

MEASURING THE IMPACT OF BUSINESS DIGITALIZATION ON INDONESIA'S ECONOMIC GROWTH IN 2020, 2022, AND 2023: A STUDY OF ELECTRONIC COMMERCE, MARKETING, AND DIGITAL PAYMENTS

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Abstract

The digital economy continues to grow in various ASEAN countries. Indonesia is the country with the largest digital economy value compared to other ASEAN countries. On the other hand, in Indonesia there are still inequalities in the use of digitalization, especially in the business sector. This could potentially affect Indonesia's economic growth. This study aims to analyze the effect of business digitalization on Indonesia's economic growth for the 2020, 2022, and 2023 periods by considering the different aspects of digitalization utilization between provinces in Indonesia. The variables used are economic growth (at current prices) as the dependent variable, electronic commerce, digital marketing, and digital payments as independent variables. The analysis is carried out with a quantitative descriptive approach, namely by describing the condition of the variables based on the data, then the data will be further analyzed by conducting panel data regression to determine the effect of the independent variables on the dependent variable. The results of this study indicate that the electronic commerce variable has a significant positive effect on Indonesia's economic growth, the digital marketing variable has no effect on Indonesia's economic growth, and the digital payment variable has a significant negative effect on Indonesia's economic growth. With these findings, it is hoped that it can be a reference for various interested parties in efforts to develop digitalization to improve the economy.

Keywords: Digitalization, Economic Growth, Electronic Commerce, Digital Marketing, Digital Payment.

INTRODUCTION

One form of technological change is digitization. Digitization can be defined as the process of changing data from analog or physical format to digital format (Zulvikri et al., 2024). In relation to the economic context, digitization has become one of the main drivers of economic growth in various countries (Abdillah, 2024; Nurdiana et al., 2023; dan Nabila et al., 2022).

According to Bain (2024), the overall value of Indonesia's digital economy when viewed from the GMV value is the largest when compared to Malaysia and Singapore. In 2022, the value of Indonesia's digital economy reached USD 76 billion, then in 2023 the value of Indonesia's digital economy grew by 6% to USD 80 billion, and then in 2024 it grew by 13% to USD 90 billion. The data indicates that digitalization can have an impact on Indonesia's economic growth. This growth can be obtained through the use of technology that can facilitate business activities and trade transactions (Gultom et al., 2024). The following graph presents a comparison of the value of the digital economy of Indonesia, Malaysia and Singapore based on GMV value.

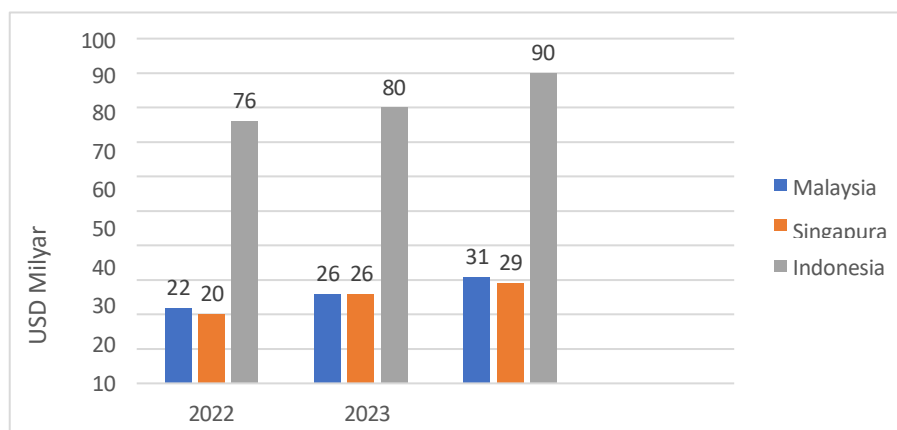


Figure 1. Comparison of the value of the digital economy of Indonesia, Malaysia and Singapore based on GMV value.

Although the value of the digital economy is the highest compared to Malaysia and Singapore, there are several challenges still faced in the development of economic digitization in Indonesia, for example unclear regulations, taxation issues, unfair competition, and uneven digitization (Sudiantini et al., 2023). In addition, according to Lasiyono et al. (2025), the lack of high-speed internet access, limited digital skills, and high operational costs are the main challenges in accelerating digitalization in Indonesia. Another challenge in accelerating digitalization in the economic sector is the impact of the development of the digital economy which poses great challenges to the government, including changes in people's lifestyles and business models (Muna & Aenurofik, 2023).

