Investigating the Impact of Rail Transport on Nigeria's Economic Growth

Dr. Muhammad Nurudeen Isa[1], Achi Peter Olisemeke[2]
[1&2] *(Department of Economics, University of Abuja, Gwagwalada, Abuja, FCT- Nigeria)*

Abstract: *This study investigates the impact of rail transport on Nigeria's economic growth. The main objective of the study is to determine the impact of rail transport expenditure on Nigeria's economic growth. The study employed the endogenous growth model to explain the relationship between economic growth and rail transport. Time-series data covering the period 1980 to 2013 were employed. To empirically determine the impact of rail transport expenditure on Nigeria's economic growth the study used ADF test and OLS estimation technique. The study found that government expenditure on rail transport has insignificant impact on Nigeria's economic growth as it has resulted in growing cost of road transport services, regular road collapse and unprecedented carnage on our roads. The study therefore, recommends that for rail transport to have a significant contribution on economic growth in Nigeria like in other nations, government should improve its budgetary provision on rail transport infrastructure in Nigeria so as to create an enabling environment for public private partnership.*
Keywords: *Economic Growth, Government Expenditure and Rail Transport.*

1. Introduction

All over the world, railway transportation has remained an important segment in overall logistics business. This is so because railway transport has obvious advantage over other means of transportation in the movement of goods and passengers overland. In many of these countries, rail transport has retained its pride of place as a veritable source of economic development. But the story is different in Nigeria. Rail transport in Nigeria has suffered greatly in terms of investment in the sector, growth and contribution to the national economy (Adesanya 2002).

In many countries, rail transport continues to play a vital role in bringing about socio-economic development; it contributes substantially to the movement of passengers and freight. Indeed, railways provide the most cost-effective, affordable, energy saving and environmentally friendly form of transport, when traffic densities are high, Agwu & Emeti (2012). According to Adesanya (2010), the primary reason for constructing railways in Nigeria was to open up the hinterland for the exploitation of agriculture and mineral resources – to evacuate mineral resources and agricultural products from the hinterlands to the seaports, for onward shipment to overseas markets in Europe. In Africa, the role of transportation as lifeline of the economy is captured in the statement that "the material development of Africa is summed up in one word – transportation" (Lugard, 1965).

Due to the role it plays in growth and development process, rail transport is seen as the mainframe around which an integrated national transport system is built on. Its capacity, which is further accentuated by its safety and security factors, coupled with its ability to travel longer distance with ease and lower unit costs, places it in good stead to serve as the hub of a transport system of a nation (Nwanze, 2002).

Given the enormous resources that will ultimately be required to bring back the railway system in Nigeria after many years of neglect and coupled with the global economic meltdown which affected the revenue profile of the country, it becomes apparent that government alone cannot adequately shoulder the responsibility of reviving the railway transport system. It is interesting too that government recognized this fact and has articulated a policy framework to involve the private sector in the task of reviving the nation's moribund railway system (Edward, 2001).

The choice of this paper was informed based on the moribund state and completes neglect of development of rail transport system by successive governments despite its contributory effect in promoting economic growth and development in most nations of the world. Although, a number of empirical studies have investigated the impact of transportation in driving economic growth, only a few empirical studies on the

impact of rail transport on Nigeria's economic growth existed. Therefore, this study seeks to cover this knowledge gap by investigating the impact of rail transport on Nigeria's economic growth with data spanning1980 to 2013.

The research findings will be of valuable use to academics and students, it will complement existing text on rail transport and economic growth in Nigeria and it will also provide a valuable store of knowledge to the general public. And as it is common with all research work, this study is hampered by inadequacy of data, time and cost constraint etc. Thus, future researcher should endeavour to consider time and fund adequacy for a successful and hitch-free research study.

1.2 Statement of Problem

Carapetis *et al.* (1984) pointed out that adequate, reliable and economic transport is essential for the social and economic development of rural areas especially in the developing world. They noted that the "absence of regular and reliable transport services ... [will] condemn remote communities to subsistence production in perpetuity".

However, railway transport in Nigeria is still bedevilled with various challenges such as poor funding and huge operating losses, Poor response to emerging rail transport needs, Loss of patronage to the road transport sector, configuration of track and facilities problem etc. For over three decades, the Nigerian Railway transport system was neglected in terms of investment and budget allocation to the sector. For instance, Nigeria covers a distance of 923,768 km but there are still only 3,505 km of railways, of which 1,788 km are sharp curves. They are all single-track 1067-mm gauge with either steel or timber sleepers. By comparison, road network increased from 72,000 km in 1962 to about 150,000 km in the mid-1980s, the number of airports increased from 2 in 1970 to over 18 in 1990 (Jaekel, 1997). So the length of railway network has remained constant at 3,505km over the last 50 years. Based on the above stated problems, the study intends to answer this research question: What impact does rail transport has on the economic growth of Nigeria?

