



**THE IMPACT OF E-COMMERCE ON INDONESIA ECONOMIC GROWTH:  
INTERMEDIATION MODELS WITH FINANCIAL TECHNOLOGY  
CONSTRAINT**

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**Abstract**

*The COVID-19 pandemic triggered economic shocks that adversely affected the global economy. Economic growth contracted significantly. Restrictions on economic activity trigger people's shopping behavior to switch to non-cash and online systems. E-commerce, as one part of digital economic transformation, has experienced a significant increase which impacts the flow of dissemination of ideas, innovations, and information, thus encouraging economic growth. This study analyzes the Impact of e-commerce on economic growth in Indonesia during the COVID-19 pandemic using intermediation models and fixed effect analysis. The results show that e-commerce negatively and significantly impacts economic growth during 2019 and 2021. Because e-commerce stimulates economic growth in a country but needs to be supported by quality infrastructure, quality broadband internet, online security (cyber security), and digital payment systems (e-payment). The variables of online financing, efficiency of government spending, length of schooling, and number of tourists have a positive and significant effect. Meanwhile, the poverty rate and human development index have a negative and significant effect. In maximizing e-commerce activities in Indonesia, strong support and collaboration from the government, financial institutions, and the Ministry of Communication and information technology are needed.*

**Keywords:** E-Commerce, Financial Technology, Economic Growth, Indonesia

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## **INTRODUCTION**

The COVID-19 pandemic that hit the world in 2019 had a destructive impact on the global economy (Nguyen et al., 2022); (Ingham, 2023); (Hao et al., 2023); (Sawada & Sumulong, 2021). The world economy is threatened by recession, including Indonesia. Several studies were conducted to see the effect of the pandemic on the economy (Zubaidah et al., 2021); (Widiastuti & Silfiana, 2021). In this second quarter of 2020, Indonesia's economic growth contracted by -5.32 percent. The economic gains made by the government have had a positive impact on improving economic growth. Namely, in the first quarter of 2021, economic growth was -0.71 and increased in the second quarter to 7.07 percent. Sectors that contracted negatively included mining and quarrying, processing industry, electricity and gas production, construction, wholesale retail and repair trade, transportation and construction, provision of commodity and will minimum, jasa company, and other services. These sectors contracted until the first quarter of 2021 (BPS, 2021).

Economic improvement efforts carried out by the government have positively impacted previously contracted sectors. The restriction of public movement as a policy to reduce the death rate due to the Covid-19 pandemic has caused goods and services transactions carried out by the public in cash to decrease. The development of digital technology has provided easy access to

various kinds of information and innovations that allow them to carry out economic activities on a global scale (Nasution et al., 2020); (Mustajibah, 2021). During the COVID-19 pandemic, digital economic transformation stimulated innovation and significant market share, impacting economic growth, especially in Indonesia (Criveanu, 2023). In addition, the use of the digital economy also encourages entrepreneurs to grow faster due to the ease of information and opportunities for innovation (Dianari, 2019). The digital economy has an impact on the culture of society and organizations (Criveanu, 2023), increased economic growth (Criveanu, 2023; Matthess & Kunkel, 2020), non-discriminatory access, transparency of economic activity (Dianari, 2019; Pouri & Hilty, 2021), and a change in corporate mentality (Schieferdecker & Mattauch, 2013).

Economic digitalization, such as payment technology and digital shopping, influences all economic activities of the community. Figure 1 shows the percentage of digital financial inclusion where the population uses internet banking by 48.4 percent; 2.4 percent credit cards; 30.8 percent credit cards; 3.1 percent use e-money (OVO, GOPAY, etc.); 34.6 percent make and receive digital payments; 9.9 percent buy from the internet; 7.7 percent use online banking; and 4.2 percent use internet banking to pay utility bills. E-commerce is a prominent economic digitalization in defining the transformation

of the digital economy (Criveanu, 2023; Meneghello et al., 2019). Economic transaction activity has changed since the emergence of e-commerce regarding price competition, product innovation, and marketing strategies (Fernández-Bonilla et al., 2022). The rise of e-commerce can potentially harm small and medium-sized enterprises (SMEs) that cannot adapt to new media on par with large e-commerce companies nationally and internationally (Fernández-Bonilla et al., 2022). Innovation and mastery of social networking tools influence the successful use of e-commerce (Fernández-Bonilla et al., 2022; Molinillo et al., 2018).

E-commerce has experienced a significant increase to become one of the new economy concepts as a driver of the digital economy that leads to transactions of goods and services through internet media, especially during the Covid-19 pandemic (Dianari, 2019). Figure 2. illustrates that the percentage of users who carry out the most extensive online shopping activities per week reaches 60.6 percent by buying products or services online, and the lowest rate in secondhand shopping activities is 13 percent. The advancement of e-commerce as one of the digital economy technologies contributes to a sustainable economy of a country (Criveanu, 2023). E-commerce has implications for increasing the flow of dissemination of ideas and information to

encourage economic growth. Previous studies have found a positive influence on economic growth (AT Kearney, 2015; Criveanu, 2023; Dianari, 2019; Elseoud, 2014; Jahangard & Pourahmadi, 2013; Lastri & Anis, 2020; Liu, 2013; Qu & Chen, 2014).

In 2020, the development of e-commerce skyrocketed to 90.18 percent, but the economic growth rate decreased by -2.07. Due to the economic shock in the form of the Covid-19 pandemic impacts the country's economic sluggishness and changes in the pattern of buying and selling transactions to non-cash and online. In 2021, Indonesia's economic growth improved with an economic growth rate of 3.7 percent, with the development of e-commerce activities of 25.92 percent. The contribution of e-commerce to a country's economic growth needs to be supported by the quality of infrastructure as a process of distributing goods from/between producers to consumers (AT Kearney, 2015; Jahangard & Pourahmadi, 2013). In addition, regulations on a country's online transactions contribute (Dianari, 2019). Based on the National Cyber Security Index (NCSI) report (2022), Indonesia's cybersecurity index score ranks third lowest among all G20 countries, 38.96 points, and ranks 6th in Southeast Asia.

This study uses endogenous economic growth theory that considers technological variables as factors of a country's economic growth (Jahangard & Pourahmadi, 2013). The

element of technology and knowledge shows that it has become one of the indicators of a country's economic growth (Dianari, 2019). Capital accumulation, population growth, and technological progress are the main components that affect economic growth (Latri & Anis, 2020). Therefore, this study analyzes the influence of the digital economy on economic growth with model intermediation during the pandemic period from 2019 to 2021 in Indonesia.

## **LITERATURE REVIEW**

Research related to e-commerce and economic growth fulfilled in several countries. Research by (Jahangard & Pourahmadi, 2013); (Liu, 2013); (Qu & Chen, 2014); (Elseoud, 2014) found a positive influence between e-commerce and economic growth in developed countries such as (China, dan Arab Saudi) and Indonesia. (Criveanu, 2023) found a significant effect between e-commerce and economic growth where the government must encourage sustainable digital economic performance in countries with a low level of economic digital transformation. In addition, previous studies have found that e-commerce contributes positively and significantly to economic growth (Elseoud, 2014; Liu, 2013; Qu & Chen, 2014) in Indonesia in the long term (Dianari, 2019; Latri & Anis, 2020). It is because the value of e-commerce transactions is the interaction of business sites as *suppliers* and the use of the internet as a *demand* to

stimulate an increase in the intensity of macroeconomic activities (Dianari, 2019). However, studies (AT Kearney, 2015) show that e-commerce and economic growth have a positive impact but need to be supported by the quality of infrastructure, increased broadband access, promotion of e-payment, and reinforce online security (cyber security). The study also found that the quality of infrastructure in Indonesia (land, sea, and air) has low competitiveness compared to other countries (in this case, ASEAN member countries).