In the application of business digitalization, which is believed to have an effect on Indonesia's economic growth, in fact there are still inequalities in utilization within the scope of interprovinces in Indonesia (Dewi & Wulansari, 2021). Some regions, especially those with good Information and Communication Technology (ICT) infrastructure and access to digitally literate human resources, have been able to optimize digital technology to improve business competitiveness and expand markets. In contrast, regions with limited ICT infrastructure, low levels of digital literacy, and limited capital and access to technology training still face obstacles in adopting business digitization.

According to BPS (2025), the adoption of digital technology by businesses in Indonesia is increasing, especially in the use of electronic commerce where in 2022 the number of businesses using electronic commerce was 2,995,986 users and in 2023 it rose to 3,816,759 users. The development of the number of businesses using electronic commerce can affect the Indonesian economy. The utilization of electronic commerce by business actors can increase income, assets, production of goods, and facilitate marketing, promotion, and expand market reach (Lismula, 2022). Digital marketing is also an application of digitalization that allows businesses to save marketing costs compared to conventional marketing. Businesses can also reach a wider market with targets that can be determined. With the adoption of digital marketing, business actors can increase the added value of products and increase their business sustainability (Chusumastuti et al., 2023). Digital payment systems also support the digital ecosystem by facilitating easier and more convenient transactions (Maysari et al., 2023). Digital payment systems offer speed, ease of use, efficiency, effectiveness, transparency, and accessibility (Iradianty & Aditya, 2020). This has the potential to have a positive impact on business development, which in turn can lead to further effects in the form of better economic growth.

Research on how business digitalization through e-commerce, digital marketing, and digital payments affects Indonesia's economic growth by taking into account differences in digitalization utilization between provinces is limited. Several previous studies have shown that the use of electronic commerce and digital marketing has a positive impact on economic growth (Rahmadani et al., 2024; Fathoni & Asfiah, 2024; Aula & Suharto, 2021). However, there is no research that examines these three aspects by considering differences in the use of digitalization between provinces.

With this research gap, this study aims to fill the literature by analyzing the impact of electronic commerce, digital marketing, and digital payments on Indonesia's economic growth for the period 2020, 2022, and 2023 by considering the different utilization of digitalization in 34 provinces in Indonesia. Thus, this research is expected to contribute to the development of a more inclusive and sustainable digital economy policy.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Economic growth is the process of changing the economic condition of a country during a certain period towards a better situation on an ongoing basis (Yunianto, 2021). Economic growth is characterized by increasing production capacity, expanding employment opportunities, increasing per capita income, and improving various indicators of public welfare. With stable and sustainable economic growth, a country can achieve a higher level of prosperity and improve the quality of life of its people (Marcal et al., 2024).

Cobb & Douglas (1928) theorized that production factors can have an impact on economic growth by emphasizing the relationship between production factors in the form of capital and labor and their output. This theory reveals that capital and labor can affect the amount of output produced, which in turn can affect economic growth. This theory also includes technology, but only as an exogenous factor that is not influenced by decisions in the economic system. In other words, this theory argues that as technology increases, it can also increase the output produced without changing other factors of production, such as capital and labor.

Based on the Cobb Douglas theory, Solow (1956) also proposed his theory that long-term economic growth can be achieved by improving technology. Technology plays a role in increasing the efficiency in the use of other factors of production, such as capital and labor, so as to increase the total productivity of production factors. This increase in productivity can increase the amount of output produced, which in turn will increase economic growth.

According to Romer (1990), in his theory, endogenous growth emphasizes that knowledge accumulation and innovation are the main factors driving economic growth. This theory corrects the shortcomings of Solow's theory by explaining how technological progress occurs as a result of deliberate economic decisions. The theory explains that investment in research and development and the production of non-rival but partially-excludable ideas and technologies are the source of economic growth. The theory predicts that more open and larger economies have higher growth rates because the incentive to invest in innovation increases with wider markets. This explains why countries with access to global markets tend to develop faster than countries with limited domestic markets.

According to Rahman & Alam (2021), factors that affect economic growth in the long run include energy use, international trade, physical capital, labor, foreign direct investment, and human capital. Meanwhile, according to Hajdari et al. (2024), factors affecting economic growth include human development, level of corruption, peace, and human rights and rule of law. All of these factors together are important factors that affect economic growth.

