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Development of Information and Communication Technology (ICT): Does it Drive Economic Growth in ASEAN?

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Abstract

The purpose of this study is to influence of International Financial Integration and Information and Communication Technology (ICT) on economic growth in ASEAN. The variables of ICT is fixed broadband subscription, fixed telephone subscription, mobile cellular subscription, individuals using the internet. The data uses panel data from nine ASEAN countries for the period 2010 to 2021. This research uses a quantitative approach. The method used is the Panel Vector Error Correction Model (PVECM). The variable of ICT with indicator fixed broadband and fixed telephone indicators had a negative and significant effect, while mobile cellular had a positive and insignificant effect and individuals using the internet had a positive and negative effect. significant to economic growth. Economic growth responded positively to fixed broadband subscriptions, while mobile subscriptions and individuals using the internet were positive at the start of the period, while telephone subscriptions remained negative. Fixed telephone subscriptions and individuals using the internet contribute more to economic growth than fixed broadband subscriptions and mobile subscriptions.

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Introduction

Information and Communication Technology (ICT) is needed for the economic growth and development of the country because (1) ICT can increase the speed of data transmission and a lot of information is disseminated between individuals; (2) Can reduce production costs because it is possible to access the knowledge produced at minimum costs; (3) ICT can overcome space and time constraints, resulting in increased data transmission between buyers and sellers and production processes beyond national borders; (4) Increasing market

transparency followed by increasing individual demand to easily access the necessary data (Sepehrdoust & Ghorbanseresht, 2019).

The development of ICT infrastructure by encouraging increased ICT investment to provide easy access to technology can encourage economic growth (Toader et al., 2018). In accordance with Sapuan & Roly (2021), better ICT infrastructure in a country makes it possible to attract more foreign investors to invest. To carry out the spread of ICT in the private sector through several policy interventions such as reducing taxes, promoting e-commerce, and developing partnerships in the development of telecommunications infrastructure and services (Bahrini & Qaffas, 2019).

Economic growth can also be achieved by encouraging Information and Communication Technology (ICT) innovation. The issue of ICT as a variable that can encourage economic growth has been reviewed empirically. Empirical average results show that ICT drives economic growth. This can be described as fintech innovations that make it easier for customers to transact, such as e-money (Positioning, 1968-2019). ICT increases the availability of information, forms new communication methods, reformats productive processes, and increases the efficiency of various economic activities, thus playing a role in encouraging accelerated economic growth (Sepehrdoust & Ghorbanseresht, 2019 and Bahrini & Qaffas, 2019).

ICT plays a role as a driving force in spurring economic growth (Sapuan & Roly, 2021). ICT has changed the way people interact, do business and learn. In this case, the focus will be on technologies that enable MCS to be used in smart cities, such as data collection, task management, cost-saving tools, incentive systems, and monitoring (Wildan et al., 2023). Improved ICT allows companies to communicate more quickly thereby reducing production costs and increasing productivity, enabling access to new markets, enabling access to human resources through long-distance networks, encouraging the sustainable development of entrepreneurship and small and micro businesses, and reducing information asymmetry (Toader et al. al., 2018).

ICT infrastructure enables society, companies, and governments to access information, knowledge, and policies better in terms of scale, scope, and speed (Bahrini & Qaffas, 2019). ICT infrastructure refers to "digital telephone networks, mobile phones, internet capabilities, internet servers, fixed broadband, and other technologies" (Pradhan et al., 2018). Research by Bahrini & Qaffas (2019) and Toader et al. (2018) used four indicators that show ICT, namely fixed broadband subscription, fixed telephone subscription, mobile cellular subscription, and individuals using the internet.

The development of ICT in the last few decades has created a very drastic transformation in the world of digitalization. The penetration of the internet and mobile cellular accelerates the diffusion of technology. These developments in technology can affect organizational and business performance (Purnomo et al., 2021). The increase in ICT is building a fairly extensive economic network globally. ICT innovations vary throughout the country and play an important role, especially in economic development (Sapuan & Roly, 2021). By becoming increasingly integrated into networks, micro-level organizations are connected to the global level (Majeed & Ayub, 2018).

