



RESEARCH ARTICLE

Analysis Of The Impact Of Telecommunications Infrastructure And Goods Expenditure On Gross Domestic Product (Period 2000-2023)

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Abstract

This research aims to analyze the influence of telecommunications infrastructure and government spending on goods on gross domestic product (GDP) in Indonesia in the period 2000-2023. The analysis method used is linear regression. The dependent variable for this research is the Gross Domestic Product (GDP); the independent variables are the number of broadband network users, cell phone users, and goods expenditure. The results of the research show that cell phone use and shopping for goods have a positive and significant effect on gross domestic product in Indonesia, while the broadband network user variable does not have a significant effect on gross domestic product. This research provides new insight into the importance of digital economic integration and telecommunications infrastructure development as supporting factors for gross domestic product (GDP) development..

Keyword: Goods Expenditure, Telecommunications Infrastructure, Broadband Network Users, Mobile Phone Users, Gross Domestic Product.

Introduction

In the era of globalization and the 4.0 industrial revolution, the digital economy has become one of the key factors contributing to the economic growth of a country. E-commerce, as one of the major pillars of the digital economy, has transformed the way consumers shop and interact with markets. With the ease of access and transactions offered, e-commerce has grown rapidly and become a new force in the global economy. Technological developments, and the telecommunications infrastructure, have enabled Indonesians to access a wide range of products and services without geographical constraints, which has helped to increase purchasing power and consumption.

The economic growth theory developed by Robert Solow in 1956 is one of the most influential macroeconomic theories in the analysis of long-term economic growth, emphasizing the role of accumulation of capital, labor, and especially technology as key factors driving economic growth. According to Solow, technology plays a key role in economic growth because of its ability to increase productivity. In his model, Solow assumed that technology evolved exogenously, meaning that technological progress occurred outside the model and was not explained by the factors in the model itself. Technological progress is seen as a residue that explains the portion of output growth that cannot be explained by the accumulation of capital and labor growth alone.

The Solow model shows that, in the end, sustainable economic growth can only be achieved through technological progress. The accumulation of capital and the growth of labor

may boost economic growth, but the effects will diminish over time as the law of yields diminishes. Therefore, without constant technological innovation, economic growth will slow down and approach zero growth rates. The Solow-Swan approach, which is an extension of Solow's theory, also emphasizes the importance of technological progress. This model states that long-term economic growth depends on capital accumulation and technological advances. Capital accumulation includes investments in physical and human resources, while technological advances include discoveries, increased productivity, and the spread of existing technology throughout the economic sector.

In the modern context, the relevance of Solow's thinking is still felt. In an era of economics driven by innovation and knowledge, technology is becoming more important than ever. Investment in R&D, education, and technological infrastructure are key factors that can accelerate economic growth and improve people's well-being.

The availability and quality of telecommunications infrastructure play a direct role in determining the efficiency and efficiency of economic activity. Expanding telecommunications infrastructure has connected remote areas of Indonesia to global markets. This opens up new opportunities for local entrepreneurs to expand their range of products and services. The availability of reliable telecommunications infrastructure has driven innovation in various economic sectors. Companies can increase their productivity through the use of infrastructure-related technologies such as mobile phone use and broadband network use. In a previous study conducted by (Isa & Adeniji, 2015) investigating the relationship between telecommunications infrastructure and economic growth in Nigeria, the findings found that telecom infrastructure influences economic development in Nigeria while in a study carried out by (Khaira & Ariusni, 2020) finds that telecom infrastructure does not have a predetermined impact on Indonesian economic growth.

goods expenditure, as an indicator of domestic consumption, also has a significant impact on Gross Domestic Product (GDP). When the government spends on goods, whether

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for administrative purposes or infrastructure development, this can increase economic activity through purchasing goods and services from domestic producers. Thus, government spending can be a stimulus for economic growth, because it increases aggregate demand which ultimately contributes to increasing GDP. Research conducted by (Gosal et al., 2022) found that spending on goods affects economic growth

Based on my background and previous research, I am interested in researching the influence of the number of broadband network users and cell phone users and goods expenditure on Indonesia's gross domestic product. It is hoped that this research will provide valuable insights for policymakers, business people and academics interested in the intersection of technology, economics and social development. By understanding the influence of the digital economy, telecommunications infrastructure and goods spending on economic growth, Indonesia can formulate the right strategy to utilize digital technology as a driving force for inclusive and sustainable gross domestic product.

Method

This research uses a quantitative approach with a time series data analysis method. The data time series used is annual data from 2000 to 2023. The analytical tool used is SPSS 24. As for the dependent variable in this study, the gross domestic product measured by GDP is constant price and the independent variable is the telecommunications infrastructure seen from the number of fixed broadband subscriptions and mobile cellular subscriptions and government consumption expenditure for goods spending.