In this study, the independent variables analyzed include e-commerce, digital marketing, and digital payments. Electronic commerce is the process of buying and selling or exchanging products, services, and information carried out electronically through computer networks, including the internet, which includes various activities such as distribution, sales, and marketing (Kurniawan et al., 2022). The development of e-commerce has changed the global trade landscape, enabling businesses to reach wider markets with greater efficiency. According to Melina & Sudrartono (2023), e-commerce offers various advantages such as cost efficiency, market expansion, and ease of promotion and customer service. With e-commerce, transactions become faster and are not bound by time and location constraints. There are three main business models in e-commerce: Business to Business (B2B), Business to Consumer (B2C), and Consumer to Consumer (C2C).

Digital marketing is the process of producing and disseminating value-added content through digital media such as Search Engine Optimization (SEO), email, social platforms, or other digital media with the aim of creating brand awareness, building loyalty, increasing product sales, and generating revenue (Ode et al., 2024). Digital marketing can directly target potential customers more specifically, efficiently, and effectively, and can realtime measure the effectiveness of marketing carried out. In its application, digital marketing involves various techniques, such as SEO, social media marketing, digital advertising, and artificial intelligence-based personalization, all of which play a role in increasing brand awareness, market reach, cost efficiency, and sales conversion (Afriani et al., 2024; Saragih et al., 2024).

Digital payment is a transaction system through electronic media without using cash. According to Zhafirah & Nuryadin (2024), digital payments can improve transaction efficiency, expand market reach, encourage business growth, and support the strengthening of the national economy. Technological developments have encouraged various innovations in digital payment systems, such as digital wallets, Quick Response Code Indonesian Standard (QRIS), mobile banking, and cryptocurrencies, which are increasingly used by the public and businesses.

Hypothesis 1: Electronic commerce has a positive effect on Indonesia's economic growth.

Electronic commerce is the process of buying and selling goods carried out by utilizing the internet network. With the use of this internet network, trading activities become more efficient, because it can cut accommodation costs in transporting or distributing goods. According to the results of research by Tanjung et al. (2022) and Aula & Suharto (2021), there is a positive and significant influence between electronic commerce on economic growth. This can happen because the digital economy is a medium to facilitate transactions, so that transactions are carried out more quickly and efficiently, which in turn can have a positive impact on economic growth.

Hypothesis 2: Digital marketing has a positive effect on Indonesia's economic growth.

According to Afriani et al. (2024), digital marketing has benefits such as expanding market reach, increasing sales, building communication with customers, increasing distribution channels, allowing producers to target potential consumers specifically, and increasing time, cost, and convenience efficiency. This can indirectly affect economic growth, because if business conditions are good and can develop, then business people will get more profits so that they can continue to develop their business and have a multiplier effect on the economy.

In research conducted by Krisnawati et al. (2019) found that digital marketing had a positive impact on the income of Karawang Regency. In another study, it was also found that the use of digital marketing can have a positive effect on business turnover because it can minimize production costs, expand markets, and increase profitability (Fevriera et al., 2023).

Hypothesis 3: Digital payments have a positive effect on Indonesia's economic growth.

Digital payment is a payment process that utilizes the internet network in its application. With the application of digital payments, payments become easier, faster, safer, and more efficient (Mellani & Putri, 2024). In research conducted by Aguilar et al. (2024) stated that digital payments have an impact on increasing GDP per capita. This can indirectly increase economic growth. In line with previous research, research from Aldaas (2021) also found that in Saudi Arabia and the UK digital payments encourage economic growth, due to the positive relationship between digital payment utilization and GDP growth in the medium and long term.

RESEARCH METHODS

This research was conducted using a quantitative descriptive approach. The selection of the method is based on its usefulness, namely to explain a problem under study using numerical or statistical data. With the use of numerical or statistical data, it is hoped that the resulting research can accurately describe the problem under study.