ICT is an important factor in economic and social development because of its positive impact on economic growth, productivity, and employment. Most research shows the contribution of ICT to increasing productivity, reducing poverty, and encouraging economic growth (Toader et al., 2018). Neo-Schumpterian and neoclassical theories state that there is a significant positive relationship between technology and economic growth. These theories suggest that technology enters as input into the economic supply in the form of capital, causing the production process through capital investment and making advances in technology and the quality of labor (Bahrini & Qaffas, 2019). Theory predicts that ICT has a significant relationship with economic growth, employment, and productivity. However, several studies show different results, especially in developing countries. This is due to a lack of awareness about ICT and innovation in these countries (Sapuan & Roly, 2021).

The relationship between ICT and economic growth has been widely studied. Research by Myovella et al. (2020) shows that technology has a positive effect on economic growth, especially in non-developing countries. Sepehrdoust & Ghorbanseresht (2019) conducted research on the impact of ICT on economic growth in the OPEC region and found that ICT had an effect on economic growth but was relatively weak due to the characteristics of oil exporting countries. Likewise, the results of research by Toader et al. (2018) show positive and significant results. However, research by Bahrini & Qaffas (2019) shows that one of four indicators has a negative impact on economic growth. Apart from being influenced by ICT, economic growth can be influenced by other things, such as inflation, corruption, financial development, and the workforce. These variables are control variables modified research-supporting journals Bong & Premaratne (2019) and Appiah et al. (2020). These control variables are to control the dependent variable of this research.

In macroeconomics, inflation is an important discussion. Increased inflation can affect macroeconomics, possibly having a negative impact on economic growth and harming financial activities. Increasing inflation causes interest rates to increase, which will have a negative impact on private investment and economic growth (Rahman et al., 2020). Several studies, such as those conducted by Bong & Premaratne (2019) and Meriem et al. (2022) found that inflation and economic growth have a negative relationship. A high inflation rate can slow down economic growth in a country.

Corruption is one of the main problems throughout the world. Corruption can cause a slowdown in investment activities and low capital inflows in a country (Hamdi & Hakimi, 2019). In line with the results of Meriem et al. (2022), it shows that corruption and economic growth have a negative and significant relationship. Corruption can hamper growth by discouraging private investment. Financial development is important because a structured financial system is a requirement for economic growth (Rahman et al., 2020). Financial development and economic growth are closely linked, and economic growth is the process of increasing output per capita over the long term (Wildan et al., 2021). This means that financial development can increase economic growth, but when the level of financial development is high it will have a negative effect on growth (Sahay et al., 2015). The instability of financial development towards growth is influenced by the stage of development of a country. In the early stages, financial development involves growth, and then when real growth appears, this relationship becomes insignificant (Matei, 2020). However, research conducted by Bist (2018) revealed that financial

development and economic growth have a long-term relationship in low-income countries.

The labor force is used in this study because it is a production input that will have an impact on economic growth. According to Azid (2015), the labor force has an important role as a determining factor for economic growth in a country. However, all countries must be able to manage labor resources into a productive workforce in order to accelerate economic growth. According to Safrizal et al. (2020), employee performance is the stage of achievement as an employee's work achievement. Research conducted by Rahman et al. (2020) and Appiah et al. (2020), shows that the labor force has a negative relationship with economic growth in ECOWAS countries and Pakistan.

Based on previous research, it can be seen that there are still differences in research results regarding ICT and economic growth. These differences can be caused by the economic, political, legal, social, geographical, and other specifications of the objects studied (Phutkaradze et al., 2019). Therefore, this study tries to examine the influence of ICT on economic growth in the ASEAN region. There are several research updates offered in this study. First, add dummy variables pre-MEA and period MEA. Second, in terms of research methods, using the Panel Vector Error Correction Model (PVECM) method. Third, using the Foreign Direct Investment (FDI) Net Inflow and Foreign Direct Investment (FDI) Net indicators as proxies for IFI. Fourth, modify the control variables with supporting journals from research by Bong & Premaratne (2019) and Appiah et al. (2020), such as inflation, corruption, financial development, and the workforce.

RESEARCH METHODS

This research uses a quantitative approach, namely the collection and analysis of numerical data to describe, explain, predict, or control variables and phenomena of interest. The type of data in this research is secondary data, namely data collected by previous researchers. Secondary data comes from books, literature, and government publications. Secondary data in this research is a combination of time series data and cross-section data, usually called panel data. According to Wooldridge (2019), time series data is a collection of data with a time sequence within a certain time range on one or more variables. Meanwhile, cross-section data takes a population sample at a certain point in time.

