

# The Effect of Telecommunication Infrastructure on Economic Growth in the Six ASEAN Countries

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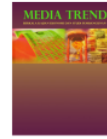
**Submission date:** 16-Dec-2022 06:14AM (UTC+0800)

**Submission ID:** 1982345600

**File name:** 43\_2022\_media\_trend\_effect\_of\_telcom\_infras.pdf (1.08M)

**Word count:** 5285

**Character count:** 29330



## The Effect of Telecommunication Infrastructure on Economic Growth in the Six ASEAN Countries

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### Article Information

Article of History:  
Received February 2022  
Approved April 2022  
Published April 2022

### ABSTRACT

Information and Communication Technology (ICT) as a facilitator of information between the government and the public by increasing network access and broadband services. Digital technology in ASEAN is worth up to US\$625 billion by 2030 (8 percent of ASEAN's annual GDP), which can be derived from increased efficiency, new products and services, etc. According to the World Bank (2015), the use of digital technology contributes to economic growth. This study aims to analyze the effect of Individual Internet Users Percentage, Mobile Cellular Subscriptions (Per 100 Persons), Fixed Broadband Subscriptions (Per 100 Persons), Government Expenditures and Labor on GDP Per Capita in six ASEAN Countries in 2011-2019. The type of data used in this research is secondary data from the World Bank which is processed by panel data regression method.

**Keywords:** Percentage of Individual Internet Users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), Government Expenditure and Labor, panel data regression.

**JEL Classification Code:** L96, L98, J21



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DOI: <http://dx.doi.org/10.21107/mediatrend.v17i1.13640>  
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**INTRODUCTION**

The development of technology in the last decade has undergone very rapid changes. With the development of Information and Communication Technology (ICT) has changed a person in facilitating work, business, and communication around the world. Technology offers new innovations such as the use of mobile phones and internet networks (Myovella et al., 2020). Digital innovation is in the process of transforming almost every sector of the economy by introducing new business models, new products, new services, and ultimately new ways to create value and jobs. (World Bank, 2019).

Technological transformation greatly impacts the economy, both in production, distribution, and consumption. The community has been facilitated by technological innovation to consume an item or service online. With technology in the consumption process in society, producers must use technology to produce and distribute goods or services. Likewise, there is a shift in the way of transacting cash to non-cash, this is due to the use of smartphones and the internet in everyday life.

ASEAN countries have the potential to create very rapid and fast digital economic growth. This is because

the population is very large. The increase in internet access via cellphones and startups in the digital economy is also increasingly in demand by people in ASEAN. Based on the Google & TEMASEK report (2018), the driving factors for the increasingly digital economy in ASEAN are the presence of active internet users and industries such as e-commerce, online media, online travel, and ride-hailing, which are growing from previous years. The value of the ASEAN 6 digital economy contributed 1.3% to GDP in 2015 and grew to 2.8% to GDP in 2018. And will reach 8% of GDP in 2025.

Based on the ASEAN Connectivity Master Plan (MPAC) 2025 in ASEAN (2016) digital technology in ASEAN has the potential to be worth up to US\$625 billion by 2030 (8 percent of annual ASEAN GDP), which could come from efficiency improvements, new products, and services, etc. Information and Communication Technology (ICT) is a facilitator of information between the government and the public by increasing network access and broadband services. Technology also has a major impact on the way governments operate and interact with their citizens, opening the door to increased transparency and more efficient service delivery (World Bank, 2019). The following are ASEAN countries that have adopted the Broadband Plan:

**Table 1  
ASEAN Countries Adopting Broadband Plan**

Negara ASEAN	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	√	√	√	√	√	√	√	√	√
Malaysia	√	√	√	√	√	√	√	√	√
Singapura	√	√	√	√	√	√	√	√	√
Thailand	√	√	√	√	√	√	√	√	√
Brunei Darussalam	√	√	√	√	√	√	√	√	√
Filipina	√	√	√	√	√	√	√	√	√
Laos	x	x	x	x	x	x	x	x	x
Kamboja	x	x	x	x	x	x	x	x	x
Vietnam	√	√	√	x	x	x	x	√	√
Myanmar	x	x	x	x	x	x	x	x	x

Source: ITU (2020)

Table 1 explains that not all ASEAN countries have adopted the Broadband Plan. Only six countries have consistently implemented the Broadband Plan, namely Indonesia, Malaysia, Singapore, Thailand, Brunei Darussalam, and the Philippines. Meanwhile, Laos, Cambodia, and Myanmar do not implement the Broadband Plan. And Vietnam has not consistently implemented it. According to the 2017 Telephony Sectors Competition Index, Singapore and Malaysia have good mobile telephone services. The Philippines, Cambodia, Thailand, Indonesia, Vietnam, and Brunei Darussalam have mobile telephone services in a fairly good category. Meanwhile, Myanmar and Laos have poor mobile telephone services (World Bank, 2018).

