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Analysis of the Impact of Infrastructure Development on Gross Regional Domestic Product of West Lombok Regency 2010 – 2023

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This article contributes to:

Abstract. Infrastructure is everything needed to support a regional development process. With the increasing need for infrastructure development to support economic growth, which has encouraged the Indonesian government to provide a better framework. This study aims to analyze the effect of school infrastructure on gross regional domestic product. This study uses secondary data research methods and multiple linear regression data analysis. From the above conclusions, it can be seen that the supporting factor for the dependent variable or the Gross Regional Domestic Product variable is school infrastructure, because increasing school buildings will increase the value of Gross Regional Domestic Product in West Lombok Regency.

Keywords: Infrastructure, Multiple Linear Analysis, GRDP, Economic Growth, West Lombok Regency.

1. Introduction

The study of development economic theory reveals that to create and increase economic activities, adequate infrastructure facilities are needed [1]. Infrastructure is everything needed to support a regional development process. With the increasing need for infrastructure development to support economic growth, which has encouraged the Indonesian government to provide a better framework [2]. This aims to attract investment and private participation in a measurable manner in infrastructure projects. Infrastructure is an important driver of economic growth [3]. From the allocation of public and private financing, infrastructure is seen as the locomotive of national and regional development. Infrastructure plays an important role in improving the quality of life and human welfare [4]. This can be seen from the increase in consumption value, labor productivity, access to employment, and the prosperity that is realized. Infrastructure also has an important impact on increasing consumption value, increasing labor productivity, and access to employment [5].

Based on the history of economic development in Indonesia, infrastructure is placed as a vital sector in the process of achieving high economic growth. To achieve this process, hard work is needed so that infrastructure development always increases every year [6]. The government's priority on infrastructure development is partly motivated by the belief that infrastructure is a vital instrument for the government's efforts to increase economic growth and improve national competitiveness. In addition, every time a potential investor conducts an initial analysis before investing in a country or region, the main consideration is the infrastructure support available in the region [7].

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Furthermore, Indonesia illustrates the importance of infrastructure development by giving an example of a situation where an industrial area will not be able to attract investors if it is not supported by a port capacity that can accommodate large ships to dock. For this reason, support from all parties in supporting the government's priority in accelerating infrastructure development is needed. Indonesia must move towards a more productive country, which is competitive, which has high flexibility in dealing with these changes [8]. Therefore, the government will prepare major stages. In the field of infrastructure development, the government will continue to develop infrastructure. The main infrastructure has been built and, in the future, we will continue to connect the main infrastructure more quickly [9]. These infrastructures, such as toll roads, railways, ports, and airports with people's production areas, will be connected to small industrial areas, connected to Special Economic Zones and tourism areas, including connecting to rice fields, plantation areas, even with fish ponds [10].

From the Central Statistics Agency, NTB Province has an area of 19,675.89 km2, NTB Province has a lot of natural potential that is very large to be developed. This is a very valuable asset in developing the economy in NTB. Agricultural land and mining potential in NTB also drive economic growth [11]. In addition, the natural beauty is one of the main attractions for tourists to continue visiting NTB. The development of various potentials in NTB Province requires adequate infrastructure support, appropriate policies, and the involvement of local communities and the government.

Infrastructure development has become the focus of the NTB Provincial Government in recent years, especially after the construction of the Mandalika Special Economic Zone (KEK) and the recovery from the earthquake on Lombok Island in 2018. The development of the Mandalika KEK encourages the development of other infrastructure that is more massive and evenly distributed, especially the development of transportation facilities and basic services to support economic activities in the Mandalika KEK [12]. From the Central Statistics Agency, West Lombok Regency surrounds Mataram City which is the capital of West Nusa Tenggara Province. West Lombok Regency is a regency with a favorable geographical location. The area of West Lombok Regency is 922.91 km2 consisting of ten sub-districts with Gerung District as the Regency Capital. Of the 10 sub-districts in West Lombok Regency, there are 119 villages and 3 urban villages. These 3 urban villages are only found in Gerung District. The center of government of West Lombok Regency is located in Dasan Geres Village, Gerung District.