1.3 Objective of the study

To this end, the objective of the study is to examine the impact of government expenditure in the rail transport sub-sector on Nigeria's economic growth.

1.4 Research Hypothesis

For the purpose of this study, the research hypothesis to be tested is:
H_0: rail transport has no significant impact on Nigeria's economic growth
H_1: rail transport has a significant impact on Nigeria's economic growth

2. Literature Review and Theoretical Framework

2.1 Establishment of Railway System in Nigeria

Available history suggests that railway system started in Nigeria in 1898 following the laying of the first railway track from the South West (Lagos to Ibadan) by the colonial administrators, Muktar(2011)& Oni(2000). This history placed Nigerian railway system among the first generation of railway systems in the world. The nation's railway network was designed in a North-South fashion mainly to facilitate the flow of goods, such as groundnut, cocoa and cotton from the inlands to the coast for shipment to Europe. In the early years of its existence and up till late 1970s, the railway system was generally efficient and vibrant (Adesanya, 2002).

Although the single-track narrow gauge network ran diagonally across the country, it was able to haul agricultural products from the north to seaports in Lagos and Port Harcourt. The era of groundnut pyramids in the north, palm oil produce from the east and cocoa from the west coincided with rail development in the country (Adesanya, 2010). Following the discovery of crude oil in commercial quantity and the subsequent transition to a petro-dollar propelled economy, agricultural commodities ceased to be the mainstay of the economy.

Consequently, the nation's rail tracks were abandoned as there was no need to transport crude oil through the railways system since crude oil was produced in the coastal areas and was easily pumped into vessels for shipment (Enebeli-Uzor, 2012). By the 1970s through to the early 1980s, both the volume of passengers and goods carried by the Nigerian Railway had started to drop dramatically. Also, the fortunes of the rail transport sub-sector have declined tremendously due to the enormity of the problems and challenges of the standard gauge tracks which connects Ajaokuta (where the country's steel mill is located) to Warri (a major oil hub and transit point for goods through its port). The narrow gauge tracks cover two major rails lines: one connects Lagos and Nguru in Yobe State (Western corridor); the other (Eastern corridor) connects Port Harcourt and Maiduguri in Borno State. The single-narrow gauge railway line was for many years the only mode of freight movement between the North and South. Successive years of neglect have stalled the expansion of the existing railway network as it has not significantly changed from the legacy bequeathed by the colonial administration. No city in the country currently has an operational intra-city rail system. However, two major intra-city rail systems are currently being developed; these are the Lagos light rail and the Abuja light rail projects (Enebeli-Uzor, 2012).

2.2 Railway System and Economic Growth

The availability of efficient railway system is crucial as transport services are essential for economic growth and development (Oni & Okanlawon 2006). In many countries of the world, rail transport has continued to play catalytic role in bringing socio-economic development. It contributes substantially to the movement of goods and passengers. Empirical works have shown that rail transport provide the most cost-effective, affordable, energy saving and environmentally friendly form of transportation especially in areas where traffic densities are high (Olanrewaju, 1986, World Bank, 1994). According to Adesanya (2002) when railway systems are properly integrated with other modes of transportation, economic levels of traffic can be consolidated to enable the railway to provide efficient services for high density flows of homogenous traffic carried over relatively long distances, including high volumes of containerized cargo or bulk freight such as oil, coal, steel or agricultural produce.

2.3 Empirical Review

Several authors have examined rail transport-growth nexus both in the developed and the developing countries. Herranz-Loncan (2011) examined the contribution of rail transport to economic growth in the Latin America before 1914. The paper used the growth accounting framework to provide estimates of the contribution of railways to the region's economic growth using four of the main Latin American economies (Argentina, Brazil, Mexico & Uruguay), in order to obtain the impact of the railway on those economies during the period of export-led growth. Results show that the contribution of railways to growth varied substantially across Latin American countries.

Furthermore, Herranz-Loncán (2011) examined the role of railways in export-led growth of Uruguayan economy between 1870 and 1913 using OLS estimation. The results showed that Uruguayan railways did produce some positive effects. They helped to integrate the national market while also promoting the political and administrative unification of the country. This indeed has affected the growth prospects of the Uruguayan economy. The study concluded that Uruguayan case provides a clear-cut example in which geography limited the potential of railway technology to generate significant levels of economic growth.