The constant price of the Gross Domestic Product (GDP) is the total value of all goods and services produced in a country in a given period. It gives a more stable measure of a country's economic output. Fixed broadband subscription refers to the number of non-mobile or fixed high-speed internet subscriptions, which indicate the infrastructure that supports internet access at home or work. Mobile cellular subscription is the amount of mobile service subscription that indicates mobility and communication availability for individuals. Government consumption expenditure for purchasing goods includes all government purchases for products that will be used to provide public services or for public investment.

The data required for the analysis was obtained from the Central Statistical Agency (BPS), the World Bank and the Internet Service Organizers Association of Indonesia. (APJII). The data collected will be analyzed using a dual linear regression model to determine the significant impact of independent variables on dependent variables. This analysis will help in understanding the relationship and impact of telecommunications infrastructure and commodity spending on economic growth.

The regression equation for research is :

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where :

Y= GDP (thousand)

X1 = Number of fixed broadband subscription(thousand)

X2= Number of mobile cellular subscriptions (thousand)

X3= Number of spending of goods(thousand)

e = error term.

Results and Discussion

Determination coefficient (R-square)				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.985 ^a	.970	.964	793567587700.000
a. Predictors: (Constant), spending of goods(X3), Fixed broadband subscription (X1), mobile cellular subscription (X2)				

The study found that the value of the r-square is 0.970 or equal to 97 percent which means that the independent variables fixed broadband subscription, mobile cell subscription and commodity purchases can explain the dependent variable which

Gross Domestic Product Development, Mobile Phone Users, Broadband Users And Spending Of Goods Indonesia

In the period from 2000 to 2023, Indonesia has experienced a year-on-year increase in gross domestic product, which can be influenced by several factors such as mobile phone users, broadband users and goods purchases.

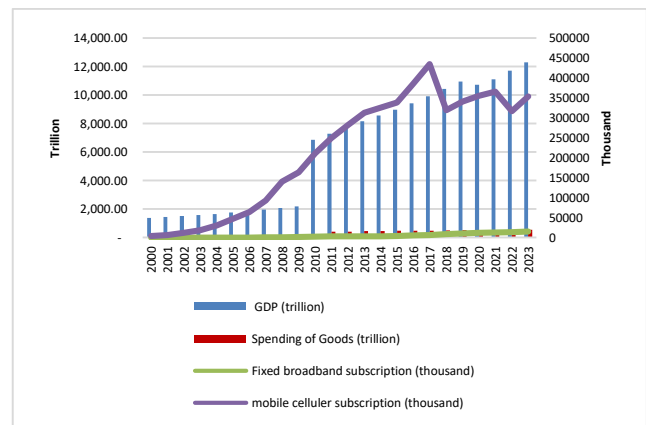


Fig 1. Gross Domestic Product Development, Mobile Phone Users, Broadband Users and Spending of Goods in Indonesia

Graph 1 shows a positive trend in the Indonesian economy from 2000 to 2023, with GDP rising consistently, indicating the contribution of various sectors to the emerging economy. In addition, high-speed internet usage has also increased sharply, from 4,000 to 14.91 million users by 2023, up 7.6% from the previous year, reflecting improved technology infrastructure. The introduction of 3G technology in the early 2000s and the launch of commercial services in 2006 have driven the rise in mobile phone use, with 357 million users in 2023, indicating Indonesia's transition to a connected information society. This growth not only shows the technology adaptation by society but also opens up huge opportunities for innovation and further development. In terms of government spending, there are significant fluctuations in commodity spending with a peak in 2023 of Rp. 553,066 billion, indicating an increase over previous years and reflecting changes in policy and dynamic economic conditions.

Results Double Linear Regression Analysis

(1). Determination coefficient test (R-square)

R-square, or determination coefficient, is a statistical measure in a regression model that shows the proportion of variance in a regression model that shows the proportion of variance of dependent variables that can be explained by independent variables. R-square values range from 0 to 1 and are often expressed as a percentage from 0% to 100%. High R-courts indicate that regression models have a good ability to explain and predict variability depending on variables based on independent variables.

is gross domestic product 97 percent while the remaining 3 percent can be explained by other variables that do not exist in this study.

(2). Test the hypothesis

In research, the two main methods used to test hypotheses are the T test and the F test. The t-test, also known as the partial hypothesis test, is a statistical technique that evaluates the significant influence of one independent variable on a

dependent variable. On the contrary, the F test, or simultaneous trial, is used to check whether there is a significant impact of several independent variables jointly on the dependent variable in a regression model.