The time series data used is 12 years from 2010-2021. This time range was chosen to see the comparison between the pre-MEA and the MEA period. Meanwhile, cross-section data for 9 countries in ASEAN. Researchers use ASEAN as an object because ASEAN countries implement international financial integration policies and open financial access which aims to stimulate the economy. This data consists of GDP, FDI net inflow, FDI net, fixed broadband, fixed telephone, mobile cellular, individuals using the internet, inflation, corruption, financial development, and the workforce. The data is in the form of numbers sourced from publications by the World Bank, International Telecommunication Union, Worldwide Governance Indicator, and International Monetary Fund. The following is a brief table of data types and sources:

Table 1. Table Types and Sources of Data

Variable	Code	Unit	Source	Type
GDP (Y)	LnGDP	USD	World Bank	Secondary
Fixed Broadband Subscriptions (X1)	LnICT1	Per 100 People	International Telecommunication Union	Secondary
Fixed Telephone Subscriptions (X2)	LnICT2	Per 100 People	International Telecommunication Union	Secondary
Mobile Cellular Subscription (X3)	LnICT3	Per 100 People	International Telecommunication Union	Secondary
Individuals Using the Internet (X4)	ICT4	Percent	International Telecommunication Union	Secondary
Inflation (X5)	LnINF	Index	World Bank	Secondary
Corruption (X6)	COR	Index	Worldwide Governance Indicator	Secondary
Financial Development (X7)	FD	Index	International Monetary Fund	Secondary
Labor Force (X8)	LnLF	Soul	World Bank	Secondary

This research uses GDP at constant prices as a proxy for economic growth. GDP at constant prices is the total gross value added by all domestic producers in an economy plus taxes on products and minus subsidies that are not included in the value of the products. GDP data uses annual data from 2010 to 2021 sourced from the World Bank in USD units, then the data is transformed into natural logarithm units. The GDP in question is GDP at constant prices with i used by Indonesia, Malaysia, Laos, Thailand, Vietnam, Cambodia, Brunei Darussalam, the Philippines, and Singapore, and t indicating the years 2010-2021.

Fixed broadband subscriptions (X1), are fixed broadband subscriptions that refer to fixed subscription broadband access to the public internet. Fixed broadband subscriber data is divided by population and multiplied by 100. Fixed broadband subscription data uses annual data from 2010 to 2021 sourced from the International Telecommunication Union in units per 100 people. The data is then transformed into natural logarithm units.

Fixed telephone subscriptions (X2), are fixed telephone subscriptions that refer to the number of active numbers on analog fixed telephone lines. Fixed telephone subscriber data is divided by the population and multiplied by 100. Fixed telephone subscription data uses annual data from 2010 to 2021 sourced from the International Telecommunication Union in units per 100 people, then the data is transformed into natural logarithm units.

Mobile cellular subscriptions (X3), is a cellular telephone subscription that refers to public cellular telephone services that use cellular technology. Cellular telephone subscription data is divided by population and multiplied by 100. Mobile cellular subscription data uses annual data from 2010 to 2021 sourced from the International Telecommunication Union in units per 100 people, then the data is transformed into natural logarithm units.

Individuals using the internet (X4), are individuals who have used the internet. Data on individuals who use the internet is divided by the total population.

Individuals using the internet data use annual data from 2010 to 2021 sourced from the International Telecommunication Union in percent units.

Inflation (X5) in this study uses the consumer price index. The consumer price index reflects changes in the average consumer costs of purchasing goods and services by consumers at certain intervals. Inflation data uses annual data from 2010 to 2021 sourced from the World Bank. Then the data was transformed into natural logarithmic units.

Corruption (X6) in this research uses Control of Corruption. Perception of controlling corruption is the extent to which public power is exercised for private interests, including large and small corruption as well as seizure of the state by elites and private interests. Corruption data uses annual data from 2010 to 2021 sourced from the Worldwide Governance Indicator with an indicator score of -2.5 to 2.5 index units.

