

**THE IMPACT OF ROAD TRANSPORTATION ON ECONOMIC GROWTH IN NIGERIA:  
1986-2013**

**BY**  
**AIGBEDION ISIBOR MARVELOUS<sup>1</sup>**  
**SALIHU DANJUMA SIIBU<sup>2</sup>**  
**OMORUYI KENNETH IGBINOBA<sup>3</sup>**

<sup>1</sup>Department of Economics, University of Abuja, P.M.B 114 Abuja +2347038931162  
[newworl819@gmail.com](mailto:newworl819@gmail.com), [newworld819@yahoo.com](mailto:newworld819@yahoo.com)

<sup>2</sup>Department of Economics, University of Abuja, P.M.B 114, Abuja +2348033140236

<sup>3</sup>Enforcement and Compliance Department, National Lottery Regulatory Commission, 69  
Limit Road, Off Sapele Road, Benin City, Edo State, Nigeria +2348036211916  
[komoruyi@ymail.com](mailto:komoruyi@ymail.com)

**Abstract:**

*This research work is an attempt to examine the economic impact of road transportation system in Nigeria. The research cover the period of 25 years, the researchers adopted secondary data, the sources were the Central Bank of Nigeria and National Bureau of Statistics. Multiple Regression of Ordinary Least Squares was used in analyzing the secondary data. The economic variables used in estimation were Gross Domestic Product which was a function of the amount of Road transportation in GDP (ROT), capital utilization (CUR), Government Expenditure on road transportation (GENOT), Exchange Rate (EXCHR), and External Reserves (EXTR) and E-view 7.0 software was used in the estimation. The result indicated that there is a positive and significant relationship between the dependent variable (Gross Domestic Product) and the independent variables. The research findings suggests that road transportation has a positive impact on economic growth in Nigeria. From the findings one of the challenges of road transportation system in Nigeria is poor funding and management of the facilities across the nation. Also government's attention to road transportation system and even the entire transportation sector is inadequate, monies meant for the maintenance of old projects and development of new projects are often diverted. This has been the case most West Africa countries. Therefore, the study recommends that the road transport system in Nigeria should be revitalized and government should put more attention to the sector by ensuring that funds allocated for the purpose of developing the road transportation system are judiciously applied to enhance sustainable economic growth in Nigeria.*

**Keywords: Transportation, Road, Growth, Development, Infrastructure**

**I INTRODUCTION**

The history of road transport development in Nigeria dates back to the period before 1910 when the existing bush paths were developed into motorable routes. According to Stanford Research Institute (1963), the growth of road transport in Nigeria was a later development, which did not evolve through the stage of animal drawn carts. According to this Institute, roads were not developed until the advent of motor vehicles in the 1920s and 1930s. The end of the Second World War (1945)

actually marked the period when the country was served with adequate network of all season roads for lorry and passenger car traffic.

According to Onakomaiya (2008), the roads were designed to serve two major objectives. First, they were meant to extend the commercial hinterlands opened up by the government railways by linking up the nearest urban centers with the major railway stations. The second was to reduce the strains thrown on the inland provinces in the provision of porters for the British Colonial Officers. The adequacy of road transport infrastructure determines a country's success and another; failure in diversifying production, expanding trade, coping with population growth reducing poverty, or improving environmental conditions. A good road transport infrastructure raise productivity especially in the agricultural sector of the economy and lowers production costs, in Nigeria the link between where the major production activities take place and where it is needed for final consumption need good road transportation that will bridge the gap, although the precise linkages between infrastructure and development are still open to debate. However, according to the World Development Report 1994 infrastructure capacity grows step by step with economic output - a one percent increase in the stock of infrastructure is associated with one per cent increase in gross domestic production (GDP) across all countries. As countries develop, infrastructure must adapt to support changing patterns of demand. The kind of infrastructure put in place also determines the pattern of income distribution. Poverty alleviation in rural areas and the growth of farm productivity and non-farm rural employment is linked closely to infrastructure provision.

Infrastructure services that help the poor also contribute to environments sustainability. Clean water and sanitation, non-polluting sources of power, safe disposal of solid waste, and better management of traffic in urban areas provide environmental benefits for all income groups. The urban poor often benefit most directly from good infrastructure services which mitigates squalid living conditions characteristic of concentrated settlements such as unsanitary conditions, hazardous emissions, and accident risks.

Integrated urban planning and transport policy can lead to more efficient use of both land and transport capacity with favorable environmental results. Expansion of transport infrastructure can reduce total pollution loads as congestion falls, average vehicle speeds rise, and routes are shortened. But road improvements can also encourage vehicle use and increase emissions. Therefore, additions to infrastructure capacity are only part of the solution. Improved management of traffic and land use and promotion of non-motorized modes, cleaner fuels, and public transport are also important.

Therefore this study is an attempt to re-examine the impact of road transportation system on economic growth in Nigeria. To achieve the objective above, the study is structured into five sections, which are introduction, literature review and theoretical framework, the methodology, data presentation and analysis, finally, conclusions and recommendations.

## **II LITERATURE REVIEW**

### **A. Concept of Transportation and Road Transportation**

According to Olakunori (1992), Transportation is the movement of people and goods from one location to the other. It is a means by which goods (raw material, production equipment, operating inventories, semi-finished goods and finished goods) as well as people are able to get to or be made available where they are needed for commercials or non-commercial purposes, as at when desired. The mobility (transportation of people and materials) is therefore one of the greatest needs that have to be adequately satisfied in any society if any meaningful level of social interaction, co-operation, production activities, economic and other types of development, and the enhancement of human welfare is to be achieved. This is the reason why road transport is popularly referred to as the engine and wheel of the society it helps the world to go round and function actively.

The necessity of road transport in the society can easily be realized when we consider the daily activities of an average person. He takes road transport to his place of work or business. The goods he buys are brought to him by means of road transportation. He moves around to interact with others and goes to church activities with the aid of road transport. The police that ensure his peace and security depend greatly on road transport for him to carry out their duties effectively (Olakunori, 1992).

