

ANALYSIS OF INFRASTRUCTURE EFFECT ON INDONESIA'S ECONOMIC GROWTH YEAR 2007 - 2014

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Abstract

A production process requires inputs to be used to produce output. The input according to Solow is the capital and labor described in the Cobb – Douglas function. Infrastructure can be said as capital in an effort to increase productivity, since labor requires supporting facilities that can increase their productivity. Therefore infrastructure is seen as having an important role in driving economic growth, so that adequate infrastructure is expected to have a positive impact on economic growth. This study aims to analyze the influence of the availability of infrastructure that is divided into economic infrastructure, social infrastructure and institutional infrastructure, on the economy in Indonesia which is described by the GDP. This study uses secondary data in 33 provinces in Indonesia in 2007-2014. This study uses panel data regression using the fixed effect model and correction of Heteroscedasticity and Autocorrelation Consistent (HAC).

Based on the results of econometric regression, it is known that the variables of road, electricity, education, health and capital expenditure have a positive and significant effect. While the employee expenditure variable has a positive but not significant relationship. In addition, it is known that telephone variables have a negative and insignificant relationship. The results of this study also show that electricity infrastructure has the biggest influence on economic growth..

Keywords: *Infrastructure, Economic Growth, Indonesia, Data Panel Regression, Fixed Effect,*

1. INTRODUCTION

Development is intended to improve the economy of an area to encourage better community welfare. The government as a regulator as well as a driver of development has an important role in order to improve the welfare of society and economic growth in the country. Todaro Smith explained that economic growth has several components, namely capital accumulation which includes investment in production factors, human resources through improvements in education and health. Growth in population which can then lead to growth in the workforce so as to encourage the level of productivity in a country. This has also been explained in the Solow growth theory based on the Cobb-Douglas function.

Capital accumulation is the first step to increase and encourage production activities. The capital accumulation occurs due to investment or investment, followed by an increase in production. The increase in production was supported by the presence of infrastructure. In addition to capital production factors which have an important role, labor factors also play a role in the production process. The availability of quality labor will drive productivity in the economy which will drive economic growth. Improving the quality of the workforce is done through improvements in education and health.

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Infrastructure has an important role in economic growth. Infrastructure as an accelerator in economic growth can increase productivity. Infrastructure can be said as an economic wheel for a country, because some infrastructure sectors such as telecommunications, electricity and water are used as inputs in the production process in almost all sectors in the United States and Japan (World Bank 1994). Infrastructure is not only used for final consumption, but is also used to encourage productivity such as through reducing the time and effort made to get access to clean water, bringing crops to the market. In addition, the company can reduce the cost of distributing goods. The availability of infrastructure will make it easier to connect between regions with existing integrated regions and will further reduce production costs.

Infrastructure development will increase employment and other economic activities, reduce production costs through ease of transportation and connectivity. Increased productivity by providing better connections to the market or access to other economic facilities. So with the limited availability of infrastructure that has been experienced so far, it causes obstacles to maximize opportunities in increasing economic activity which then causes high logistics costs and makes economic costs high and leads to an increase in prices of goods and services. This will impact on the reduced level of competition in economic activity.

Based on reports from the World Economic Forum, Indonesia's position is below that of Singapore, Malaysia and Thailand in the ASEAN sphere. Looking at data from the World Economic Forum, although Indonesia is still lagging behind the three neighboring countries namely Singapore, Malaysia and Thailand but when compared with 2016 - 2017, Indonesia has increased in the following year with a score that also increased to 4.5 in the 52nd rank from the previous 4.2 in the 60th rank. This can illustrate that Indonesia's infrastructure development is still a challenge that must be faced and continues to strive to improve infrastructure performance.

The problems in the infrastructure sector in Indonesia are still quite a lot, especially the problems regarding the quantity, quality, capacity to the even distribution of infrastructure development. Indonesia's economic activities are still concentrated in western Indonesia, especially on Java. This can be seen from the contribution of Java Island GRDP which dominates more than 50% of the total Indonesian GDP. The capacity and availability of adequate infrastructure will help drive the economy and competitiveness in the region.

The problems described above can illustrate the important role associated with the availability of infrastructure in the course of economic activities and the impact of infrastructure on development in an area. This makes the problem of the availability of infrastructure against the running of the economy in Indonesia a thing that deserves further investigation.

2. LITERATUR STUDY

The Solow growth model is designed to show how growth in capital stock, labor and technological developments interact in an economy and how it affects the total output of national goods and services (Mankiw 2000). An important modification of the Harrod-Domar growth model is that the Solow model allows for a substitution between capital and labor.