A study on online financing on economic growth conducted by (Maulana & Wiharno, 2022) states that peer-to-peer (P2P) lending positively and significantly influences economic growth in Indonesia. The more developed financing transactions in P2P Lending, the better it will impact the Indonesian economy (Wajuba et al., 2021). P2P Lending as a digital economy financing platform triggers positive growth in various sectors, including the financial, real, and capital markets (Eun Young Oh and Peter Rosenkranz, 2020). Because P2P Lending provides alternative credit options that provide ease of access, loan disbursement efficiency, and reach several unbankable segments of society (de Roure et al., 2021; Maulana & Wiharno, 2022; Najaf et al., 2022). In addition, the demand for P2P Lending loans is more reflected in a dynamic and innovative business environment, thus

driving the increasing volume and expanding the reach of P2P Lending (Eun Young Oh and Peter Rosenkranz, 2020; Maulana & Wiharno, 2022).

Poverty is still a problem that every country must solve. Many people living in poverty will trigger macroeconomic problems such as unemployment, crime rates, and economic growth. Studies related to poverty and economic growth were conducted (Ebunoluwa & Yusuf, 2018); (Heshmati, 2021); (Francis & Webster, 2019). Poverty in the United States consists of three concepts, namely multidimensional, relational, and normative transparent (Desmond & Western, 2018). (Garza-Rodriguez, 2018), using cointegration analysis, found that in Mexico, there is a relationship between economic growth and poverty reduction in the short and long term. The census (Fransman & Yu, 2019) found that unemployment, length of schooling, and disability can lead to poverty. Hence, Ebunoluwa & Yusuf (2018) suggest directing economic growth to pro-poor programs to reduce poverty. Furthermore, (Wahiba & Ahlem, 2022) suggests that economic growth and public spending significantly reduce poverty. In line with this, empirical findings (Misini & Mustafa, 2022) show that economic growth is negatively related to unemployment and poverty in Kosovo.

Human capital development and education are necessary for economic growth.

In the Czech Republic, Hungary, Poland, and Slovakia, the found evidence that higher education affects GDP as a determinant of economic growth (Gruševá & Blašková, 2022).

On the contrary, there is empirical evidence that public spending on education does not affect short-term economic growth. Likewise, (Ramallari & Velaj, 2023) found that education does not positively influence economic growth in Albania. In Indonesia, (Zulfa, Andria, and Meutia, 2018) stated that in West Java province, the average length of schooling in urban districts is still low.

Tourism is one of the factors driving economic growth. A study by Rediteani & Setiawina (2018) found that tourist visits affect economic growth through hotel taxes. The study by (Ksamawan et al., 2019) in Asean found that the number of tourist visits to tourist places positively influences economic growth in the short and long term. In addition, the tourism sector in Indonesia shows the existence of drivers of economic growth in conditions of economic shocks/crises. And also studies by (Chen & Chiou-Wei, 2009; Seghir et al., 2015; Shahzad et al., 2017). Tourists who come will bring in foreign exchange (Damayanti & Kartika, 2016). The longer tourists stay in a country, and the more money will be spent, including taxes (Rediteani & Setiawina, 2018; Wijaya, 2016). Nevertheless, a study by (Antonakakis et al., 2015) found no relationship between tourist numbers and economic growth in

Turkey, Germany, Cyprus, and Greece in the short and long term. In addition, the study by (Sugiarto et al., 2023) also found that the number of tourist visits had a negative but insignificant effect on local income.

In addition, the role of the government in encouraging economic growth is indisputable. The imperfect market with the availability of information that is not symmetrical makes the role of government urgently needed. The government corrects this hole of market imperfection by intervening through public spending efficiency instruments. Government spending becomes a lubricant for economic activities related to public services such as road construction, electricity, transportation, social security, and others; The more advanced the economy, the more critical the role of the government in providing regulations and improving public welfare (Febriani & Rambe, 2022). Efficient government spending is a measure of the success of local governments in managing their budgets, meaning that efficient government spending reflects public spending as a percentage of output with its direct impact on public policies such as education, health, transportation, social protection, and this will lead to the creation of positive economic growth (Rambe et al., 2022). Furthermore, the study developed by Chan et al. (2017) displaying the efficiency of government spending plays a role in

increasing economic growth. The efficiency of government spending measures the government's ability to produce goods and services in productive sectors by utilizing available resources to encourage economic growth (Albassam, 2022).

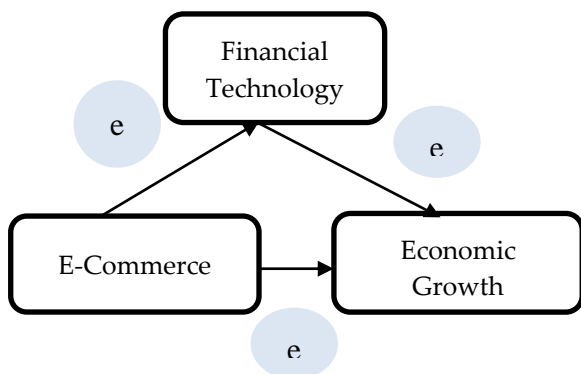
Meanwhile, other factors also affect economic growth, namely the Human Development Index (HDI). HDI is a measure of success in building the quality of human life, seen from the achievements of individuals' health, education, and purchasing power. HDI's ability to encourage economic growth by realizing high labor productivity through providing skilled and character labor. The role of qualified humans is an instrument driving economic growth. So the need for human capital in economic development becomes interesting as a study from Hung & Thanh (2022) states that the human development index fosters economic growth. However, the study built by Zhao & Zhou (2021) explains that China's economic growth depends on physical investment capital and energy consumption, and there is no dependence on human capital, including Education and Health. In contrast, Rivera (2017) states that there is only a one-way relationship between economic growth to human development (HDI), indicating that the cycle from human development to economic growth does not fully exist.

## RESEARCH METHODS

### Data, Instruments, and Data Collection Technique

This research uses panel data consisting of macroeconomic and digital economy data from 2019 to 2021 in thirty-three (33) provinces in Indonesia during the COVID-19 pandemic (excluding North Kalimantan). Digital economy indicators are derived from the e-commerce statistics publication report of Indonesia's central statistics bureau (BPS), macroeconomic indicators based on BPS publication reports, and Bank Indonesia (BI) payment system and financial market infrastructure (SPIP) statistics publication reports. In this study, economic growth is a dependent variable. The interesting variable is the digital economy.

inefficiencies. Then, the control variables in this study consisted of digital financing, digital payments, population, regional inequality, regional poverty rate, human development index, average length of schooling, and number of tourists. Next, the table outlines the description of the variables used in the research, consisting of one dependent variable and 1 interest variable, and 10 control (independent) variables.



