

Innovation And Entrepreneurship For Competitiveness In The ASEAN: An Empirical Analysis

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<i>Info Articles</i>	<i>Abstract</i>
<p><i>Article history:</i> Received June 25, 2021 Revised August 16, 2021 Accepted September 13, 2021 Available online September 28, 2021</p> <p><i>Keywords:</i> <i>ASEAN, Competitiveness, Entrepreneurship, Inclusive Development, Innovation</i></p> <p>JEL Classification; F6, O3, O5</p>	<p>ASEAN economies face new challenges in achieving sustainable, inclusive development, namely entrepreneurial innovation, impacting ASEAN's competitiveness. This research investigates the relationship between the power of innovation, entrepreneurship, and national competitiveness at the ASEAN country level. This study also examines how innovation and entrepreneurship can affect a country's competitiveness and inclusive development. The results of the comparative analysis based on means-testing using an independent sample t-test at the ASEAN level show a significant difference between the group of countries with a low-medium level of innovation ability and the group of countries with a high level of innovation ability. High levels of innovation imply that these countries have high competitiveness, entrepreneurship, and inclusive development levels. Meanwhile, the regression and correlation analysis results show that several ASEAN countries have high national competitiveness due to high levels of innovation, entrepreneurship, and inclusive development. The findings of this study may help develop policies to boost national competitiveness in inclusive growth.</p>

INTRODUCTION

Entrepreneurship can increase national productivity and economic growth. Its contribution to boosting a country's national GDP is significant (Naudé, 2010). In the current era of globalization, the essential parts of entrepreneurship are developing economic competitiveness to increase the welfare of the community, especially the countries that make up the Association of South Asian Nations (ASEAN). In 2015, ASEAN member countries decided to work together to strengthen the four pillars of the ASEAN Community: a single market and production base, a highly competitive economic region, a region with equitable economic development, and integration with the global economy (MEA, 2018)

With such an agreement, ASEAN member states believe that creative entrepreneurship can be a driver of competitiveness and positively impact

long-term development (Dhahri & Omri, 2018). The agreement was motivated by the fact that it obtained global that many developed countries. It is caused by the source of the national economy, which came from companies who can compete by creating a product with a value of innovation. The more new items developed, the more benefits that can be transferred from the product to better communal life (Youssef et al., 2018). Furthermore, the ability of a country's people and businesses to adopt innovation is a necessary condition for seeing the good consequences of creation at the economic and societal levels. The relationship between innovation, entrepreneurship, and increased competitiveness is an issue that ASEAN countries must explore to create a sustainable economy as part of inclusive development in the fourth industrial revolution (Roig-Tierno et al., 2018).

There has never been a study of the relationship between the power of innovation and entrepreneurship in ASEAN countries using annual data and the results of comparative analysis. With the most recent data, a close model, aided by regression and correlation analysis results, illustrate disparities in the level of competitiveness, entrepreneurship, and inclusive development in ASEAN countries. The following are the points where this research paradigm differs from the literature. First, Muhamad et al. (2018); Cinnirella & Streb (2017) uses the autoregressive distributed lag model to investigate human resources and the level of innovation that influences economic growth. Second, utilizing the generalized method of moments, the Layos & Pena research (2020) examines the competitiveness of innovation in surviving the pandemic crisis in ASEAN countries (GMM).

Innovation and entrepreneurship are related to each other. Without innovation, a product does not have a competitive advantage, and without entrepreneurship, the invention cannot be realized. A balance between both must be able to create competitiveness. From the entrepreneur's variable innovation product perspective, policies can move the number of requests (Tian et al., 2019).

A study showed that entrepreneurship contributes to job creation, national development, and economic growth through innovation activities. Sector entrepreneurship is considered to spur an increase in innovation value that affects competitiveness (Nambisan et al., 2019).

