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# Analysis of the Influence of Road Infrastructure and Transportation Infrastructure on Economic Growth in Lampung Province

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**Abstract.** This article investigates the significant role of government in fostering economic growth through state development programs. Economic growth is essential for a nation's prosperity and addressing social issues like extreme poverty. Proper infrastructure facilities, including roads, electricity, and water, are crucial for stimulating economic activity and ensuring equitable development and community welfare. Infrastructure acts as the engine driving both national and regional development, making public and private funding distribution crucial for balanced growth. Furthermore, transportation infrastructure plays a pivotal role in advancing and connecting regions, facilitating the movement of goods, services, and people. This study explores the impact of Road Infrastructure and Transportation Infrastructure on economic growth in Lampung Province over an 11-year period using Ordinary Least Squares (OLS) method and processed with SPSS 25 software. In this study multiple regression will be used to examine the effect of the independent variables (Road Infrastructure and Transportation Infrastructure) partially on the dependent variable (Economic Growth). The results indicate that Transportation Infrastructure has a significant positive effect on economic growth, while Road Infrastructure shows a negative and insignificant effect. The article highlights the importance of developing robust transportation systems to drive economic growth and promote prosperity.
**Keywords**: Road Infrastructure, Transportation Infrastructure, Economic Growth, GRDP (Gross Regional Domestic Product).

## I. Introduction

One factor that significantly contributes to economic growth is the government, particularly when it comes to choosing and carrying out the general direction of state development programs. The same objective applies to all nations: how to boost annual economic growth. A country's economic health is determined by its rate of economic growth, which is a prerequisite for the development and prosperity of the country. A nation will experience new economic and social issues, such as extreme poverty, if it is unable to improve its economic growth (Salim & Fadilla, 2021). In order to achieve economic development objectives, a variety of regulation were implemented. According to the study of development economic theory, proper infrastructure facilities are required to start and grow economic activity. The community can conduct economic activities that will impact economic growth and then create equitable economic development, as well as community welfare and prosperity, with the help of the main infrastructure, which includes roads, electricity, and water (Hutajulu, 2021).

Infrastructure is the engine that propels economic growth. Around the world, transportation facilities make it possible to move people, products, and services from one location to another. It plays a crucial part in the process of producing goods as well as enabling their distribution. Infrastructure is viewed as the engine driving both national and regional development based on the distribution of public and private funding. Because of this, development needs the appropriate strategy which results in growth that is accompanied by equity.

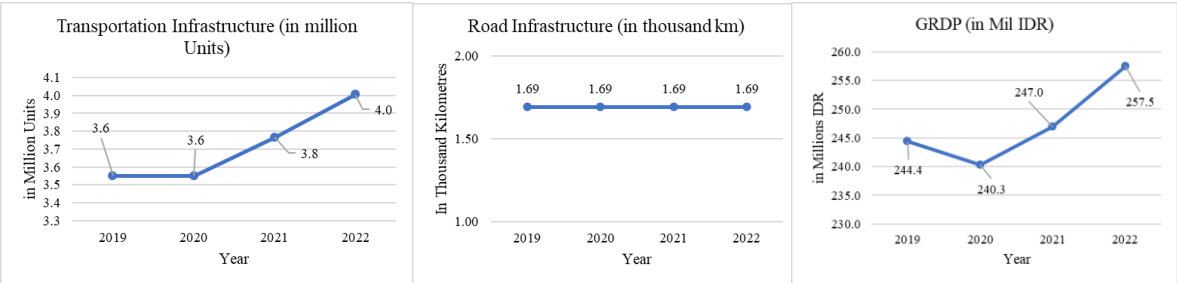


**Figure 1.** Transportation Infrastructure, Road Infrastructure, GRDP data from 2019-2022 (BPS Statistics, 2022)

Infrastructure for transportation is one of the necessities for a place to advance and grow, and as accessibility is frequently connected to a place, transportation can improve accessibility or connection. The presence of infrastructure and facilities for transportation cannot be separated from a development program while building a rural area. An efficient transportation infrastructure consistently supports the continuation of an effective manufacturing process, investment and technical advancement, as well as the creation of markets and value. When it comes to stimulating and predicting economic growth, roads are crucial. Because of this, every nation makes significant investments to raise the standard and quantity of its roads. Construction, land development, and road restoration cost developing nations about 0.8% of their GDP (Mamahit et al., 2021). A good road system provides an advantage for a country to compete competitively in marketing its products, developing industries, distributing population and increasing income.