The object of this research is the effect of business digitalization on Indonesia's economic growth. While the subject of this research is the provincial area in Indonesia, which includes 34

provinces. The data used is secondary data in the form of dynamic tables and publication reports obtained from the Indonesian Central Bureau of Statistics. The data consists of data for 34 provinces in the period 2020, 2022, and 2023. This is due to the limited availability of data at the BPS source. The selection of 34 provinces is based on the suitability of the data for 2020, 2022, and 2023 where the division of the province into 38 provinces only occurred in 2022, so that in 2022 the availability of data from the province resulting from the expansion was not yet available. Because in 2020 there were 3 empty data, namely North Kalimantan digital marketing and payment data and North Sulawesi digital payment data, efforts were made to complete the data using the mean input method where the data was obtained from the average value of existing data in one island where the provincial data did not exist.

Panel data regression analysis is used to determine the effect of independent variables on the dependent variable based on the data that has been collected. The stages in conducting panel data regression analysis start from choosing the best model, whether the Common Effect Model or Fixed Effect Model or Random Effect Model. The next stage is to conduct a classic assumption test in the form of multicollinearity and heteroscedasticity tests so that the analysis results become more accurate. The final stage is to conduct an overall model test, Adjusted R Square, partial variable test, and hypothesis testing. This study uses the following regression equation model:

$$EG_{it} = \alpha + \beta_1 EC_{it} + \beta_2 DM_{it} + \beta_3 DP_{it} + e_{it} \quad 1$$

Description:

EG	= Economic Growth
EC	= Electronic Commerce
DM	= Digital Marketing
DP	= Digital Payment
α	= Constant
β	= Independent Variable Coefficient
i	= Unit cross section
t	= Unit time series
e	= Error Rate

RESULTS AND DISCUSSION

Table 1. Descriptive Analysis of Research Data (%)

	EG	EC	DM	DP
Mean	6,11	28,92	60,49	16,78
Median	7,51	28,33	61,98	15,92
Maximum	35,10	56,79	91,25	50,31
Minimum	-68,87	12,17	24,73	3,63
Observations	102	102	102	102

Source: Excel (2025) (data processed)

In table 4.1 above, it is known that during the study period, the average economic growth in 34 provinces was 6.11%. On the other hand, the average use of electronic commerce, digital marketing, and digital payments is 28.92%, 60.49%, and 16.78%, respectively. When viewed from the maximum and minimum values, the economic growth variable has a maximum value of 35.10% and a minimum value of -68.87%, the electronic commerce variable has a maximum value of 56.79% and a minimum value of 12.17%, the digital marketing variable has a maximum value of 91.25% and a minimum value of 24.73%, and for the digital payment variable has a maximum value of 50.31% and a minimum value of 3.63%. From this figure, it can be seen that during the research period there is a large distance between the maximum and minimum values in the data.

Based on the data that has been collected, an analysis is carried out using the panel data regression analysis method. In this study, the best model is the common effect model. After knowing which model is the best, then the classical assumption test is carried out which in this study has passed the heteroscedasticity and multicollinearity tests. The last stage in the data analysis process in this study is to conduct hypothesis testing. The following will present a table of data estimation results.

Table 2. Model Estimation Results

Variabel	Koefisien	t-Statistik	Prob.
C	2,973	0,269	0,788
EC	0,327	2,056	0,043
DM	-0,007	-0,069	0,945
DP	-0,350	-1,983	0,050
Ajusted R-square	0,048		
F-statistik	2,712		
Prob(F-statistik)	0,049		

Source: EvIEWS (2025) (data processed)

Based on table 4.5 above, the estimation results using the CEM model can be written as follows:

$$EG_{it} = 2,973 + 0,327 EC_{it} - 0,007 DM_{it} - 0,350 DP_{it} \quad 2$$

According to table 2, the Adjusted R-Square value is 0.048, which means that the model is able to explain 4.8% of the dependent variable, namely economic growth. On the other hand, because the hypothesis test in this study uses a 1-way test, namely the positive direction, then based on the number of samples, the number of variables, and the alpha value of 0.05, the t table value is 1.661. Based on table 2, the estimation results show that there is only one variable that is in accordance with the hypothesis, namely the electronic commerce variable. The digital marketing variable has no effect on economic growth, but the coefficient is negative. The digital payment variable affects economic growth, but the effect is negative.

Although the test results show that only electronic commerce has a positive effect on economic growth, the independent variables simultaneously affect economic growth. This can be seen from the F statistic value of 2.712, which is greater than the F table value of 2.697. When viewed from the probability value, the probability value of the F statistic is 0.049 which is smaller than 0.05, so it can be concluded that simultaneously the independent variables affect economic growth.