Many of the findings conclude that innovations influence the company's productivity and have an essential role in developing value-social and economic value through products created. The economic element of the invention makes the company more innovative than the economy that prioritizes efficiency (Fukugawa, 2018). The relationship of the level of innovation tends to be positive with the level of development. Suppose the average level of innovation in a country increases, the intermediate level of effect of the country increase. In ASEAN countries level of action can be measured by the level of innovation in entrepreneurial activity that is innovative (Schmitz et al., 2017).

When viewed at the macro level, entrepreneurship is a sector that plays a role as an activator of even controlling the economy. The country's economy is determined by entrepreneurship characteristics that belong to a country

(Whittington, 2018). The element in question is a productive entrepreneurship character, defined as more than 10% of population entrepreneurship based on a population ratio. An indicator that measures the quality of entrepreneurship in a country is a climate of entrepreneurship that constantly innovates to increase economic development (Kumar & Joseph, 2006). GEI measures that only entrepreneurial productivity can produce good relations between employers and the environment because the relationship can bring wealth. It is proved that there is a very positive between entrepreneurship and product innovation.

Competitiveness is a concept of the activity of international trade. Competitiveness is the ability of a state to enter the foreign market and the ability to be able to survive in the market. To improve the competitiveness of every country should be able to adapt to changes in the environment. As it is today, with the growth of the swift development of technology, it can be used for a state to improve its competitiveness by combining elements of technology and innovation (Dyduch & Bratnicki, 2018). Innovation, if applied, can affect the increase in efficiency and productivity to generate additional profit. The invention can also satisfy consumers because there are elements of the products or services that are consumed (Yun et al., 2020).

The difference between this study and previous research is in the research variables and the methodology used to analyze research data in finding the results of this study. In previous studies, the research model used was not a comparative model, so the relationship between variables did not yet have a high level of disparity. While in this study, to find the relationship between the level of innovation, entrepreneurship, and competitiveness. It is the primary value of this research.

Based on these considerations, this article investigates the relationship between innovation, entrepreneurship, and national competitiveness at the ASEAN level to demonstrate how innovation and entrepreneurship can influence competitiveness and economic development in these countries.

RESEARCH METHODS

To analyze the extent of the competitiveness of the innovation affects entrepreneurship, using some of the indicators described in Table 1. The competitiveness approach in this study is based on previous research that a climate of productive entrepreneurship accompanies countries with a high rate of innovation. It is going to be a positive influence on the country's competitiveness.

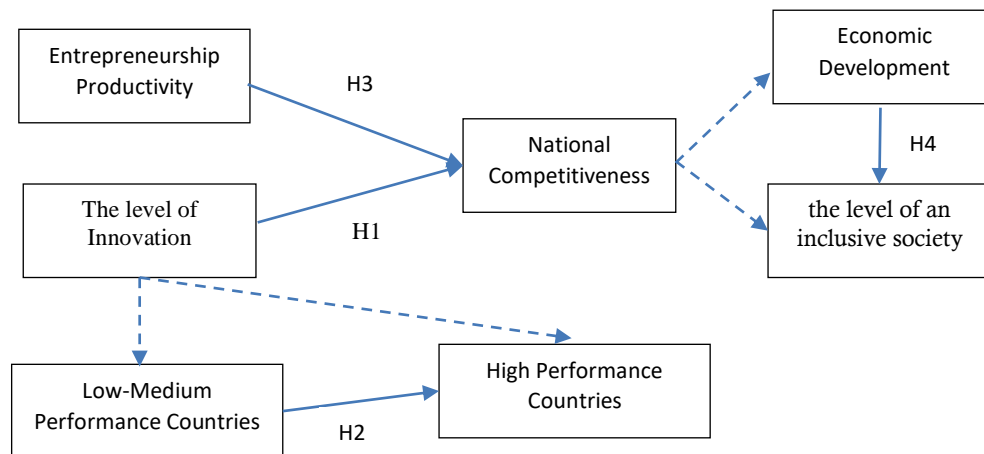
Based on the background and some evidence literature, the following hypothesis can be formulated. Figure 1 shows the relationship between the hypotheses.

