

Spurring Economic Growth in Terms of Happiness, Human Development, Competitiveness and Global Innovation: ASEAN case

Abstract

Happiness, human development, level of competitiveness, and capacity in innovation play an important role in a country to spur long-term sustainable economic growth. This study presents the relationship of is the use of factors that influence economic growth, including happiness, human development, competitiveness, and innovation in the ASEAN region. Besides, case studies in ASEAN have never been available from previous studies that discuss this, so this study is very interesting to present. We use panel data which is a combination of time series and cross-sections. The object of study is ASEAN countries with the multiple linear regression method. In 2013-2019, we found that overall economic growth had a real impact. Based on the results partially, human development and global innovation are two-way related to economic growth (positive and significant). However, there is an insignificant influence of happiness and competitiveness on economic growth. Competitiveness can reduce the level of economic growth because the results are negative. The policy considerations pursued by countries in ASEAN are through the government's strategic steps to improve the productivity of its population because human resources are needed not only as objects but actors in economic activities themselves in managing development.

Keywords: sustainable economics; productivity; human resources; long-term; ASEAN.

1. Introduction

Economic growth to date has become an important reference in seeing the extent of its economic patterns and the level of public welfare. Because of its importance, countries are competing to increase the value of economic growth with various measures and strategies implemented. For this reason, economic growth is one of the vital indicators which includes the production process, distribution, and consumption of goods and services. All that requires the role of human development, competitiveness, innovation, and the level of happiness that is aligned with the desired goals (Wijaya et al., 2021).

Many countries with low incomes in the world promote economic growth because it is often seen as a success and policy priority. As something that looks important, because the goal is to increase one's happiness (Easterlin, 2013). Those who live in several countries (for example developed countries) see the material is not the only measure of happiness. Even many people who judge that a material (financial wealth and assets) have not fully made their happiness. On the other hand, the need for a sense of happiness sometimes arises from social and environmental aspects (Loke et al., 2014).

Humans who act as actors in development always create their own innovations and creativity. Therefore, economic growth will not be created, if it is not supported by the equitable development of resources. A commitment to spur economic growth is very important involving human development. In enhancing human development, it must be consistent so that economic growth increases, in order to create sustainable integration (Appiah et al., 2019).

In addition, national competitiveness is considered as one of the main factors for developed and developing countries. The government as a policymaker, specifically responds to the importance of the competitiveness of its citizens. Some observers and experts in the field of economics highlight the competitiveness and matters relating to the competitive or non-competitive problems of a country (Lall, 2001; Kordalska & Olczyk, 2015).

Countries that are classified as "developing", such as ASEAN, need encouragement to create good innovation so that human productivity in supporting quality economic growth. This is very much needed, bearing in mind that ASEAN continues to compete with countries that are classified as advanced in terms of natural resource management. For developing countries, it must focus on the application of innovation policies into national strategies, so that it impacts on economic growth (Darma, 2019; Al-Zaroog & Bakir, 2020).

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The contribution in this study is expected to be material for consideration and reference, especially for academics, practitioners, and the government in addressing the problems that have been presented previously. The sharpness of this study focuses on several factors that influence economic growth in ASEAN, where these factors are only limited to happiness, human development, competitiveness, and global innovation. The presentation of the paper is summarized in several strands. The first part is an introduction that describes the theoretical phenomena and empirical findings that are relevant to the objectives of the study. Second, the techniques and study approaches are arranged based on the objectivity of the study. The third section presents the main findings and discusses the empirical results. In the next section, i.e. conclusions and limitations explain the main points of the study as well as becomes a recommendation for related parties and future studies. Contribution through this study can provide added value in the ASEAN region to highlight the dynamics related to economic growth which are not always measured from the monetary and fiscal aspects, but also the role of human resource productivity in response to the demographic bonus.

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2. Theoretical background and hypothesis

In rich, developing and transition countries, it has been proven that with high economic growth, it can increase life satisfaction. Through the acceleration of the rate of economic growth, quality is not necessarily able to increase life satisfaction in the long run. The existence of cultural, social and political differences in each country, at least makes the perception of the value of economic growth very varied. For example, happiness in the United States has increased from year to year and brought great changes to economic growth (Easterlin, 2013).

Indeed, so far there is a fairly strong relationship between GDP per capita and happiness. The importance of GDP growth in raising living standards and creating new jobs will bring happiness closer. However, this is only seen in the aspect of economic development. In fact, there are also indicators of welfare that are not economical (Esmail & Shili, 2018).