Individual internet users experience different conditions in the six ASEAN countries from 2011-to 2019. Several countries experienced an increase in internet users such as Indonesia, Singapore, Thailand, and Brunei Darussalam from 2011 to 2019. Meanwhile, the Philippines in 2014 amounted to 49.6% and experienced a significant decline of 36% in 2015. Malaysia experienced a drastic decline in internet user penetration. in 2012 by 65.8% to 57.06% in 2013. The high use of mobile phones and internet services in ASEAN countries is due to

online shopping, social media, music, and video streaming subscriptions to food orders by startup companies (Gojek and Grab).<sup>20</sup>

Economic growth is an important indicator in assessing a country's economic performance. According to the traditional neoclassical growth theory, output growth always comes from one or more of three factors, namely an increase in the quality and quantity of labor, additional capital (savings and investment), and technological improvements (Todaro and Smith, 2008). Every developing country wants development in all fields and is expected to achieve high economic growth so that people can live in prosperity, justice, and prosperity. Telecommunication investment has the potential to increase productivity and economic growth.

Economic growth in the six ASEAN countries fluctuated. Thailand's economic growth in 2011 was 0.84%, Brunei Darussalam also experienced a decline in 2011 by 3.75% until 2014 by -2.51%. According to Bank Indonesia (2016), Indonesia's economic growth has stagnated due to slowing growth in household consumption and the manufacturing sector. Economic growth in six ASEAN countries decreased in 2019 due to the COVID-19 pandemic (SDGs, 2020).

**Table 2**  
**Grouping of Six ASEAN Countries based on Internet User Level and Country Income Classification**

Classification	Group 1	Group 2	Group 3
Percentage of Internet Users	Singapura, Malaysia, Brunei Darussalam	Thailand, Filipina	Indonesia
Country income (GDP Per Capita)	Singapura (High Income) Malaysia (Upper-middle) Brunei D. (High Income)	Thailand (Upper-middle) Filipina (Lower-middle)	Indonesia (Lower-middle)

Source: Internet Society (2015)

Table 2 illustrates that the classification of GDP Per Capita grouping is based on the World Bank's definition and the percentage grouping of internet users based on the Internet Society in six ASEAN countries. Internet penetration rates are divided into three groups. In the first group, countries where more than 60% of the population has access to the internet, countries included in this classification are Singapore (73%), Malaysia (67%), and Brunei (65%). In the second group, countries with 25-60% internet penetration, countries included in this category are the Philippines (37%) and Thailand (29%). In the third group, countries with internet penetration of less than 25%, countries included in this classification are Indonesia (16%).

Solow (1956) argues that labor productivity grows continuously and exogenously. An increase in the capital stock (assumed to be homogeneous over time) will result in a continuous expansion in the level of output and consumption. If there is a change in labor productivity, it will explicitly create improvements in technology (Shell, 1967 and 1973). Government spending is a policy carried out by the government to improve the welfare of the community and increase economic growth. The infrastructure sector is the most important sector of government spending that can improve people's welfare so that it can affect the economic growth of a country (Ladung, 2018).

Based on this background, this is the basis for researchers to look at the influence of telecommunications infrastructure on economic growth in six ASEAN countries from 2011 – to 2019. This research is built on the theory and previous empirical studies of telecommunications infrastructure on economic growth in various countries in the world. The research is expected to be useful as a reference in the priority policies of ASEAN telecommunication infrastructure development.

Neo-Classical growth theory is a modern theory of economic growth, this theory emphasizes the importance of investment formation in economic growth. Economic growth is influenced by capital accumulation, population growth, and technological developments. The Solow model is derived from developing the Harrod - Domar model by adding labor and technology factors into the growth equation. Growth is explained by exogenous changes such as population growth and technological progress. "According to Solow, only technological progress can explain the continued increase in living standards" (Mankiw, 2003). Labor and the model are assumed to experience diminishing returns if they are analyzed separately and constant returns to scale if they are analyzed together (Todaro & Smith, 2006). Capital accumulation is the main source of economic growth (Mankiw, 2006).