The financial development (X7) used in this research is the financial development index. This index embodies the complex multidimensional nature of financial development which describes how financial institutions and financial markets develop in terms of depth (size and liquidity), access (ability to access finance), and efficiency (ability to offer financial services). Financial development data uses annual data from 2010 to 2021 sourced from the International Monetary Fund (IMF) with index units on a scale of 0 to 1.

The workforce (X8) refers to people aged over 15 years who are currently working or looking for work. Data on the labor force uses annual data from 2010 to 2021 sourced from the World Bank. The data was then transformed into natural logarithmic units.

The analysis technique used is PVECM. According to Perrson (2015), PVECM is an analysis method for variables that are interdependent or have cointegration. The PVECM model is able to capture dynamic relationships between variables so that it can analyze the effects that occur. In data processing, the author uses Eviews 12 software. The data is annual from 2010 to 2020 with nine ASEAN countries as the object. The following are the steps taken:

$$\Delta LnGDPit{-}1 = \alpha + \beta 1\Delta LnICT1it{-}1 + \beta 2\Delta LnICT2it{-}1 + \beta 3\Delta LnICT3it{-}1 + \beta 4\Delta ICT4it{-}1 + \beta 5\Delta LnINFit{-}1 + \beta 6\Delta CORit{-}1 + \beta 7\Delta FDit{-}1 + \beta 8\Delta LnLFit{-}1 + \gamma 1Dit{-}1 + \gamma 1ECTit{-}1 + \varepsilon it{-}1 \qquad (1)$$

Where LnGDP, LnICT1, LnICT2, LnICT3, ICT4, LnINF, COR, FD, and LnLF are economic growth, Fixed Broadband, Fixed Telephone, Mobile Cellular, Individuals Using the Internet, Inflation, Corruption, Financial Development and Labor Force. This variable is an endogenous variable. D is a dummy variable as an exogenous variable. α is a constant, Δ is the first difference, $\beta 1 \ldots \beta 8$ is the coefficient of the endogenous variable, γ is the speed of adjustment parameter, ECT is the error correction term, and ε is the error term.

The data function is transformed into a natural logarithm form to minimize one of the deviations, namely heteroscedasticity. By carrying out natural transformations, you can change data that is not initially normally distributed into or close to a normal distribution. Apart from that, you can find out the coefficients that show elasticity and bring the data scale closer.

RESULT

The initial step taken is the data stationarity test which aims to determine whether the data is stationary or not. The stationarity test on panel data was carried out on time series data. In this research, the panel data stationarity test uses the IPS (Im, Pesaran, Shin) unit root test.

Table 2. Im, Pesaran, Shin (IPS) Test Results Table

Variable	Im, Pesaran, Shin (IPS)	
	At level (I(0))	First Difference (I(1))
LnGDP (Economic Growth)	0.0 472 **	0.0864 ***
LnICT1 (*Fixed Broadband*)	0.9788	0.0125 **
LnICT2 (*Fixed Telephone*)	0,0153**	0,0001*
LnICT3 (*Mobile Cellular*)	0,0029*	0,0001*
ICT4 (*Individuals Using Internet*)	0,9777	0,0059*
LnINF (Inflasi)	0,0611***	0,0002*
COR (Korupsi)	0,0372**	0,0007 *
FD (*Financial Development*)	0,0002 *	0,0001 *
LnLF (Labor Force)	0.0015 *	0.0191 **

Note: (*), (**), and (***) are significant at 1%, 5% and 10%.

Based on the table above, shows mobile cellular, financial development, and stationary workforce at levels with α 1%. The variables economic growth, fixed telephone, and corruption are stationary at a level of α 5%. For stationary inflation at a level with α 10%. Meanwhile, fixed broadband and individuals using the internet accept the null hypothesis so they are not stationary at the level.

The next stage is to differentiate all variables by re-conducting the unit root test at the first difference level. The results show that fixed telephone, mobile cellular, individuals using the internet, inflation, corruption, and financial development show stationary with α 1%. Meanwhile fixed broadband and the workforce are stationary with α 5%. And economic growth is stationary at α 10%. Thus, it can be concluded that the time series data has met the criteria, namely that it does not contain unit root test problems.