Increasing economic growth will provide employment in the long run, so that it will have an impact on per capita income. Indirectly, it will play an important role in community welfare and expand government capacity to improve the quality of human resources through the provision of health, access to health, and infrastructure. In turn, harmony will be created in the future in human development with high productivity (Mukherjee & Chakraborty, 2010).

Several studies have shown that there is a two-way relationship between human development and economic growth. This implies that a country that has good human resource capacity, will form inclusive economic growth, whereas if human development is still low, it does not support economic growth (even tends to be negative). This fact has been addressed by countries that have implemented massive human resource management. In other words, the relationship between these two indicators is like a cycle (Ranis, et al., 2000; Costantini & Salvatore, 2008; Ghosh, 2006).

The main concern in developed and developing countries, especially policymakers are racing to advance national competitiveness and enhance it with various strategies (Rusu & Roman, 2018). Competitiveness has become part of assessing the ability of companies, industries, regions and nations to produce competition at the global level. With relatively high income and sustainable employment, it can generate added value. This needs to be highlighted, that the competitiveness of a country, refers to its economic structure and institutions so that it helps economic growth as a weight at the global level (Hatzichronoglou, 1996; Porter et al., 2000).

Furthermore, innovation is fundamental to economic development. Innovation is needed in competition not only from companies but also from industries and countries. Thus, in achieving high levels of production and distribution (goods and services), innovation is needed (Cheung, 2014).

Both the relationship between innovation and economic growth presents great attention from researchers. Schumpeter described the model of economic growth by looking at the competition through innovation and the importance of educational factors in driving economic growth. The link between innovation and economic growth now refers to developed and developing countries to increase broad markets (Carlin, 1956; Aghion et al., 2005; Pece et al., 2015).

The gap between theoretical insight and practical problematics has raised major concerns. The vital justification for theoretical will, ideally, hopes that economic growth will increase due to the drive for competitiveness, happiness, human development, and global innovation. However, in reality, studies relevant to this concept are inversely proportional to what is happening in developing regions such as ASEAN. Case studies in developed countries, of course, are not comparable to countries that tend to apply "conventional" economic systems based on primary or capital-intensive economic structures, so that it is very different from those who rely more on sectors whose direction is

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in the service sector. Figure 1 concentrates on the extent to which support for economic growth is seen from the sides that have not been highlighted by previous researchers. It is interesting to combine concepts such as happiness, human development, competitiveness, and global innovation together in order to spur economic growth. From here also, it can be identified that these four items are independent variables, while economic growth is demonstrated as the dependent variable. The dependent variable is the group or object that is influenced by the independent variable and the proportion of the independent variable functions to influence the dependent variable (e.g. Flannelly et al., 2014; Wierenga & Bruggen, 1998).

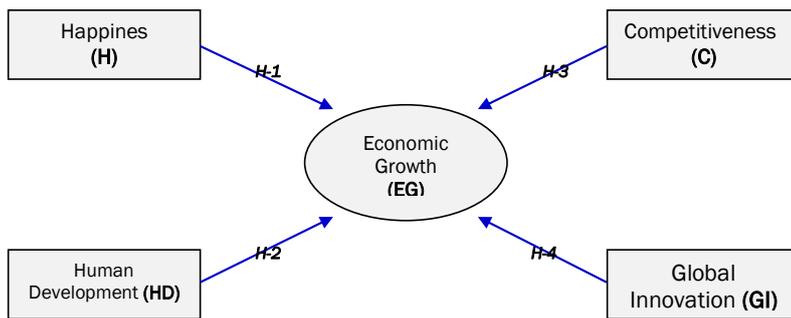


Figure 1: Study framework

From several literature studies and previous studies, we have arranged the following hypothesis:

- Hypothesis-1 (There is a positive and significant relationship between happiness and economic growth).
- Hypothesis-2: (There is a positive and significant relationship between human development and economic growth).
- Hypothesis-3: (There is a positive and significant relationship between competitiveness and economic growth).
- Hypothesis-4: (There is a positive and significant relationship between global innovation and economic growth).

3. Research model

To facilitate understanding of this study, explanations relating to operational variables are needed. Variable definitions need to be specified, so that there is no double interpretation and limit the use of predetermined variables (see Table 1).