The results of the F test which state that the independent variables simultaneously affect economic growth are based on the reason that the use of electronic commerce, digital marketing, and digital payments can simultaneously increase business growth through ease of making transactions and increasing business efficiency. This can lead to further effects in the form of increased business development which will also have an impact on increasing the availability of jobs, and ultimately can affect Indonesia's economic growth. The findings in this study are in line with Abdillah (2024) which states that the digital economy which includes the use of electronic commerce, marketing, and digital payments has an effect on Indonesia's economic growth. The study states that the impact of the digital economy on Indonesia's economic growth can be seen from several aspects including increased productivity, increased employment, increased business competitiveness, and economic equity.

Based on table 2, the electronic commerce variable has a positive effect on economic growth. The utilization of electronic commerce by business actors can increase business efficiency because business actors can more easily reach their consumers and then carry out the transaction process electronically without being limited by space restrictions. On the other hand, when viewed from the consumer side, electronic commerce offers convenience in shopping online, making it easier for consumers to buy goods offered by business actors, so that it can trigger business growth. This business growth, in turn, can have a multiplier effect in the form of increased availability of employment, increased community income, and ultimately can have a positive effect on Indonesia's

economic growth. These findings are in line with the research of Nasution et al. (2020) and Nur'aini (2023) which state that electronic commerce is part of the digital economy which is an engine driving economic growth due to increased competitiveness and accessibility to global markets, improving people's welfare, and increasing productivity and efficiency.

The digital marketing variable in this study basically has no significant effect on Indonesia's economic growth. This result is caused by the coefficient value of digital marketing which is too small, namely -0.007. The coefficient value that is too small causes the effect to be small, so that its effect on economic growth is considered non-existent. According to Nieminen et al. (2013) regression coefficients are used as a measure of the magnitude of the effect caused. A small coefficient (e.g. below 0.29) is categorized as having a small effect, which is often not statistically significant.

According to table 2, the analysis results show that the digital payment variable has a negative effect on Indonesia's economic growth. When viewed from the data between the value of economic growth and the value of digital payment utilization, there are different trends between the two. In the economic growth data, most provinces have a tendency for economic growth patterns to increase from 2020 to 2022, then decrease from 2022 to 2023. The increase that occurred in 2022 was due to the easing of restrictions on community mobility, so that community economic activities could run more smoothly. The large growth value is due to the phenomenon of false growth where the economic growth rate looks very high because in the base year (previous year) the economic growth rate is very low due to extreme conditions, such as the Covid-19 pandemic. This results in the creation of a false picture of economic growth, not entirely due to a substantial increase in economic output (INDEF, 2021).

In the digital payment utilization data, some provinces experience a trend pattern of increasing digital payment utilization from 2020 to 2022, then to 2023, but some have a decreasing pattern from 2020 to 2022, then an increase from 2022 to 2023. This is different from the trend pattern of economic growth. When compared, there will be a pattern that shows when there is a decrease in the use of digital payments, the value of economic growth increases and when there is an increase in the use of digital payments, the value of economic growth decreases. The existence of this contradictory pattern indicates a negative influence between the utilization of digital payments and economic growth.

CONCLUSION

The adoption of business digitalization, which includes the use of electronic commerce, digital marketing, and digital payments, jointly affects Indonesia's economic growth. However, if a spatial test is conducted, only the electronic commerce variable has a positive effect on Indonesia's economic growth. The digital marketing variable has no effect on Indonesia's economic growth, while the digital payment variable has a negative effect on Indonesia's economic growth.

Implications based on the results of this study include the need for government efforts to increase the adoption of digitalization by business actors by increasing equitable internet access and the ability of the community, especially business actors, to utilize business digitalization. Provincial governments with relatively low levels of business digitalization adoption need to make efforts to catch up, for example by collaborating and exchanging knowledge with provinces with higher levels of business digitalization adoption. From the private sector, there needs to be an active role in providing solutions in the form of digital platforms that are easy to use, affordable, and relevant to be adopted by businesses to support their business activities. From the researcher side, it is necessary to explore variables that are still relevant by future researchers for further research development.

The limitation in this study is the incomplete data of the independent variables, so that in future studies it is expected to complete the data so that the analysis can be done more accurately. Another limitation is that in this study, it still uses cross section data with a per-province database,

further research can use a per-district / city database, so that it can more comprehensively describe the situation in Indonesia.

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