**Figure 1.** Schematic diagram of an intermediary variable model

Source: data processed by author, 2023

In Figure 1. Showing intermediary variables affecting regional economic growth can constrain regional spending efficiency. The digital economy can prevent information asymmetry between local governments and financial institutions, so it has an important role in reducing regional spending

**Table 1.** Variables Descriptive

Variable Classification	Variables	Symbol	Variable indicator
Dependent Variable	Economic Growth	GRDP	Gross regional domestic product rate
Interest Variables	E-Commerce	E-Commerce	
Metavariable	Financial Technology	P2P_lending	Amount of Peer-to-Peer (P2P) Lending
Control Variables	Poverty Level	Poverty	Number of poor people per Province
	Government Spending Efficiency	Ef_Spending	The level of efficiency of regional shopping with the DEA method
	Digital Payments	Atmdebit Credit_card	Number of transactions through digital payments (atm, debit, and credit card)
	Regional inequality	Gini	Indeks gini
	Human development index	IPM	Human development index by Province
	Average of Education	Av_school	The average length of schooling per Province
	Total tourist	Tot_tourist	Number of tourists coming to the Province per year
	Population	Population	Number of inhabitants per Province

Source: data processed by author, 2023

### Methodology

This research is a form of descriptive and explanatory research. In addition, this study includes two (2) stages of the model, namely the data envelopment analysis (DEA) model, to determine the level of efficiency of government spending in each Province (33 provinces) in Indonesia for the period 2019 to 2021. The DEA method has generally acceptable for measuring the banking industry's and financial institutions' economic efficiency (Cooper et al., 2007). However, DEA analysis has developed widely to measure the efficiency of non-bank institutions such as insurance institutions, hospitals, universities, tax offices,

and zakat institutions (Rusydia & Hasib, 2020). Therefore, measuring the efficiency of government spending is considered appropriate using DEA analysis using an output-oriented model through a variable return to scale (VRS) approach (Rambe, 2020).

Objective Function Efficiency Model:

$$\text{Max } E = \mu_1 Y_1 + \mu_0$$

Subject to

$$\mu_1 X_1 + \mu_2 X_2 + \mu_3 X_3 + \mu_4 X_4 = 1$$

$$\mu_1 X_1 + \mu_2 X_2 + \mu_3 X_3 - \mu_0 - (v_1 X_1 + v_2 X_2 + v_3 X_3 + v_4 X_4) \leq 0$$

$$\mu_{1234} v_{1234} \geq 0$$

With information  $Y_1$  is economic growth,  $X_1$  is health spending per capita,  $X_2$  is education spending per capita,  $X_3$  is economic spending



per capita,  $X_4$  is social protection spending per capita, and  $E$  is the efficiency value of DMU.  $\mu_{1234}$  is the output weight, and  $v_{1234}$  is the input weight that can be positive or negative.

Furthermore, the panel data analysis model is the second model stage as the primary analysis model. Peng et al. (2023) declared that panel data could use the fixed effect model method for the relationship between the digital economy and economic growth with the mediating effect of regional spending efficiency constraints.

Model analysis without intermediary variable :

$$GRDP_{it} = \alpha_0 + a_1 E-commerce_{it} + \sum a_k Controls_{it} + \varepsilon_i + \mu_{it}$$

Intermediated variable by Financial Technology

:

$$P2P\_Lending_{it} = b_0 + b_1 E-commerce_{it} + \varepsilon_i + \mu_{it}$$

Model analysis with intermediary variable :

$$GRDP_{it} = c_0 + c_1 E-Commerce_{it} + c_2 Ef\_Spending_{it} + \sum c_k Controls_{it} + \varepsilon_i + \mu_{it}$$

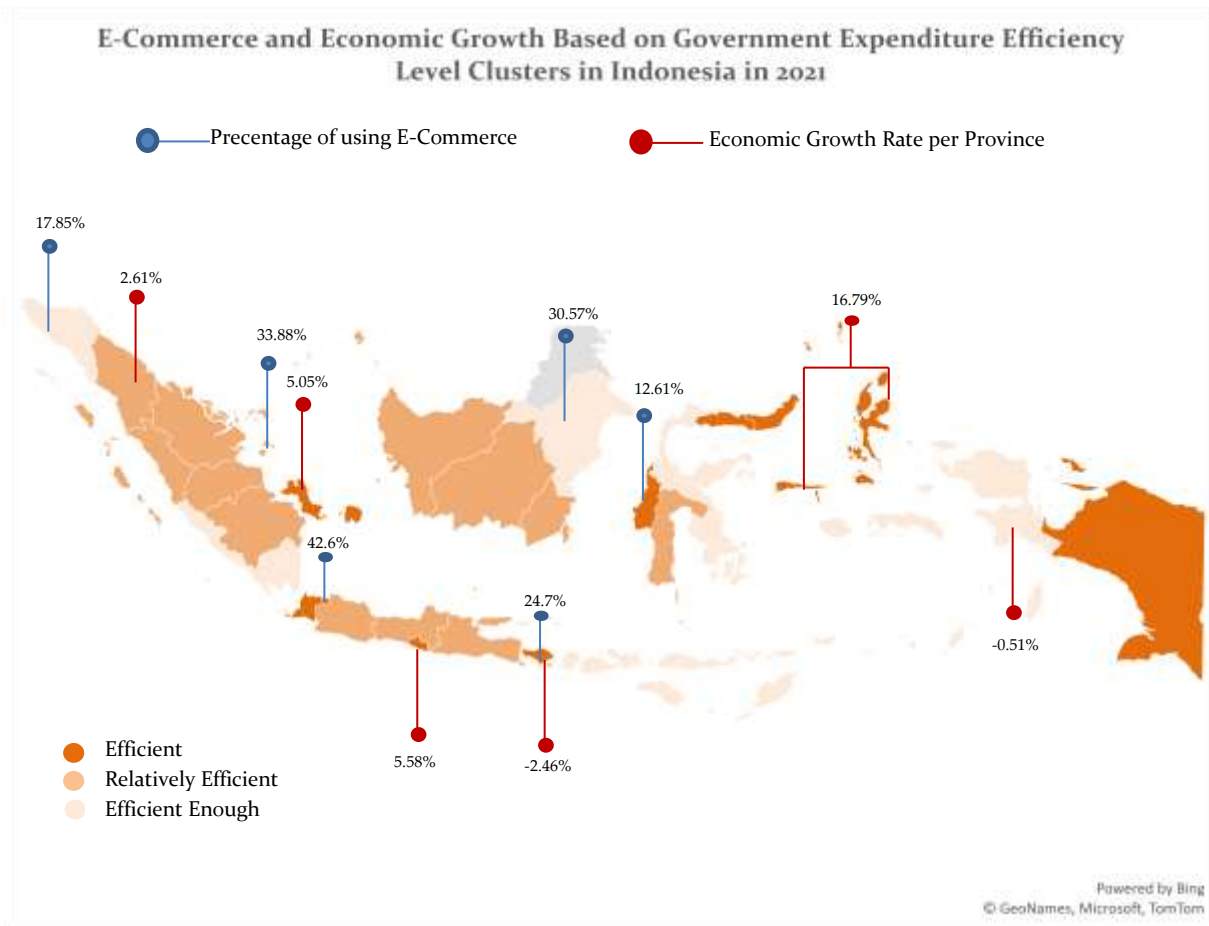
$$GRDP_{it} = c_0 + c_1 E-Commerce_{it} + c_2 P2P\_Lending_{it} + c_3 Poverty_{it} + c_4 Ef\_Spending_{it} + c_5 ATMdebit_{it} + c_6 Credit\_card_{it} + c_7 Gini_{it} + c_8 IPM_{it} + c_9 Av\_school_{it} + c_{10} Tot\_tourist_{it} + c_{11} Population_{it} + \varepsilon_i + \mu_{it}$$

Fixed effect models show from (5.1) to (7.2). The GRDP shows regional economic growth proxied by gross regional domestic product (GRDP),  $E-Commerce_{it}$  is the development of the digital economy proxied by e-commerce,  $P2P\_Lending_{it}$  is the amount of online financing by borrowers recorded in the

financial services authority,  $Controls_{it}$  is all control variables that considered to affect economic growth, including  $Poverty_{it}$  namely the number of poor people;  $Ef\_Spending_{it}$  is the level of efficiency of government spending;  $ATMdebit_{it}$  is the transaction volume of ATM cards and Debit cards;  $Credit\_card_{it}$  is the volume of transactions using credit cards;  $Gini_{it}$  is a regional inequality index;  $IPM_{it}$  is human development index;  $Av\_school_{it}$  is the average length of school aged 15 years and over;  $Tot\_tourist_{it}$  is the number of tourists visiting;  $Population_{it}$  is the number of inhabitants per Province. In addition,  $\varepsilon_i$  is an unobservable variable that affects economic growth, and  $\mu_{it}$  indicates an error term.