Table 1: Component measurements

| Variables (Codes) | Scale | Explanation | Source |
|----------------------|----------------|--|-------------------------------|
| Economic growth (EG) | Percentage (%) | An output that contains the accumulation of production, distribution, and consumption activities in a country in a certain | The Global Economy (GE), 2020 |

| | | period | |
|------------------------|--------------------|---|-------------------------------|
| Happiness (H) | Index (13 – 19) | Living conditions that include dimensions of life satisfaction, dimensions of feelings, and dimensions of the meaning of life of the population | The Global Economy (GE), 2020 |
| Human development (HD) | Index (0 – 1) | Measures for achieving human development are based on many basic components of quality of life | The Global Economy (GE), 2020 |
| Competitiveness (C) | Index (1 – 7) | The ability of countries to provide high levels of prosperity to their population | The Global Economy (GE), 2020 |
| Global innovation (GI) | Index (0 – 100) | An assessment of the country's capacity and success in innovation | The Global Economy (GE), 2020 |

The object of study is the countries that are members of ASEAN (Philippines, Indonesia, Malaysia, Singapore, Thailand, Brunei Darussalam, Vietnam, Laos, Myanmar, and Cambodia). As for the use of panel data-based data, to discuss the relationship between the variables of happiness, human development, competitiveness, and innovation on economic growth from ASEAN. Study data for 7 years (2013-2019).

The reason for using panel data, because studies refer to data that contains observations of time series from some individuals. Therefore, observations in panel data involve at least two dimensions (cross-sectional and time series). As additional information, the superiority of the panel data is that it can compare several study objects, for example between a group or organization, company, region, or country (Hsiao, 2005).

We apply the **multiple linear regression model** to answer the intended purpose. Regression assumptions as analytical tools that match the relationship between one or more to minimize the number of quadratic errors. This model is very suitable because it reveals the difference between the actual and predicted values of the outcome variable (Zdaniuk, 2014). Following are the detailed equations of the variable linear relations:

$$Y_{it} = \alpha + \beta * X_{it} + n + \epsilon_{it} \quad (1)$$

Equation 1 is a basic function in regression, so it needs to be adjusted to the statistical functions below:

$$EG_{it} = \alpha + \beta_1 H_{it} + \beta_2 HD_{it} + \beta_3 C_{it} + \beta_4 GI_{it} + \epsilon_{it} \quad (2)$$

Where: i (observation), t (time), it (number of panel data of 2013-2019), Y (Economic growth), α (constant), $\beta_1, \beta_2, \beta_3, \beta_4$ (coefficient of Happiness, Human development, Competitiveness, and Global innovation), and ϵ (error term).

4. Results and discussion

In statistical calculations, will be assessed from each of these elasticity figures with several tests summarized from highlights regression models, classical assumptions, and display data during the observation period. With the help of the Statistical Product and Service Solution (SPSS) 25, we were able to describe and conclude the study.

Table 2 shows the highest Pearson correlation coefficient number of the variable competitiveness and economic growth is 0.708 (very strong) and close to 1. On the one hand, the relationship between global innovation and economic growth

is characterized by a strong category of 0.583 or the lowest value among others. The probability level for measuring correlation is 0.000 from a standard or condition of 0.05 (5%).

Descriptions of the study models describe 5 variables, innovation with the largest mean calculated at 34.5143 and a standard deviation of 10.78973. For the smallest mean is the human development variable (0.7099) with a standard deviation value of 0.11522. The research sample or observation is 70, which is the number of objects and timeframe (see Table 3).

Table 2: Correlation estimates

| | | EG | H | HD | C | I |
|----|--------------------|------|------|------|------|------|
| EG | Person Correlation | 1 | .583 | .706 | .708 | .402 |
| | Sig. (1-tailed) | | .000 | .000 | .000 | .000 |
| H | Person Correlation | .583 | 1 | .868 | .789 | .870 |
| | Sig. (1-tailed) | .000 | | .000 | .000 | .000 |
| HD | Person Correlation | .706 | .868 | 1 | .923 | .870 |
| | Sig. (1-tailed) | .000 | .000 | | .000 | .000 |
| C | Person Correlation | .708 | .789 | .923 | 1 | .758 |
| | Sig. (1-tailed) | .000 | .000 | .000 | | .000 |
| GI | Person Correlation | .402 | .780 | .870 | .758 | 1 |
| | Sig. (1-tailed) | .000 | .000 | .000 | .000 | |

Source: Own tabulation

Noted: Correlation is sig. at the 0.05 level

Table 3: Statistical distribution

| | Mean | Std. Deviation | N |
|----|---------|----------------|----|
| EG | 5.1927 | 2.45236 | 70 |
| H | 5.3690 | .74705 | 70 |
| HD | .7099 | .11522 | 70 |
| C | 4.5269 | .71627 | 70 |
| GI | 34.5143 | 10.78973 | 70 |

Source: Own tabulation

Based on Table 4, all independent variables have a VIF value under the condition ($n < 10$). That is, the model does not occur in multicollinearity symptoms. The homoscedasticity of the four variables on economic growth has been fulfilled or no heteroscedasticity symptoms occur because the probability is simultaneously smaller than the rule ($n < 0.05$).