The two main factors of production are capital and labor. Capital can be defined as a set of tools used by workers. And labor can be interpreted as the amount of time used to work. While the production function is the technology used as a determinant of the number of goods and services produced by a number of workers and based on the availability of capital. With the same input, more efficient technology can increase the amount of output. Neo-Classical growth theory is generally based on the production function.

Where Capital (K) is defined as physical input in the long term, for example, buildings, machinery, equipment, and others. Manpower (L) includes the number of workers, the amount of time worked, physical strength, skills, and health of workers in the production process. In this model technology variables can affect all inputs. So with the improvement of technology, it will be able to increase the output that comes from all inputs. In general calculations, economic growth can

be interpreted as GDP growth and can be used as a benchmark for government performance. The above equation aims to show the factors of production which include the growth of the capital stock, labor force, and technological progress as proxied by the internet network that interacts with each other in an economy, besides seeing how it influences the output of goods and services of a country as a whole (Mankiw, 2003).

According to the Solow Neutral approach, technological improvement will lead to workforce effectiveness by improving the quality of the workforce. In the Neo-Classical growth model, Mankiw, G., Romer, D., & Weil, (1992) stated that technology not only implies labor augmenting progress but also natural resources, institutions, climate, and others that have different values in society. between countries. The type of technological development through labor augmenting progress and neutral can be relaxed through an increase in capital which has an impact on increasing technology and output (capital augmenting progress) (Lall, 2007).

The higher the investment, the better the economy of a country will be. A country's economic growth can be said to be successful if national income also increases (Nanga, 2001). The factors of production and the production function together determine the number of goods and services supplied, which is equal to the economy's output. Where the supply of capital, labor, and technology is constant, the output is also constant.

In theory, the use of digital technology contributes to economic growth (World Bank, 2015). Strong telecommunications investment has an important role and creates externalities for a country's economic growth. Improved communication skills will also increase the company's ability and intensity of information in productive activities. Modern

telecommunications infrastructure is very important for the transformation of a highly competitive economy, such as cellular telephones as a form of simplification of wired telephones that become an easy means of communication and reach a wider communication network. The use of telecommunications infrastructure can support all sectors of economic activity.

The Internet can increase economic growth because the Internet can disseminate information, stimulate innovation, build networks, grow businesses, deepen capital, increase the workforce, strengthen market competition, and help companies to take advantage of emerging markets so that they can help fight economic crises (Chu, 2013). The function of cell phones for a country's economy is to increase market efficiency. While ICT Broadband is a vital engine that drives economic growth. Broadband technology enables fast and efficient communication technology in various countries essential to success in the world economy. Broadband technology and services are among the highest-value, fastest-growing high-tech products in international trade, generating new skills and sustaining revenue growth. According to Barro (1990), expenditures used for investment and productive activities including state-owned production must make a positive contribution to economic growth. According to Todaro (2000), population growth and labor force growth have traditionally had a positive impact on economic growth.

Some literature says that Jorgenson & Vu (2010) get the results that the very high GDP growth rate comes from the dynamic growth of total factors of production between 2000-2004 in Eastern Europe. TFP's contribution to GDP growth is estimated at 5.2%. This value is the largest and cannot be reached by other countries in the world, even Asia is only 2.64%. The contribution of capital and labor growth to GDP increased substantially (to

1.1% ppa and 0.91% ppa respectively), and changes in TFP became an important factor in economic growth.

1 Ward & Zheng (2016) found some general conclusions about the influence of telecommunications on growth. First, telecommunications appears to be an important contributor to economic growth in China. Second, cellular services contributed more to growth than fixed services. Third, the complementary effect between fixed and cellular services appeared to be small and non-existent after 2001 when China was less developed. Fifth, the effect of mobile services is relatively smaller, and fixed services relatively larger, in less developed western China but only before 2001. In particular, Internet use is increasingly facilitating both business-to-business commerce and business-to-consumer commerce. . Internet services are improving both along broad margins as more people have access and along intensive margins as their access gets faster. Just as cellular seems to be becoming more important than fixed-line services, internet usage may eventually prove more important than cellular.