Table 3. Optimum Lag Test Results Table

Lag	LR	FPE	AIC	SC	HQ
0	NA	6.44e-06	13.58799	13.85404	13.69473
1	**2512.278**	**2.07e-20***	**-19.79621***	**-17.13571***	**-18.72878***
2	88.61233	3.92e-20	-19.22544	-14.17049	-17.19733
3	116.9845*	3.84e-20	-19.43269	-11.98330	-16.44390

Source: Eviews 12, data processed

The table above also shows that the second model shows that lag 1 has the smallest FPE (Final Prediction Error), AIC (Akaike Information Criterion), SC (Schwarz Bayesian Information Criterion), and HQ (Hannan-Quinn Information Criterion) values. This means that the optimal influence between variables occurs

within a time horizon of 1 period. This indicates that lag 1 will be used by the second model to estimate PVECM parameters.

Table 4. KAO Cointegration Test Results Table

Model 1		
ADF	t-Statistics	Prob.
	-2.775367	0.0028

Source: Eviews 12, data processed.

The table above shows the prob values. The ADF of the first model and second model shows results smaller than α 1%. So it can be stated that the variables contained in the first and second models have cointegration or a long-term relationship. After it is stated that the variables in the first and second models have cointegration, we can carry out regression for the PVECM model.

Tabel 5. Table of Long-Term PVECM Estimation Results

Independent Variable	Model
	Mark
LnINF (Inflation)	-1.064411
	(0.81016)
	[-1.31382]
COR (Corruption)	-0.501217
	(0.13521)
	[-3.70 52 0]*
FD (*Financial Development*)	-0.096400
	(0.70074)
	[0.13757]
LnLF (Labor Force)	-0.704961
	(0.08273)
	[-8.5 74 06]*
LnICT1 (*Fixed Broadband*)	-0,482695
	(0,13385)
	[-3,60855]*
LnICT2 (*Fixed Telephone*)	-0,234530
	(0,10225)
	[-2,29176]*
LnICT3 (*Mobile Cellular*)	0,336899
	(0,39749)

	[0,84758]
	0,046059
ICT4 (Individuals Using Internet)	(0,00801)
	[5,74711]*
C	-10.07816

Note:

() : Standard Error
[]: t-Statistics
*: Significant t-table: 1.984723

Based on this table, shows the long-term PVECM estimation results, fixed broadband has a negative and significant influence. This means that with a 1 percent increase in fixed broadband, economic growth decreases by 0.482695 percent. Fixed telephones have a negative and significant influence. This means that with a 1 percent increase in fixed telephones, economic growth will decrease by 0.234530 percent.

Mobile cellular has a positive influence but not a significant effect. This means that with a 1 percent increase in mobile cellular, economic growth increases by 0.336899 percent. And individuals using the internet have a positive and significant influence. This means that with a 1 percent increase in individuals using the internet, economic growth increases by 0.046059 percent.

Inflation has a negative influence but is not significant. This means that with a 1 percent increase in inflation, economic growth will decrease by 1.064411 percent. Meanwhile, corruption has a negative influence but is not significant. This means that with a 1 percent increase in corruption, economic growth decreases by 0.501217 percent.

Financial development has a negative influence but is not significant. This means that with a 1 percent increase in inflation, economic growth decreases by 0.096400 percent. And the workforce has a negative influence but is not significant. This means that, with a 1 percent increase in the workforce, economic growth decreases by 0.704961 percent.

Table 6. Short-Term PVECM Estimation Results

Error Correction	Model
	D(LNGDP)
ECT_{t-1}	-0.019583
	(0.00504)
	[-3.88584]*
	0.064278
D(LnGDP(-1))	
	(0.12459)
	[0.51593]

D(LnGDP(-2))	
D(LnINF(-2))	0.315530
	(0.16402)
	[1.92375]
D(LnINF(-2))	
D(COR(-1))	0.048885
	(0.03112)
	[1.57062]
D(COR(-2))	
D(FD(-1))	0.369530
	(0.15056)
	[2.45431]*
D(FD(-2))	
D(LnLF(-1))	0.357214

	(0.22536)
	[1.58509]
D(LnLF(-2))	
D(LnICT1(-1))	-0.06319
	(0.02196)
	[-2.87768]*
D(LnICT2(-1))	0.012666
	(0.01197)
	[1.05788]
D(LnICT3(-1))	-0.080852
	(0.02999)
	[-2.69625]*
D(ICT4(-1))	0.000634
	(0.00080)
	[0.79462]
C	0.023721
	(0.00946)
	[2.50674]*
DUMMY	0.007785
	(0.00805)

[0.96719]

Note:
() : Standard Error
[]: t-Statistics
*: Significant t-table: 1.984723
Source: Eviews 12, data processed.