## II. Literature Review

### Economic growth

One of the driving factors of economic development's success is economic growth. According to (Mahzalena & Juliansyah, 2019), economic growth is the process of continually or continuously expanding the economy's productive capacity over time in order to achieve a rising level of national income and production. Another view defines economic growth as any action that boosts society output of commodities and services while also boosting people's welfare (Hutajulu, 2021). Economic growth in practice refers to the physical development of the economy. The expansion of infrastructure and the rise in the manufacture of products and services are three examples of physical economic developments that take place in a nation. Economic growth demonstrates the degree to which economic activity will, over time, provide greater income for the community. Gross Regional Domestic Product (GRDP) is a measure of economic growth (Wadana & Prijanto, 2021).

### Road Infrastructure

Road infrastructure serves as an engine for economic development in both urban and rural areas. The infrastructure sector can generate jobs for millions of employees in Indonesia through projects. Additionally, the smooth flow of goods, services, people, money, and information from one market zone to another is determined in part by the road infrastructure. The majority of Indonesians with lesser incomes will be able to afford these items because to this requirement's lower price caps on goods and services.

### Transportation Infrastructure

Transportation, according to (Silondae, 2016), is a benchmark in the spatial relationships between regions and is crucial to a region's progression for growth . In order to serve the needs of the community in areas with varying geographic conditions, several modes of transportation must be integrated. In essence, a transportation system is created to link two places that may have different land uses. To boost its economic value, transportation is utilized to move people and/or things from one location to another. It will make it easier for locals to interact with the outside world if there is good transportation.

The distance between producers and consumers is eliminated through the role of transportation as a bridge. This distance may be expressed as a geographic or temporal separation. There are time gaps because products made today might not be used until tomorrow. To prevent damage to the products in question, this distance or gap is filled through a warehousing procedure utilizing particular techniques.

Because both warehousing and storage improve the benefits of commodities, they are closely related. A place advantage is produced when commodities are transported from one location to another so they can be used in locations where they are not already available. When commodities are stored or warehoused, they can be kept there until they are needed, which buys time (Kadarisman et al., 2017). The development of a transportation route will encourage the expansion of other facilities, all of which are of course valuable economically.

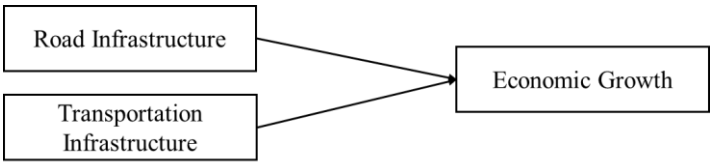


**Figure 2.** Hypothesis Flow Charts

**Hypothesis**

$H_0$ : None of the independent variabels (Road and Transportation Infrastructure) have any significant effect on Economic Growth

$H_1$ : Both of the independent variabels (Road and Transportation Infrastructure) have positive significant effect on economic Growth

## III. Research Method

Infrastructure and Economic Growth. In this study, time series data are used for 11 years, starting from 2012-2022. The analytical method used is the Ordinary Least Squares (OLS) and processed using SPSS 25 software. In this study multiple regression will be used to examine the effect of the independent variables (Road Infrastructure and Transportation Infrastructure) partially on the dependent variable (Economic Growth). Multiple linear regression testing techniques consist of classical assumption tests, namely autocorrelation tests, multicollinearity tests, and heterokedasticity tests, hypothesis testing consisting of F tests, determination coefficient tests ($R^2$), and t tests.

According to (Firdaus et al., 2021) the multiple linear regression equation can be expressed in the form of a formula as follows : $ECGRWTH = \beta_0 + \beta_1 ROADINF + \beta_2 TRNSINF + e$

1. Economic Growth (Y)
   The dependent variable in this study is Economic Growth, which is a process of raising an economy's production capacity and is reflected in a rise in national revenue. The data used is Lampung Province's Economic Growth measured by Gross Regional Domestic Product (GRDP) in units of millions of rupiah (Rp) from the year 2012 until the year 2022.
2. Road Infrastructure ($X_1$)
   Infrastructure, according to (Hendra Andy Mulia Panjaitan et al., 2020), is a group of structures that are connected to one another and create a framework for supporting a specific overall structure. The community's infrastructure system serves as the primary underpinning for the social and economic systems' operations. Road Infrastructure data used in this study is taken from Lampung Province ‘s database which the measurement unit is in kilometers (km) from the year of 2012 until the year of 2022.
3. Transportation Infrastructure ($X_2$)
   The state of the transportation facility, the flow of people, products, and services are reflections of the interaction between regions. Transportation is a benchmark in the spatial relationship between regions, and it plays a crucial role in supporting a region's growth, according to (Silondae, 2016). To boost its economic value, transportation is utilized to move people and/or things from one location to another. Transportation Infrastructure data used in this study is taken from Lampung Province‘s database which the measurement is in count of units from the year of 2012 until the year of