According Pradhan (2010) road transportation provides the essential activities of time and place. Utility of time entails making things available when they are needed. One of the industries where time utility is of a major essence is that of the daily newspapers. This industry greatly depends on road transport to ensure that its vendors and papers get to customers early in the morning when the news they carry is still regarded as fresh. As day wear on, the news becomes stale and lose its values and prices.

Road transport helps to provide and add value to goods by making them available to consumers where they are needed. Most goods would be of no use to consumers if they are not made available at the places where they are needed for sale, purchase and or consumption. Hence the need for producers and marketers or business entrepreneurs to put in place an effective and efficient transport system for timely delivery of goods and services to adequately deliver satisfaction to the society is a necessary evil that can never be overemphasized (Pradhan, 2010).

According to National policy on road transportation (2004), an “adequate transport system” means that available transport infrastructure and services meet the needs of all Nigerians for access to the market, place of employment and to basic social services. The transport system will serve as an instrument for social, political and economic unification; strengthening the operation of markets, facilitating production and resource development, and promoting relationships with the outside world. A “Safe transport system” means that all reasonable standards are set and actions taken to prevent accidents and minimize the number of potential victims and the destruction of property. Effective safety measures should protect transport operators and their employees, users of transport services and the public at large (National policy on road transportation, 2004).

An “environmentally sound transport system” means that reasonable, effective actions will be taken to diminish atmospheric, water and other pollution, through proper planning of infrastructure and the establishment of appropriate regulatory standards (National policy on road transportation, 2004).

An “efficient transport system” means that the transport services are provided in a way that ensures resources are used efficiently and the economic potential of appropriate technology is used to achieve sustainable gains in productivity in order to reduce costs and improve service quality. An efficient transport system also implies the progressive reduction of social costs, the control of other external costs of transport, and the expenditure of public funds in a way that is properly justified and carefully managed (National policy on road transportation, 2004).

An “affordable transport system” means that adequate transport services can be enjoyed by all classes of Nigerians at reasonable cost, and where market mechanism fails to provide this, the Government will intervene to support the provision of essential transport services (National policy on road transportation, 2004).

An “integrated transport system” means the effective connectivity between ports, rail, road, inland waterways and air, thereby making use of the advantages of different modes to ensure seamless movement of goods and people and better utilization of resources (National policy on road transportation, 2004).

## **B. Problems of Road Transportation in Nigeria**

According to Olakunori, (2006) A lot of problems are associated with operation of road transport service and road transportation in Nigeria. Most of these problems arose as a result of poor management of roads on the part of the government as well as poor attention to customers on the part of the operators of road transportation service. Some of these problems are as follows: Recklessness of motor vehicle drivers; inadequate number of transit vehicles; inadequate road network; Bad roads, Menace of highway robbery and Inadequate maintenance of transit vehicles.

## **C. Overview of Road Transportation System in Nigeria**

Nigeria has become increasingly dependent on the road system to meet virtually all its inland transport needs as the rail, pipeline and inland waterway systems have deteriorated. At the same time, the road network itself has suffered from continuing lack of maintenance and investment by the three levels of government, Federal, State and Local. Nigeria has a total of 193,200 km of roads, made up of 34,123km of Federal roads, 30,500km of state roads and 129,577km of local government roads. As provided for in the Constitution, the different tiers of government have independent responsibilities for the planning, financing and maintenance of their roads. Three major issues affect the road network: Misuse particularly as a result of axle overloading causing damage to roads; Neglect of periodic and routine maintenance and an absence of emergency maintenance; and inadequate design and construction.

The above diagnosis reveals that: There is an urgent need to ensure an adequate and efficient maintenance of the existing road network. Failure to do so imposes high costs on road users and raises the cost of rehabilitation works. Past failures to ensure adequate and effective maintenance, due largely to the inadequacy of resources, are the major cause of the current massive need for road rehabilitation. In addition to rehabilitation needs, there is the need to check the misuse of road infrastructure due to excessive axle load. The costs of rehabilitation and improvement programs are very high and government is finding it increasingly difficult to meet them. Lack of transit parks for trucks along the Federal roads; and to find the funding to meet the high cost of rehabilitation and improvement programs, Additional sources of revenue need to be considered to fund the roads, including user charges in the form of road tolls; and Better control and more efficient use of available funds are also needed.

In 1985, about 23 percent of national roads were in a bad state. This rose to 30 percent in 1991 and 50 percent in 2001. The current dependence of Nigeria on its road system increases the urgency of addressing this issue. Unless roads and bridges are kept in good conditions they cannot support the desired socio-economic development of the country. The Government will therefore introduce user charges on Federal Roads, as the primary means of augmenting as the primary means of augmenting the budgetary allocation for road maintenance and rehabilitation. The Ministry of Works is responsible for the construction of new roads and the major upgrade of existing roads whilst Federal Roads Maintenance Agency (FERMA) created in 2002 has the mandate for the routine maintenance of Federal Roads. The Government will continue to contribute to the funding of road construction and maintenance, and attract additional funding by promoting private sector investment in the upgrade and maintenance of roads and management of tolls through PPPs. In this way, performance risk will be passed to the private sector and there will be a strong discipline for efficient delivery of services. A road study undertaken in 1998 indicates that N300 billion will be required over the next 10 years to bring national road network into a fairly good condition. After the recovery, an average of N24 billion will be required each year for subsequent maintenance and N32 billion per year for road rehabilitation. Further neglect of these roads implies a loss of network value of N80 billion per year and additional operating cost of N53 billion per year. Except roads

and bridges are kept in good conditions they cannot support the desired socio- economic development of the country.

#### D. Theoretical Framework

Observation regarding the nature and causes of economic growth are of considerable interest of models such as the Harrod-Domar, the Solow neoclassical model, the Two-Gap or Dual-Gap model, the Endogenous Growth model, and the Three-Gap model among others. In what follows, we shall be examining a few of the growth models:-

The Harrod-Domar model is a combination of the Classical and Keynesian theories of growth and recognizes the strategic importance of investment in the growth process. The model is used to estimate investment required to achieve a target rate of growth in output. In practice, emphasis is on the additional capital that is required to produce an additional unit of output. The formal Harrod-Domar growth model is specified as follows:  $(DY/Y = sk)$  or  $(g = s/k)$  or  $(g = sp)$ .