Based on the table above showing the short-term PVECM estimation results, economic growth has a positive but not significant relationship to economic growth itself. This means that with a 1 percent increase in economic growth, economic growth itself increases by 0.064278 percent. Meanwhile fixed broadband has a negative and significant influence. This means that with a 1 percent increase in fixed broadband subscriptions, economic growth will decrease by 0.063190 percent.

The fixed telephone has a positive influence but is not significant. This means that with a 1 percent increase in fixed telephone subscriptions, economic growth increases by 0.012666 percent. Mobile cellular has a negative and significant relationship. This means that with a 1 percent increase in mobile cellular subscriptions, economic growth will decrease by 0.080852 percent. And individuals using the internet have a positive but not significant influence. This means that with a 1 percent increase in individuals using the internet, economic growth increases by 0.000634 percent.

Inflation has a positive influence but is not significant. This means that with a 1 percent increase in inflation, economic growth increases by 0.315530 percent. Meanwhile, corruption has a positive influence but is not significant. This means that with a 1 percent increase in corruption, economic growth increases by 0.048885 percent.

Financial development has a positive and significant influence. This means that with a 1 percent increase in financial development, economic growth increases by 0.369530 percent. And the workforce has a positive but not significant influence. This means that with a 1 percent increase in corruption, economic growth increases by 0.048885 percent. The dummy variables in the first and second models have a positive but not significant influence. This means that IFI and ICT are not influenced by MEA.

DISCUSSION

Information and Communication Technology (ICT) can increase the speed of data transmission and more information is disseminated between individuals, can reduce production costs because it is possible to access the knowledge produced at minimum costs, can overcome space and time constraints, and increase market transparency followed by an increase in individual demand to easily access the necessary data (Sepehrdoust & Ghorbanseresht, 2019).

ICT with the fixed broadband subscriptions indicator has a negative and significant effect in the long term. Likewise, in the short term fixed broadband subscriptions have a negative and significant effect. The results of this study are in accordance with the research of Myovella et al. (2020) which shows that fixed

broadband subscriptions have a negative and significant effect on economic growth.

The fixed telephone subscriptions indicator has a negative and significant effect in the long term. Meanwhile, in the short term fixed telephone subscriptions have a positive but not significant effect. The results of this research are in accordance with research by Bahrini & Qaffas (2019) which shows that fixed telephones have a negative and significant effect on economic growth.

The mobile cellular subscriptions indicator has a positive but not significant effect in the long term. Meanwhile, in the short term mobile cellular subscriptions have a negative and significant effect. The results of this study are in accordance with the research of Myovella et al. (2020) which shows that mobile cellular subscriptions have a positive effect on economic growth.

Indicators of long-term individuals using the internet have a positive and significant effect. Meanwhile, in the short term, individuals using the internet have a positive and insignificant effect. The results of this study are in accordance with the research of Toader et al. (2018) which shows that individuals using the internet have a positive and significant effect on economic growth.

The negative effect of fixed telephones can be explained by the fact that mobile cellular is a substitute for fixed telephones in many developing countries. This applies to ASEAN countries which over the last three years have experienced developments in mobile cellular penetration. In accordance with the research results, ICT indicators, especially mobile cellular and individuals using the internet, must be developed to encourage economic growth. Lack of socialization about ICT and its benefits is one of the problems resulting in a lack of ICT penetration, especially in ASEAN. Policymakers should consider promoting more internet users in ASEAN as mobile cellular usage expands to reach a wider population. ICT investments must be made to stimulate consumer demand for fixed broadband to overcome the challenges of the digital divide. The widespread use of Internet infrastructure will enable various business opportunities (Myovella et al., 2020).

Inflation is an important indicator of a country's economic development. According to Gillman et al. (2005), inflation is a monetary event that shows a general upward trend in commodity prices, which means a decrease in the value of the currency. Inflation can be called when an increase in the price of one or two commodities causes an increase in the price of other commodities. Inflation occurs because the amount of money in circulation exceeds the amount of money needed by society, resulting in a surplus of money in society.