The aggregate production function, $Y = F(K, L)$ is assumed with a constant returns to scale. As in the case of the function known as the Cobb-Douglas production function, at time t is obtained

$$Y(t) = K(t)^\alpha (A(t)L(t))^{1-\alpha}$$

Where Y is the national output, K is the stock of capital that includes both physical capital and human capital, L is labor and $A(t)$ is labor productivity that grows continuously at an exogenous level.

Infrastructure in general can be understood as anything that is used as the main support to be able to do a process. Infrastructure is generally known as public facilities such as roads, bridges, hospitals and so on. Based on the Routledge Dictionary of Economics infrastructure

is a basic service or social capital of a country, which enables the implementation of social economic activities by providing transportation, health and education facilities and buildings for community activities (Rutherford 2002). Railways, hospitals, roads, schools and sanitation systems and reservoirs are the basic types of social capital.

Solow's growth theory explains that productivity is influenced by labor and capital and technology as exogenous factors. Any change in either an increase or decrease in output will be affected by changes in the level of labor and capital (Canning 1999). In this study, capital is represented by the availability of infrastructure which is categorized into three namely, economic infrastructure, social infrastructure and institutional infrastructure. Economic infrastructure consists of the length of roads, electricity distribution and the number of telephone users. Social infrastructure consists of the number of hospitals and puskesmas and the number of secondary schools (SMA). Institutional infrastructure consists of capital expenditure and employee expenditure. The availability of infrastructure will then affect the GRDP growth of each province in Indonesia and share infrastructure with labor as an assumption of productivity levels. The growth marked that there was an increase and development in various sectors with infrastructure as a driver in the economy.

Economic Infrastructure

Roads become one of the important infrastructures in the economy for accessibility between one region and another. Especially in economic activities in terms of the distribution of factors of production and production results (goods and services). Road and Ravallion (2002) found that increased road density had a positive and significant effect on household agricultural consumption expenditure in poor areas in China. As well Démurger (2001) Examining the role of infrastructure in growth performance in 24 provinces in China, he concluded that infrastructure support together with openness of reform and location is geographically significant to see differences in growth performance in the provinces. Then, the study states that transportation facilities are the key differentiating factor to explain the growth gap.

Electrical energy that can be distributed to the community illustrates how much availability of an area's access to electrical energy that can be used to drive the economic activities of the area. Electricity infrastructure as both consumer goods and intermediate goods is related to income growth so that the causality relationship between infrastructure and income may be related both ways. In Cook (2011) Huang's research groups countries by income to examine the relationship between energy consumption and growth. The study found a two-way relationship between electricity consumption and growth. Low-income countries do not have a causal relationship between electricity consumption with growth, middle-income countries economic growth leads positively to electricity consumption while high-income countries are negatively related.

During the last few decades there have been rapid developments in the world economy that began as an industrial society shifted to an informative society. This is driven by the development of technological advancements which then increase the role of information in human life has changed the pattern of business activities carried out in various sectors. Canning (1999) found elasticity related to telephone stock of around 0.14 holding capital stock constantly, which means there is a big impact from the increase in telephone stock. In addition, these results indicate that there are large externalities to telecommunications infrastructure in both developing and under-developed countries. The fact in this study that the telephone has a higher productivity than other types of capital in the study.

Social Infrastructure

Social infrastructure has a role in the economy to be able to improve the quality of human resources themselves. According to Hall and Jones (1999) Social infrastructure such as education and health is very important to promote better use of physical infrastructure and human resources and improve quality of life. Economic development cannot be ruled out by

education. Likewise according to Myrdal in Jhingan (1993) to start a national development program without regard to the education of its inhabitants is futile. Through education the government can increase the effective stock of workers and the productive capacity of the nation. Primary and secondary education needs to be provided so that every school-age child can enjoy educational services.

Institutional Infrastructure

An better economy an institution will have an impact on increasing economic efficiency and performance. A good institution will reduce the uncertainty in economic activities. Economists have long recognized that economic growth is related to the ability of society to increase its human resources, physical capital and technology. In this case, technology is not only related to techniques available to companies, but also in production organizations which implies that several countries will use resources efficiently (Acemoglu and Robinson 2010).

The role of institutions can also be seen from the amount of expenditure made by the government to finance government activities to encourage economic activity. Research Come on (2005) examining the relationship between government spending and economic growth in the United Kingdom between 1830-1993, the results of causality - granger shows that government spending causes growth. As government spending increases (as part of GDP), GDP growth also increases.