## RESEARCH RESULT AND DISCUSSION

This research discusses the Impact of e-commerce on economic growth in Indonesia during the COVID-19 pandemic, namely from 2019 to 2021. The statistical description in this study aims to describe the data used and the patterns and forms of data distribution in various provinces in Indonesia.



**Figure 2.** E-Commerce and Economic Growth Based on Spending Efficiency Level in Indonesia in 2021

Sources: data processed by author, 2023

In Figure 2 above, shows the distribution of e-commerce and economic growth in Indonesia based on the efficiency of government spending in 2021. Deep green shading indicates the area has reached efficiency, light green means relatively efficient, and green tends to be white means quite efficient. In Sumatra, the most extensive use of E-commerce is in the Riau Islands, and the enormous economic growth in the Bangka Belitung Islands. While the lowest use of E-commerce is in Aceh, and economic growth is in North Sumatra. As much as 42.6 percent in DKI Jakarta and 5.58 percent in Yogyakarta is the largest use of E-commerce and economic

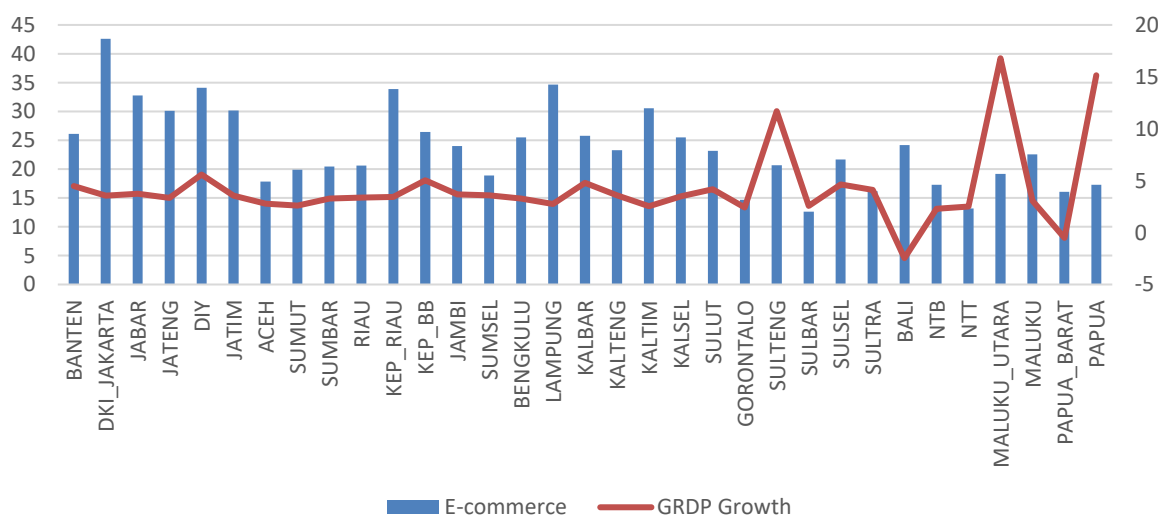
growth in Java and Bali, where both regions also have a relatively efficient level of government spending.

Meanwhile, Bali ranked lowest in E-commerce usage and economic growth in Java and Bali in 2021 despite Bali being an efficient area in government spending. In the Eastern region, the largest use of E-commerce was East Kalimantan (30.57 percent), and the lowest was West Sulawesi (12.61 percent). In contrast, the most considerable economic growth rate is in South Sulawesi, located in North Maluku.

Figure 3. describes the distribution of E-commerce and the rate of economic growth in Indonesia for the period 2021. Indonesia

began to be affected by the COVID-19 pandemic in early 2020. Some regions can still maintain the stability of the economic growth rate except Papua. The highest use of E-commerce is in the Yogyakarta region. Indonesia began to experience a contraction in economic growth in 2020 when the decline in the economic growth rate was quite significant. However, the use of E-commerce tends to experience a significant increase due to changes in people's non-cash shopping behavior patterns due to the Covid-19 pandemic.

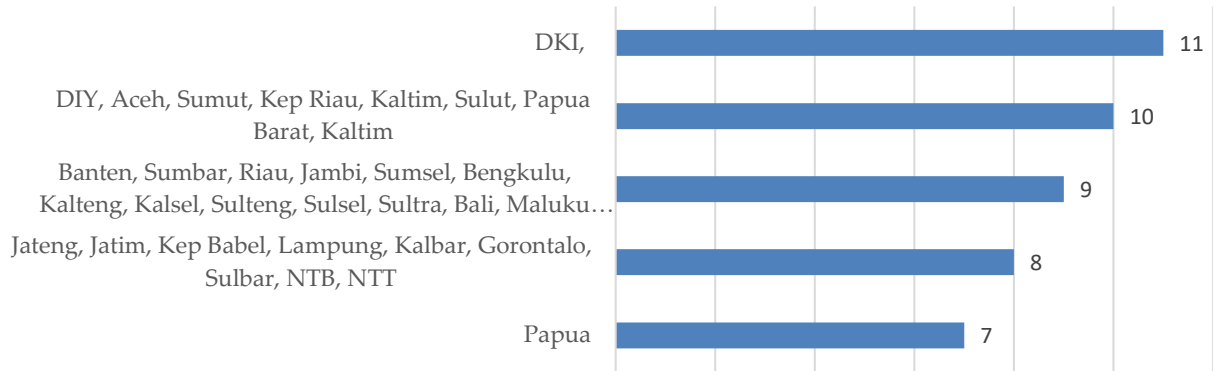
In 2021, the government's efforts to deal with economic conditions due to the COVID-19 pandemic tend to improve. It is present through an increase in the economic growth rate in various regions in Indonesia despite a decrease in the percentage of E-commerce usage from the previous year. Because restrictions on the movement of community activities tend to return to normal, some people choose to return to cash transactions, and others still maintain non-cash shopping.



**Figure 3.** The Spread of E-Commerce and Economic Growth in Indonesia 2021  
Sources: data processed by author, 2023

Education can determine knowledge literacy and ability to use information technology and computers (ICT), including E-commerce. Figure 4 describes the average length of education in Indonesia by region.

DKI Jakarta occupies an area with an average education length of 11 years. Meanwhile, the Papua area has the lowest average length of public education.



**Figure 4.** The Average School Enrollment Rate for 2021  
Sources: data processed by author, 2023

Furthermore, Table 2 shows the results of statistical descriptions of the data used in this study. The number of observations used was 99 samples, and it is panel data from 33 provinces from 2019 to 2021. The average E-commerce use is 42.08 percent, with a standard deviation of 33.81 percent. The average economic growth rate was 2.53 percent, with a standard deviation of 4.29

percent. Then, the average online financing is 4,280 trillion, with a minimum loan of 3,670 billion and a maximum of 7,720 trillion. In government spending, the average level of expenditure efficiency is 0.96 (relatively efficient). In addition, this study's average length of education was nine years / junior high school (SMP).