Table 4: Classic assumption criteria

| Assumptions | Method | Test Result | Conclusion |
|-------------------|--------------------|-------------|-----------------------|
| Multicollinearity | Variance Inflation | 4.109 (H) | Assumptions fulfilled |

| | | | |
|--------------------|-------------------------|---------------------------------------|---|
| | Factor (VIF) | 5.465 (HD) 7.186 (CI) 4.398 (I) | |
| Heteroscedasticity | Glejser | .000 | Homoscedasticity does not occur |
| Autocorrelation | Durbin-Watson (D-W) | 1.659 | Free from autocorrelation |
| Normality | Kolmogrov-Smirnov (K-S) | .822 (H) | 2 variables are normally distributed and 2 variables are not normally distributed |
| | | .000 (HD) | |
| | | .524 (CI) | |
| | | .000 (I) | |

Source: Own tabulation

The third requirement is the autocorrelation test because this assumption can lead to an unbiased but not efficient **multiple regression** estimate. Regression results found that the magnitude below the provisions ($du < d < 4$) or can be said to have no autocorrelation problems. Finally, from the assumption of normality in the study found that it has a probability below 5%, meaning that the residual data from the variable of human development and global innovation are not normal.

Positive intercepts on economic growth are constant, which means that if all the independent variables in the study period increase, have a positive and significant influence on the economic growth of 20.40%. Of the models used, half have a positive and significant effect on economic growth, namely the variable of human development and global innovation. On one hand, happiness has had a positive effect, but it is not significant and competitiveness variable has a negative effect and is not significant for economic growth. Simultaneously, human happiness, human development, competitiveness and global innovation have had a positive and significant impact on economic growth in ASEAN during 2013-2019. Overall, the results of the coefficient of determination from Table 5 have illustrated that this study is feasible to use, as indicated by the R^2 value of 68.6% and as much as 31.4% is a confounding factor or other variables outside the model.

Table 5: Hypothesis testing on regression

| Models | Coef. | t | Sig. | Conclusion |
|--------------------------------------|--------|--------|------|------------|
| Constant | 20.404 | 13.731 | .000 | Accepted |
| H | .104 | .226 | .822 | Rejected |
| HD | 1.362 | 4.988 | .000 | Accepted |
| C | -.119 | -.640 | .524 | Rejected |
| GI | .849 | 5.829 | .000 | Accepted |
| $R^2 = .686$ | | | | |
| Adj. $R^2 = .667$ | | | | |
| F = 35.584 | | | | |
| Std. Error of the Estimate = 1.41472 | | | | |

Source: Own tabulation

Referring to from year to year, the average index of happiness in ASEAN looks fluctuating. At 2019 was the highest period with 5.49 achievements and the lowest in 2013 was 5.30. Of the 10 countries, Singapore appeared to dominate during the observations, while the happiness index for Myanmar was the smallest (Figure 2).

The higher level of happiness shows a happier life in ASEAN. Conversely, the lower the index value, the more unhappy the population. Empirical findings suggest there is no significant effect, despite the positive relationship of happiness on economic growth. Therefore, the submission of hypothesis-1 has been rejected.

Happiness is a measure that describes welfare because happiness is a reflection of the level of welfare achieved by the population. There are differences in the results of investigations from this study with research Guo & Hu (2011). They found that individual well-being can be predicted and measured, so there is a positive correlation between happiness and economic growth in the USA.

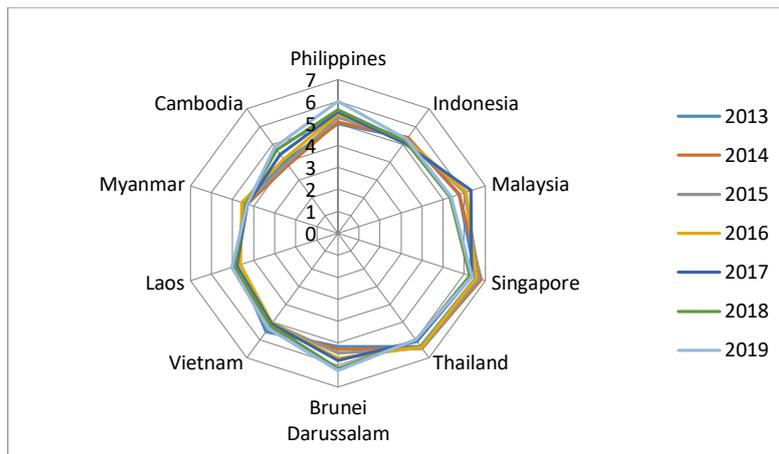


Figure 2: Happiness Index in ASEAN, 2013-2019

Source: GE (2020)

