

Original Article

E-Commerce Effect on Economic Growth in Asean Countries

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Received Date: 10 January 2021

Revised Date: 18 February 2021

Accepted date: 21 February 2021

Abstract - This study aims to analyze the effect of e-commerce on economic growth in ASEAN countries in 2015-2019. The analysis method uses panel data with the Fixed Random Effect (FEM) approach. The results of this study indicate that the value of e-commerce transactions, investment in the ICT sector (Technology, Information, and Communication), and the labor of e-commerce businesses partially or collectively have a positive and significant effect on economic growth in ASEAN countries.

Keywords - Economic Growth, E-Commerce, Investment, Labor, Fixed Random Effect.

I. INTRODUCTION

Inclusive and sustainable economic growth is the goal of all countries. Inclusive and sustainable economic growth is growth characterized by an increase in output, reduction in poverty, reduction in inequality in income distribution, and the absorption of more labor (Purohit, 2005). Economic growth is a long-term problem and the ultimate goal of all economic activities in various sectors. The accumulation of output from various economic sectors is a reflection of economic growth that will be compared with the accumulation of the previous period. Economic growth shows changes that are quantitative in nature (quantitative change) and are usually measured using the Gross Domestic Product (GDP) or the final market value (total market value) of the final goods and services produced (Kurniawan and Hayati, 2015).

The countries that are members of the ASEAN (Association of Southeast Asian Nations) also have the same economic goal, namely inclusive and sustainable economic growth. One of the objectives of establishing ASEAN is the formation of economic integration and improvement of regional competitiveness between countries. ASEAN consists of ten countries, namely Indonesia, Brunei Darussalam, Laos, Malaysia, Singapore, Philippines, Vietnam, Myanmar, Thailand, and Cambodia. The following is an illustration of the GDP development of ASEAN countries from 2018 to 2019 based on the ASEAN Integration Report (2019):

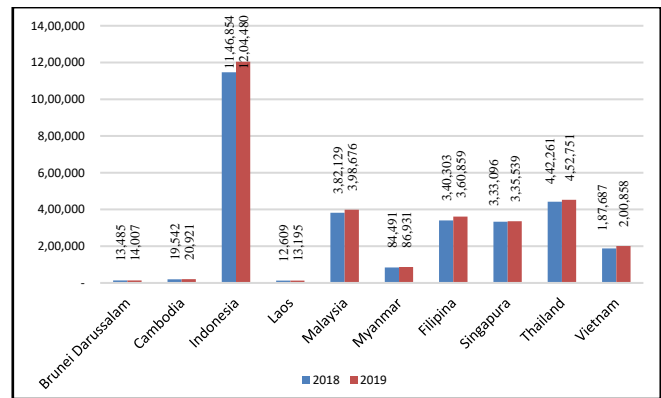


Fig. 1 GDP Progress of ASEAN Countries 2018 - 2019 (million USD)

Based on the picture above, Indonesia is the country that has the largest GDP with a value of 1,204,480 million USD or around 34.9% of the total ASEAN GDP in 2019, and Laos has the smallest GDP value among ASEAN countries with a value of 13,195 million USD of total GDP ASEAN in 2019.

Based on the theory of endogenous growth put forward by Paul Romer, the factors that influence a country's economic growth are capital, labor, and technological progress. The most influential technological development and invention for humans and the economic sector today is the internet. The internet (international network) is a large computer network, where the network is formed from small networks that are connected to each other (Yasmeen and Tufail, 2015). The internet has become a new reality in the development of a digital economy. The government, business people, and individuals are juxtaposing all their activities by using the internet as a step to increase output to a new level (Box, Sarah, And Gonzalez, 2017).

E-commerce is a platform that has tremendous potential in contributing to economic growth by providing a new and much broader environment or interaction to reach the most distant markets. E-commerce is considered a new engine for driving economic growth because it can increase production productivity, expand market share, and improve efficiency (Kinda, 2019). E-commerce can occur between businesses,



such as producers and wholesalers (business to business or B2B), or between businesses and consumers (business to consume or B2C).

