



E-ISSN: 0331-846X

TRANSPORTATION SYSTEM
AND
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Received: 02 September 2025

Accepted: 30 September 2025

Published: 03 October 2025

CitationOgbonna, K. I. and Daminabo, S. I. (2025).
Effects of Road Transport Infrastructure
on Economic Growth in Rivers State.
Transportation System and Logistics, 2 (1),
14 - 19.<https://doi.org/10.70726/tsl.2025.211419>**Effects of Road Transport
Infrastructure on Economic Growth
in Rivers State****Abstract**

The study investigated the effects of road transport infrastructure on economic growth in River State. The objectives of the study were to ascertain the extent to which road network and connections, overpasses and road transport terminal impact economic growth in Rivers state. Four research questions and hypotheses were formulated to guide the study. The study was conducted in Rivers state with 503 respondents drawn from different economic sectors in Rivers State, Nigeria. A multi-stage sampling technique was used to draw the sample of the study. A valid instrument tagged Road, Overpass, Terminals and Economic Growth Assessment questionnaire was used for the collection of data in the study. The reliability of the instrument was determined using Cronbach alpha. The research questions were answered using regression analysis (simple and multiple). The null hypotheses were tested at 0.05 alpha level of significance. In answer to the research questions, the result of the study revealed that road network and connections have significant positive effects on economic growth. The result of the study also indicated that both overpasses and bridges as well as road transport terminals have significant positive effects on economic growth. The results of the study also demonstrated that road network and connections, overpasses and bridges as well as road transport terminal combined have significant positive effects on economic growth. Based on the findings, conclusions were drawn that road transport infrastructures have a clear and glaring positive impact and effects on economic growth in Rivers state and recommendations made.

Keywords : Road Transport System, Road Transport Infrastructure, Economic Growth, Rivers State

Introduction

Transportation is one of the key components and a critical measure of economic growth and development in every nation. In other words, the determination of a nation's level of growth, development and standard of living could be a function of transportation improvement as well as other macroeconomic variables operational in a nation. Accordingly, economic growth is one of the most important single forces leading to long run increase in the standard of living of nation (Agarwal, 2025). Economic growth is viewed as an increase in the production of economic goods and services in an economy in one period of time compared with a previous period (Potters, 2024). Increases in capital goods, labor force, technology, material flow and human capital can all contribute to economic growth. Economic growth no doubt is crucial as it is often associated with increased living standards, such as higher income, more employment opportunities, increase in investment and improved public services. It can also lead to a reduction to a reduction in poverty and unemployment



(Roser, 2021). Additionally, higher economic growth can result in higher tax revenues without increasing tax rates, which can help governments reduce debt-to-GDP ratios and invest in infrastructure and services.

Looking at the cruciality of Economic growth in nation's economy, one will definitely be persuaded to identify those factors that enable economic growth of every system in order to emphasis and encourage its enhancement and sustainability. A breadth of research has revealed that road infrastructure transport development is positively associated with economic growth (Ding 2013, Canning & Bennathan, 2000; Fan & Chan-Kang. 2008; Meyer & Miller, 2001). Moreover, because of intensive use of infrastructures in an economy, the transport sector is an important component of the economy, and a common tool used for economic growth and development, especially when it has to do with providing mobility for the efficient movements of people and goods, as well as providing accessibility to a wide variety of agricultural, commercial and social activities This is even more so in a global economy where economic opportunities have been increasingly related to the mobility of people, goods, services, and freight, including information management and communication technologies. Road transport infrastructure is summarily viewed as the road network and associated physical infrastructure such as overpasses, road terminal (motor or bus parks), signage, lighting and vehicle refueling service (Gibson, Mines, Morris & Hills, 2011).

Overpasses and bridges remain the key components in any road network for infrastructure development. They are very essential for conveying of the product materials such as food grains, industrial goods, passengers etc. The roads and bridges are very essential for growth of economy of the country (Kusano & Jakobsen, 2021). Another component of road transport infrastructure is road transport terminal which is any location where passengers and freight either originate, terminate, or are handled in the transportation process and it could be literally referred to as parks or motor parks. Normally, Terminals are central and intermediate locations in the mobility of passengers and freight. They often require specific facilities and equipment to accommodate the traffic they handle (Rodrigue & Slack, 2024).