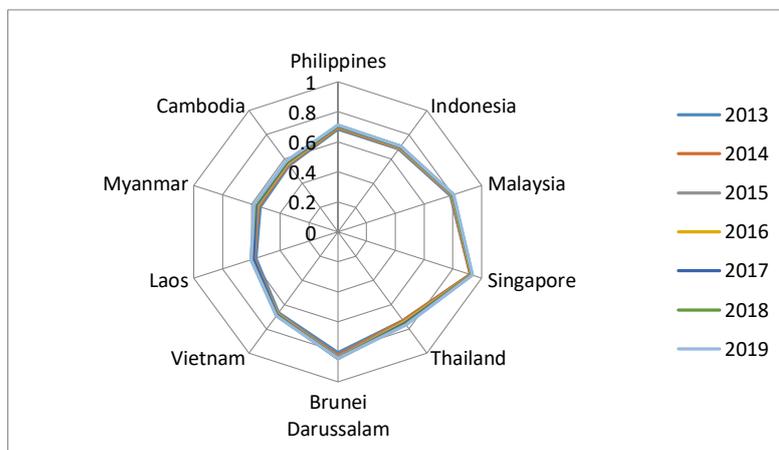


Figure 3: Human Development Index in ASEAN, 2013-2019

Source: GE (2020)

Broadly speaking, the human development index (HDI) in ASEAN has increased in several periods. This can be seen from Figure 3, that the countries in it also increased (albeit slowly). Among the 10 countries, Singapore as the highest winner and behind is Cambodia (1 rank below Myanmar).

Human development as an effort of people to live longer, healthier, and have a good level of welfare. Human development is interpreted as a reflection of their health status, human education and economic capabilities. Hypothesis-2 is in line with the study analysis that more human development increases, it will produce positive and significant economic growth in ASEAN. This empirical relevance is in line with the findings of Suri et al. (2011) who reveal the power of human development plays an important role in determining endogenous economic growth consistently.

There are several reasons why the relationship between competitiveness and economic growth is negative and insignificant, thus rejecting hypothesis-3. This phenomenon is explained by Figure 4 which explains if the competitiveness index (CI) in the ASEAN region does seem to increase, but it is quite consistent and tends to be below the countries that are fairly developed. For the average, for 7 years it is not more than 5, even in some cases the value has been stagnant. For example, in 2013-2014 the competitiveness in ASEAN was 4.37 and in 2018-2019 it also did not increase (did not move from the 4.69 level). As a ranking, Brunei Darussalam is ranked first as the country with the highest competitiveness, while the lowest is Myanmar (10th position).

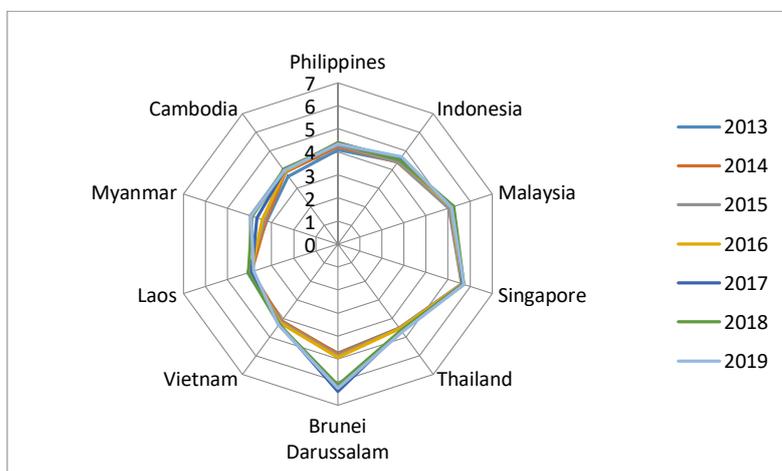


Figure 4: Competitiveness Index in ASEAN, 2013-2019

Source: GE (2020)

Competitiveness is a benchmark to see productivity and determines the long-term growth or income of a country. Previous studies explain there is a positive relationship between competitiveness and economic growth in Iran and selected countries for 2006-2016 (Dadgar et al., 2018).