4 Myovella et al., (2020) have examined how the diffusion of digital technology has affected economic growth, analyzing a group of 41 countries from sub-Saharan Africa and 33 from the OECD the results show that digitalization has a positive contribution to economic growth in both groups of countries. The effect of broadband internet is minimal for SSA compared to OECD countries, While the impact of Mobile telecommunications is higher in SSA compared to OECD Partners. This result is particularly interesting as less advanced technologies create more opportunities in the least developed countries as there is more room for improvement. With respect to policy implications, this study recommends that SSA governments should invest more in ICT along with other infrastructure, so as

to benefit from digitalization and realize significant economic growth.

Research by Anusua Datta & Sumit Agarwal (2006) examines the role of telecommunications infrastructure in long-term economic growth using a sample of 22 OECD countries. The results of this study indicate that both telecommunications are statistically significant and positively correlated with real growth. GDP per capita growth for these countries. Yields are strong even after controlling for investment, government consumption, population growth, past openness of GDP levels, and lagging growth. The results further show that telecommunications investments are subject to diminishing returns, suggesting that countries in the early stages of development are likely to derive most of their income from investments in telecommunications infrastructure. From a government policy perspective, the data provide strong evidence showing that providing an efficient telecommunications infrastructure, is essential for the development of economic growth.

Sridhar (2007) found a positive impact of mobile phones on national output. The research of Cronin et al., (1991) shows a feedback process in which telecommunications investment increases economic activity and growth as well as economic activity and growth drives demand for telecommunications infrastructure investment. (Waverman, L. Meschi, M. & Fuss, 2005) used data in 92 countries from 1980 – 2003, and found that mobile phones have a positive and significant impact on economic growth, and this impact may be twice as large in developing countries as in developed countries. developed by the state. In a study examining the effects of cell phones on GDP per person for 120 developed and developing countries. (Qiang, C., Rossotto, C. & Kimura, 2009) also found a greater positive effect of increasing mobile phone penetration than Fixed-Line penetration.

**METHODOLOGY**

The type of data used in this study is secondary data in panel data which is a combination of the cross-section of 6 ASEAN countries and 9-year time-series data. The number of observations is 54 data from 9 years in 6 ASEAN countries consisting of Indonesia, Malaysia, Singapore, Thailand, Brunei Darussalam, and the Philippines.

The variables used in this study are Gross Domestic Product Per Capita (GDP Per Capita) as endogenous variables while exogenous variables are Percentage of Individual Internet Users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), Government Expenditures and Number of Working Population with data collected from the World Bank.

A panel data regression model is a regression model that combines time series and cross-section data. The combination of time series and cross-section data in this study makes the number of observations increase significantly without special treatment for the data so as to produce a greater degree of freedom. In addition, the data can explain two pieces of information, namely information on differences between individuals and information on changes between time periods.

There are three methods that can be used to manage panel data. First, using the Pooled Least Square (PLS), Fixed Effect Model (FEM) and Random Effect Model (REM) approaches. To test this research hypothesis, there are two hypotheses, namely the Percentage of Individual Internet Users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), Government Expenditures, and Manpower have a significant simultaneous and partial effect on GDP Per Capita in Six ASEAN Countries 2011-2019.

**RESULT AND DISCUSSION**

The regression results using the Pooled Least Square (PLS) method produce an R-Squared value of 0.8505. The regression results of the Pooled Least Square (PLS) method show that partially the independent variables are the Percentage of Individual Internet Users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), Government Expenditures have a significant effect on economic growth. This can be seen from the P-Value value which is smaller than the significance level. While the P-Value value of the independent variable Labor is greater than the level of significance.