Atack *et al*. (2009) investigated whether railroad induced or followed economic growth in the American Midwest for the period 1850-1860. Using a newly developed GIS transportation database, the study examined the subject matter, focusing on two indicators of broader economic change, population density and the fraction of population living in urban areas. The difference in estimates (supported by IV robustness checks) strongly suggest that the coming of the railroad had little or no impact upon population densities just as Albert Fishlow concluded some 40 years ago. However, the results also imply that the railroad was the reason for mid- western urbanization, accounting for more than half of the increase in the fraction of population living in urban areas during the 1850s.

Haines and Margo (2006) used panel data set of counties for 1850 and 1860 to examine the economic impact of gaining access to a railroad on local economic development in the US. Difference in approach was adopted to compare outcomes from a treated group (counties that gain rail access in the 1850s) with a

control group (those that gain rail access before and after 1850s). Results showed that rail access appears to have increased the percentage participation in the service sector, decreased agricultural yields, and reduced the share of improved acreage in total land area.

In addition, Ramirez (2001) studied the impact of rail transport on the Colombian's economic development using panel data set for the period 1914-1980. The study adopted fixed effect model and found out that railroads did not play an overwhelming role in the Colombian economy, in contrast to other Latin American countries with similar rail transportation system such as Brazil and Mexico. In addition, the study found out that railroads caused expansions in coffee exports, but the magnitude of these effects were lower than those suggested in the literature.

In order to verify the impact of rail transport on economic development, Bollinger and Ihlanfeldt (1997) used a simultaneous model of census tract population and employment to study the economic impacts of Atlanta's MARTA rail transit system for the period 1980-1990. The results indicated that MARTA has had no discernible impact on total population or employment in station areas, but it has altered the composition of employment in these areas in favour of the public sector.

In conclusion, the review reveals an inconclusive argument in the literature as to the contribution of rail transport to economic growth, both in the developed and developing countries.

2.4 Theoretical Framework

2.4.1 The Endogenous Growth Theory

The endogenous growth theory is a new theory which explains the long-run growth rate of an economy on the basis of endogenous factors as against exogenous factors of the neoclassical growth theory. The new growth theory does not simply criticize the neoclassical growth theory. Rather, it extends the latter by introducing endogenous technical progress in growth models. The endogenous growth models have been developed by Arrow, Romer and Lucas, among other economists, Romer (2012).

2.4.2 The Endogenous Growth Models

The endogenous growth models emphasize technical progress resulting from the rate of investment, the size of the capital stock, and the stock of human capital. One of the three main models of endogenous growth is:

2.4.3 Romer's Model of Technology Change

Romer's model of Endogenous Technical Change of 1990, identifies a research sector specializing in the production of ideas. This sector invokes human capital along with the existing stock of knowledge to produce ideas or new knowledge. In the Romer model, new knowledge enters into the production process in their ways. A new design is used in the intermediate goods sector for the production of a new intermediate input. In the final sector, labour, human capital and available producer durables produce the final product. And a new design increases the total stock of knowledge which increases the productivity of human capital employed in the research sector.

2.4.4 The Model

The Romer model can be explained in terms of the following technological production function

$$\Delta A = F(K_A, H_A, A)$$

Where ΔA is increasing technology, K_A is the amount of capital invested in producing the new design (or technology), H_A is the amount of human capital (labour) employed in research and development of the new design. A is the existing technology of designs, and F is the production function for technology. The production function shows that technology is endogenous when more human capital is employed for research and the development of new designs, then technology increases by a larger amount. If more capital is invested in research laboratories and equipment to invent the new design, then technology also increases by a large amount. Thus the production of new technology (knowledge or idea) can be increased through the use of physical capital, human capital and existing technology.