Table 1. GRDP, Economic Growth, Schools and Health Facilities in West Lombok Regency 2010-2023

Year	GRDP (million)	Economic Growth (%)	School (unit)	Health Facilities (unit)
2010	7011320.00	4.87	890	74
2011	7435386.00	6.05	934	76
2012	7827193.00	5.27	914	74
2013	8238698.00	5.26	952	74
2014	8708308.00	5.7	954	102
2015	9264355.00	6.39	976	101
2016	9792221.00	5.7	1024	101
2017	10432306.00	6.54	1030	101
2018	10491747.00	0.57	1027	125
2019	10894640.00	3.84	1048	120
2020	10128300.00	-7.03	1080	126
2021	10472210.00	3.4	1096	133
2022	10834220.00	3.46	1128	164
2023	11379480.00	5.03	1142	200

GRDP is basically the amount of added value generated by all business units in a certain area, or is the amount of final goods and services (net) generated by all economic

units. GRDP at current prices describes the added value of goods and services calculated using prices prevailing in each year, while GRDP at constant prices shows the added value of goods and services calculated using prices prevailing in a particular year as a basis.

To calculate GRDP figures there are three approaches that can be used, and are explained below: (a) Production Approach, GRDP is the amount of added value of goods and services produced by various production units in a region within a certain period of time (usually one year). Income Approach, GRDP is the amount of compensation received by production factors that participate in the production process in a region within a certain period of time (usually one year). Expenditure Approach, GRDP is all components of final demand consisting of: (1) household consumption expenditure and private non-profit institutions, (2) government consumption, (3) gross domestic fixed capital formation, (4) changes in inventory, and (5) net exports, (net exports are exports minus imports). Conceptually, the three approaches will produce the same figure. This publication presents GRDP with a Production approach [13].

In essence, economic development is a series of efforts and policies aimed at improving people's standard of living, expanding employment opportunities, equalizing the distribution of people's income, improving regional economic relations and through shifting economic activities from the primary sector to the secondary and tertiary sectors. In other words, the direction of economic development is to strive for people's income to increase accompanied by the best possible level of equality [14]. At this time, there has been a development process in people's lives. Development is carried out to support and improve the quality of people's lives. All aspects and aspects of people's lives experience various developments, from the smallest to the largest [15]. From the data from the Central Statistics Agency of the West Lombok Regency Government in Table 1, it shows that the infrastructure of health facilities in the form of general hospitals and special hospitals has increased, namely in 20015 there were 101 places and every year there was an increase then in 2018 there were 125 places. Development aims to improve people's welfare. The role of government as a mobilizer of development is very strategic in supporting the improvement of people's welfare and the economic growth of its country. Economic growth is one indicator to see the results of development that has been carried out and is also useful for determining the direction of development in the future [17].

The importance of infrastructure in economic growth is debated among economists, even the availability of infrastructure is one of the things needed to achieve the expected economic growth. Infrastructure development in West Lombok Regency does not always show an increase. Infrastructure development plays a very important role in encouraging various economic activities to improve people's welfare. Infrastructure has an impact on the economy, namely with the existence of infrastructure on the economy, it will increase income. Seeing this condition, the researcher tried to reveal how much Influence Infrastructure Development has on the Economy in West Lombok Regency.

2. Method

This study employs a quantitative approach aimed at analyzing the influence of school infrastructure and health facility infrastructure on the Gross Regional Domestic Product (GRDP) in West Lombok Regency. The quantitative approach was chosen because it enables a systematic explanation of the relationships between variables through objective statistical data processing. The research was conducted in West Lombok Regency due to the availability of relevant data that supports the analysis. The

study covers the period from 2010 to 2023 to capture long-term dynamics and trends. The type of data used in this research is secondary data, collected through documentation techniques. The data sources include official institutions such as the Central Bureau of Statistics (BPS) and related local government agencies. The collected data includes the number of school buildings at the elementary, junior high, and senior high school levels, the number of health facilities such as hospitals, clinics, and public health centers (puskesmas), as well as regional GRDP data.