**Table 2.** Descriptive Analysis of Variables

Variable	Obs	Mean	Std. Dev	Min	Max
GRDP	99	2.52798	4.292405	-15.74	16.79
E-Commerce	99	42.04848	33.81102	4.66	96.85
P2P_Lending	99	4.28e+13	1.26e+14	3.67e+10	7.72e+14
Atm_debet	99	146.372	379.1931	0.806665	2589.843
Credit_card	99	9.093737	27.90677	0.04	174.11
Ef_spending	99	0.9652121	0.0488518	0.761	1
Poverty	99	10.59848	5.444094	3.42	27.38
IPM	99	71.16596	3.939792	60.44	81.11
Av_School	99	9.060808	0.8427272	6.85	11.2
Tot_tourist	99	1.88e+07	3.26e+07	266371	1.59e+08
Gini	99	0.3590909	0.040094	0.262	0.4485

Sources: data processed by author, 2023

This study uses intermediation variables, namely digital financing (online), namely peer-to-peer lending (P2P Lending), which have officially registered with the

Financial Services Authority (OJK). In Table 3. The E-commerce and P2P Lending regression test results, show a positive and significant relationship (significance level of 10%). It

indicates that the higher online financing to commerce collaboration can increase the borrowers will increase online shopping on E-commerce sites. E-commerce and financial technology (fintech) collaboration stimulate the digital ecosystem amid the COVID-19 pandemic. Lily Suriani, General Manager of Kredivo Indonesia, said that fintech and E-commerce collaboration can increase the average value of purchases and transaction frequency. Higher public trust in online shopping encourages digital payment and financing innovation because of the ease of access and periodic payment options offered by fintech ([www.seluler.id](http://www.seluler.id), 2020).

**Table 3.** Benchmark Regression Result with E-Commerce and Intermediation Model (Peer-To-Peer Lending)

Metavariabel: P2P Lending	Coef	Robust Std, Err.	T	p> t
E-Commerce	1.85e+11	1.06e+11	1.75	<b>0.090*</b>
_Const	3.50e+13	4.45e+12	7.86	0.000
F-Statistic	0.0897*			
R_Square	0.4956			

Note: Significant level  $p > |t|$  : \*\*\*<1% (0.01); \*\*<5% (0.05); \*<10% (0.10). The estimation method is fixed effects estimation.

Sources: data processed by author, 2023

Table 4. shows the regression results of economic growth. However, E-commerce independent variables against dependent variables. The variable of interest used is E-commerce as a digital economy transaction. shows a negative relationship with economic growth. For every 1-point increase in E-commerce usage, economic growth decreases Based on the regression results, it found that by 0.0879 points at a significance level of 1%. E-commerce has a significant effect on

**Table 4.** Benchmark Correlation Analysis and Regression Result

Variables	Economic Growth Rate		
	(1) Fixed Effect	(2) Random Effect	(3) Common Effect
E-Commerce	<b>-0.0879***</b> (0.0086)	<b>-0.0872***</b> (0.0067)	<b>-0.0876***</b> (0.0089)
Peer-to-Peer Lending	<b>7.22e-15*</b> (3.78e-15)	9.52e-16 (1.75e-15)	2.56e-17 (5.41e-15)
The transaction volume of ATM-Debit	0.0014 (0.0023)	-0.0010 (0.0008)	-0.0006 (0.0021)
The transaction volume of Credit Card	0.2014 (0.1523)	0.0070 (0.0065)	0.0045 (0.0175)
Spending Govnt Spending Efficiency	<b>77.441***</b> (22.874)	<b>72.95414***</b> (25.02736)	<b>72.862***</b> (10.107)
Level of Poverty	<b>-2.5801**</b> (1.1001)	<b>0.3687***</b> (0.1236)	<b>0.3809***</b> (0.0993)
Human Development Index	<b>-10.056**</b> (4.261)	<b>-0.4096*</b> (0.2445)	<b>-0.3799**</b> (0.1652)

Variables	Economic Growth Rate		
	(1) Fixed Effect	(2) Random Effect	(3) Common Effect
Average of School	<b>19.425**</b> (8.5923)	<b>2.2090**</b> (1.1284)	<b>2.1302***</b> (0.6285)
Total of tourist	<b>4.25e-08*</b> (2.30e-08)	5.38e-09 (6.79e-09)	5.06e-09 (1.17e-08)
Gini index	-19.044 (68.014)	-7.5795 (7.1325)	-7.4142 (8.4282)
Population	-0.0262 (0.0219)	0.0045 (0.0110)	0.0029 (0.0109)
Constanta	<b>503.5121**</b> (219.5174)	<b>-56.5516**</b> (25.1910)	<b>-57.945***</b> (12.817)
Observation	99	99	99
R Square	0.9871	0.1883	0.6212

Note: Significant level  $p > |t|$  .\*\*\*<1% (0.01); \*\*<5% (0.05); \*<10% (0.10). The estimation method is fixed effects, random effect, and common effect model estimation.

Sources: data processed by author, 2023

Previous studies have yielded a positive relationship between E-commerce and economic growth. But studies from A.T. Kearney (2015) show that E-commerce stimulates a country's economic growth in the same direction. With a population of 248 million people and 42.6% of E-commerce users, Indonesia shows excellent potential to access online shopping optimally. However, e-commerce can hinder economic growth without strengthening supporting quality, including infrastructure quality, logistics, and trade efficiency, increasing broadband internet, strengthening cyber security, and promoting e-payments. These obstacles include:

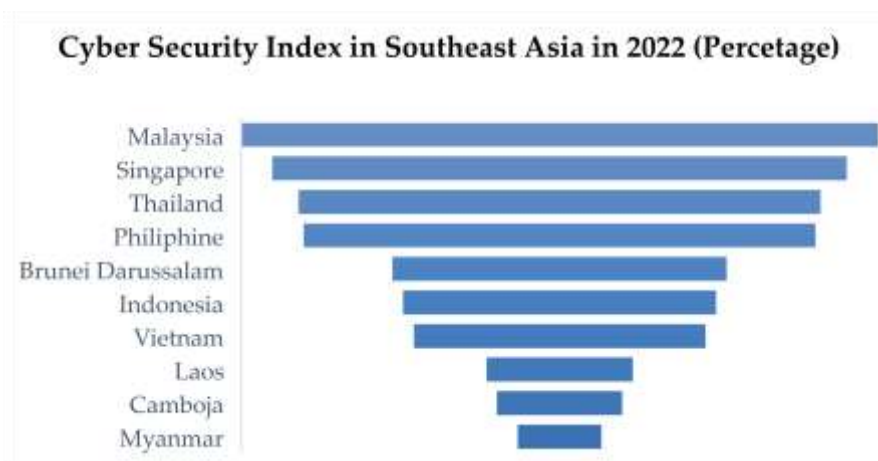
1. Internet broadband quality

According to the study results (AT Kearney, 2015), online connectivity in ASEAN countries, including Indonesia, is still relatively low. Indonesia is one of the

ASEAN countries where fixed broadband quality is not fully developed, so consumers are more likely to use mobile phones than computers for online shopping. These obstacles include limited network coverage, slow internet speed, high prices, and limited public awareness.

2. Strengthening online security (cyber security)

In E-commerce activities, consumers want to ensure online transactions are safe, especially user personal data. In Indonesia, as many as 60% of digital shoppers do not trust providing credit card information online ((AT Kearney, 2015). It indicates that online security in Indonesia is still relatively low. This problem is motivated by regulatory gaps and the ease of cyber attacks in Indonesia.



**Figure 5.** Percentage of Cyber Security Index in Southeast Asia in 2022  
Sources: data processed by author, 2023

3. Quality of infrastructure to improve logistics and trade efficiency

According to research (AT Kearney, 2015) said that logistics/delivery flows are the main reason E-commerce users are reluctant to buy goods online. This is due to poor transportation infrastructure, insufficient readiness of goods from warehouses to E-commerce, and inefficient long-distance delivery. In addition, Indonesia's road and rail network is still bad, while port and air transportation is quite good.