ASEAN countries are becoming emerging markets, especially for companies engaged in digital and e-commerce (Yasmeen and Tufail, 2015). IFLIX (Malaysia, Internet TV provider), Tokopedia (Indonesia, trading platform), and Sea.Ltd (Singapore, gaming platform) are a few examples of e-commerce in ASEAN countries. The following is the development of ASEAN e-commerce which is represented by the value of e-commerce transactions of each country in ASEAN:

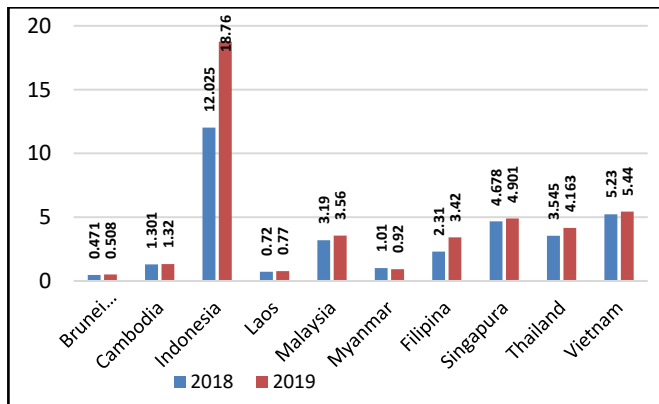


Fig. 2 Progress of ASEAN E-Commerce Transaction Value 2018-2019

In 2019, Indonesia had the highest e-commerce transaction value among ASEAN countries with a value of 18.76 billion USD or 1% of the total ASEAN GDP. Online shopping platforms still contribute significantly to transaction value in Indonesia, including Tokopedia, Shopee, and Bukalapak. The three e-commerce sites are the top platforms for the online shopping segment in Indonesia (Dianari, 2018).

Elseoud (2014) states that there is a positive and significant relationship between the value of business transactions via the internet and economic growth in Saudi Arabia. Other research states that the value of e-commerce transactions and economic growth has a positive and significant relationship in the short and long term in China (Qu and Chen, 2014). Qu and Chen explained that e-commerce is a platform that can reach a wider market, increase trade volume, especially MSME products, and provide a multiplier effect for other fields related to the digital economy. The development of e-commerce in China does not take long to affect economic growth because China has formed a digital ecosystem that is indeed prepared to convert the conventional economy to the digital economy. The problem in the two studies above relates to research locations that have different cultures towards the adaptation of digital economy implementation.

Investment decisions made by investors are influenced by considerations of future potential for profit. Investments in ICT infrastructure are the initial foundation for realizing the digital economy in ASEAN countries. Investments in the ICT sector have a positive impact on economic growth because they can accelerate the development of supporting technology in various sectors such as the financial services sector, business services, and distribution, and others (Kamel et al., 2009). Investment in ICT infrastructure is an important factor to drive productivity and growth of e-commerce in particular and the global economy in general with various implications in developed and developing countries (Kamel et al., 2014). The investment is in the form of improving the quality and infrastructure of ICT services, such as the addition of internet networks, optical cables, and provision of hardware and software.

In research conducted by Jorgensen, Ho, and Samuels (2005) in America, Okugun, Awoleye, and Siyanbola (2012) in Nigeria found that investment in the ICT sector is an important determinant of increasing economic productivity and efficiency, as well as increasing the rate of economic growth. The development of e-commerce leads to an increase in the volume of investment in the ICT sector which in turn leads to increased productivity and economic growth. A different thing is shown in research conducted by Kwan (2017). The results of his research found that investment in logistics and supporting infrastructure such as acceleration of transportation routes is a major determinant in the relationship between e-commerce and economic growth in ASEAN. According to him, the multiplier effect of e-commerce transactions will focus more on the warehousing and logistics business industry; therefore, more investment is needed in these fields to support the development of e-commerce in ASEAN.

Labor is one of the important components of production input. In this study, the workforce will be represented by the e-commerce business workforce. According to Americo and Veronico (2018), the e-commerce business workforce is any individual who works in technology-based and electronic economic enterprises and every individual or group that has technology-based and electronic economic enterprises. Based on the 2020 report from the ILO (International Labor Organization) that Singapore ranks first as a country with an e-commerce business workforce with a ratio of 20.1. Meanwhile, the country with the lowest e-commerce workforce ratio was Cambodia, with a ratio of 2.1.

Research conducted by Elseoud (2014) found that the ratio of labor to the population has a positive and significant relationship to economic growth in Saudi Arabia. Americo and Veronico (2018) also found that the e-commerce business workforce has a positive and significant relationship to economic growth in Torino. The E-commerce business workforce has an important role in contributing to increased

economic growth as an input to a business that is considered a new engine in the economy. In his research, he states that an increase in the workforce in e-commerce businesses will have a positive impact on business productivity with various kinds of technology-based innovations to reduce input but produce large output.