## IV. Results and Discussion

**Results**

| | Unstandardized Coefficients | | t Statistic | Sig (t-statistic) | Collinearity Statistics | | F Statistic | Sig (F-statistic) | R Square | Durbin Watson | Spearman's rho |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Variabel | B | Std.Error | | | Tolerance | VIF | | | | | |
| Constanta | 1155547282 | 810455754.8 | 1.426 | .192 | | | 278.660 | .000[b] | .986 | 1.683 | |
| ROADINF | -644718.385 | 470180.997 | -1.371 | .208 | .278 | 3.591 | | | | | .866 |
| TRNSINF | 49.397 | 4.382 | 11.272 | .000 | .278 | 3.591 | | | | | .779 |

Sources: secondary data, processed

From the above estimation results, the equation can be written as follows: Economic Growth (PE) = 1,155,547,282 - 644,718.385 X1 + 49.397 X2 + e. Based on the test results, it is known that variable X1 has no negative and insignificant effect on economic growth, while variable X2 has a positive and significant effect on economic growth, as evidenced by the statistically significant t-value. For the F-test, the calculated F-value is 278.660, which is greater than the F-table. The significance value (sig.) is 0.000, indicating a significant influence between the independent variables, Road Infrastructure and Transportation Infrastructure, on the dependent variable, economic growth, simultaneously or together.

Furthermore, the Durbin Watson value is 1.683, suggesting that this regression equation is free from autocorrelation. The Variance Inflation Factor (VIF) for each variable is below 10 (<10), indicating that this regression model is also free from multicollinearity. The results of the rank Spearman test show that all variables have significant values >10, hence, the model is concluded to be free from heteroskedasticity. Moreover, this regression model has an R-squared value of 0.986 or 98.6%, indicating that the independent variables in this study have the capability to influence the dependent variable by 98.6%, while the remaining 1.4% is explained by variables outside of this research.

**Discussion**

**The Influence of Road Infrastructure on Economic Growth**

The result of this research is about Road Infrastructure, using road length (X1) as the variable, and the t-test results show that variable X1 has a negative and insignificant effect on economic growth in Lampung Province. In this case, the existence of road infrastructure still faces many challenges, such as road congestion due to the high development of vehicles and the large number of people using private vehicles. Secondly, there are still roads used as informal parking spaces and many street vendors operating without government permits, which disrupt motor vehicle drivers and cause traffic jams. Thirdly, the road infrastructure in Lampung still needs optimal improvements, and unwanted natural disasters have an impact on road conditions, causing damage. The results of this research are similar to previous research conducted by (Intan Suswita et al., 2020). However, their study stated that road infrastructure has a positive and insignificant effect on economic growth in Simalungun Regency. This research also aligns with the theory stating that roads have a dual function. On one side, roads act as drivers of economic growth by facilitating the flow of goods and services between production centers and marketing areas, and vice versa. On the other side, roads function to reduce development disparities between regions. Therefore, road development is an effort to enhance the capacity of transportation facilities and infrastructure and the integration of multimodal and intermodal transportation systems (Kementerian Pekerjaan Umum dan Perumahan Rakyat, 2017).

**The Influence of Transportation Infrastructure on Economic Growth**

Based on the t-test results, the Transportation Infrastructure variable has a significant positive effect on economic growth. Theoretically, adequate transportation availability plays a role in increasing Gross Regional Domestic Product (GRDP), especially in the transportation services sector (Febriansyah & Gautama, 2022). This is in line with research conducted by (Palilu, 2018), where the researcher stated that the limitations of the National Budget and Regional Budget (APBN and APBD) in Ambon City, resulting in limited infrastructure capacity, lead to mobility constraints and hinder the distribution of goods and people to their destinations. This chain of domino effects results in a decline in economic growth.

## V. Conclusion

Based on the research results on the Analysis of the Influence of Road Infrastructure and Transportation Infrastructure on Economic Growth in Lampung Province, the findings can be summarized as follows: Road Infrastructure has a negative contribution to economic growth, where a 1% increase in road infrastructure leads to a decrease in economic growth by 644,718.385 units. However, theoretically, roads play a significant role in stimulating and anticipating economic growth. Therefore, every country invests heavily in improving the quality and quantity of roads. Approximately 0.8% of the GDP of developing countries is allocated to road construction, development, and rehabilitation (Mamahit et al., 2021).

There are other phenomena in road infrastructure that have a negative impact, such as the influence of increasing vehicles and the activities of people using private vehicles, turning roads into parking lots and places for vending. Additionally, natural disasters like earthquakes make it necessary to improve road infrastructure in Lampung Province, especially the provincial roads.

On the other hand, Transportation Infrastructure contributes positively to Economic Growth. A 1% increase in transportation infrastructure leads to an increase in economic growth by 49,397 units. This can be attributed to the increasing number of transportation units in Lampung Province each year, resulting in rapid transportation within the province, which, in turn, affects the increase in economic growth due to the rise in activities leading to increased transactions and trade. According to (Silondae, 2016), transportation is a measure of spatial interaction between regions and plays a crucial role in supporting the development process of an area.

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