In line with hypothesis-2, that there is a positive influence of global innovation and economic growth in ASEAN during 2013-2019. In addition, it can be seen from Figure 5 that the global innovation index (GII) for ASEAN, whose slopes are fluctuating, even in 2015-2018 had dropped and returned to increase rapidly for 2019. However, these figures are not a problem if viewed qualities that have a systematic impact on economic growth, so hypothesis-4 can be accepted.

As a comparison, Singapore has shot sharply as the biggest producer of global innovation compared to others in 7 years. Meanwhile, Laos is ranked last in ASEAN, because it has the lowest GII and no more than 24 (which Myanmar holds in 9th position).

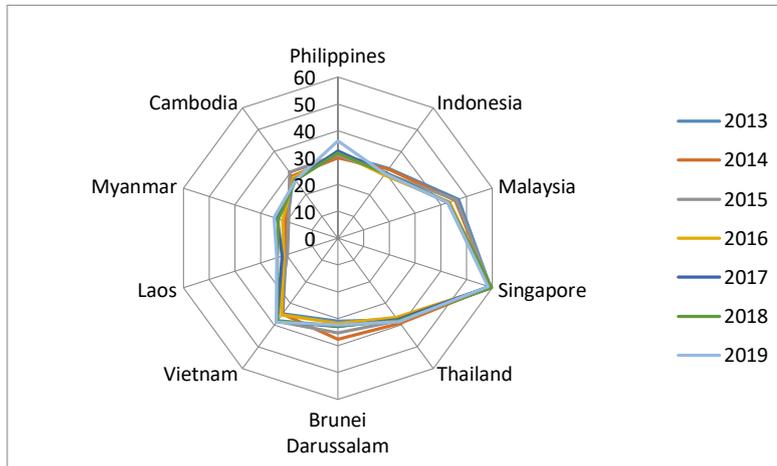


Figure 5: Global Innovation Index in ASEAN, 2013-2019

Source: GE (2020)

Although innovation has been considered as the main driver of economic growth, nothing has been accepted from the general standard used in its measurement, although in the United States, most innovations contribute to and are related to economic growth. Therefore, the study findings are in line with what Zhong (2017) previously investigated.

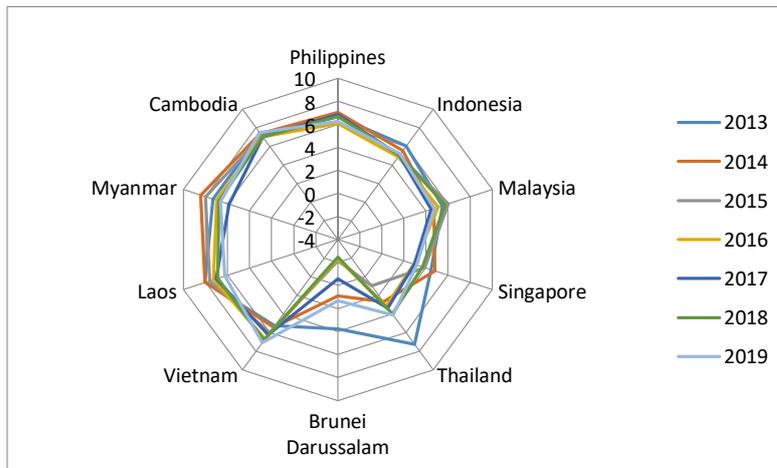


Figure 6: Economic Growth in ASEAN, 2013-2019

Source: GE (2020)

Economic development is absolutely necessary for ASEAN in order to improve the standard of living and welfare of the community through improvements in all fields of activity. Furthermore, to improve welfare, a stable and evenly distributed economic growth is needed.

Economic growth between countries, from Figure 6 seems to have slowed down in 2014-2016, while from 2017-2019 there was an increase in inclusion (although not so big). Overall, GDP growth for ASEAN in 7 years is still relatively low (5.19%). Brunei Darussalam had experienced a recession from negative economic growth and it happened for 4 periods, resulting in accumulation at the ASEAN level in the spotlight. On the other hand, even though there is no consistent country, Laos is the highest growth rate among others.

5. Conclusions

Referring to the empirical findings from observations made at the ASEAN level, we find that from the designed model, half have a positive and significant effect on economic growth. On the other hand, happiness has an insignificant (though positive) impact and competitiveness have a negative and insignificant effect on ASEAN economic growth.