E-commerce is one form of representation of economic digitization that has most successfully formed a multiplier effect. The previous explanation has discussed that e-commerce is considered as one of the new engines that drive the economy based on research conducted by Kinda (2019). ASEAN is the fastest and most significant country for online market development, including e-commerce with more than 350 million internet users and a market share of US \$ 72 million billion dollars in 2018 (Chen, 2017). Based on this research, ASEAN is the most dynamic region in the development of e-commerce after China and India.

This research was conducted to analyze the value of e-commerce transactions, investment in ICT, and e-commerce business workforce on economic growth in ASEAN countries in 2015-2019. Qu and Chen (2014) use e-commerce transaction value as an independent variable, Jorgensen and Stiroh (2005) use ICT investment as an independent variable, and Americo and Veronico (2018) use e-commerce business workforce as an independent variable on economic growth. In Torino. If some of the previous research results are linked, ASEAN countries have the potential to have new sources in shaping economic growth through e-commerce. Therefore this study will discuss the effect of e-commerce on economic growth in ASEAN countries.

II. RESEARCH METHODOLOGY

This research is a descriptive quantitative study, and the data used are secondary data. Secondary data is data that has been processed and published by institutions related to this research topic. The data used in this study is panel data with a combination of time series data for the 2015-2019 period and cross-section data of 10 ASEAN countries. This study identified 10 ASEAN countries, namely Indonesia, Vietnam, Myanmar, Brunei Darussalam, Cambodia, Laos, Malaysia, Singapore, Thailand, and the Philippines. The type of data used in this study is panel data obtained from the World Bank, ASEAN.org, and the International Labor Organization (ILO) published on the official website.

The model used in this study is the Mankiw, Romer, & Weil (1992) Growth Model which has been modified to determine the effect of the value of e-commerce transactions, ICT investment, and e-commerce business workforce on economic growth:

$$PE_{it} = \beta_0 + \beta_1 ECOM_{it} + \beta_2 INV_{it} + \beta_3 TK_{it} + \varepsilon_{it}$$

PBE_{it} = Economic Growth (%)
 $\beta_0, \beta_1, \beta_3$ = Constant
 $ECOM_{it}$ = E-commerce Transaction Value (%)

INV_{it} = ICT Investment (%)
 TK_{it} = E-Commerce Business Workforce (%)
 ε_{it} = error term
 i = sector unit
 t = sector time

A. Selection of Best Method for Panel Data Regression

Panel data model analysis is known as three approaches which consist of Common Effect, Fixed Effect, and Random Effects. Furthermore, three stages of testing will be carried out, namely the Chow Test, Hausman Test, and the LM test, to determine the method used.

B. Classic Assumption Test

a) Normality test

A normality test is carried out to see whether the independent and dependent variables have a normal distribution or not in the regression model. Residuals are stated to be normally distributed if Jarque Bera > chi-squares, and / or probability (p-value) > $\alpha = 5\%$ (Gujarati, 2012).

b) Multicollinearity Test

The multicollinearity test detects whether the data in the regression model used has a relationship between independent variables. The multicollinearity test can be carried out with Auxiliary regression by comparing the partial determination coefficient (r^2) with the multiple determination coefficient (R^2). If $R^2 < r^2$, then the model has a multicollinearity problem, and if $R^2 > r^2$, then the model is free from multicollinearity problems.

c) Heteroscedasticity Test

The heteroscedasticity test detects a problem with the unstable homoscedasticity assumption. The regression results will show misleading if the regression model has heteroscedasticity problems (Gujarati, 2012). A heteroscedasticity test is done by comparing Obs * R-Squared with χ^2 (Chi-Square) table. If the value of Obs * R-Squared is greater than χ^2 table, it is concluded that there is no heteroscedasticity in the model.

d) Autocorrelation Test

The autocorrelation test can detect whether there is a relationship between residuals in the regression model by using the Breusch-Godfrey Serial correlation LM Test by comparing the Obs * R Square value with the Chi-square value. (Gujarati, 2012)

C. Statistical Hypothesis Testing

a) The T-test (Partially)

T-test was conducted to detect the partial influence of the independent variable on the dependent variable at the significant level $\alpha = 5$ percent *ceteris paribus*. In this case, the value between t-count and t-table will be compared with the testing criteria if t table < t statistic, then H_0 is rejected. H_a is accepted. This means that partially the dependent variable

regression coefficient has a significant effect on the dependent variable and vice versa.

b) F Test Statistics

The essence of the statistical F test is to determine the effect of all independent variables on the dependent variable together. The test criteria if F table <F statistic, then H₀ is rejected H_a accepted. This means that the regression coefficient of the independent variables together has a significant effect on the independent variable and vice versa.

c) Coefficient of Determination (R²)

The coefficient of determination test sees how much influence the independent variable has on the dependent variable used in the study. If the value of R² is close to 1, then the independent variable used is able to properly explain the variation of the dependent variable.