Table 1. Results of the hypothesis test

Model	Unstandardized Coefficients			Standardized Coefficients	T	Sig.
	B	Std. Error	Beta			
1	(Constant)	79802555100.000	298741825900.000		2.671	0.015
	Fixed Broadband Subscription (X1)	298878202.000	198480581.000	0.349	1.506	0.149
	Mobile Cellular Subscription (X2)	9764212.838	4108448.339	0.345	2.377	0.028
	Spending Of Goods (X3)	8.281	3.064	0.426	2.703	0.014
	F-statistic		153.00			
	Prob (Fstatistic)		.000 ^a			

a. Dependent Variable: PDB

b. Predictors: (Constant), spending of goods (X3), Fixed broadband subscription (X1), mobile cellular subscription (X2)

In the partial test results (test) of Table 2, broadband network users, the research results showed that fixed broadband subscription users had a positive and insignificant influence on gross domestic product. This may be because, with the increasing use of mobile phones equipped with internet services and data quotas from various providers, the public may not feel the need to subscribe to broadband networks. Besides, although broadband networks have been available, they are still limited in some areas, as well as relatively high access costs. Broadband networks tend to be used by large-scale, while micro MSMEs can still rely on mobile phones for their business activities. In the context of micro MSMEs, the need for broadband networks is not too urgent, as they can operate with the existing infrastructure.

Meanwhile, for mobile phone users, the results of the study show in Table 2, that mobile phone user has a positive and significant influence with a coefficient of 9,764,212,838 which means an increase of 1,000 mobile phone use will increase the gross domestic product of 9,764 billion rupees in Indonesia and for commodity, spending has a negative and significant impact with the value of a factor of 8,281 which means that when the commodities spending increases by 1 trillion rupias then the gross national product will increase by 8,28 trillion rupee in Indonesia.

The use of mobile phones and government spending on expenditure on goods influence gross domestic product. This can be seen through MSMES. MSMES, which contributes 61 percent to GDP by 2023, can use cell phones to sell its products and reduce operating costs so that MSMES revenue will increase. In Indonesia, by 2023 as many as 24.8 million MSMEs have been using online platforms where which shows an increase from the previous year, 20.8 million by 2021. Moreover, with government spending, on commodities, governments can invest in infrastructure and technology can create a double effect on the economy by stimulating business activity and the mobility of goods and services. Which will ultimately increase the economic productive capacity in the long term.

Simultan testing (F test) in Table 2 showed that a significant value of F of 0,000 which means independent variables such as internet usage, fixed broadband subscription, mobile cellular subscription, and commodity purchases can affect the dependent variable of gross domestic product simultaneously.

Influence Of Mobile Phone Users On Gross Domestic Product

Indonesia has undergone a significant digital transformation, which is reflected in its gross domestic product. One important indicator of this transformation is the increase in the number of mobile phone users. Based on the results of mobile cellular subscription research on gross domestic product

in Indonesia have a positive and significant impact which is in line with previous research carried out by (F.W, 2018; H.lee et al., 2020; Musa et al., 2023; Ngatono, 2016; Pradono, 2021; Röller & Waverman, 2003; Wahyuningtyas et al., 2019).. The positive impact of mobile subscriptions on GDP in Indonesia. With better access to mobile networks, individuals can communicate and transact more efficiently, increasing productivity. Moreover, mobile subscriptions support the digital economy by enabling e-commerce and online business. It creates new opportunities for entrepreneurs and small to enter the market, which can boost innovation and competition.

Impact Of Goods Purchases With Gross Domestic Product

Procurement of goods by the government is one of the important components of fiscal policy that has a strategic impact on a country's gross domestic product. Based on the results of the research that has been carried out it has been achieved that the expenditure of goods against the Indonesian gross domestic product has a positive and significant influence. This study is in line with previous research (Waryanto, 2017) that showed that government spending, including expenditure on commodities, has a significant relationship with economic growth. It can be explained through some mechanisms. First, government spending on goods can boost aggregate demand, which boosts production and investment. Second, spending is often directed to infrastructure projects that have a multiplier effect, create jobs, and increase productivity.

One of them is goods purchases that can be used against technological infrastructure that plays an important role in supporting economic growth. Infrastructures such as telecommunications networks, data centers, and other information technology support facilities, not only strengthen the foundations of the digital economy but also enable innovation and operational efficiency. The development of ICT infrastructure can accelerate the process of digitization, which is vital in an era of globalization and a knowledge-based economy. With adequate ICT infrastructure, governments can provide more efficient public services, support locals to compete in global markets, and increase financial inclusion through technology..

Conclusions and Recommendations

Based on the results of the research that has been conducted, it was found that the number of cell phone users and purchases of goods have a positive and significant effect on GDP. The growth of mobile users is driving the expansion of digital services and increased data consumption. On the other hand, government spending on goods creates stable demand for products and services, which supports domestic production and

creates jobs. Future research could examine the effects of the digital economy on economic inequality in Indonesia, including the influence of e-commerce on income and employment in cities and villages, as well as the impact of telecommunications infrastructure on education and health.

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