4. Digital payment promotion (e-payment)

To increase electronic payment penetration, digital transaction payments through E-commerce need to collaborate with online payments. In addition, electronic payments stimulate the growth of retail e-commerce because they are cheaper and less risky for merchants than cash payment methods. However, some regions still carry out E-commerce

payment systems with non-cash / cash-on-delivery (COD) methods. This problem is because financial inclusion in developing countries has not been maximized compared to developed countries, as evidenced by the large number of people who have not accessed bank accounts (unbankable) and concerns about data security.

There are several recommendations in the study to maximize the positive relationship of E-commerce to Indonesia's economic growth, including:

1. Increase broadband coverage and connectivity, and literacy in the community
2. Increase the range of bilateral information and assistance and improve the online security system through regulation and cooperation.
3. Improve transportation infrastructure for online retail logistics problems, whether land, sea, or air.

4. They are encouraging partnerships between e-retailers and logistics players and logistics system integration.
5. Increase the promotion of non-cash transactions by establishing e-payment security regulations at both central and regional levels.

Furthermore, P2P Lending variables positively affect economic growth in Indonesia. It is in line with research from (de Roure et al., 2021; Eun Young Oh and Peter Rosenkranz, 2020; Maulana & Wiharno, 2022; Najaf et al., 2022; Wajuba et al., 2021). P2P Lending is an alternative credit option with advantages in ease of access, fast disbursement time, and can reach unbankable communities. In addition, the development of financing transactions in P2P Lending has had a good impact on the Indonesian economy in various real sectors and the capital market sector.

Control variables such as poverty rate, average length of schooling, efficiency of government spending, human development index, and total tourists visiting significantly affect the economic growth rate in Indonesia. The poverty rate and human development index variables show a negative relationship, meaning that economic growth increases when the poverty rate decreases. It is in line with (Ebunoluwa & Yusuf, 2018); (Heshmati, 2021); (Francis & Webster, 2019), (Misini &

Mustafa, 2022)—furthermore, increased human development index results in decreased economic growth. Based on convergence theory, underdeveloped areas (poor areas) have high HDI compared to prosperous areas that maintain a stable HDI. In this case, underdeveloped areas tend to catch up with areas with stable HDI. However, these prosperous areas experience stagnation due to the growth process that cannot increase.

The variables of efficiency of government spending, average length of schooling, and number of tourists have a positive and significant relationship to economic growth. This result aligns with (Ebunoluwa & Yusuf, 2018) stating that economic growth must be directed to pro-poor programs, including education programs. In addition, the number of tourists coming to Indonesia brings in the country's foreign exchange through taxes to encourage economic growth (Chen & Chiou-Wei, 2009; Seghir et al., 2015; Shahzad et al., 2017; Damayanti & Kartika, 2016; Rediteani & Setiawina, 2018; Wijaya, 2016).



## CONCLUSIONS

Since the COVID-19 pandemic, the digital economic transformation has been overgrown, marked by the development of goods and services transactions through internet media, known as E-commerce. E-commerce is predicted to impact the economic growth of a country, including Indonesia. Through a panel data analysis approach and the involvement of intermediation variables in 33 provinces in Indonesia from 2019 to 2021, it was found that E-commerce has a negative and significant impact on the economic growth rate in Indonesia due to external factors supporting the readiness of E-commerce producers and end-users, including the quality of infrastructure related to the distribution of goods or services or broadband internet, promotion of e-payments, and the low level of online security (cyber security). In addition, peer-to-peer lending, efficiency of government spending, length of schooling, and number of tourists have a positive and significant effect on economic growth in Indonesia. Meanwhile, the human development index and poverty rate negatively and significantly influence economic growth in Indonesia

Indonesia has great potential to expand the E-commerce market to encourage economic growth. The negative relationship between E-commerce and economic growth in the short term shows no good consistency, so regulations are needed to ensure the

sustainability of E-commerce activities in Indonesia. It can assist through 1) increased innovation; 2) the distribution infrastructure of goods and services; 3) broadband infrastructure internet access; 4) banking conduciveness; 5) regulation of cyber security systems; and 6) literacy and community adaptation to economic digitalization. This research cannot show the long-term effects of e-commerce on economic growth so the development of this research is still needed for researchers and other researchers

## REFERENCES

- Albassam, B. A. (2022). Government spending and economic growth in the Middle East and North Africa region. *International Review of Administrative Sciences*, 88(4), 1124–1140. <https://doi.org/10.1177/0020852320969802>
- Antonakakis, N., Dragouni, M., & Filis, G. (2015). How strong is the linkage between tourism and economic growth in Europe? *Economic Modelling*, 44, 142–155. <https://doi.org/10.1016/j.econmod.2014.10.018>
- AT Kearney. (2015). *Lifting the Barriers to E-Commerce in ASEAN*. 1–23.
- Chan, S.-G., Ramly, Z., & Karim, M. Z. A. (2017). Government Spending Efficiency on Economic Growth: Roles of Value-added Tax. *Global Economic Review*, 46(2), 162–188. <https://doi.org/10.1080/1226508X.2017.1292857>

- Chen, C. F., & Chiou-Wei, S. Z. (2009). Tourism expansion, tourism uncertainty, and economic growth: New evidence from Taiwan and Korea. *Tourism Management*, 30(6), 812–818. <https://doi.org/10.1016/j.tourman.2008.12.013>
- Cooper, W. W., Seiford, L. M., & Tone, K. (2007). Data envelopment analysis: A comprehensive text with models, applications, references, and DEA-solver software: Second edition. *Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References, and DEA-Solver Software: Second Edition*, January, 1–490. <https://doi.org/10.1007/978-0-387-45283-8>
- Criveanu, M. M. (2023). Investigating Digital Intensity and E-Commerce as Drivers for Sustainability and Economic Growth in the EU Countries. *Electronics (Switzerland)*, 12(10). <https://doi.org/10.3390/electronics12102318>
- Damayanti, N. L. E., & Kartika, I. N. (2016). Pengaruh Kunjungan Wisatawan Asing dan Investasi terhadap Penyerapan Tenaga Kerja serta Pertumbuhan Ekonomi. *E-Jurnal EP Unud*, 5(7), 882–900.
- de Roure, C., Pelizzon, L., & Tasca, P. (2021). How Does P2P Lending Fit into the Consumer Credit Market? *SSRN Electronic Journal*, 30. <https://doi.org/10.2139/ssrn.2848043>
- Desmond, M., & Western, B. (2018). Poverty in America: New directions and debates. *Annual Review of Sociology*, 44(May), 305–318. <https://doi.org/10.1146/annurev-soc-060116-053411>
- Dianari, Rr. G. F. (2019). Pengaruh E-Commerce Terhadap Pertumbuhan Ekonomi Indonesia. In *Bina Ekonomi* (Vol. 22, Issue 1, pp. 43–62). <https://doi.org/10.26593/be.v22i1.3619.45-64>
- Ebunoluwa, O. O., & Yusuf, W. A. (2018). Effects of Economic Growth on Poverty Reduction In Nigeria. *IOSR Journal of Economics and Finance*, 9(5), 25–29. <https://doi.org/10.9790/5933-0905012529>
- Elseoud, M. S. A. (2014). Electronic Commerce and Economic Growth in Saudi Arabia. *International Journal of Economics, Commerce and Management United Kingdom*, II(5), 1–16.
- Eun Young Oh and Peter Rosenkranz. (2020). Determinants of Peer-to-Peer Lending Expansion : *ADB Economics Working Paper Series*, 613.
- Febriani, R. E., & Rambe, R. A. (2022). Government revenue and spending nexus in regional Indonesia: Causality approach. *Economics, Management and Sustainability*, 7(1), 34–42. <https://doi.org/10.14254/jems.2022.7-1.3>
- Fernández-Bonilla, F., Gijón, C., & De la Vega, B. (2022). E-commerce in Spain: Determining factors and the importance of the e-trust. *Telecommunications Policy*, 46(1). <https://doi.org/10.1016/j.telpol.2021.102280>