The results of the analysis of the inflation variable have a negative but not significant effect in the long term. Meanwhile, in the short term inflation has a positive but not significant effect. The results of this research are in accordance with research by Onah (2022) which shows that inflation has a negative and insignificant effect on economic growth.

High inflation will hamper the rate of economic growth. Inflation will distort the purchasing power of the ASEAN community because inflation can change relative prices and influence interest rates which have an influence on the savings collection and mobilization activities of banks and other financial institutions (Bist, 2018). The choice of price stability as monetary policy was motivated by the reality

that high inflation results in negative impacts and instability for the economy.

The results of the analysis of the corruption variable have a negative and significant effect in the long term. The results of this study are in accordance with research by Meriem et al. (2022) and Son et al. (2020) which shows that corruption has a negative and significant effect on economic growth. This means generally accepting that corruption hinders economic growth in ASEAN. Meanwhile, in the short term, corruption has a positive and insignificant effect. This shows that corruption in ASEAN in the short term has no effect on economic growth.

Corruption can cause harm to economic growth. One of them is that corruption can disrupt the banking sector which will have a negative impact on economic growth (Son et al., 2020). The lack of a corruption control system can prevent economic growth from increasing. Apart from that, it can hamper social development (Appiah et al., 2020).

The devastating impact of corruption justifies efforts to eradicate corruption to continue the drive for economic development. The government policy that ASEAN countries must carry out is to eliminate corruption and maintain macroeconomic stability to increase economic growth. Along with the industrial revolution, one solution is to increase e-readiness to reduce corruption in the economy (Ntemi & Mbamba, 2016).

Financial development is one of the main factors of economic growth in both developed and developing countries. Financial development as an indicator of the financial sector plays a very significant role in triggering a country's economic growth (Levine, 1997). A well-functioning financial system is considered one of the main foundations on which sustainable economic development can be built.

The results of the analysis of the financial development variable have a negative but not significant effect in the long term. The results of this research are in accordance with the research of Appiah et al. (2020) which shows that financial development has a negative and insignificant effect on economic growth. Meanwhile, in the short term, financial development has a positive and significant effect. The results of this study are in accordance with research by Rahman et al. (2020) which shows that financial development has a positive and significant effect on economic growth.

In accordance with research results which show that financial development has a positive effect on ASEAN economic growth in the short term. Cross-country differences in financial development explain a significant portion of cross-country differences in average growth rates (Klein & Olivei, 2008). Financial development can optimize capital allocation, provide investment information, and mobilize capital.

According to Bist (2018), economic growth creates demand for financial development to be developed in the short term. Therefore, financial development is important for economic growth. Financial stability risks still exist at low levels of financial development, therefore policymakers need to ensure that adequate buffers are maintained to reduce the risk of financial crises.

The results of the analysis of the force variable have a negative and significant effect in the long term. The results of this research are in accordance

with the research of Appiah et al. (2020) which shows that the workforce has a negative and significant effect on economic growth. Meanwhile, in the short term, the workforce has a positive but not significant effect. This shows that the workforce in ASEAN in the short term has no effect on economic growth.

The development of a country depends on its workforce (Bist, 2018). However, labor productivity is needed in order to encourage production efficiency, reduce costs per unit of output, and reduce unemployment. Policies are needed to stimulate labor force participation in economic activities to rebalance the demographic structure and distribution and to invest in education and human resource development, so that every ASEAN country can experience economic development and sustainable growth (Soava et al., 2020).

CONCLUSION

The ICT indicator of fixed broadband subscriptions has a significant effect in the long and short term. For fixed telephone subscriptions, the effect is significant in the long term, while in the short term, the effect is not significant. Mobile subscriptions have no significant effect in the long term, while they have a significant effect in the short term. Finally, individuals using the internet have a significant effect in the long term, while in the short term, the effect is not significant.

ICT with the fixed telephone subscription indicator has responded positively to economic growth. Meanwhile, the response to mobile cellular subscriptions and individuals using the internet was that economic growth was positive at the beginning of the period, then negative in the following period. Meanwhile, fixed broadband subscriptions respond to changing economic growth every period, both positive and negative. Based on variance decomposition, it can be seen that fixed telephone subscriptions and individual use of the Internet contribute more to economic growth than fixed broadband subscriptions and mobile cellular subscriptions.

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