Where  $g = DY/Y$ ; the growth rate of national output

$s =$  the saving ratio;

$k =$  capital output ratio; and

$p = 1/K$ ; the reciprocal of the productivity of capital.

It thus utilizes the marginal capital output ratio. The major limitations of the model include:

- The analyses of Harrod and Dormar, were developed under different set of conditions and were meant to prevent an advanced economy from the possible effects of secular stagnation. It was never intended to guide industrialization programmes in underdeveloped countries.
- It fails to solve the problem of structural unemployment prevalent in underdeveloped” arising out of the deficiency of effective demand or under- utilization of capital.
- The model is based on the assumptions of closed economy and lack of government intervention in economic activities. These are unrealistic given the state of the undeveloped economies vis-a vis globalization.

The Two Gap model follows from the formal Harrod-Dormar growth model which states that the growth rate of national output equal the saving ratio divided by the capital output ratio or the saving ratio multiplied by the reciprocal of the productivity of capital. Considering the impacts of the external sector given that most economies are open, it is important to economies are open, it is important to examine the impact of foreign borrowing or grants on growth. Thus, we have:

$$\begin{array}{rcl} DY/M & = & m \\ M/Y & = & i \\ g & = & im \end{array}$$

Where  $m$  is the incremental output – import and is the ratio of investment good imports to income. The specification of the Two-Gap model is based on the assumption that growth requires investment goods, which may either be provided domestically or imported. The domestic provisioning requires savings while the external one requires foreign-exchange. Therefore, if investment goods can only be provided from abroad, there is always a minimum amount is unavailable, then growth is constrained. A similar constraint is engendered by a shortage of saving in case of domestic provisioning of inputs.

The Two-Gap model is based on certain restrictive assumptions which limit its usefulness in achieving the target growth rate in LDC's. These include the assumption that domestic savings and foreign borrowing are mutually exclusive and that there are structural rigidities in the economy. It also treats all types of capital investment as homogenous and excludes the impact of government intervention in the economy. In view of these limitations, the Two-Gap model pioneered by Chenery and Bruno (1962) and Chenery (1967) has been extended to a Three-Gap framework. This approach distinguished the fiscal constraint as another impediment to economic growth. The fiscal gap analysis is normally linked to the public sector borrowing requirement (PB) expressed as a proportion of national income (Y).

Thus, we have

$$\begin{aligned}
 I_g - S_g &= PB/Y = P_u; \\
 \text{Where } I_g &= \text{government investment;} \\
 S_g &= \text{government savings;} \\
 PB/Y &= \text{public sector borrowing requirement} \\
 &= \text{Actual national output ratio; and} \\
 u &= \text{capacity utilization.}
 \end{aligned}$$

The model assumes that the Incremental Capital Output Ratio (ICOR) and other behavioural parameters are fixed at least in the medium term. It also assumes that there is lack of substitutability between foreign and domestic resources, especially in the short-run. In spite of these limitations, this model has been variously applied in empirical studies. In this study, the Three-Gap would be used, given that it is the most appropriate model for the less developed countries.

### **E. Empirical Evidence**

The evidence is mixed across countries, data and methodologies, with some finding a positive impact, while others find little or no significant growth effect of infrastructure. Empirical work by Aschauer (1989) on the United States has provided evidence of a strong and positive relationship between public investment in infrastructure and growth over the period 1949-1985. He asserts that the decrease in public investment may be crucial in explaining the US economy's relatively poor economic performance between 1970s and 1990s. This finding has been confirmed in some subsequent studies, but challenged in others. For example, the World Bank's World Development Report (1994) finds a large range of empirical results on the importance of infrastructure for economic growth, with estimates ranging from no effect, to rates of return in excess of 100% per annum. Using cross-country data, Easterly and Rebelo (1993) find a positive effect of investment in transport and communication on economic growth. Sanchez-Robles (1998) also find a positive impact of road length and electricity generating capacity in explaining subsequent economic growth. Aschauer (2000) finds that the stock of public infrastructure capital is a significant determinant of aggregate total factor of productivity and that investments in public sector not only improve quality of life but also increase economic growth and returns for private investments. The findings of Demetriades and Mamuneas (2000) indicate that public infrastructure capital has significant positive long-run effects on both output supply and input demands in 12 OECD countries. Calderón and Servén (2004) find that indicators of telecommunication and energy infrastructure have positive and significant effect on growth. Boopen (2006) analyses the contribution of transport capital to growth for a sample of 38 Sub-Saharan African countries using both cross-sectional and panel data analysis. In both sample cases, the analysis concludes that transport capital has been a contributor to the economic progress of these countries. Results of Seethepalli et al. (2008) also prove that infrastructure is important for promoting growth in East

Asia. Zou et al. (2008) analyses data from China and find that higher economic growth level comes to a greater extent from better transport infrastructure and that public investment on road construction in poor areas is crucial to growth and poverty alleviation. The results obtained by Montolio and Solé-Ollé (2009) support the idea that productive public investment in road infrastructure has positively affected relative provincial productivity performance in Spain. In contrast, Tatom (1991; 1993), Holtz-Eakin (1994), Holtz-Eakin and Schwartz (1995) and Garcia-Mila et al. (1996) suggest that there is little evidence of an effect from infrastructure to income growth in a panel of U.S. state level data, particularly when fixed effects are included. It is interesting to note that even though the relationship between transport infrastructure and economic growth has attracted a lot of research effort and attention from economists, policy makers and politicians in the early 1990s (Gramlich, 1994), it remains essentially unclear whether the direction of causation is from transport infrastructure to economic growth or vice-versa or both. Kessides (1996) notes that one of the main shortcomings of research on the economic impact of transportation infrastructure is that it has so far not adequately accounted for simultaneity of effects-economic growth can lead to development of the transport system as well as result from it. Previous studies based on Cobb-Douglas production function could not confirm the direction of causation between the development of the transport sector and economic growth. In addition, most of these studies have typically relied on cross-sectional or panel data regressions. A general problem associated with such studies is that they implicitly impose or assume cross-sectional homogeneity on coefficients that in reality may vary across countries because of differences in geographical, institutional, social and economic structures. Hence, the overall results obtained from these regressions represent only an average relationship, which may or may not apply to individual countries in the sample (Bloch and Tang, 2003). Results obtained by Ashipala and Haimbodi (2003), Canning and Pedroni (2008) and Egart et al. (2009) lend support to this view.