In the aspect of institutional infrastructure, this study will use indicators of capital expenditure and employee expenditure. The use of capital expenditure indicators is intended to show how efficient an institution is in using available resources, in this case capital expenditure to be able to improve the performance of economic activities. While employee expenditure indicators are intended to show how efficient an institution is to encourage economic performance through employee incentives.

This study will look at the effect of economic and social infrastructure and institutional infrastructure on economic growth using the basic theory of Solow economic growth with the Cobb-Douglas model in which infrastructure is assumed as capital. The hypothesis that will be tested in this study are:

- a. Road infrastructure is thought to have a positive influence on Indonesia's provincial GRDP
- b. Electricity infrastructure is thought to have a positive influence on the provincial GRDP in Indonesia
- c. Telephone infrastructure is thought to have a positive influence on the provincial GRDP in Indonesia
- d. Health infrastructure is thought to have a positive influence on the provincial GRDP in Indonesia
- e. Education infrastructure is thought to have a positive influence on the provincial GRDP in Indonesia
- f. Capital expenditure infrastructure is thought to have a positive influence on Indonesia's provincial GRDP
- g. Employee expenditure infrastructure is thought to have a positive influence on Indonesia's provincial GRDP.

3. RESEARCH METHODOLOGY

Research variable

The variables used in this study consisted of the dependent variable and the independent variable. The dependent variable is the variable that is affected or that is the result, because of the independent variable (independent). The independent variable is the variable that influences or which causes the change or emergence of the dependent variable (bound). Meanwhile, the control variable is a variable that is thought to have a close relationship in influencing the dependent variable.

In this study, Gross Regional Domestic Product (GRDP) is used as the dependent variable. While the other seven independent variables consist of infrastructure variables

which are divided into three groups, namely economic infrastructure (road length, number of electricity distribution and number of telephone and cellular phone users), social infrastructure (number of hospitals and health centers and number of high schools), and institutional infrastructure (capital expenditure and employee expenditure). This research is in the period of eight years, 2007 - 2014 and uses samples in 33 provinces in Indonesia.

Analysis Method

The approach used to see the condition of infrastructure on economic growth of this study uses fixed effect analysis with panel data regression with the help of the Eviews 9. Panel data (pooled data) is a combination of time-series and individual data (cross-section). Although the fixed effect regression model has different intercepts for each observation, each interception in each observation does not change over time, this is what is meant by time-invariant. In addition, the fixed effect assumes that each coefficient (slope) of each independent variable does not differ for each individual or intertemporal. This model is also known as the Least Square Dummy Variable Model

Panel Data Regression Analysis

This study analyzes the effect of infrastructure on the economy in Indonesia. The approach in this study uses the Cobb-Douglas function, with a model that has been used by previous research (David Canning, 1999)

$$Y_{it} = A_{it}K_{it}^{\alpha}L_{it}^{\beta}U_{it}$$

Where, Y is the output proxied by GRDP, A is the total factor of production, K is capital for infrastructure, L is labor, i is an index for the province, t is an index for the year and U is the error term. Equation (2) is used to estimate the effect of infrastructure on GRDP, where infrastructure in this case acts as capital. So we get a research model that will be used as follows:

$$\ln PDRB_{it} = \ln \alpha_{0i} + \ln \alpha_1 road_{it} + \ln \alpha_2 electric_{it} + \ln \alpha_3 telephone_{it} + \ln \alpha_4 hospitals_{it} + \ln \alpha_5 highschool_{it} + \ln \alpha_6 bmodal_{it} + \ln \alpha_7 employee_{it} + \mu_{it}$$

Where,

- Ln PDRB : GRDP above 2010 constant prices per labor
- Ln Road : Long length of paved roads regardless of road conditions (Km) per worker work
- Ln Electric : Ln amount of electricity distributed (GWh) per workforce
- Ln Telephone : Ln number of telephone and cellular (soul) users per workforce
- Ln Hospitals : Ln number of hospitals and puskesmas (units) per workforce
- Ln high school : Ln the number of physical high schools (units) per workforce
- Ln Bmodal : Ln amount of capital expenditure (Billion Rupiah) per labor
- Ln Employee : Ln amount of employee expenditure (Billion Rupiah) per workforce

4. RESULT AND DISCUSSION

Infrastructure Conditions

The condition of infrastructure in Indonesia in 2007 - 2014 in general continued to increase. Based on BPS data on economic, social and institutional infrastructure, there is an increasing development even though some types of infrastructure experience fluctuating developments in several provinces. Roads are one of the important physical facilities in the field of land transportation. Roads have a strategic function in connecting one area to another. In addition, the road functions as a link between production centers and marketing areas, the existence of road facilities is considered to have benefits in improving the economy.