The two-way relationship between human development and global innovation for economic growth needs to be supported by a variety of policies that are very directly in touch with the management of human resources and technology so that they can be sustainable. The competitiveness and level of happiness of the population can be created, if there is even distribution of income through increased productivity. Furthermore, distributed economic growth will shape better human resources and have an impact on quality happiness and competition.

The limitation of our study lies in the time lag, therefore future researchers should consider using a longer period of time. In addition, it is also recommended to add variables so that the results of the analysis are more varied or the number of samples that can be compared between regions (not only ASEAN). The progress of this study can also be extended by the value of complex origins in other developing countries so that there are interesting illustrations from time to time.

Authors' contributions

Comment [MOU5]: •The authors might think about two things as they revise their conclusion
 •First, it would be useful if they could identify some of the practical implications of their findings.
 •Second, the authors can provide insights into the types of research activities that may come next, with an eye on advancing or extending the findings presented in the present manuscript.

Authors are involved in this study, starting from making ideas, composing and writing, processing and analyzing data, to final confirmation, and others. Dr. Saida Zainurossalamia, Dr. Siti Amalia, Dio Caisar Darma, and Dr. Musdalifah Azis has contributed to the maximum. There is no internal grant or external grant from any institution.

Conflict of interest statement

We declare that there is no conflict of interest for this study. We are also very grateful to the Editor of AJSTD for their truly excellent reviews and comments. We dedicate this work entirely to open access.

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Appendix

Table A-1. Happiness Index Data in ASEAN, 2013-2019

| Countries | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------|------|------|------|------|------|------|------|
| Philippines | 4.99 | 5.07 | 5.28 | 5.43 | 5.52 | 5.63 | 6.01 |
| Indonesia | 5.35 | 5.40 | 5.31 | 5.26 | 5.09 | 5.19 | 5.29 |
| Malaysia | 5.76 | 5.77 | 6.01 | 6.08 | 6.32 | 5.34 | 5.38 |
| Singapore | 6.55 | 6.80 | 6.74 | 6.57 | 6.34 | 6.26 | 6.38 |

| | | | | | | | |
|-------------------|------|------|------|------|------|------|------|
| Thailand | 6.37 | 6.46 | 6.47 | 6.42 | 6.07 | 6.01 | 6.00 |
| Brunei Darussalam | 5.16 | 5.29 | 5.44 | 5.68 | 5.78 | 6.14 | 6.25 |
| Vietnam | 5.53 | 5.36 | 5.06 | 5.07 | 5.10 | 5.18 | 5.35 |
| Laos | 4.79 | 4.88 | 4.88 | 4.62 | 4.80 | 4.89 | 5.03 |
| Myanmar | 4.44 | 4.31 | 4.40 | 4.55 | 4.31 | 4.36 | 4.31 |
| Cambodia | 4.07 | 3.82 | 3.91 | 4.17 | 4.43 | 4.70 | 4.85 |
| Average | 5.30 | 5.32 | 5.35 | 5.39 | 5.38 | 5.37 | 5.49 |

Source: GE (2020)

Table A-2. Data on the Human Development Index in ASEAN, 2013-2019

| Countries | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|
| Philippines | 0.684 | 0.692 | 0.697 | 0.702 | 0.704 | 0.709 | 0.712 |
| Indonesia | 0.682 | 0.688 | 0.691 | 0.696 | 0.700 | 0.704 | 0.707 |
| Malaysia | 0.782 | 0.787 | 0.792 | 0.797 | 0.801 | 0.802 | 0.804 |
| Singapore | 0.920 | 0.923 | 0.928 | 0.929 | 0.933 | 0.934 | 0.935 |
| Thailand | 0.733 | 0.731 | 0.739 | 0.746 | 0.753 | 0.762 | 0.765 |
| Brunei Darussalam | 0.805 | 0.824 | 0.832 | 0.843 | 0.844 | 0.843 | 0.845 |
| Vietnam | 0.668 | 0.673 | 0.675 | 0.680 | 0.685 | 0.690 | 0.693 |
| Laos | 0.569 | 0.579 | 0.586 | 0.594 | 0.589 | 0.602 | 0.604 |
| Myanmar | 0.541 | 0.551 | 0.558 | 0.565 | 0.571 | 0.577 | 0.584 |
| Cambodia | 0.548 | 0.555 | 0.561 | 0.566 | 0.572 | 0.578 | 0.581 |
| Average | 0.693 | 0.700 | 0.706 | 0.712 | 0.715 | 0.720 | 0.723 |

Source: GE (2020)