- H1:** There is a positive relationship between the level of innovation and national competitiveness in ASEAN countries
- H2:** There are significant differences between the group of countries with the innovation performance of low-and medium country group performance high innovation related to national competitiveness and productivity of the workforce.

H3: There is a positive relationship between entrepreneurship productivity and national competitiveness in ASEAN countries

H4: There is a positive relationship between economic development and an inclusive society level in ASEAN countries specified language is not supported.

Figure 1. Correlation Between Variables in Hypothesis Research



The Nominal Labour Productivity (LP) per person employed and the Global Competitiveness Index (GCI) measure national competitiveness as defining a set of policies and the factors that affect productivity. It was used to analyze the level of national competitiveness in ASEAN countries. The identification of the characteristics of innovation performance in the ASEAN countries in various aspects has been analyzed based on the Summary Innovation Index (SII). SII is a composite indicator that summarizes the implementation of research and innovation systems in the country. Level based on the four main types of needles and ten innovation dimensions, capturing 27 different indicators. According to the perspective per GCI (2019), the ASEAN member states are grouped into four innovation performance groups based on their average performance scores relative to the ASEAN average (of 100%): "innovation leaders" (Singapore), "strong innovators" (Malaysia and Thailand), "moderate innovators" (Indonesia, Vietnam, Philippine and Brunei Darussalam) and "modest innovators" (Cambodia and Laos).

Table 1. Variables Included in Analysis Descriptive Statistic

Variables	N	Minimum	Maximum	Mean	Std. Deviation
SMEs introducing product or process innovations (SMEs-PP)	10	3,80	47,70	16,0300	14,21822
SMEs introducing marketing or organisational innovations (SMEs-MK)	10	7,20	53,50	22,6700	16,19417
IDI	10	2,20	4,40	3,3600	0,79050
GEI	10	20,20	60,80	41,9000	14,19554
SII	10	30,20	110,98	60,5180	28,69235
GCI	10	2,80	4,20	3,4700	0,46916
LP	10	33,20	170,20	71,4900	44,42796
GDP/ CAPITA	10	28,00	75,00	40,2000	14,31239

In international comparisons, the level of entrepreneurship is always expressed by the term Total Early-stage Entrepreneurial Activity (TEA) rate and SMEs. The TEA rate is said to be that state that can be called productive is a country with a high level of innovation, not from the number of entrepreneurs. With the high invention, then the company can be said to be qualified. Until recently, the level of productivity entrepreneurship for ASEAN countries has been recorded by the Global Entrepreneurship Index (GEI). GEI is a composite indicator which "measures both the quality of entrepreneurship in a country and the extent and depth of the supporting entrepreneurial ecosystem." GEI has a score range between 0% to 100%. The higher the score obtained by that state, the country has increased productivity. While measuring innovation, every SME can be measured by two indicators. SMEs that include innovation elements in the production process and SMEs that enter creation in the marketing process.

The development of the economy of ASEAN countries could be described by using the Gross Domestic Product (GDP) per capita and the Index of Inclusive Development (IDI). IDI is a composite index that consists of three pillars (growth and development, inclusion and equity, and sustainability), including 12 key performance indicators of inclusive development. Score IDI and the GCI are based on 1 to 7, where one is the worst and seven is the best.

To study the strength of the linear relationship between the variables, it used Pearson Correlation Coefficient (r) for each sample. We use simple regression analysis to identify the functional relationship between the dependent variable (competitiveness and development) and independent variables (innovation, entrepreneurship).

On the data SII, there are two groupings of countries based on innovation performance, namely the low-medium innovation performance of countries group. This group includes seven countries that are considered moderate

innovators, the "L-M group" and high and very high-innovation countries group (3 countries), the "H-VH group." It includes those countries which are solid innovators and innovation leaders. Testing needs to be done to measure the significant difference between the two countries (Group L-M vs. Group H-VH). The test method used is a statistical analysis that focuses on testing the mean with t-test independent variable.