The World Development Report noticed that as the economy develops, an increasing proportion of the country would need to open up by the construction of roads (World Bank, 1994). Work by Fernald (1999) provides evidence that increasing the road stock induces faster productivity growth in those industries that use reading more intensively, implying that the causation is more likely to be from infrastructure investment to output growth, rather than the other way around. Based on a cross-regional study comparing infrastructure provision in Spain and the US, De la Fuente (2000) also concludes that causality flows from infrastructure investment to economic growth. Other studies have used the VAR approach to solve the problem associated with the endogeneity of public investment in the production function approach. Majority seems to agree with the theoretical postulation that public investment has a positive effect on output. Among these are Queiroz and Gautam (1992) who find road infrastructure to be significant factor of economic growth and development. Sturm et al. (1999) find strong evidence of a positive impact of investments in transport infrastructures, such as roads, canals and railways, on the output level of the Dutch economy in the second half of the nineteenth century.

Furthermore, they find that transport infrastructure positively Granger-causes GDP whereas GDP negatively Granger-causes transport infrastructure. Mittnik and Neumann (2001) also establish that public investment has positive influence on GDP. However, there is no significant causal link running from GDP to public investment. Their results provide evidence for a complementary relationship between public and private investment. Using time series data for the US economy and cointegration analysis, Lau and Sin (1997) reject the endogenous growth model for the US economy. Looney (1997) analyses the effects of several types of public infrastructure in Pakistan and finds that public infrastructures have not been instigating private sector expansion but have been rather a response to the needs of the sector. Mamatzakis (2002) finds a positive effect of public

infrastructure (ports, railways, roads, electricity and communications) on output and private capital productivity of the Greek industrial sector. He also finds that the causal relationship is from public infrastructure to productivity. Canning and Pedroni (2008) investigate the consequence of various types of infrastructure provision in a panel of countries. They show that while infrastructure does tend to cause long-run economic growth, there is substantial variation across countries. Ashipala and Haimbodi (2003) look at the relationship between public investment and economic growth in South Africa, Botswana and Namibia using the VECM methodology. They find that the effect of public investment on growth is not significant however, it has the correct sign. On the other hand, private investment is shown to have a long run growth impact in South Africa and Namibia. However, they find evidence indicating a reverse causality from GDP growth to public investment. The causality is negative in the case of Botswana suggesting that as the economy grows investment in public goods declines, which contradicts both the Keynesian theory and Wagner's law. Nurudeen and Usman (2010) use cointegration and error correction methods to analyze the relationship between government expenditure and economic growth in Nigeria. Their results reveal that government total capital expenditure, total recurrent expenditures, and government expenditure on education have negative effect on economic growth. On the contrary, rising government expenditure on transport and communication results to an increase in economic growth. Finally, Pradhan (2010) explores the nexus between transport infrastructure (road and rail), energy consumption and economic growth in India over the period 1970-2007. He finds evidence of unidirectional causality from transport infrastructure to economic growth.

### III METHODOLOGY

#### A. Types and Sources of Data

Econometrics methodology is employed in this study as the analytical tool for the examination of the relationship between human capital development and economic growth. Consequently, the Ordinary Least Squares method is adopted to investigate the long-run relationship between human capital development and economic growth. The model states that economic growth is a function of Road transportation in GDP, capital utilization (CUR), government expenditure on road transportation (GENOT), Exchange Rate (EXCHR).

To further examine the relationship between money supply and economic growth in Nigeria, the study employed Johansson's Cointegration Test. The secondary data used for this study covering the period 1980-2010 were obtained from the World Bank Database, Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics, Global Development Finance Statistics and International Development Statistics.

#### B. Model Specification

The model formulation of this study is based on the theoretical framework, which was adopted in chapter two of this study, and the econometric model adopted by Tang in 2003, the model was specified as follows:

$$GDP = f(ROT, AIT, RAT) \dots \dots \dots (3.1)$$

Where the GDP is the gross domestic product in Nigeria, ROT is the amount of road transportation in the gross domestic product, AIT is the amount of air of transportation in gross domestic product and RAT is the amount of rail transportation in gross domestic product in Nigeria. This model was used to establish the relationship between economic growth and transportation infrastructure in



Nigeria. Similar, modification was done on the model in order to achieve the objective of the study; the new model formulated for the study is as follows:

$$GDP = f(ROT, CUR, GENOT, EXCHR) \dots \dots \dots (3.2)$$

In making the model an econometric model we

$$GDP = \alpha + \beta_1 ROT + \beta_2 CUR + \beta_3 GENOT + \beta_4 EXCHR + \mu \dots \dots \dots (3.3)$$

From the model above gross domestic product is a function of the amount of Road transportation in GDP, capital utilization (CUR), government expenditure on road transportation (GENOT), Exchange Rate (EXCHR) and Error Term.

Taking the natural log of the variables in equation 3.3 we derive the equation 3.4 below:

$$GDP = \alpha + \beta_1 \ln ROT + \beta_2 \ln CUR + \beta_3 \ln GENOT + \beta_4 \ln EXCHR + \mu \dots \dots \dots (3.4)$$

The a priori expectation of the model specified in equation 3.4 such that  $\beta_1, \beta_2, \beta_3$  and  $\beta_4 > 0$ .

