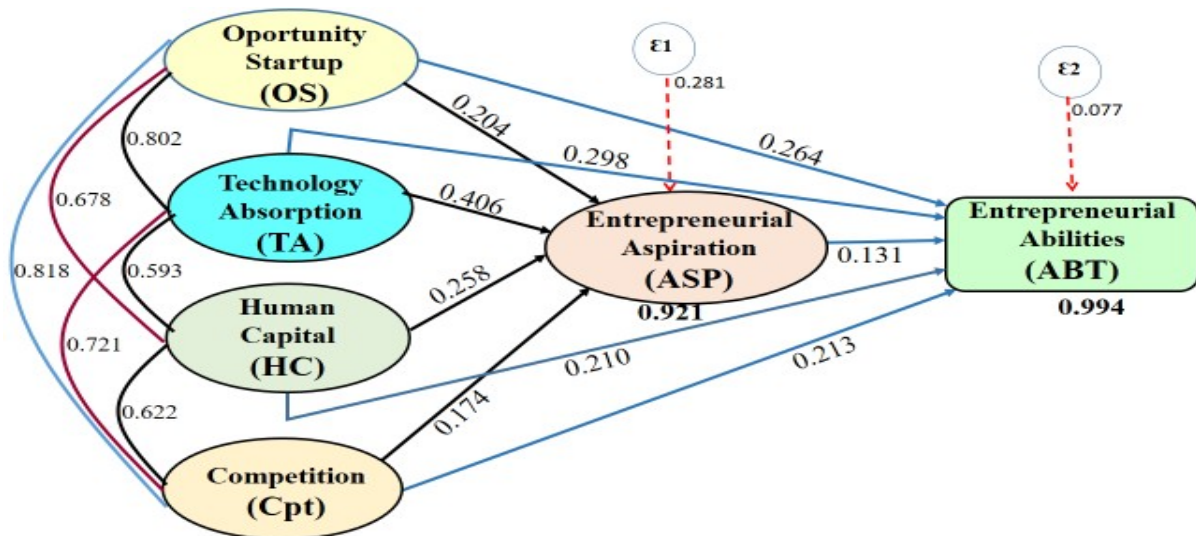
Model-1: $ASP = 0.204(OS) + 0.406(TA) + 0.258(HC) + 0.174(Cpt) + \varepsilon_1$

Model-2: $ABT = 0.264(OS) + 0.298(TA) + 0.210(HC) + 0.213(Cpt) + 0.131(ASP) + \varepsilon_2$

Source: Secondary data, (Acs, at.al., 2019) processed.

In addition to the main role of absorption technology, an interesting critical note to consider is the contribution of the human capital factor, which in Model-1 still has the second-largest contribution after the ability of technology to absorb entrepreneurial aspirations. This means that this research still supports previous research, which states that human capital is the main reflection in encouraging entrepreneurial competitiveness and economic growth (Prasetyo, 2020a, 2020d). Furthermore, in model-2, the contribution of the human capital factor also is still a large and dominant contribution after the factors of absorption technology, opportunity start-up, and competition. Based on the interrelationship of the results of research in both model-1 and model-2, it is increasingly apparent that the absorption technology factor is the main driver for entrepreneurial aspirations, and entrepreneurial abilities are actually real. However, the human capital factor is the main fundamental factor and the first to create the power of absorption technology. That means, with the availability of resources owned, such as knowledge and education level, inspiration and aspirations will be formed to be able to absorb technology to run businesses. Furthermore, the ability to capture technology is a strong inspiration for entrepreneurs to continue to improve their entrepreneurial abilities to establish sustainable competitive advantages.

Figure 2: Diagram of the results of the path analysis of increasing entrepreneurial skills



Based on figure-2 and table-2, it is increasingly apparent and convincing that the contribution of absorption technology is able to give the first, biggest influence and contribution (proven by the direct effect of 8.9 per cent, the indirect effect of 16.2 per cent, and the total effect of 25.10 per cent). In addition, this technology absorption factor is also able to make the most dominant contribution, as the main determinant is 25.10 per cent (or a total influence of 29.15 per cent from a total of 86.10 per cent in the research model). Thus, this condition can achieve the increasingly clear research objectives that contribute to the adoption of

technology as the first source and main determinant to encourage entrepreneurial aspirations in enhancing global entrepreneurial capabilities. The second largest major contribution was direct, indirect, and total influence contributed by opportunity start-up factors, each of which were 7 per cent, 15.4 per cent, and 22.4 per cent. This phenomenon indicates the opportunity to be able to start using technology because of the absorption of the technology itself as its main source. The level of correlation between the two factors of technology absorption and start-up opportunity is also very close at 80.2 per cent. Furthermore, the interrelationship between the two factors (between the ability of technology absorption and start-up opportunity) is able to provide the largest total contribution compared to other relationships, which is 55.17 per cent of the total of 86.10 per cent in the research model.

Table-2: Research results of direct, indirect, and total effects on global entrepreneurial capabilities

Variable	Direct Influence	Indirect Influence						Total Influence
		OS	TA	HC	Cpt	ASP	Sub Total	
OS	0.070		0.063	0.038	0.046	0.007	0.154	0.224
TA	0.089	0.063		0.037	0.046	0.016	0.162	0.251
HC	0.044	0.038	0.037		0.028	0.007	0.110	0.154
Cpt	0.045	0.046	0.056	0.028		0.005	0.135	0.180
ASP	0.017	0.007	0.016	0.007	0.005		0.035	0.052
Total	0.265						0.596	0.861

Source: Secondary data, (Acs, at.al., 2019) processed.

In addition to these explanations, other critical notes based on the results of research in Figure 2 and Table 2, it seems increasingly clear that the strongest level of correlation occurs between the opportunity start-up factor and the competition factor of 81.8 per cent. This phenomenon indicates that the strength of the ability to absorb technology as the first source and main reflection can encourage the opportunity to start a business using technology properly in the current modern era. This then becomes the main source of competition power in such a business. Integrating the human capital factor with an entrepreneurial culture that can master the absorption of new technologies and innovations well will add to the love of business and create an increasingly competitive environment, which in turn will become a sustainable source of competitive advantage in global entrepreneurship. However, changing a good entrepreneurial culture that is integrated with a competitive and conducive environment is not easy and still requires a long process and time.

Conclusion

Based on the results of research, it can be concluded that the ability of technology absorption is the first source and is the main determinant in the ability to create an entrepreneurial



culture that has and loves a competitive environment. With the ability to absorb good technology, start-up opportunities from various fields of entrepreneurial business will be created, which will create an increasingly competitive and conducive environment to support global entrepreneurial competitiveness.

In 2045, Indonesia will enter the golden year of independence, and by 2050, the world economy will be integrated into a highly competitive environment with a good and resilient entrepreneurial culture. If a country does not have an entrepreneurial culture and does not love a competitive environment, it will become a nation that has difficulty growing and developing well and sustainably. However, changing the culture of entrepreneurship and competitive environments is not a quick fix. It will still take a long time to achieve this. The ability to absorb innovative new technology and have a good attitude and aspirations in a competitive environment is the main basic capital to develop a good culture to face every major challenge. Attractive policy implications for governments at international, national and local levels are to create entrepreneurship education and a culture based on creativity, innovation and technology to support a competitive environment and encourage innovation and adoption of new technologies for the advancement and strength of industrial and entrepreneurial businesses in each country.



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