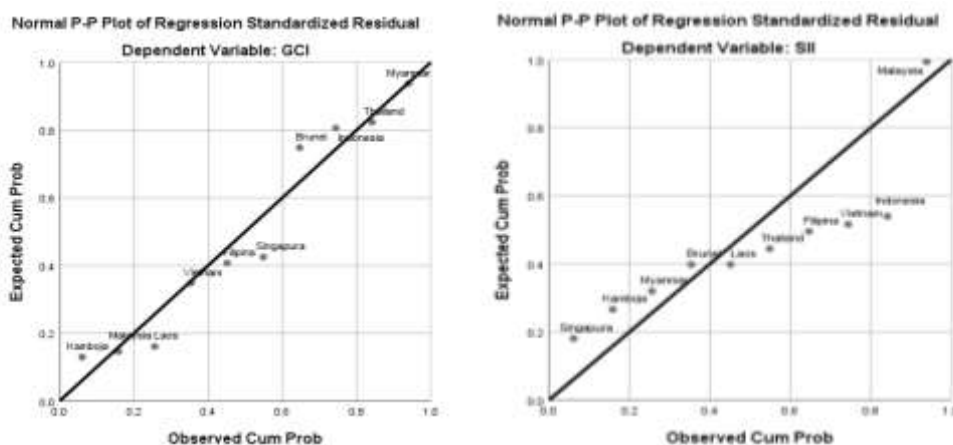
The sample in this research is the countries members of ASEAN, which amounted to 10 countries. Statistical Data about the related variables in this study was obtained from several sources, namely the ASEAN states and others. While for the data processing, we are going to use the SPSS program.

RESULTS AND DISCUSSION

To find the status of the national competitiveness of the ASEAN countries, first, score the GCI and the productivity of labor in the year 2019 should be analyzed. Data from Table 1 shows that the average score of competitiveness in the 10 ASEAN countries is 4,53. The minimum value obtained Laos (4,02) and the maximum value obtained from Singapore (6,30). Then to score the percentage of labor productivity, the average level of competitiveness of the ASEAN countries is 180.5% (ASEAN-10 = 100%). The story of productivity of most low-obtained Cambodia (38,2%) and Singapore's highest level (50,6%).

According to the World Economic Forum (2018) data, Cambodia has been classified as still in the development stage. It still takes a diverse range of innovations that could enhance the competitiveness of the country. So also with five other countries, namely Laos, Indonesia, Vietnam, Philippines, and Brunei Darussalam. The Data of figure 1 shows that some countries in ASEAN have successfully through a period of transition from a developing country into a country's GDP almost on par with developed countries. These countries are Singapore and Malaysia. This transition shows that the two countries are already doing development driven by innovation. It can be concluded that the difference in competitiveness of each country is caused by some factor that requires particular action.

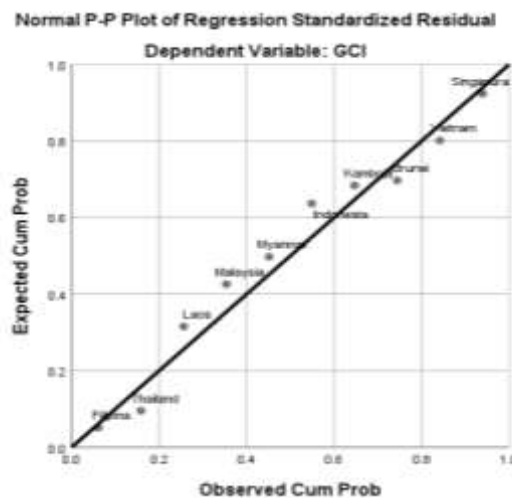
Figure 1. Competitiveness and Innovative Performance: a) GCI and SII; b) LP and SII



The overall comparison of the national competitiveness ranking between ASEAN countries confirms that, by a score of GCI and productivity labor, Singapore has succeeded in placing itself as an innovation center in the world. This performance has been supported by the strength of the factors of higher productivity and technological readiness.