Table A-3. Competitiveness Data in ASEAN, 2013-2019

| Countries | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------|------|------|------|------|------|------|------|
| Philippines | 4.08 | 4.23 | 4.29 | 4.40 | 4.39 | 4.36 | 4.35 |
| Indonesia | 4.43 | 4.38 | 4.40 | 4.53 | 4.57 | 4.52 | 4.68 |
| Malaysia | 5.08 | 5.06 | 5.03 | 5.16 | 5.23 | 5.26 | 5.17 |
| Singapore | 5.63 | 5.67 | 5.61 | 5.65 | 5.68 | 5.72 | 5.71 |
| Thailand | 4.51 | 4.52 | 4.52 | 4.54 | 4.66 | 4.64 | 4.72 |
| Brunei Darussalam | 4.75 | 4.77 | 4.87 | 4.94 | 6.42 | 6.14 | 6.27 |
| Vietnam | 4.24 | 4.11 | 4.18 | 4.23 | 4.30 | 4.31 | 4.36 |
| Laos | 4.08 | 3.91 | 4.00 | 3.93 | 3.91 | 4.05 | 3.82 |
| Myanmar | 3.23 | 3.24 | 3.32 | 3.41 | 3.67 | 3.88 | 3.93 |

| | | | | | | | |
|----------|------|------|------|------|------|------|------|
| Cambodia | 3.63 | 3.85 | 4.01 | 3.89 | 3.94 | 3.98 | 3.93 |
| Average | 4.37 | 4.37 | 4.42 | 4.47 | 4.68 | 4.69 | 4.69 |

Source: GE (2020)

Table A-4. Data on the Global Innovation Index in ASEAN, 2013-2019

| Countries | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|
| Philippines | 31.2 | 29.9 | 31.1 | 31.8 | 32.5 | 31.6 | 36.2 |
| Indonesia | 32.0 | 31.8 | 29.8 | 29.1 | 30.1 | 29.8 | 29.7 |
| Malaysia | 46.9 | 45.6 | 46.0 | 43.3 | 42.7 | 43.0 | 42.7 |
| Singapore | 59.4 | 59.2 | 59.4 | 59.2 | 58.7 | 59.8 | 58.4 |
| Thailand | 37.6 | 39.3 | 38.1 | 36.5 | 37.6 | 38.0 | 38.6 |
| Brunei Darussalam | 30.9 | 37.7 | 35.3 | 31.7 | 32.9 | 32.8 | 32.3 |
| Vietnam | 34.8 | 34.9 | 38.3 | 35.4 | 38.3 | 37.9 | 38.8 |
| Laos | 20.2 | 20.7 | 19.6 | 20.9 | 21.6 | 23.4 | 23.7 |
| Myanmar | 19.6 | 20.3 | 19.2 | 21.5 | 23.4 | 23.1 | 24.8 |
| Cambodia | 28.1 | 28.7 | 30.4 | 27.9 | 27.0 | 26.7 | 26.6 |
| Average | 34.07 | 34.81 | 34.72 | 33.73 | 34.48 | 34.61 | 35.18 |

Source: GE (2020)

Table A-5. Data on Economic Growth in ASEAN, 2013-2019

| Countries | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------|------|------|-------|-------|-------|-------|------|
| Philippines | 6.68 | 7.06 | 6.15 | 6.07 | 6.88 | 6.68 | 6.24 |
| Indonesia | 6.03 | 5.56 | 5.01 | 4.88 | 5.03 | 5.07 | 5.17 |
| Malaysia | 5.47 | 4.69 | 6.01 | 5.09 | 4.45 | 5.74 | 4.74 |
| Singapore | 4.45 | 4.82 | 3.90 | 2.89 | 2.96 | 3.70 | 3.14 |
| Thailand | 7.24 | 2.69 | 0.98 | 3.13 | 3.36 | 4.02 | 4.13 |
| Brunei Darussalam | 3.75 | 0.91 | -2.13 | -2.35 | -0.57 | -2.47 | 1.33 |
| Vietnam | 5.25 | 5.42 | 5.98 | 6.68 | 6.21 | 6.81 | 7.08 |
| Laos | 8.03 | 8.03 | 7.61 | 7.27 | 7.02 | 6.89 | 6.25 |
| Myanmar | 7.33 | 8.43 | 7.99 | 6.99 | 5.86 | 6.76 | 6.62 |
| Cambodia | 7.31 | 7.36 | 7.14 | 7.04 | 7.03 | 7.02 | 7.50 |
| Average | 6.15 | 5.50 | 4.86 | 4.77 | 4.82 | 5.02 | 5.22 |

Source: GE (2020)