- Francis, D., & Webster, E. (2019). Poverty and inequality in South Africa: Critical reflections. *Development Southern Africa*, 36(6). <https://doi.org/10.1080/0376835X.2019.1666703>
- Fransman, T., & Yu, D. (2019). Multidimensional poverty in South Africa in 2001–2016. *Development Southern Africa*, 36(1), 50–79. <https://doi.org/10.1080/0376835X.2018.1469971>
- Garza-Rodriguez, J. (2018). Poverty and economic growth in Mexico. *Social Sciences*, 7(10). <https://doi.org/10.3390/socsci7100183>
- Gruševá, E., & Blašková, V. (2022). Education as a factor influencing the economic growth of the V4 countries. *Review of Applied Socio-Economic Research*, 24(2), 58–69. <https://doi.org/10.54609/reaser.v24i2.139>
- Hao, J., Gregg, H., & Yao, Y. (2023). COVID-19 and Long-Term Economic Growth. *Australian Economic Review*, 56(2), 221–237. <https://doi.org/10.1111/1467-8462.12500>
- Heshmati, A. (2021). Growth, Inequality and Poverty Relationships. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.602466>
- Hung, N. T., & Thanh, S. D. (2022). Fiscal decentralization, economic growth, and human development: Empirical evidence. *Cogent Economics & Finance*, 10(1), 2109279. <https://doi.org/10.1080/23322039.2022.2109279>
- Ingham, H. (2023). COVID-19, the Great Recession and Economic Recovery: A Tale of Two Crises. *Journal of Common Market Studies*, 61(2), 469–485. <https://doi.org/10.1111/jcms.13383>
- Jahangard, E., & Pourahmadi, Z. (2013). The Effects of Broadband Infrastructure on Economic Growth in Developing Countries. *Iranian Journal of Economic Studies*, 2(2), 1–23.
- Ksamawan, K. wahyu, Maskie, G., & Kaluge, D. (2019). Pariwisata Pengaruhnya Terhadap Ekonomi: Analisis Kajian Asal Kunjungan Wisatawan Mancanegara. *Jurnal Ilmu Ekonomi Terapan*, 4(1). <https://doi.org/10.20473/jiet.v4i1.10663>
- Lastri, W. A., & Anis, A. (2020). Pengaruh E-Commerce, Inflasi, Dan Nilai Tukar Terhadap Pertumbuhan Ekonomi Indonesia. *Jurnal Kajian Ekonomi Dan Pembangunan*, 2(1), 151. <https://doi.org/10.24036/jkep.v2i1.8902>
- Liu, S. (2013). An Empirical Study on E-commerce's Effects on Economic Growth. *Icetms*, 81–84. <https://doi.org/10.2991/icetms.2013.260>
- Matthess, M., & Kunkel, S. (2020). Structural change and digitalization in developing countries: Conceptually linking the two transformations. *Technology in Society*, 63, 101428. <https://doi.org/10.1016/j.techsoc.2020.101428>
- Maulana, Y., & Wiharno, H. (2022). Fintech P2P Lending dan Pengaruhnya

- Terhadap Pertumbuhan Ekonomi Indonesia. *Indonesian Journal of Strategic Management*, 5(1). <https://doi.org/10.25134/ijsm.v5i1.5741>
- Meneghello, F., Calore, M., Zucchetto, D., Polese, M., & Zanella, A. (2019). IoT: Internet of Threats? A Survey of Practical Security Vulnerabilities in Real IoT Devices. *IEEE Internet of Things Journal*, 6(5), 8182–8201. <https://doi.org/10.1109/JIOT.2019.2935189>
- Misini, S., & Mustafa, B. (2022). The Relationship Between Economic Growth, Unemployment, and Poverty. *Corporate Governance and Organizational Behavior Review*, 6(4), 57–63. <https://doi.org/10.22495/cgobrv6i4p5>
- Molinillo, S., Liébana-Cabanillas, F., & Anaya-Sánchez, R. (2018). A social commerce intention model for traditional E-commerce sites. *Journal of Theoretical and Applied Electronic Commerce Research*, 13(2), 80–93. <https://doi.org/10.4067/S0718-18762018000200107>
- Mustajibah, T. (2021). Dinamika E-Commerce Di Indonesia Tahun 1999-2015. *Avatara*, 10(3), 3–11.
- Najaf, K., Subramaniam, R. K., & Atayah, O. F. (2022). Understanding the implications of FinTech Peer-to-Peer (P2P) lending during the COVID-19 pandemic. *Journal of Sustainable Finance and Investment*, 12(1), 87–102. <https://doi.org/10.1080/20430795.2021.1917225>
- Nasution, E. Y., Hariani, P., Hasibuan, L. S., & Pradita, W. (2020). Perkembangan Transaksi Bisnis E-Commerce terhadap Pertumbuhan Ekonomi di Indonesia. *Jesyra*, 3(2), 506–519. <https://doi.org/10.36778/jesyra.v3i2.227>
- Nguyen, T. D., Le, A. H., Thalassinou, E. I., & Trieu, L. K. (2022). The Impact of the COVID-19 Pandemic on Economic Growth and Monetary Policy: An Analysis from the DSGE Model in Vietnam. *Economies*, 10(7). <https://doi.org/10.3390/economies10070159>
- Peng, S., Jiang, X., & Li, Y. (2023). The Impact of the digital economy on Chinese enterprise innovation based on intermediation models with financing constraints. *Heliyon*, 9(3), e13961. <https://doi.org/10.1016/j.heliyon.2023.e13961>
- Pouri, M. J., & Hilty, L. M. (2021). The digital sharing economy: A confluence of technical and social sharing. *Environmental Innovation and Societal Transitions*, 38(October 2020), 127–139. <https://doi.org/10.1016/j.eist.2020.12.003>
- Qu, L., & Chen, Y. (2014). The Impact of e-Commerce on China's Economic Growth. *13th Wuhan International Conference on E-Business, WHICEB 2014*, 66–72.
- Ramallari, A., & Velaj, E. (2023). The Impact of Education in Economy. The Case of Albania. *Review of Economics and Finance*, 21(1), 336–342. <https://doi.org/10.55365/1923.x2023.21.33>