The variables in this study consist of one dependent variable, the Gross Regional Domestic Product (GRDP), and two independent variables: school infrastructure and health facility infrastructure. GRDP is measured based on the total added value from all business sectors. School infrastructure is measured by the number of school buildings, regardless of the number of classrooms, while health facility infrastructure is measured by the number of general hospitals, specialist hospitals, clinics, and health centers in the region. The data analysis technique used is multiple linear regression analysis to determine the effect of independent variables on the dependent variable. The regression model used is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \qquad (1)$$

Where Y is the GRDP, α\alphaα is the intercept, β1 and β2 are regression coefficients, X1 is school infrastructure, X2 is health facility infrastructure, and ε the error term. Before conducting the regression analysis, classical assumption tests are performed to ensure the validity of the model. These include a normality test to assess the distribution of residuals, a multicollinearity test to detect correlations among independent variables, a heteroscedasticity test to examine the consistency of residual variances, and an autocorrelation test, particularly important for time series data. If the assumptions are met, the regression model can be interpreted reliably. Furthermore, hypothesis testing is conducted using both the F-test (simultaneous test) and the t-test (partial test). The F-test determines whether the independent variables jointly have a significant effect on the dependent variable, while the t-test assesses the individual effect of each independent variable. A significance level of 5% (α = 0.05) is used in this analysis.

3. Results and Discussion

3.1 Results

Classical assumptions are a set of assumptions that must be met in order for a multiple linear regression model to produce valid, unbiased, and efficient estimates. Serves to determine whether the data obtained comes from a population that has a normal distribution or not, because a good regression model is one that has a normal distribution.

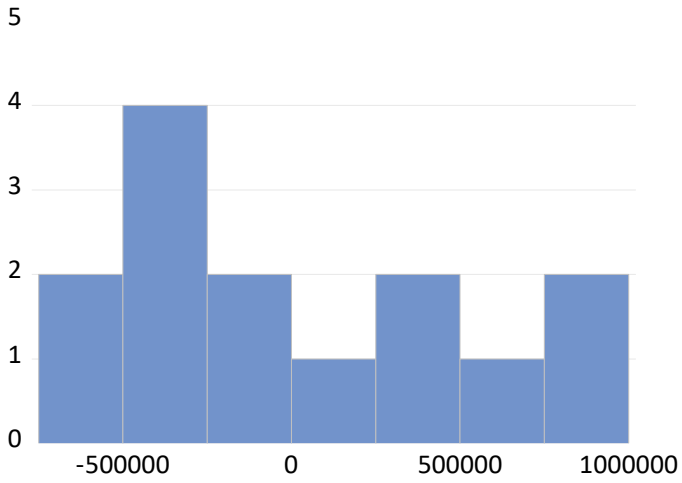

Figure 1. Normality Test Results

Analysis of the results of the normality test. The Jarque-Bera probability value is known to be 0.598937 (>0.05), so it can be concluded that the data is normally distributed (passes normality).

Table 2. Multicollinearity Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.48E+13	662.8942	NA
School	23372697	1080.157	6.178868
Health	1.11E+08	68.75021	6.178868

Analysis of the results of the multicollinearity test. The VIF value of the independent variables (school infrastructure and health facility infrastructure) is known (<10.00), so it can be concluded that the assumptions of the multicollinearity test have been met or have passed the multicollinearity test.

Table 3. Heteroscedasticity Test

Heteroscedasticity Test			
F-statistic	0.829749	Prob. F(5,8)	0.5627
Obs*R-squared	4.780939	Prob. Chi-Square (5)	0.4432
Scaled explained SS	1.236542	Prob. Chi-Square (5)	0.9413
Auto Correlation			
F-statistic	1.732484	Prob. F(2,9)	0.2309
Obs*R-squared	3.891671	Prob. Chi-Square (2)	0.1429

It is known that the Probability Obs R-Squared value is 0.4432 (>0.05), so it can be concluded that the assumption of the heteroscedasticity test has been met or the data has passed the heteroscedasticity test. Analysis of autocorrelation test results. The Probability Obs R-Squared value is known to be 0.1429 (>0.05), so it can be concluded that the assumptions of the autocorrelation test are met or the data passes the autocorrelation test.