Figure 2 below is the data. The results of statistical analysis showed a positive relationship between competitiveness and innovation. From Figure 2, it can be concluded that the invention's performance can be one of the factors that are the primary driver of the national competitiveness of a country to become more evolved.

**Figure 2. Competitiveness and Innovative Performance: a) GCI and SII;
b). LP and SII**



From these graphs, the level of performance innovation (SII) between the two groups of countries (Group L-M and the Group H-VH) very nature of heterogeny. The average innovation performance in groups L-M to 1.5 is higher than the performance of the innovation group H-VH. In group L-M, Indonesia has the level of innovation of the highest (76,7%) among the countries of the L-M other. It was then followed by the Philippines, Myanmar, and Brunei Darussalam. At the same time, the Countries of Cambodia and Laos have a level of innovation performance below 50%.

In the group of countries H-VH, there is a high level of heterogeny. There is a range of performance innovation from the minimum value of the 97% who obtained Malaysian state to a maximum value equal to 150,5% on the country of Singapore. The specified language is not supported

Table 2. Multiple Correlation Matrix

Variables	SMEs- PP	SMEs- PP	IDI	GEI	SII	GCI	LP	GDP/Capita
SMEs- PP	1.000	0.853	0.276	0.653	0.882	0.650	0.688	0.566
SMEs- PP		1.000	0.418	0.647	0.834	0.602	0.607	0.729
IDI			1.000	0.617	0.793	0.578	0.722	0.716
GEI				1.000	0.743	0.534	0.921	0.644
SII					1.000	0.488	0.908	0.677
GCI						1.000	0.877	0.589
LP							1.000	0.912
GDP/ Capita								1.000

Note: Correlation is significant at the 0.01 level (2-tailed); *at the 0.05 level (2-tailed).

The results of the correlation analysis in Table 2 and Figure 1 explained the relationship between GCI and SII in ASEAN countries. In 2019 found that there was a strong and statistically significant positive relationship (Person correlation $r = +0.912$, $p < 0.01$).

The exact relationship between GCI and Workforce Productivity occurs, but with a lower intensity y ($r = + 0.650$, $p < 0.01$). In Figure 1, there is also a level of variation in the GCI variable and Labor Productivity of 60% on the third-degree polynomial trend line.

When compared with the level of national competitiveness of each ASEAN country with the innovation performance, the results of the independent variable t shows that there is a significant difference between the group of countries with a high level of innovation (H) and the group of countries with a very high level of innovation (VH) for the two GCI graphs [$t(24) = -7.606$; $p = 0.000$] and LP [$t(24) = -5,122$; $p = 0.000$].

Hypothesis 2 (H2) is also corroborated by the finding that the mean H-VH country group had a significantly higher GCI score than the L-M group (5.205 scores compared to 4.453), likewise with the level of Labor Productivity (LP), where the H-VH group of countries has a much higher score than the L-M group of countries.

Table 3. Results of independent samples t-test: low-medium innovation performance countries group (L-M group) versus high and very high innovation performance countries group (H-VH group)

Variables	Mean		Levene's Test		t-test	
	H-VH Group (N=2)	LM Group (N= 8)	F	Sig	t	Sig
GEI	42.318	59.998	0.188	0.525	-8.788	0.000
GCI	4.208	5.800	0.240	0.489	-7.725	0.000
IDI	4.322	5.549	0.210	0.833	-5.230	0.000
LP	74.290	90.843	0.058	0.130	-5.210	0.000
GDP/Capita	72.500	92.059	2.225	0.023	-4.460	0.000
KIA	10.902	15.658	3.922	0.075	-5.892	0.000
SMEs-PP	21.098	25.660	7.833	0.068	-6.753	0.000
SMEs-PP	22.590	30.540	1.110	0.076	-5.622	0.000

Note: 1Levene's test for equality of variances delivered a significance value higher than 0.05 for all the variables for which the "equal variances assumed" option was used; df=24; 2t-test for equality of means; 32-tailed.