**IV. EMPIRICAL RESULTS, INTERPRETATION AND ANALYSIS**

**A. Unit Root Tests**

The unit root test was conducted to ascertain the stationarity of the data before estimation using both the Augmented Dickey Fuller (ADF) and the Philips-Perron (PP). The results of the test presented in Table I show that all the variables (except the Primary School enrolment rate (PER), Secondary School enrolment rate (SER), and Tertiary Institutions enrolment rate (TER)) are stationary at levels at 1 per cent significant level.

Since all the variables (except the Primary School enrolment rate (PER), Secondary School enrolment rate (SER), and Tertiary Institutions enrolment rate (TER)) in the model are stationary at levels at 1 per cent significant level, the hypotheses that state the presence of unit roots in all the variables under consideration (except the Primary School enrolment rate (PER), Secondary School enrolment rate (SER), and Tertiary Institutions enrolment rate (TER)) are rejected. This shows that all the variables included in the model are stationary at level while the Primary School enrolment rate (PER), Secondary School enrolment rate (SER), and Tertiary Institutions enrolment rate (TER) are stationary at first difference at 1 per cent significant level.

Given the unit-root properties of the variables, we proceeded to conduct the cointegration test to ascertain the long-run relationship between human capital development and economic growth.

**TABLE I  
UNIT ROOT TEST RESULTS**

Variables	ADF Test Statistic		Philips-Perron Test Statistic		Conclusion
	Level	1 <sup>st</sup> Difference	level	1 <sup>st</sup> Difference	
GDP	4.629	2.6253	1.599	-5.176	I(0)
ROT	2.775	1.9662	6.829	4.8642	I(0)
CUR	3.999	2.5641	11.158	1.3470	I(0)
EXCHR	6.787	5.0909	-1.198	-4.464	I(0)
GENOT	0.1266	-3.701	-1.510	-3.736	I(1)
EXTR	2.258	-4.559	-0.919	-6.385	I(0)
1% Critical	-3.6661	-3.649	-3.6661	-3.6752	
5% Critical	-2.9627	-2.953	-2.9627	-2.9665	
10% Critical	-2.6200	-2.616	2.6200	-2.6220	

\*indicates significant at 1% or a rejection of the null hypothesis of no unit root at the 1% level

### ***B. Johansen Cointegration Test Results***

The Johansen cointegration test result in Table II shows the existence of two cointegrating equations at 5% significance level in the model. The hypothesis which states there is no long-run relationship between human capital development and economic growth is rejected at 5% significance level. This implies that there exists a long-run relationship between human capital development and economic growth in Nigeria.

**TABLE II**  
***JOHANSEN COINTEGRATION TEST RESULTS***

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.753709	111.0280	82.49	90.45	None **
0.710742	70.39203	59.46	66.52	At most 1 **
0.362152	34.41942	39.89	45.58	At most 2
0.305066	21.37941	24.31	29.75	At most 3
0.225435	10.82518	12.53	16.31	At most 4
0.111151	3.417023	3.84	6.51	At most 5

*(\*\*)* denotes rejection of the hypothesis a 5 % (1%) significance level L.R. test indicates 2 cointegrating equation(s) at 5% significance level

### ***C. The Long Run Regression Results***

The table III below shows the estimation results of the equation used in the study, from the results the R-squared of 0.78 indicates that 78 percent variation in the dependent variable is accounted for by the estimated equation. This implies that 78 percent variation in the Gross Domestic Product in Nigeria is caused by the independent variables.

The Adjusted R-squared of 74 percent suggests that the model in used is fit in explanation the variation in GDP put in consideration the losses of degree of freedom cause by the number of independent variables, that is the independent variables are statistically significant in determining the total variation in Gross Domestic Product in Nigeria. The F-statistic suggest that the model employed in the study is statistically significant given the value as 18.45499 , meaning at 5 percent level of significant, the equation in use is statistically significant that means, useful in explaining a unit change in Gross Domestic Product in Nigeria.

From the result Road transportation contribution to Gross Domestic Product has a positive impact on Economic Growth in Nigeria, given its coefficient (0.209677) of the equation it is statistically significant at less than 5 percent level of significance and it is capable of determining the variation in economic growth in Nigeria. This implies a unit change in Road transportation contribution will cause 0.21 percent change in Gross Domestic Product in Nigeria.

The capital utilization from the model was seen to have a negative relationship on Gross Domestic Product in Nigeria but statistical insignificant in determining the variation in economic growth given its coefficient which is higher than 5 percent level of significance. This implies that in determining the impact of road transportation system on the Nigerian economic growth capital utilization is statistically insignificant in determining the changes in economic growth in Nigeria, but it has a negative effect on Gross Domestic Product in Nigeria.

The results shows that the Government Expenditure on Road Transportation (GENOT) is positively related to Gross Domestic Product in Nigeria and its coefficient suggests that Government Expenditure on Road Transportation (GENOT) is statistically significant at less than 5 percent level

of significance in determining the variation in Gross Domestic Product in Nigeria. This implies that Government Expenditure on Road Transportation (GENOT) has a positive impact on economic growth in Nigeria and that Government Expenditure on Road Transportation (GENOT) can either increase the rate of economic growth in Nigeria or reduce the level of growth in Nigeria.

From the result Government Expenditure on Road Transportation (GENOT) will is responsible for 0.160711 changes in Gross Domestic Product in Nigeria that is a unit change in Government Expenditure on Road Transportation (GENOT) will cause 0.161 percent change in Gross Domestic Product in Nigeria.

Exchange Rate (EXCHR) is found to be positively related to Gross Domestic Product in Nigeria that is having a positive impact on Gross Domestic Product in Nigeria, but statistically insignificant in explaining the variation in Gross Domestic Product in Nigeria given the value of its coefficient and the level of significance higher than 5 percent level of significant. This implies that Exchange Rate (EXCHR) account for less or no variation in Gross Domestic Product in Nigeria that is its impact is less on the economic growth in Nigeria.

From the result the External Reserves (EXTR) was found to be positively related to Gross Domestic Product in Nigeria, and given the coefficient of 0.1447 and the level of significant it is statistically significant in accounting for the variation in Gross Domestic Product in Nigeria. This implies that External Reserves in Nigeria can improve road transportation which can translate to increase in economic growth in Nigeria. Also a unit change in external reserve we cause 0.1447 increases in Gross Domestic Product in Nigeria.