**Table 3**  
**Panel Regression Estimation**

Variable	Metode Pooled Least Square		Metode Fixed Effect Model		Metode Random Effect Model	
	Koefisien	p-value t	Koefisien	p-value t	Koefisien	p-value z
Internet User	0,014	0,025	0,006	0,000	0,014	0,021
Mobile Cell Subs	-0,013	0,001	0,004	0,000	-0,013	0,000
Fixed Broadband Subs	0,088	0,000	-0,027	0,007	0,088	0,000
Gov Expenditure	0,057	0,004	-0,025	0,001	0,057	0,003
Labor	0,026	0,314	0,007	0,363	0,026	0,309
R-Squared	0,8505		0,5730		0,9132	
Prob (F-statistic)	0,0000		0,0000		0,0000	

Source: Primary data processed 2021



The next step after regressing using the Pooled Least Square (PLS) method is to estimate the panel data using the Fixed Effect Model (FEM) method. Regression using the Fixed Effect Model (FEM) method produces an R Square value of 0.6597. The regression results of the FEM method partially show that the independent variables are Individual Internet Users Percentage, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), and Government Expenditures have a significant effect on economic growth. This can be seen from the P-Value value which is smaller than the significance level. While the P-Value value of the independent variable Labor is greater than the level of significance. After performing regression using the Fixed Effect Model (FEM) method, the next regression was performed using the Random Effect Model (REM) method.

Regression using the Random Effect Model (REM) method produces an R-Squared value of 0.9122. The regression results of the Random Effect Model (REM) method show that partially the independent variables are the Percentage of Individual Internet Users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), and Government Expenditures have a significant effect on economic growth. This can be seen from the P-Value value which is smaller than the significance level. While the P-Value value of the independent variable Labor is greater than the level of significance.

The selection of the panel data estimation method can be done through

the F-Restricted test, Hausman test, and Lagrange Multiplier test. The first stage of testing was carried out with the F-Restricted test aimed to determine which panel data regression method the Pooled Least Square (PLS) or Fixed Effect Model (FEM) method is better used in research. The results of the F-Restricted test show that the p-value of the Fixed Effect Model (FEM) output is 0.0000. This means that the p-value in the model is smaller than the 0.05 level of significance, so it can be concluded that  $H_0$  is rejected and the best estimation method used is the Fixed Effect Model (FEM) estimation method. After the Fixed Effect Model (FEM) estimation method is selected, the next step is to carry out the Hausman test with the aim of choosing between the Fixed Effect Model (FEM) or Random Effect Model (REM) panel data regression method which is better used in research.

The results of the Hausman test on the model show a Chi-Square p-value of 0.0004. This means that the p-value of Chi-Square in the model is smaller than the 0.05 significance level, so it can be concluded that  $H_0$  is rejected and the best estimation method used in both models is the Fixed Effect Model (FEM) estimation method. Based on the selection of the estimation method that has been done, it can be concluded that the best method used is the Fixed Effect Model (FEM) regression method. The use of the Fixed Effect Model (FEM) method means taking into account the dummy variables in the model to capture differences in intercepts. Following are the regression results of the Fixed Effect Model (FEM) estimation method.

**Table 4**  
**Fixed Effect Model (FEM)**

Variable	Coefficient	Std. Err	T	P-Value t
C	8,494	0,625	13,58	0,000
Internet User	0,006	0,001	5,40	0,000
Mobile Cell Subs	0,004	0,001	4,43	0,000
Fixed Broadband Subs	-0,027	0,009	-2,84	0,007
Gov Expenditure	-0,025	0,007	-3,69	0,001
Labor	0,007	0,008	0,92	0,363

Based on the results of the F-Restricted test and Hausman test, it can be seen that the best method used is the Fixed Effect Model (FEM) estimation regression method.

$$PDBP_{it} = 8,494 + 0,006 \text{ Internet User}_{it} + 0,004 \text{ Mobile Cell Subs}_{it} - 0,025 \text{ Fixed Broadband Subs}_{it} - 0,025 \text{ Gov Expenditure}_{it} + 0,007 \text{ Labor}_{it} + \varepsilon_{it}$$

Individual Internet Users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 People), Government Expenditures. Variable Percentage of Individual Internet Users (Internet User) has a probability value of 0.000. This value is smaller than the 0.05 significance level, so it can be said that capital stock has a significant effect on economic growth in the Six ASEAN Countries from 2011-to 2019. Variable Percentage of Individual Internet Users has a coefficient value of 0.006. This means that every one percent increase in the capital stock will cause an increase in the economic growth of 0.006 percent.

The variable Mobile Cellular Subscriptions (Per 100 people) (Mobile Cell Subsite) has a probability value of 0.000. This value is smaller than the 0.05 significance level, so it can be said that Mobile Cellular Subscriptions (Per 100 people) have a significant effect on economic growth in the Six ASEAN Countries from 2011-to 2019. The variable Mobile Cellular Subscriptions (Per 100 people) has a coefficient value of 0.004.