When transport systems are deficient in terms of capacity or reliability, they can have an economic cost, such as reduced opportunities and lower quality of life. Generally, road infrastructure plays a vital role by providing not only mobility for the efficient movements of people, goods and services, but also providing accessibility to land and a wide variety of commercial and social activities (Meyer & Miller, 2001). Nistor and Catalin (2014) had stressed that investment in road transport infrastructure is a tool for regional development, especially in developing countries, mainly for the road sector.

Similarly, some empirical studies have argued that a developed road infrastructure can be a strong influence to growth production function locally as well as development in number of ways. Firstly, it was noted that road infrastructure can act as an unpaid factor of production with its inputs, thereby influencing economic growth function. Moreover, a well-developed road transport infrastructure could aid other infrastructures making them more productive and efficient (Mose, 2022). Furthermore, a well designed and developed road network reduces passenger, goods and service movement time there by reducing production process cost. Analogously, good network combination will attract new investors and enable the growth of the economy (Gisore, 2022). However, Kessides (1996) noted that one of the main shortcomings of research on the transportation infrastructure impacts on economic growth is that simultaneity of effects is not accounted for adequately. In other words, while transportation may bring about economic growth, it may also be argued that economic growth may also lead to investment in transport infrastructure and therefore causality cannot be inferred from time series correlations. Gramlich (1994) also argued that it remains essentially unclear whether the direction of causation is from transport infrastructure to economic growth or from economic growth to transport infrastructure or both. Moreover, an investigation done on the consequence of various types of infrastructure provision in a panel of countries and regions, indicated that while infrastructure does tend to cause long-run economic growth, there is substantial variation across nations, regions or states as the case may be (Pedroni, 2008). Therefore, one may be persuaded to conclude that the relationship between transport and economic growth is not a direct one, but rather related to its influence on the structures and processes of production, location and size of enterprises, structures and processes of distribution and other characteristics of production within an economy (Nistor & Popa, 2014). Some scholars also have even argued empirically and also demonstrated that the positive effect of road infrastructure development on economic growth declines if the development of roads is increased in isolation from other socioeconomic development factors such as physical capital, human capital, health and education etc.

In Rivers state, Nigeria currently there has been recently massive increase in the number of road construction and overpasses (fly overs), mostly in the major highways all over Port Harcourt, the state capital being executed to link many Local government areas (LGAs) in the state. Therefore, if road transport infrastructure actually stimulates economic growth force as perceived and advocated by some scholars, then there should be positive correspondence economic changes as well as the state's Gross domestic product (GDP). In view of the aforementioned, one may inquire whether there is strong evidence that these additional road networks bring positive market changes, employment and productivity

in the economy, especially in Rivers State. Thus, it was in the light of the above preceding facts that the need to find out whether there are valuable effects of road transportation infrastructure on economic growth in Rivers state and to what extent became glaringly urgent and necessary.

Literature Review

In the recent times, empirical studies and scientific evidence show that the investment in road networks and connections, especially in developing and some others countries with shortages of road infrastructure have been proven to provide an impressive return in the nations' economy (Canning & Bennathan, 2000). However, the influence of road transport infrastructure has become a debatable issue especially in the recent time. The discussions have major mainly on the economic impact of road transport infrastructure, due to the promotion of significant economic development of both state, regions and industries (Cohen, 2010; Giang & Sui Pheng, 2011). Accordingly, a robust road network is quite vital for a nation or state economic growth, creating enabling environment for investment, facilitating trade, reducing transportation costs, and boosting national and state tourism, which will in turn bring about optimization in employment generations and enhancing access to other essential services.

The empirical studies conducted by Boopen (2006) opined that better developed road network will obviously provide the needed connection between spatial separated facilities, providing the enabling environment for accessing better education, social interactions. Also enhancing efficient road transport movement, thereby reducing time and cost wastage in traffic population. Similarly, Pradhan et al. (2013) conducted a study Transport Infrastructure, Foreign Direct Investment and Economic Growth Interactions in India during the period 1970-2012. Using autoregressive distributed lag (ARDL) and vector error correction model (VECM). The null hypothesis was tested using the general F-statistics and by comparing them with critical values set out by Pesaran et al. (2001). The correlation results show a significant and positive association between road infrastructure (ROA) and economic growth (GDP) and at the 5% significance level. In the same manner,

In Nigeria, a research study conducted by Siyan et al. (2015) on the Impact of road transportation infrastructure on economic growth in Nigeria. The data were analyzed using probit model and multivariate model. The unit root test was estimated using both the Augmented Dickey Fuller (ADF) and the Philips-Perron (PP). The result of data analyses showed that the transport sector has positive impact on the economic growth in Nigeria.