Infrastructure development in Indonesia continues, this is seen from the development of the length of roads which have tended to increase over the past few years. National road length grew by 7.78% over the last six years to 295,878 KM in 2014.

Electrical energy that can be distributed shows how much ease of access to get electrical energy. Every year the electricity consumption in Indonesia is increasing along with the development of society, both in terms of the number of customers and the amount of production. This can be seen from the data that shows an increase in the distribution of electricity every year. National electricity distribution shows an increasing trend in the past six years by 40.6% in 2014 with a total of 189,028 GWh.

The development of technology is growing rapidly, especially in the development of telecommunications. This technology will facilitate the community in communicating so that it will be more efficient which then increases productivity. The development of telecommunications in Indonesia continues to show an increase, seen from the development of cellular subscribers in Indonesia which reached 325 million subscribers in 2014 and the number increased from the previous year of 3.43% based on the 2015 Indonesian Data Pocket Book and ICT Trends report.

High school is one of the formal education programs that carry out education at the level of secondary education as a continuation of basic education such as junior high, MTs, or other forms of equivalent. Based on BPS data the number of school buildings shaded by the Ministry of Education and Culture, has increased every year. Although several provinces experienced a decline in the number of school buildings, nationally the number of high school buildings in 2014 increased by 13.38% over the past six years which was 12,513 high school units.

The hospital is one form of service in the health sector, with the existence of hospital services expected to provide good health services so as to improve the level of public health. Good health will reduce the death rate in the community caused by poor health. This makes the government to continue to accelerate development. Health services consisting of hospitals and puskesmas have an upward trend. Nationally, health services in 2014 increased by 33.56% in the last five years.

Based on Attachment III of the Minister of Finance Regulation Number 101 / PMK.02 / 2011 concerning the classification of the budget, capital expenditure is an expenditure for the acquisition of assets and / or adds value to fixed assets or other assets that can provide benefits over one accounting period and exceed the minimum capitalization limit fixed assets / other assets that have been determined by the government. Based on the calculation of capital expenditure data in 2010 nationally has increased by 44.49% over the past five years while growth in employee spending has increased by 49.22% in the same period.

Influence of Infrastructure on Economic Growth

The model estimation uses panel data regression analysis which produces the fixed effect model as the best model based on the Chow test and the Hausman test. The results of the panel data regression estimation of each independent variable, namely roads, electricity, telephone, health, education, capital expenditure and employee expenditure on economic growth (GRDP).

Table 1. Panel Data Regression Estimation Results with Fixed Effect Model
 Dependent Variable: LNPDRB

Variable	Coefficient	t-Statistic	Prob.
Education	0.248348	3.25991	0.0013
Telephone	-0.03669	-0.83773	0.4031
Electricity	0.281973	5.118042	0.0000
Health	0.196425	2.085675	0.0381
Street	0.09812	2.047902	0.0417
Employee Shopping	0.055051	1.100587	0.2723
Capital Expenditures	0.052034	4.284844	0.0000

Source: Data processing results, 2018

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Regression coefficient values for each variable can be written into the following equation:

$$\begin{aligned} \ln PDRB = & 4.152 + 0.098 \ln road + 0.282 \ln electric - 0.036 \ln telephone \\ & + 0.196 \ln health + 0.248 \ln education + 0.052 \ln capital\ expenditure \\ & + 0.055 \ln employee\ shopping + \mu_{it} \end{aligned}$$

Road regression coefficient, electricity, health, education, capital expenditure and employee expenditure have a positive direction, while the telephone regression coefficient has a negative direction. In addition, the variables of roads, electricity, health, education and capital expenditure all have a significant effect on economic growth, while the telephone and employee expenditure variables have no significant effect on economic growth in 33 provinces in Indonesia in the 2007-2014 period. Furthermore, a test the statistics shown in Table 2 follows:

Table 2. Determination Regression Coefficient Test Results

Estimasi	Nilai
R-squared	0.990551
Adjusted R-squared	0.988906
S.E. of regression	0.064024
Sum squared resid	0.918205
Log likelihood	372.6897
F-statistic	602.1086
Prob(F-statistic)	0,00000

Source: Data processing results, 2018

Table 2 shows that the R-squared value in this study was 0.990551. This means that 99% of economic growth in 33 provinces can be explained by the variation of the seven independent variables together, namely roads, electricity, telephone, health, education, capital expenditure and employee expenditure. While the rest is explained by other variables outside the model not included in this study. This is reinforced by the F-statistic probability value that is 0,000 less than the degree of trust ($\alpha = 0.05$), and the F-statistic value that is 602.1086 which is greater than the F-table of 2.134. Thus the ability of independent variables is able to provide almost all the information needed to predict the dependent variable.