- Rambe, R. A. (2020). Inefisiensi Belanja Pemerintah Daerah di Indonesia: Pendekatan DEA dan Regresi Logit. *Indonesian Treasury Review: Jurnal Perbendaharaan, Keuangan Negara Dan Kebijakan Publik*, 5(4), 311–324. <https://doi.org/10.33105/itrev.v5i4.175>
- Rambe, R. A., Purmini, P., Armelly, A., Alfansi, L., & Febriani, R. E. (2022). Efficiency Comparison of Pro-Growth Poverty Reduction Spending Before and during the COVID-19 Pandemic: A Study of Regional Governments in Indonesia. *Economies*, 10(6), 150. <https://doi.org/10.3390/economies10060150>
- Rediteani, N. M., & Setiawina, N. D. (2018). Jumlah Kunjungan Wisatawan, Lama Tinggal, Tingkat Hunian Hotel, Pajak Hotel Restoran, Pertumbuhan Ekonomi. *E -Jurnal Ekonomi Pembangunan*, 7(1), 114–133.
- Rivera, M. A. (2017). The synergies between human development, economic growth, and tourism within a developing country: An empirical model for Ecuador. *Journal of Destination Marketing & Management*, 6(3), 221–232. <https://doi.org/10.1016/j.jdmm.2016.04.002>
- Rusydiana, A., & Hasib, F. F. (2020). Super Efisiensi Dan Analisis Sensitivitas Dea: Aplikasi Pada Bank Umum Syariah Di Indonesia. *Amwaluna: Jurnal Ekonomi Dan Keuangan Syariah*, 4(1), 41–54. <https://doi.org/10.29313/amwaluna.v4i1.5251>
- Sawada, Y., & Sumulong, L. (2021). Macroeconomic Impact of COVID-19 in Developing Asia. *SSRN Electronic Journal*, 1251. <https://doi.org/10.2139/ssrn.3912360>
- Schieferdecker, I., & Mattauch, W. (2013). ICT for Smart Cities: Innovative Solutions in the Public Space. *Computation for Humanity: Information Technology to Advance Society*, 127–153. <https://doi.org/10.1201/9781315216751-12>
- Seghir, G. M., Mostéfa, B., Abbes, S. M., & Zakarya, G. Y. (2015). Tourism Spending-Economic Growth Causality in 49 Countries: A Dynamic Panel Data Approach. *Procedia Economics and Finance*, 23(October 2014), 1613–1623. [https://doi.org/10.1016/S2212-5671\(15\)00402-5](https://doi.org/10.1016/S2212-5671(15)00402-5)
- Shahzad, S. J. H., Shahbaz, M., Ferrer, R., & Kumar, R. R. (2017). Tourism-led growth hypothesis in the top ten tourist destinations: New evidence using the quantile-on-quantile approach. *Tourism Management*, 60, 223–232. <https://doi.org/10.1016/j.tourman.2016.12.006>
- Sugiarto, A., Manalu, S. P. R., & Pakpahan, E. (2023). Pengaruh Jumlah Kunjungan Wisatawan Dan Pajak Restoran Terhadap Pertumbuhan Ekonomi Kabupaten Tapanuli Utara Dengan PAD Sebagai Variabel Intervening. *Jesya*, 6(1), 221–232. <https://doi.org/10.36778/jesya.v6i1.903>
- Wahiba, N. F., & Ahlem, N. (2022). Relationship Between Public Expenditure, Economic Growth, and Poverty. *Review of Economics and Finance*, 20(2017), 516–523.

- <https://doi.org/10.55365/1923.X2022.20.58>
- Wajuba, L., Fisabilillah, P., & Hanifa, N. (2021). Analisis Pengaruh Fintech Lending Terhadap Perekonomian Indonesia. *Indonesian Journal of Economics, Entrepreneurship and Innovation*, 1(3), 2721–8287. <https://doi.org/10.31960/ijoeei.vii3.866>
- Widiastuti, A., & Silfiana, S. (2021). Dampak Pandemi Covid-19 Terhadap Pertumbuhan Ekonomi Di Pulau Jawa. *Jurnal Ekonomi-Qu*, 11(1), 97. <https://doi.org/10.35448/jequ.viii.11278>
- Wijaya, I. N. (2016). Analisis Jumlah Wisatawan Mancanegara, Lama Tinggal, dan Kurs Dollar Amerika Terhadap Penerimaan Produk Domestik Bruto Kabupaten Badung. *Soshum Jurnal Sosial Dan Humaniora*, 6(2), 188–200.
- Zhao, J., & Zhou, N. (2021). Impact of human health on economic growth under the constraint of environment pollution. *Technological Forecasting and Social Change*, 169, 120828. <https://doi.org/10.1016/j.techfore.2021.120828>
- Zubaidah, T., Yenriani, Putri, F. H., & Pangastuti, N. (2021). Krisis Ekonomi Bangsa Indonesia Dimasa Covid-19. *Frontiers in Neuroscience*, 14(1), 1–13.
- Zulfa, Andria; Meutia, R. (2018). The Influence of Economic Growth Per Capita and the Average Length of Schooling on the Human Development Index in West Java. *Indian Journal of Public Health Research & Development*, 9(12), p1826-1831. 6p.
- \_\_\_\_\_. Data E-commerce Indonesia 2022. Accessed on June 6th, 2023, at 23.45 WIB through website <https://grahanurdian.com/data-e-commerce-indonesia-2022/>
- Badan Pusat Statistik (BPS). (2021). Laporan publikasi pertumbuhan ekonomi Indonesia tahun 2019 dan 2021. Accessed on website <https://www.bps.go.id/subject/169/pruduk-domestik-bruto--pengeluaran-.html#subjekViewTab5> on June 6th 2023, at 10.15 WIB
- Badan Pusat Statistik (BPS). (2023). Tabel Anggaran Belanja Pemerintah Pusat Berdasarkan Fungsi (Milyar Rupiah), 2019-2023. Accessed on June 6<sup>th</sup> 2023, at 13.35 WIB through website <https://www.bps.go.id/indicator/13/1082/1/tabel-anggaran-belanja-pemerintah-pusat-berdasarkan-fungsi.html>
- BPS. (2019). Statistik E-commerce 2019. Accessed on June 6<sup>th</sup> 2023, at 13.35 WIB through website <https://www.bps.go.id/publication/2019/12/18/fd1e96b05342e479a83917c6/statistik-e-commerce-2019.html#:~:text=Statistik%20E-Commerce%202019%20Unduh%20Publikasi%20Nomor%20Katalog%20%3A,Rilis%20%3A%202019-12-18%20Ukuran%20File%20%3A%201.55%20MB>
- BPS. (2020). Statistik E-commerce 2019. Accessed on June 6<sup>th</sup> 2023, at 13.35 WIB through website <https://www.bps.go.id/publication/20>

- [20/12/24/2548417ddc6dab8247553124/statistik-e-commerce-2020.html#:~:text=Statistik%20E-Commerce%202020%20Unduh%20Publikasi%20Nomor%20Katalog%20%3A,Rilis%20%3A%202020-12-24%20Ukuran%20File%20%3A%203.81%20MB](https://www.bps.go.id/publication/2021/12/17/667821e67421afd2c81c574b/statistik-e-commerce-2021.html#:~:text=Statistik%20E-Commerce%202021%20Unduh%20Publikasi%20Nomor%20Katalog%20%3A,Rilis%20%3A%202021-12-17%20Ukuran%20File%20%3A%208.27%20MB)
- BPS. (2020). Statistik E-commerce 2019. Accessed on June 6<sup>th</sup> 2023, at 13.35 WIB through website <https://www.bps.go.id/publication/2021/12/17/667821e67421afd2c81c574b/statistik-e-commerce-2021.html#:~:text=Statistik%20E-Commerce%202021%20Unduh%20Publikasi%20Nomor%20Katalog%20%3A,Rilis%20%3A%202021-12-17%20Ukuran%20File%20%3A%208.27%20MB>
- Bank Indonesia. Laporan publikasi statistik sistem pembayaran dan infrastruktur pasar keuangan (SPIP) tahun 2019-2021. Accessed on June 8<sup>th</sup>, 2023, at 13.30 WIB through website <https://www.bi.go.id/id/statistik/ekonomi-keuangan/spip/Default.aspx>
- Otoritas Jasa Keuangan (OJK). (2023). Statistik Fintech. Accessed on June 6<sup>th</sup> 2023 at 13.45 WIB on website <https://www.ojk.go.id/id/kanal/iknb/data-dan-statistik/fintech/Default.aspx>
- Riadi, Yuni. (2020). Kolaborasi E-commerce dan Fintech Genjot Ekosistem Digital di Tengah Pandemi. Accessed on June 8<sup>th</sup>, 2023, at 13.30 WIB through website Fintech & Crypto News at link <https://selular.id/2020/09/kolaborasi-e-commerce-dan-fintech-genjot-ekosistem-digital-di-tengah-pandemi/>