Table 4. Hypothesis Test Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8214812.	3851112.	-2.133101	0.0563
SCHOOL	17804.54	4834.532	3.682785	0.0036
HEALTH	-3066.642	10543.96	-0.290844	0.7766
R-squared	0.867801	Mean dependent var		9493599.
Adjusted R-squared	0.843765	S.D. dependent var		1415920.
S.E. of regression	559664.9	Akaike info criterion		29.49547
Sum squared resid	3.45E+12	Schwarz criterion		29.63241
Log likelihood	-203.4683	Hannan-Quinn criter.		29.48280
F-statistic	36.10394	Durbin-Watson stat		0.983380
Prob(F-statistic)		0.000015		

$$Y = -8214812 + 17804.54\,X_1 + -3066.642\,X_2 + e \quad (1)$$

The constant value obtained is -8214812, which means that if the independent variables (school infrastructure and health facility infrastructure) increase by one unit overall, then the variable (PDRB) will decrease by -8214812. The regression coefficient value of the X1 school infrastructure variable is positive (+) at 17804.54, which means that if the X1 health infrastructure variable increases, the Y variable will also increase by 1,780, and vice versa. Variable X1 (school) has a t-Statistic value of 3.682785 with a Prob. (Significance) value of 0.0036 (<0.05) so it can be concluded that Variable X1 (school) has a significant effect on Variable Y. Variable X2 (health) has a t-Statistic value of -0.290844 with a Prob. (Significance) value of 0.7766 (>0.05) so it can be concluded that Variable X2 does not have a significant effect on Variable Y.

The F-Statistic value is 36.103 with a Prob. (F-statistic) value of 0.0015 (<0.05), then it can be concluded that the Independent Variables (health infrastructure and health facility infrastructure) have a significant effect simultaneously (at the same time) on the Dependent Variable (Y). It is known that the Adjusted R Square value is 0.843765, so it can be concluded that the contribution of the influence of the Independent Variable to the Dependent Variable simultaneously (simultaneously) is 84.3%. While the remaining 15.7% is influenced by other variables outside this study.

3.2 Discussion

3.2.1 The Impact of School Infrastructure Development on Gross Regional Domestic Product in West Lombok Regency

Based on the results of partial statistical testing (t-test) shows that Variable X1 (school infrastructure) has a t-Statistic value of 3,682 with a Prob. (Significance) value of 0.0036 (<0.05) then it can be concluded that Variable X1 has a significant effect on Variable Y. The school infrastructure variable has a positive effect on the Gross Regional Domestic Product of West Lombok Regency, which means that every additional school building will increase the Gross Regional Domestic Product, and vice versa. So that the results above are in accordance with research conducted by Indra et al. [21] which states that with the implementation of educational decentralization, the district/city government has broader authority to build education. So that the level of education has a positive contribution to the process of forming the quality of human resources which has an impact on increasing economic growth.

3.2.2 The Impact of Health Facilities Infrastructure Development on Gross Regional Domestic Product in West Lombok Regency

Based on the results of partial statistical testing (t-test), it shows that Variable X2 (health facility infrastructure) has a t-Statistic value of -0.290 with a Prob. (Significance) value of 0.7766 (> 0.05), so it can be concluded that Variable X2 does not have a significant effect on Variable Y. The results of the multiple linear regression test. in the study showed that health facility infrastructure had no effect on Gross Regional Domestic Product in West Lombok Regency because there were not many general and special hospitals in every corner of West Lombok Regency. This study is supported by research conducted by Sultana et al. [22] this study states that health variables have a positive effect on GRDP but are not significant on GRDP. Economic growth can have a positive impact on health but the impact may not always be significant because wealth concentrated in a portion of the population or in a particular area does not significantly affect overall health, there are still a number of populations that do not have adequate access to quality health services and factors such as geographical allocation, costs and underdeveloped health infrastructure can be barriers to equitable access to health services.

4. Conclusion

Based on the results of processing research data in the previous chapter regarding the hypothesis analysis that has been compiled and arranged properly in the previous chapter, the following can be concluded and obtained from this research: (a) the results of the research test show that the influence of school infrastructure has a positive effect on the Gross Regional Domestic Product of West Lombok Regency, which means that every additional school building will increase economic growth, and vice versa. (b) The results of the multiple linear regression test in the study showed that hospital facility infrastructure did not affect the Gross Regional Domestic Product in West Lombok Regency because there were not many general hospitals and inadequate health services such as a lack of specialist doctors, unpaid BPJS health claims in two hospitals in West Lombok Regency. Based on the research results and conclusions above, the following is to achieve sustainable economic growth in West Lombok Regency, policies are needed that can support it.

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6. Declaration

Author contributions and responsibilities - The authors made major contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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