III. RESULTS

A. Classic Assumption Testing

a) Normality Test

The results of the probability test for normality of 0.559521 are greater than $\alpha = 5\%$ (0.05); it can be concluded that the data is normally distributed.

b) Multicollinearity Test

Tabel 1. Multicollinearity Test Results

	ECOM	INV	TK
ECOM	1,000000	0,444981	0,356795
INV	0,444981	1,000000	0,581309
TK	0,356795	0,581309	1,000000

From the multicollinearity test, it was found that there were no variables that had an r² value greater than R² or 0,96. Therefore, it can be concluded that the variables used do not have multicollinearity, or in other words, there is no linear relationship between the independent variables.

c) Heteroscedasticity Test

Tabel 2. Heteroscedasticity Test Results

Variable	Prob.	Conclusion
ECOM	0.1269	Accept H ₀
INV	0.6906	Accept H ₀
TK	0.7001	Accept H ₀

Table 2 shows that all independent variables have a probability value greater than the value of $\alpha = 0,05$. This means accepting H₀ and rejecting H_a; it can be concluded that in this study, there is no heteroscedasticity problem in the equation.

d) Autocorrelation Test

From the test results, the Durbin-Watson stat value is 1.649380, while for the DL = 1.4206 and DU = 1.6739 (n = 50, k = 3 with $\alpha = 5\%$). So that it can be written (4-DW) > DU <DW or 2.35062 > 1.6739 <1.649380, it can be concluded that there is no autocorrelation problem.

B. Statistical Hypothesis Testing

a) Partial T-Test

In this study, the t-test was carried out at a 95 percent confidence level ($\alpha = 0.05$) with an n-k-1 degree of freedom (n = number of observations, k = number of independent variables) or df of 46.

Tabel 3. T-Test Result

Variabel	t-Statistic	t-Tabel	Prob.	Information
ECOM	4.283430	2,01290	0.0001	Reject H ₀
INV	4.099060	2,01290	0.0002	Reject H ₀
TK	2.077164	2,01290	0.0448	Reject H ₀

T-test results show that the value of e-commerce transactions, investment in ICT, and e-commerce business workforce partially has a positive and significant effect on economic growth in ASEAN.

b) F-Test Statistics

Based on the calculation results, the f-statistic value is 80.20128, and the f-table value is 2.81. It can be seen that the f-statistic value is greater than the f-table, so Ho is rejected, and Ha is accepted, which means that the value of e-commerce transactions, investment in ICT, and e-commerce business workforce together have an effect on economic growth.

c) Detemination Coefficient (R²)

The coefficient of determination is 0.962978 or 96.29%. This shows that the value of e-commerce transactions, investment in ICT, and e-commerce business workforce is able to explain variations in economic growth with actual data of 96.29%, and the remaining 3.71% are factors not included in the study.

IV. CONCLUSION AND SUGGESTION

The results showed that the value of e-commerce transactions, investment in ICT, and e-commerce business workforce partially at the α level (5%) had a positive and significant effect on economic growth in ASEAN countries in 2015-2019.

A. Suggestion

Provision and improvement of the main infrastructure, namely the internet, should be a concern for countries that have e-commerce development below the average. Equity and increased network quality has been shown to have an effect on increasing the use of e-commerce and will have implications for increasing economic growth. After a good network is formed, it is necessary to adopt methods that are carried out by countries that have significant e-commerce development, such as Singapore, which provides a massive integration program between economic actors and e-commerce platforms (Supply Chain Asia, 2018). The implementation of e-commerce must be accompanied by an increase in the quantity and quality of infrastructure as a

foundation for shaping the digital economy. Equity and expansion of the internet network will increase the probability of using e-commerce as a new market. Governments in ASEAN countries must pay attention to and form a strategy to open up new climate-related investment in the field of ICT (Technology, Information, and Communication). Improving the quality of technology-based infrastructure can be carried out to increase the positive multiplier effect related to the economic sector. The readiness of human resources related to technological developments needs to be prepared as one of the technology-based production inputs to increase productivity.

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