This means that every one percent increase in air transportation will cause an increase in the economic growth of 0.004 percent.

The variable Fixed Broadband Subscriptions (Per 100 Persons) (Fixed Broadband Subscription) has a probability value of 0.007. This value is smaller than the 0.05 significance level, so it can be said that trains have a significant effect on economic growth in the Six ASEAN Countries from 2011-to 2019. The variable Fixed Broadband Subscriptions (Per 100 Persons) has a coefficient value of -0.027. This means that every one percent increase in trains will cause a decrease in the economic growth of 0.027 percent.

The Government Expenditure Variable (Gov Expenditure<sub>it</sub>) has a probability value of 0.001. This value is smaller than the 0.05 significance level, so it can be said that ship shipping connectivity has had a significant effect on economic growth in the Six ASEAN Countries from 2011-to 2019. The Government Expenditure variable has a coefficient value of -0.025. This means that every one percent increase in sea transportation will cause a decrease in the economic growth of 0.025 percent.

The Labor variable (Labor<sub>it</sub>) has a probability value of 0.363. This value is greater than the 0.05 significance level, so it can be said that internet users have no significant effect on economic growth in the Six ASEAN Countries in 2011-to 2019. The labor variable has a coefficient value of 0.007. This means that every one percent increase in internet users will cause an

increase in the economic growth of 0.007 percent.

Based on the identification of each variable, all exogenous variables also show a significant influence on the endogenous variables of economic growth with varying values. Telecommunication infrastructure based on the indicators of the Percentage of Individual Internet Users and Mobile Cellular Subscriptions (Per 100 people) has a positive significance for economic growth. This finding is consistent with previous studies in several countries. The difference is only in the size of the contribution due to differences in the efficiency of investment in telecommunications infrastructure. Surprising results on telecommunications infrastructure with indicators that Fixed Broadband Subscriptions (Per 100 Persons) and Government Expenditures have a significant negative effect on economic growth. These results indicate that there is a reason that developing countries tend to have inadequate physical capital and labor so that it has an impact on economic growth in the six ASEAN countries. Therefore, it is necessary to develop telecommunications infrastructure evenly in order to generate increased economic growth. Labor shows that there is no effect but positive significance on economic growth. Factors that cause labor does not affect economic growth, namely the number of workers who work is not followed by the quality of the workforce, especially the ability to use technology, the age of the workforce, the level of education, and the productivity of the workforce.

This finding is different from the research conducted by Research (Datta & Agarwal, 2004) examining the role of telecommunications infrastructure in long-term economic growth using a sample of 22 OECD countries. The results of this study indicate that both telecommunications are statistically significant and positively correlated with real growth. GDP per capita growth for these countries. Results are

strong even after controlling for investment, government consumption, population growth, past openness of GDP levels, and lagging growth. The results further show that telecommunications investments are subject to diminishing returns, suggesting that countries in the early stages of development are likely to derive most of their income from investments in telecommunications infrastructure. From a government policy perspective, the data provide strong evidence showing that providing an efficient telecommunications infrastructure, is essential for the development of economic growth. The research of H. G. and P. Koutroumpis (2011) examined nearly 200 countries during the period 1990 – 2007 and also identified the effect of fixed telephone and mobile phone connections with a smaller effect for countries with low mobile phone penetration. Mobile phones tend to replace Fixed-Line in poor countries, but to complement Fixed-Line in rich countries, indicating that the impact of growth is stronger in poor countries. In addition, many countries with less developed Fixed-Line networks have achieved mobile phone growth with less investment than similar coverage by Fixed-Line networks will be required

## CONCLUSION

The results showed that simultaneously the percentage of individual Internet users, Mobile Cellular Subscriptions (Per 100 people), Fixed Broadband Subscriptions (Per 100 people), Manpower, and Government Expenditures had an effect on economic growth in the six ASEAN countries. Meanwhile, partially Individual Internet Users Percentage, Fixed Broadband Subscriptions (Per 100 Persons), and Government Expenditures have a positive significance on economic growth. The surprising result of Mobile Cellular Subscriptions (Per 100 people) is that it has a significant negative effect

on economic growth. Labor shows that there is no effect but positive significance on economic growth. Further research is expected to obtain more data and add some variables that affect economic growth.

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PAGE 10

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PAGE 11

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PAGE 12

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