The level of competitiveness can be explained by looking at the level and type of entrepreneurship. The data from Figure 2 and Table 3 show that entrepreneurship, expressed by GEI, differs significantly at the EU level, with the GEI rate being high in most of the countries of the H-VH group. Country-EU Nordic countries recorded high GEI scores from 67.9% to 77.8%. Furthermore, Table 3 shows the independent sample t-test, which indicates a positive difference in entrepreneurship (stated by GEI and innovative SMEs). Thus, on average, group H-VH had a significantly higher GEI rate than the L-M group [68.50% versus 43.44%; $t(24) = -8,761$; $p = 0.000$]. Furthermore, significant differences between the two groups of countries were identified in technology innovative SMEs and non-innovative SMEs technology. Countries from the H- VH group were characterized by a higher rate of innovative SMEs than countries from the L-M group [SME technology innovation: 39.3% against 22.2%, $t(24) = -4,879$; $p = 0.000$; Non-technology innovative SMEs: 42.6% versus 23.22%, $t(24) = -5.633$; $p = 0.000$]. SMEs' low level of innovation in countries in the Central, Eastern, and Southern European Union (LM group) results in low levels of innovation in manufacturing activities. So, our results show that entrepreneurs in an economy driven by innovation are much more innovative and more productive, facts confirmed by other studies.

Based on Table 2 and Figure 2, the results of the analysis of hypothesis testing 3 (H3) between national competitiveness (GCI) and productive entrepreneurship (GEI) found a strong positive correlation ($r = + 0.900$, $p < 0.05$). Also shown in Figure 2, the use of a third-degree polynomial trend line explains 86.5% of the variance between the two indices. Besides that, it is also seen that GCI is positively correlated with innovative entrepreneurship, which is shown by SMEs that are supported by innovative technology ($r = +0.670$, $p < 0.01$) and SMEs are innovative but are not supported by

technology ($r = +0.609$, $p < 0.01$). With these findings, it can be concluded that in countries.

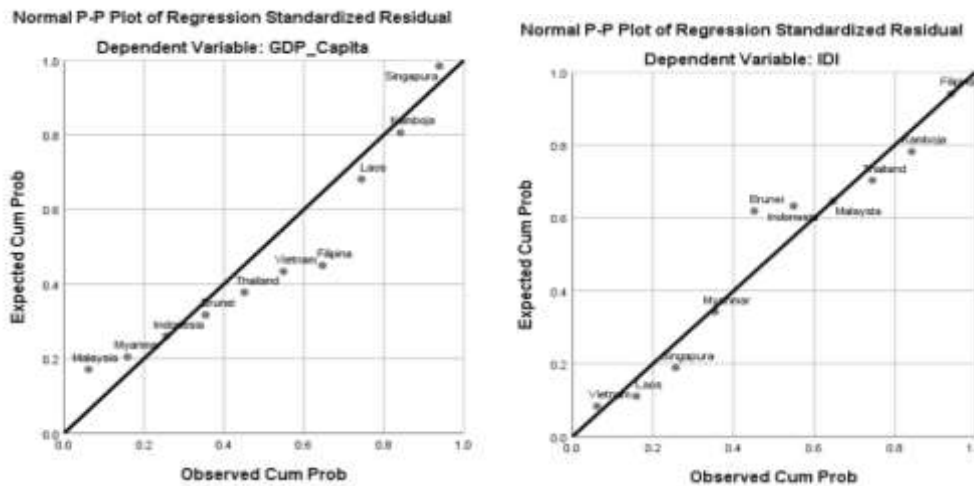
In Table 3, the results of the independent sample t-test showed that there was a significant difference between the H-VH group and the L-group.

M in terms of economic development [$t(277) = -4.652$; $p = 0.000$] and inclusive development [$t(277) = -5.235$; $p = 0.000$], indicating that countries with high innovative performance have a higher level of economic and inclusive development than countries with lower innovative performance.