**TABLE III**  
**THE LONG RUN REGRESSION RESULTS**

VARIABLES	COFFICIENT	STANDARD ERROR	T-STATISTICAL	PROB.
InC	4.7577	0.5763	8.2550	0.0000
InROT	0.2096	0.1252	1.6744	0.0060
InCUR	-0.0307	0.3470	-0.0886	0.9301
(D)InGENOT	0.1607	0.0613	2.6216	0.0144
(D)InEXCHR	0.0425	0.1237	0.3434	0.7340
(D)InEXTR	0.1447	0.0948	1.5259	0.0391
R-SQUARE	0.780			
ADJ R-SQUARE	0.737			
F-STATISTIC	18.45499			
D-W STATISTIC	1.9115			
PROB	0.00000000			

**Source:** Author's Computation from E-views software 7.0

## V. SUMMARY OF MAJOR FINDINGS

The analysis and the results from model estimation has clearly defined that there is a strong and positive relationship between road transportation and economic growth in Nigeria and also the results from the probity model shown that transportation can improve the well-being of the citizens in Nigeria. From the results of the secondary data it cleared that road transportation contribution to Gross Domestic Product in Nigeria has a great impact on the economic growth, this implies that transportation system can increase productivity and effective distribution at the long run increase the economic growth in country.

Government expenditure on transportation has a positive and a significant relationship economic implication is that increase in government expenditure on transportation in Nigeria will increase the level of economic growth on the other hand reduction in government expenditure on transportation

will cause decrease in the economic growth in Nigeria. But over the years government expenditure on transportation have been very poor and less attention have been shown by government. Similarly, External Reserve was positively related to Gross Domestic Product in Nigeria and has a positive impact on economic growth. This is because external reserves can be used for expansion of capital project and can be used in road transport maintenance and for the construction of road facilities. If external reserves from the result can improve the economic growth in the country if the funds in the external reserves are well managed.

## VI. CONCLUSION AND RECOMMENDATIONS

This research work was an attempt to examine the economic impact of road transportation system in Nigeria, seeing that all Nigerian government developmental agenda of the past and present leaders includes transportation development, especially road transportation as a tool for ensuring social well-being of its citizens. Also to examine the various National policies and programmes toward the revitalization of the road transportation system in Nigeria for economic growth and development, to investigate factors militating against the improvement and the development of road transportation in Nigeria and to examine the economic prospect of road transportation system if the policy of the present government transformation agenda is well managed and implemented.

The research cover the period of 31 years, the researcher adopted secondary data, the sources were the Central Bank of Nigeria and National Bureau of Statistic. Multiple regression of Ordinary Least Squares was used in analysis. The economic variables used in estimation were Gross Domestic Product which was a function of the amount of Road transportation in GDP (ROT), capital utilization (CUR), government expenditure on road transportation (GENOT), Exchange Rate (EXCHR), and External Reserves (EXTR).

Using E-view 7.0 in estimation the result indicated that there is a positive and significant relationship between the dependent variable (Gross Domestic Product) and the independent variables (Road transportation in GDP (ROT), capital utilization (CUR), government expenditure on road transportation (GENOT), Exchange Rate (EXCHR), and External Reserves (EXTR). The research findings suggests that road transportation has an impact in the economic development in Nigeria.

From the result economic growth in Nigeria depended on the level of good and accessible road transportation and the level of road transport infrastructures that will complete the business activities and facilitate trade of Small and Medium scale Enterprises in Nigeria.

One of the challenges of road transportation system in Nigeria is poor funding and management of the facilities across the nation, from the research government attention to road transportation system and even the entire transportation sector is poor, monies meant for the maintenance of old projects and development of new projects are diverted for personal use.

Therefore, the following policies were recommended:

- i. Road transport system in Nigeria should be revitalized and government should put more attention to the sector by making the funds allocated are used for the purpose of developing the road transportation system for sustainable economic growth in Nigeria.
- ii. Government and its agencies should come out with sustainable and implementable road development and maintenance policies that will ensure good access and good traffic flow on our roads across the nation.
- iii. There is need to increase and encourage private participation in the provision of public transport services as mentioned earlier.

**REFERENCES**

- Aschauer, D. A (1999) Is Public Expenditure Productive?" *Journal of Monetary Economics* 23 pp.177-200.
- Aschauer, D (2000), 'Does public capital crowds out private capital?' *Journal of Monetary Economics*, Vol. 24, pp 171-188.
- Aschauer, D (1990), 'Highway Capacity and economic growth', *Economic Perspectives* 14 (1): pp14-24.
- Ashipala, J. & Haimbodi N.(2003). The Impact of Public Investment on Economic Growth In Namibia. *NEPRU Working Paper No. 88.* [Online] Available:[www.unhabitat.org/pmss/getElectronicVersion](http://www.unhabitat.org/pmss/getElectronicVersion).
- Anderson D. (1999): *Infrastructure Pricing and Public Revenue: World Development Vol. 17 No. 4* Published by Pergamon Press.
- Bannister D and Berechman J (2003), 'Transport investment and economic development' Routledge, London
- Bloch, H. & Tang, S. H. K. (2003). The Role of Financial Development in Economic Growth. *Progress in Development Studies*. 3 (3), 243-251.
- Boopen, S. (2006). Transport Infrastructure and Economic Growth: Evidence from Africa Using Dynamic PanelEstimates. *The Empirical Economics Letters*. 5 (1), 37-52. [Online] Available: [http://www.eel.my100megs.com/EEL\\_files/Vol5No1\\_files/EEL0514.pdf](http://www.eel.my100megs.com/EEL_files/Vol5No1_files/EEL0514.pdf)
- Calderón, C. & Servén, L. (2004). The Effects of Infrastructure Development on Growth and Income Distribution. *The World Bank Policy Research Working Paper 3400*.
- Canning, D. & Pedroni, P. (2008). Infrastructure, long-run economic growth and causality tests for cointegratedpanels. *The Manchester School*. 76 (5), 504-527. <http://dx.doi.org/10.1111/j.1467-9957.2008.01073.x>
- Central Bank of Nigeria Annual Report and Statement of Account 1994-2012.
- Central Bank of Nigeria (CBN) Statistical Bulletin 2012
- De la Fuente, A. (2000). Infrastructures and productivity: A survey. Barcelona, Institute de Análisis Económico,CSIC, Working Paper. [Online] Available: <http://pareto.uab.es/wp/2010/83110.pdf>.