Conversely, Garcia-Mila (1996), Holtz-Eakin and Schwartz (1995) and Tatom (1993), on their various studies on the effect of road transport on economic growth suggest that there is little evidence of an effect from infrastructure to

economic growth. Accordingly, it might be interesting to indicate that even though the relationship between transport infrastructure and economic growth does exist, however, one may argue that it remains essentially unclear whether the direction of causation is from transport infrastructure to economic growth or from economic growth to road transport infrastructure or rather both one of the main shortcomings of research on the economic impact of road transportation infrastructure as highlighted by some studies is that it has to some extent not properly accounted for simultaneity of effects-economic growth can lead to the transport system development as well as result from it (Kessides,1996).

Agian, Ashipala and Haimbodi (2003) look at the relationship between public investment such as road transport infrastructure, energy infrastructure public transportation etc. and economic growth in South Africa, Botswana and Namibia using the vector error correction model (VECM) methodology. Their finds indicated that the effect of public investment on growth is not significant though, it has the correct signs.

Looking at the empirical reviews, beside that there is inconsistency of results among researchers, there seemed to be dearth literature (foreign and indigenious) on the effect of road transport infrastructure on economic growth. So, in the Nigerian case, it appears that researchers are yet to show much interest in this research area, especially in Rivers State to the best of my knowledge.

Aim and Objectives of the Study

The aim of the study is to investigate the effect of road transport infrastructure on economic growth in Rivers state. In specific terms, the objectives of the study include the following, to:

1. Determine the extent to which road network and connections impacts economic growth.
2. Ascertain the extent to which road overpasses (flyovers) and bridges impacts economic growth.
3. Determine the extent to which road transport terminal impacts economic growth.

Research Questions

The following research questions will be answered in this study.

1. What is the extent to which road network and connections impacts economic growth?
2. What is the extent to which road overpasses and bridges have effects on economic growth?
3. Does road transport terminal have effects on economic growth?

Hypotheses

The following null hypotheses will be tested at 0.05 level of significance

1. Road network and connections do not have significant effects on economic growth.
2. Road overpasses and bridges do not have significant effects on economic growth.
3. Road transport terminal does not have significant effects on economic growth.

Materials and Methods

The Ex post facto research design was adopted in carrying out this research. The study area is Rivers state, Nigeria with the population of the study consisting of all twenty-three major roads leading to the 23 Local Government Areas (LGA) in Rivers state, the 30 major road transport (Bus) terminals in the Local Government Areas in Rivers State as well as the 15 major completed overpasses (fly overs) in River state. The sample of the study consisted of 13 major road network, 10 road transport terminals and 8 overpasses (fly overs) sampled from 503 respondents using multi-stage sampling technique. One instrument which was structured into five (5) sections and was used for the study. The instrument named Road, Overpass, Terminals and Economic Growth Assessment Questionnaire was used for the study. The face and content validity as well as the reliability of the instrument was conducted to ensure that the items in Road, Overpass, Terminals and Economic Growth Assessment Questionnaire were clearly and specifically stated. The instrument pass through some experts in Logistics and Transport studies. The data collected were analysed using simple regression analysis.

Results and Discussion

Table 4.1 showed correlation coefficient (R-value) of 0.518 which indicated a positive relationship between road network and connections and economic growth. In other words, road network and connections are a predictor of economic growth. The coefficient of determination (R squared) of 0.268 showed the proportion of variance in the economic growth that is explained by road network and connections. This implies that 26.8% of the variation in economic growth was accounted for or explained by road network and connections. Furthermore, the table indicated F-ratio of $F(1, 501) = 183.55$, and $P < 0.05$ which implies that road network and connections statistically significantly predicted economic growth. Based on this, the null

hypothesis that road network and connections do not have significant effects on economic growth was rejected and the alternative that road network and connections have significant effects on economic growth was accepted.

Table 2 showed correlation coefficient (R-value) of 0.433 which indicated a positive relationship between road overpasses and bridges, and economic growth. This therefore implies road overpasses and bridges are predictors of economic growth. The coefficient of determination (R squared) of 0.187 showed the proportion of variance in the economic growth that is explained by overpasses and bridges. This implies that 18.7% of the variation in economic growth was accounted for or explained by road overpasses and bridges. Road overpasses and bridges also statistically significantly predicted economic growth at 0.05 alpha level.