The empirical results show that the existence of high and inclusive economic development also affects high national competitiveness. As shown in Figure 3 and Table 2, on the one hand, there is a positive correlation between the level of competitiveness (GCI) and economic development and GDP per capita ($r = +0.642$, $p < 0.01$) and inclusive development and IDI ($r = +0.727$, $p < 0.01$). Furthermore, on the other hand, as shown in Table 2, which shows the correlation results, all indicators of innovation and entrepreneurship have a significant positive correlation with GDP per capita and IDI.

This finding is not surprising as all of these indicators can explain the various dimensions that underpin development. Also, the relationship between economic growth and inclusive development in ASEAN countries was positive and significant, as expected ($r = +0.752$, $p < 0.01$). These results suggest that in terms of general innovation policy objectives in the ASEAN context, Growth and development strategies may differ across member countries and address country-specific challenges (Kacprzyk & Doryń, 2017).

Figure 3. Competitiveness and development: a). GCI and GDP/capita; b).GCI and IDI



Source: Authors' research based on WEF (2017a,b) and Eurostat database (2017).

These results confirm hypothesis 4, which states that higher competitiveness is associated with economic development and an inclusive higher level of ASEAN countries.

Discussion

The findings show that ASEAN countries have considerable disparities in national competitiveness rankings and values. Some countries enjoy significant national comparative advantages, whereas others struggle to compete on a national level. Differences in social and capital resources also contribute to these disparities (Nababan, 2019). According to economic theory, economic integration and international commerce may benefit countries with more excellent economic resources and diverse commodities. The countries with great national competitiveness, such as Singapore, Thailand, and Malaysia, should specialize in creating products with a high value of competitiveness. Countries with low national competitiveness, such as Laos and Cambodia, may use their economic resources to develop and export processed goods or services at which they are strong. Countries with a medium level of national competitiveness should concentrate on exporting and importing their most competitive products (Hoang, 2020).

Thus, from the analysis results, it can be concluded that Hypothesis 1 (H1) is strengthened by the finding that ASEAN countries have a low level of innovation performance. It affects the level of competitiveness, which is also common. On the other hand, ASEAN countries with a high level of innovation performance also affect competitiveness, which is also high. It can be concluded that countries with a low-medium level of innovation need to improve their innovation to increase their competitiveness nationally and affect their progress.

ASEAN countries with a high level of productive entrepreneurship (GEI) and innovative entrepreneurship impact a high level of national competitiveness, and vice versa. Policies are needed to stimulate and encourage innovative and creative mindsets in simple innovator countries and moderate innovator countries. In addition, simultaneous action is required, both at the individual and institutional level, but with a particular focus on developing an institutional environment to make entrepreneurship more efficient (Szabo & Herman, 2014).

The findings also show that some country's national competitiveness patterns are similar in terms of specific national products. These countries can still avoid competition and substitutability in regional and global markets and gain from similarity by forming national associations in ASEAN. The associations may help in the avoidance of competition between member countries and the enhancement of competitiveness and bargaining strength in global markets.

CONCLUSIONS

This study shows the relationship between innovation, entrepreneurship, and competitiveness in ASEAN countries, highlighting the critical role of the main drivers of inclusive and sustainable development in the context of the Fourth Industrial Revolution. At the ASEAN level, comparative analysis indicates a significant difference between the groups of low innovation performance countries -middle and group of countries with high and very high innovation performance. In terms of that, fact emphasizes the need to take

particular actions to improve the innovation performance of the ASEAN. Those are included in the group of low-medium innovation countries to increase national competitiveness and development. The correlation and regression analysis results show that the high level of innovation performance can mainly explain the high level of national competitiveness in several ASEAN countries. Innovative and productive group of entrepreneurship.

As a limiting aspect, we show that our study represents only a partial picture of innovation, entrepreneurship, competitiveness through analysis of some specific indicators for innovation and entrepreneurship performance and statistical analysis methods based on correlation simple regression. In this context, further research is going to be expanded. The findings of this study can be helpful for policymakers who can formulate policies that increase national competitiveness in inclusive development.

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