- Demetriades, P. O. & Mamuneas, T. P. (2000). Intertemporal Output and Employment Effects of Public Infrastructure Capital: Evidence from 12 OECD Economies. *The Economic Journal*. 110 (465), 687-712. <http://dx.doi.org/10.1111/1468-0297.00561>
- Easterly W and Rebelo S (1993) Fiscal Policy and Economic Growth, *Journal of Monetary Economics*, 32, pp.417-458.
- Egart, B., Kozluk, T. & Sutherland, D. (2009). Infrastructure and Growth: Empirical Evidence. *OECD Economics Department Working Paper 685*. [Online] Available: <http://EconPapers.repec.org/RePEc:oec:ecoaaa:685-en>.
- Engle R. F. and Granger C. W. J. (1987), "Co-integration and Error Correction: Representation, Estimation, and Testing," *Econometrica*, Vol. 55, pp 251-276.
- Fernald, G. J. (1999), 'Roads to prosperity? Assessing the link between public capital and Productivity', *The American Economic Review*, June 1999 pp 619-637
- Ford, R. and P. Poret (1991), 'Infrastructure and private sector productivity', OECD Economics Department working papers No 91
- García-Milà, T., T. McGuire and R.H. Porter (1996) "The effect of public capital in state-level production functions reconsidered", *The Review of Economic and Statistics*, LXXVIII, 177-180.
- Gramlich, M. E. (1994). Infrastructure Investment: A Review Essay. *Journal of Economic Literature*. 32 (3), 1176-1196.
- Holtz-Eakin, D. (1994). Public Sector Capital and the Productivity Puzzle. *Review of Economics and Statistics*, 76(1), 12-21.
- Holtz-Eakin, D. & Schwartz, A. E. (1995). Infrastructure in a Structural Model of Economic Growth. *Regional Science and Urban Economics*. 25 (2), 131-151. [http://dx.doi.org/10.1016/0166-0462\(94\)02080-Z](http://dx.doi.org/10.1016/0166-0462(94)02080-Z)
- Ikya, S.G. (1993); "The Urban Transportation Problems in Nigeria" in Ikya S.G. (eds) *Urban Passenger Transportation in Nigeria*. Heinemann (Nigeria), pp, 3-28.
- Iwayemi Akin (1991) *Infrastructure Deficiencies and the Nigerian Business Environment: Basic*

## Issues and Policy Options, Nigerian Economic Society (NES) Seminar.

- Kessides, C. (1996). A Review of Infrastructure's Impact on Economic Development", In: Batten, D., Karlsson, C. (Eds.), *Infrastructure and the Complexity of Economic Development*, Chapter 12, pp. 213–230.
- Lau, S.-H. P. & Sin, C.-Y. (1997). Public Infrastructure and Economic Growth: Time-Series Properties and Evidence. *Economic Record*. 73 (221), 125–135. <http://dx.doi.org/10.1111/j.1475-4932.1997.tb00986.x>
- Looney, R. E. (1997). Infrastructure and Private Sector Investment in Pakistan. *Journal of Asian Economics*. 8(3), 393-420. [http://dx.doi.org/10.1016/S1049-0078\(97\)90046-4](http://dx.doi.org/10.1016/S1049-0078(97)90046-4)
- MacKinnon, J. G., Haug, A. A. & Michelis, L. (1999). Numerical distribution functions of likelihood ratio tests for cointegration. *Journal of Applied Econometrics*. 14 (5), 563-77. [http://dx.doi.org/10.1002/\(SICI\)1099-1255\(199909/10\)14:5<563::AID-JAE530>3.0.CO;2-R?](http://dx.doi.org/10.1002/(SICI)1099-1255(199909/10)14:5<563::AID-JAE530>3.0.CO;2-R?)
- Malik, A. (2009). Effects of Private Initiatives in Infrastructure on the Macro Economy of Asia. *European Journal of Economics, Finance and Administrative Sciences*. 16, 50-65.
- Mamatzakis, E. C. (2002). Public Infrastructure and Private Output: An Application to Greece. *Journal of Economic Development*. 27 (2), 143-160.
- Mendoza, E., Milesi-Ferretti, G. & Asea, P. (1997). On the Effectiveness of Tax Policy in altering Long-run Growth: Harberger's Superneutrality Conjecture. *Journal of Public Economics*. 66 (1), 99-126. [http://dx.doi.org/10.1016/S0047-2727\(97\)00011-X](http://dx.doi.org/10.1016/S0047-2727(97)00011-X)
- Mittnik, S. & Neumann, T. (2001). Dynamic effects of public investment: Vector autoregressive evidence from six industrialized countries. *Empirical Economics*, 26(2), 429- 446. <http://dx.doi.org/10.1007/s001810000064>
- Mrakpor, O.O. (1986); "Public Passenger Transport in Benin City. A Study of Accessibility and Reliability". Unpublished M.Sc Thesis in the Department of Geography and Regional Planning, University of Benin, Benin-City.
- Montolio, D. & Solé-Ollé, A. (2009). Road Investment and Regional Productivity Growth: the