Road variables have a positive and significant effect on GRDP in 33 provinces, seen from the t-statistic greater than the t-table value ($2.047 > 1.651$) with an elasticity value of 0.098, where each 1% increase in the road will increase economic growth by 0.098 %. The results of this study are in line with research Keusuma and Suriani (2017) which states that road infrastructure has a positive impact on economic growth.

Electricity distribution variable statistically has a positive and significant effect on GRDP in 33 provinces, seen from the t-statistic greater than the t-table value ($5.118 > 1.651$) with an elasticity value of 0.282 where each 1% increase in electricity distribution will increase economic growth by 0.282%. These results indicate that efforts to increase electricity distribution have an impact in increasing economic growth, and the results are in line with existing theories, that by adding capital in the form of electrical energy can increase the level of GDP output. This agrees with the empirical facts in Huang's previous research in Cook (2011) which states that electrical energy has a relationship with economic growth.

Variable fixed telephone users and cellular users have a negative and not significant relationship to GRDP in 33 provinces, seen from the t-statistic smaller than the t-table value ($-0.83 < 1,651$). These results illustrate that the increase in fixed telephone users and cellular telephones does not have an impact on increasing economic growth, this can occur because fixed telephones are beginning to be restricted in their use and cellular telephones that are less describing have an effect on productivity. Today many economic sectors are supported by the

internet which makes it easy to carry out economic activities through an integrated system with the internet. These results are not in line with research conducted by Canning (1999) that telephones have the highest level of productivity,

The available health variables have a positive and significant effect on GRDP in 33 provinces, seen from the t-statistic which is smaller than t-table ($2.08 > 1.651$) with an elasticity of 0.196 where when there is a 1% increase in health services will increase economic growth amounted to 0.196%. These results state that the availability of health drives the level of output, this is in line with the theory which states that health will drive the level of productivity.

The variable number of high school buildings (SMA) has a positive and significant effect on GRDP in 33 provinces, seen from the t-statistic ($3.25 > 1.651$) with an elasticity of 0.24 where when there is a 1% increase in high school building services it will increase economic growth of 0.24%. These results illustrate that the availability of secondary education will help increase productivity. This is in line with existing theories, that workers' education will increase their productivity.

The estimation results of the two social infrastructure are in accordance with the theory which states that an increase in human capital through education and health will be able to increase the level of output. This is also consistent with previous research, Kumari and Sharma (2017) which states that social infrastructure has a positive impact on the economy.

Capital expenditure variable has a positive and significant relationship to GRDP in 33 provinces, seen from the t-statistic is greater than t-table ($4.28 > 1.651$) with an elasticity of 0.052 where when there is an increase of 1% capital expenditure will increase growth economy of 0.052%. This result states that institutions that can manage their resources in and have an influence in driving economic performance so that it can help increase productivity, in other words capital expenditure services influence in stimulating various sectors to encourage performance in economic activity. This result is in line with empirical facts in Yuk's (2005) research that government spending will have an impact on economic growth.

Employee expenditure variable has a positive relationship, but it is not significant to GRDP in 33 provinces, seen from the t-statistic is smaller than t-table ($1.10 < 1.651$). These results indicate that the institution has no influence in driving economic performance so it is less able to increase economic productivity.

6. CONCLUSION

Based on the results of the analysis that has been done, it is known that the condition of Indonesia's infrastructure continues to experience growth even though it must continue to improve infrastructure services in Indonesia. In addition, the results of the panel data regression analysis showed that road length, electricity distribution, health, education and capital expenditure in 33 provinces had a positive effect on economic growth. The regression results show the coefficient of electricity distribution has the greatest elasticity with an elasticity value of 0.281. Then followed by the education variable with an elasticity value of 0.24 and health variable of 0.196, the road length variable of 0.098 and capital expenditure of 0.05. While the telephone and capital expenditure variables do not have an influence on economic growth.