The results of the Table 3 showed correlation coefficient (R-value) of 0.383 which indicated a positive relationship between road transport terminal and economic growth. Thus, this indicated that road transport terminal is a predictor of economic growth. The coefficient of determination (R squared) of 0.147 showed the proportion of variance in economic growth that is explained by road transport terminals i.e. bus parks. This implies that 14.7% of the variation in economic growth was accounted for or explained by road transport terminal. Again, the table indicated F-ratio of $F(1, 501) = 86.130$, and $P < 0.05$ which implies that road transport terminal statistically significantly predicted economic growth. Based on this, the null hypothesis that road transport terminal does not have significant effects on economic growth was rejected and the alternative that road transport terminal has significant effects on economic growth was accepted.

The outcome of the study is in with the findings and conclusions made by Pesaran et al (2001) it is in line with conclusion made by Boopen (2006) and that of Cohen, 2010; Giang & Sui Pheng, 2011. The study equally agrees with the studies conducted by Ogun (2010) and Siyan et al (2015) in Nigeria which indicated a positive relationship between road transport and economic growth. The same results with other studies conducted in Nigeria such as Ejiogu et al (2020), Bosede et al (2013), Adebayo et al 2023 etc. Therefore, road transport infrastructures (road network and connections, overpasses and bridges, and road transport terminals) are very crucial infrastructure that can easily accelerates socioeconomic activities of an area as well as enhancing the improvement of accessibility and mobility of people, goods and services of a particular area.

Table 1: Regression Analysis between Road network and connections (predictor variable) and Economic growth

R = 0.518 R ² = 0.268 Adjusted R ² = 0.267 Std. Error of Estimate = 3.896								
Model	Sum sq.	Df	Mean sq.	F	ß	t	P-Val	Result
Regression	2786.429	1	2786.429	183.55			000	Sig
Residual	7605.376	501	15.180					
Total	10391.81	502						
Constant					17.629	19.244		
Road Network and Connection					0.488	13.55		

Table 2: Regression Analysis between Road overpasses and bridges (predictor variable) and Economic growth

R = 0.433 R ² = 0.187 Adjusted R ² = 0.186 Std. Error of Estimate = 4.106								
Model	Sum sq.	Df	Mean sq.	F	ß	t	P-Val	Result
Regression	1945.417	1	1945.417	115.39			000	Sig
Residual	8446.389	501	16.859					
Total	10391.81	502						
Constant					19.05	18.708		
Overpass-Flyover					0.437	10.742		

Table 3: Regression Analysis between Road transport terminal (predictor variable) and Economic growth

R = 0.383 R ² = 0.147 Adjusted R ² = 0.145 Std. Error of Estimate = 4.207								
Model	Sum sq.	Df	Mean sq.	F	ß	t	P-Val	Result
Regression	1524.445	1	1524.445	86.130			000	Sig
Residual	8867.361	501	17.699					
Total	10391.81	502						
Constant					20.01	18.654		
Road Transport Terminal					0.386	9.281		

Conclusions and Recommendations

Road transport infrastructures have a clear and glaring positive impact and effects on economic growth in Rivers state. Therefore, it is pertinent that various states and regions via this study should gain an insight that road transport infrastructures contribute a lot in boosting economic growth and development both in the state and the nation as whole. Road transport infrastructures are investments that create thousands of jobs during construction and operations. It opens up new areas for development and thereby making land use most viable. No doubt, Road transport infrastructures attract new businesses to the state, and thereby making it possible for the people in the rural community move the goods and creativity to urban area

where they may be most needed. This helps to improve that wellbeing of the economy and the nation at large.

The government should ensure efficient road transport networks in the state and the nation as whole to facilitate smooth movement of people and goods, thereby reducing transport time and cost. This will impact greatly on the effective and efficient investment, trading and industrialization in the state economy. The government and private sector should team together to provide an effective bypass routes and flyovers for the inner city. This will definitely reduce and alleviate major congestion and immensely improve both the travel time and quality of air. The study has demonstrated with comprehensive empirical evidence that road transport infrastructures contribute extensively to economic growth in Rivers state, Nigeria.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Credit Authorship Contribution Statement

Ogbonna, KI: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Visualization, Project administration, Writing - original draft. **Daminabo, SI:** Supervision, Methodology, Validation, Formal analysis, Data curation, Visualization, Review and Editing.

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