- Effects of Vehicle Intensity and Congestion. *Papers in Regional Science*. 88 (1), 99-118.  
<http://dx.doi.org/10.1111/j.1435-5957.2008.00167.x>
- Nurudeen. A. & Usman, A. (2010). Government Expenditure and Economic Growth In Nigeria, 1970-2008: A Disaggregated Analysis. *Business and Economics Journal*. 2010 (4), 1-11.
- Onakomaiya, S.O. (2008) "Transport Research and Capacity Building in Nigeria: Ebenezer by a Poor Teacher Turned Professor". Valedictory Lecture at Olabisi Onabanjo University, Ago-Iwoye.
- Okakunori, O.K. (2006). *Transportation Management*. Enugu: Grovani Publishers.
- Odeleye, J. A (2004) "Rail Option in Urban Transportation" in I. Vandu-Chikolo, A. A. Ogunsanya and A.G. Sumaila (ed) *Perspectives on Urban Transportation in Nigeria*. Published by Nigeria Institute of Transport Technology NITT. Zaria. Pp156-170
- Ogunbodede, E.F. (1996); "Adequacy of Public Transport Services in Akure Metropolis: A Geographical
- Ogunbodede, E.F. (2004) "Urban Transport and the Environment" in I. Vandu-Chikolo, A. A. Ogunsanya and A.G. Sumaila (ed) *Perspectives on Urban Transportation in Nigeria*. Published by Nigeria Institute of Transport Technology NITT. Zaria. Pp101-120
- Ogunbodede, E F. (2006) "Movement pattern of Commuters and its Implications for Transportation Planning in Akure". *Anyigba Journal of Environmental Studies*. Department of Geography and Planning, Kogi State University, Anyigba. Vol.1 (2) pp 1-16.
- Ogunjumo, A. (1986); "The Patterns of Trip Generation at Ile-Ife" in *Journal of Nigerian Institute of Town Planners*. Vol. Vi and vii pp, 99 – 114.
- Ogunsanya, A.A. (1998); "Moving the Urban Masses: Tow Steps Forward one Backwards" in Dange, M; i.v. Chikolo and A.A. Ogunsanya (ed) *Issues in Transport Planning and Management*. Published by NITT, Nigeria.
- Okpala, D.C.I. (2001); "Urban Traffic Management in Nigeria Cities – The Necessity for Mass Transit Priorities in Transportation" in *Nigerian National Development. Proceedings of a National Conference* edited by S.O. Onakomaiya and N.F. Ekanem.
- Onakomaiya, S.O. (2000); "Overland Transport" in Oguntoyinbo, J.S., O.O. Areola and M., Filani (ed), op. cit.
- Onakomaiya, S.O. (2002) "Transport Research and Capacity Building in Nigeria: Ebenezer by a



- Poor Teacher Turned Professor”. Valedictory Lecture at Olabisi Onabanjo University, Ago-Iwoye.
- Olakunori, K. (2006). *Business and Government Policy*. New York: McGraw Hill Book Company.
- Olakunori, O. K. (2006). *Transportation Management*. Enugu: Grovani Publishers.
- Pereira, A. M. and O Roca-Sagales (2003), ‘Spillover effects of public capital formation: evidence from the Spanish Regions,’ *Journal of Urban economics* Vol. 53 pp 238-256
- Pedroni P. (2004), “Panel Cointegration; Asymptotic and Finite Sample Properties of Pooled Time series Tests, With an Application to the PPP Hypothesis,” *Econometric Theory*, 20, 597-625.
- Pradhan, R. P. (2010). Transport Infrastructure, Energy Consumption and Economic Growth Triangle in India: Cointegration and Causality Analysis. *Journal of Sustainable Development*. 3 (2), 167-173.
- Queiroz, C. & Gautam, S. (1992). Road Infrastructure and Economic Development-Some Diagnostic Indicators. *The World Bank Policy Research Working Paper no.921*. [Online] Available:[http://www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1999/04/28/000009265\\_3961004011323/Rendered/PDF/multi\\_page.pdf](http://www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1999/04/28/000009265_3961004011323/Rendered/PDF/multi_page.pdf).
- Rebelo, Sergio (1993) “Fiscal Policy and Economic Growth”, *Journal of Monetary Economics*, 32, pp. 417-458.
- Sanchez-Robles, B. (1998). Infrastructure Investment and Growth: Some Empirical Evidence. *Contemporary Economic Policy*. XVI, 98-108. <http://dx.doi.org/10.1111/j.1465-7287.1998.tb00504.x>
- Seethepalli, K., Bramati, M. C. & Veredas, D. (2008). How Relevant Is Infrastructure to Growth in East Asia? *The World Bank Policy Research Working Paper 4597*. [Online] Available: [http://www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2008/04/17/000158349\\_20080417084222/Rendered/PDF/wps4597.pdf](http://www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2008/04/17/000158349_20080417084222/Rendered/PDF/wps4597.pdf).
- Stock, J. & Watson, M. W. (1993). A Simple Estimator of Cointegrating Vectors in Higher Order Integrated Systems. *Econometrica*. 61 (4), 783-820.
- Sturm, J. E., Jacobs, J. & Groote, P. (1999). Output Effects of Infrastructure Investment in the Netherlands 1853-1913. *Journal of Macroeconomics*. 21 (2), 355-380. [http://dx.doi.org/10.1016/S0164-0704\(99\)00107-X](http://dx.doi.org/10.1016/S0164-0704(99)00107-X)

- Standford Research Institute (2003); The Economic Coordination of Transport Development in Nigeria Prepared for Town Planning Committee, National Economic Council Federation of Nigeria, Menlo Park, California.
- Tatom, J. A. (1991). Public Capital and Private Sector Performance. *Federal Reserve Bank of Saint Louis Review*.73, 3-15.
- Tatom, J. A. (1993). The Spurious Effect of Public Capital Formation on Private Sector Productivity. *Policy Studies Journal*. 21 (2), 391-395. <http://dx.doi.org/10.1111/j.1541-0072.1993.tb01831.x>
- Udo, R.K., (1978); Geographical Regions of Nigeria. London, Heinemann, 4th edition.
- World Bank (1994): World Development Report published by Oxford University Press.
- Zou, W., Zhang, F., Zhuang, Z. & Song, H. (2008). Transport Infrastructure, Growth and Poverty Alleviation: Empirical Analysis of China. *Annals of Economics and Finance*. 9 (2), 345-371.