Based on the description of these results in general it can be concluded that infrastructure has an important role on output in this case GRDP. Where the role of economic and social infrastructure has a more crucial role in increasing output. This is based on the contribution of the magnitude of the elasticity of economic infrastructure and social infrastructure in the top four positions that affect the GRDP namely electricity distribution (economic infrastructure) has the biggest role in this research, then followed by the number of health and education services (social infrastructure) and finally occupied by the economic infrastructure variable again, namely the length of the road.

The government deserves to pay attention to infrastructure development, especially towards economic and social infrastructure development without reducing attention to the quality of institutions. Because the economic and social infrastructure that has a large

influence among the three types of infrastructure in this study so that the government can pay attention to the addition of electricity energy production capacity so that electricity that can be distributed can be increased then is expected to encourage economic growth acceleration.

Government attention is also needed to develop institutional infrastructure, especially in terms of institutional quality and not only to concentrate on economic and social infrastructure. Based on the estimation results, employee expenditure has a positive relationship to output but it is not statistically significant, this indicates that so far workers, especially Civil Servants (PNS) have not been able to improve their performance to help encourage economic growth.

In addition to paying attention to economic acceleration, economic equality cannot be forgotten by the government. Because broad interconnection of infrastructure can encourage economic growth rather than concentrated in a particular region, by encouraging the development of inter-island connecting infrastructure in Indonesia.

The variables in this study still use a little scope of infrastructure although they have tried to explain by classifying infrastructure, even though there are still many types of infrastructure that are interesting to study further because today Indonesia is encouraging infrastructure development. Various types of infrastructure that are interesting to study include airports, railroad routes, ports, irrigation, sanitation, fiber optics, universities, libraries, to political quality. Thus the various infrastructures can be comprehensively impacted on the economy. So that further research is expected to examine other infrastructure that is no less important for the economy.

References

- Acemoglu, Daron, and James Robinson. 2010. *The Role of Institutions in Growth and Development. Review of Economics and Institutions*. Vol. 1. <https://doi.org/10.5202/rei.v1i2.1>.
- Canning, David. 1999. "Infrastructure's Contribution to Aggregate Output." *Public Economic*.
- Cook, Paul. 2011. "Infrastructure, Rural Electrification and Development." *Energy for Sustainable Development* 15 (3): 304–13. <https://doi.org/10.1016/j.esd.2011.07.008>.
- Démurger, Sylvie. 2001. "Infrastructure Development and Economic Growth: An Explanation for Regional Disparities in China?" *Journal of Comparative Economics* 29 (1): 95–117. <https://doi.org/10.1006/jcec.2000.1693>.
- Hall, Robert E, and Charles I Jones. 1999. "Why Do Some Countries Produce So Much More Output Per Worker Than Others?*" no. February: 83–116. <http://www.stanford.edu/~chadj>.
- Jalan, Jyotsna, and Martin Ravallion. 2002. "Geographic Poverty Traps? A Micro Model of Consumption Growth in Rural China." *Journal of Applied Econometrics* 17 (4): 329–46. <https://doi.org/10.1002/jae.645>.
- Jhingan, M L. 1993. *Ekonomi Pembangunan Dan Perencanaan*. 1st ed. Jakarta: Raja Grafindo Persada.
- Keusuma, Cut Nanda, and Suriani. 2017. "PENGARUH PEMBANGUNAN INFRASTRUKTUR DASAR TERHADAP PERTUMBUHAN EKONOMI DI INDONESIA." *ECOsains: Jurnal Ilmiah Ekonomi Dan Pembangunan* 4/1 (May 2015).
- Kumari, Anita, and A. K. Sharma. 2017. "Physical & Social Infrastructure in India & Its Relationship with Economic Development." *World Development Perspectives* 5: 30–33. <https://doi.org/10.1016/j.wdp.2017.02.005>.
- Mankiw, N. Gregory. 2000. *Teori Makroekonomi*. Edited by Yati Sumiharti. 4th ed. Jakarta: Erlangga.
- Rutherford, Donald. 2002. *Routledge Dictionary of Economics Second Edition*.
- World Bank. 1994. *World Development Report 1994: Infrastructure for Development. World Development*. Vol. 26. [https://doi.org/10.1016/S0305-750X\(98\)90001-8](https://doi.org/10.1016/S0305-750X(98)90001-8).

Yuk, Wing. 2005. "Government Size and Economic Growth: Time-Series Evidence for the United Kingdom, 1830-1993." *Department of Economics, University of Victoria,*
<http://www.web.uvic.ca/econ/research/papers/pdfs/ewp0501.pdf>.