3. Methodology

3.1 Model Specification

We proceed to specify the baseline empirical model whi ch captures the hypothesized relationship among the core variables under investigation. The endogenous growth theory is considered. Following the work of Mankiw, Romer, and Weil (1992), the augmented Solow (1957) Model was put forward as:

$Y_t = A_t K_t^{\alpha} H_t^{\beta} L_t^{1-\alpha-\beta}$ …… 1

By writing equation 3.1 above in intensive form, we have:

$Y_t = A_t K_t^{\alpha} H_t^{\beta}$ …… 2

by taking logarithm of both sides, we have:

$\ln Y_t = \ln A_t + \alpha \ln K_t + \beta \ln H_t$ …… 3

To capture infrastructure components, human capital is decomposed based on the work of Ijaiya and Akanbi (2009) and Esfahani and Ram ı

$\ln H_t = \ln GE_t + \ln RA_t + \ln INF_t$…….... 4

Substituting equation 4 into 3

$\ln Y_t = \lambda_1 + \lambda_2 \ln K_t + \lambda_3 \ln GE_t + \lambda_4 \ln RA_t + \lambda_5 \ln INF_t + ?_t$……..... 5

Where:

Y_t: Gross Domestic Product (GDP) proxy for economic growth

K_t: Capital

GE_t: Government expenditure on Rail transport

RA_t: Rail and Pipeline Output

INF_t: Inflation

$?_t$: Error term

λ_1: the intercept (drift term)

$\lambda_2, \lambda_3, \lambda_4, \lambda_5$: slope parameters (which show the magnitude of impact of explanatory on explained)

3.2 Estimation Technique

Equation 3.5 above is the final equation to be estimated in order to determine the contribution of rail transport to economic growth in Nigeria. To achieve this, the first step is to test for the stationarity level of the variables. This is because non-stationarity of variable is one of the properties of time series data that was used in this study. As a result of this, the study adopts both Augmented Dickey-Fuller (ADF) test proposed by Engle and Granger (1987). The Augmented Dickey-Fuller (ADF) test for unit root involves the estimation of the following equation:

$\Delta Y_t = \beta_0 + \delta \Delta Y_{t-1} + ?_1 \Delta Yt\text{-}1 + ?_2 \Delta Y_{t-2} + \ldots + ?_p \Delta Y_{t-p} + \mu_t$

$\Delta Y_t = \beta_0 + \delta \Delta Y_{t-1} + s \sum_{?=1}^{??} ????????? + ?_t$

The ADF test for unit root test the null hypothesis: $\delta=0$ against the alternative hypothesis: $\delta > 1$, it tests the null hypothesis of a unit root against the alternative that the series is stationary.

The technique used in estimating the parameters of the specified model is the Ordinary Least Square (OLS) estimation method. The justification for choosing the OLS as the estimate techniques was due to the desirable property its estimates posse ss called the BLUE properties. This property ensures good inference making, and efficient and non -misleading conclusion and recommendations. The choice to use the OLS was also based on the fact that the OLS is among the best estimation method for the linea econometric model.

The OLS estimation of the specified model was done using Econometric Views (E-Views). Thus, in lieu of the nature of this study and the data which suit the essence of this study, a secondary data is employed, sourced from the central bank of Nigeria (CBN) Annual Statistical Bulletin, National Bureau of Statistics (NBS) Annual Publication.

4. Results and Discussions

4.1 Analysis of Results

Table 4.1: ADF Test Result

Variable	Levels	First Difference	Second Difference	Order of integration
lnGDP	5.37	-3.85	-	I(1)
lnGE	4.22	-5.39	-	I(1)
lnK	-11.91	-	-	I(0)
lnRA	-2.32	-5.77	-	I(1)
lnINF	-2.88	-5.44	-	I(1)

Source: *Authors computation*

Note: the 5% critical value for the ADF statistics is approximately -2.96, computed from Mckinnon (1996)

The estimated equation is stated below:

$$\mathbf{lnGDP_t = 5835.19 + 585.76lnK_t - 1.47lnGE_t - 29434.66lnRA_t - 83.07lnINF_t}$$
$$\mathbf{t\ (1.26)\ \ (3.41)\ \ (0.36)\ \ (-0.89)\ \ \ \ (-0.64)}$$

The equation above shows the result of regression GDP on K, GE, RA and INF.
A direct and significant relationship exist between capital and GDP, the estimated parameter shows that 1% increase in capital will on the average bring about 585.75% increase in GDP while holding other variables constant. This results supported the Endogenous growth model which proved that the growth rate of national income will directly or positively be related to capital formation (i.e. human and new technology).Government expenditure has a positive but insignificant relationship with GDP, the estimate parameter of Government expenditure shows that 1 % increase in GE will on the average bring about 1.46 % increase in GDP. This implies that government capital expenditure on rail-transport is insignificant or non-existence to impact or contribute in the growth of Nigeria economy. This could be attributed to the fact that rail transport has been ignored over the years by successive governments and budgetary allocation for that sector has not been properly channelled. Rail and pipeline output (RA) has a negative and insignificant relationship with GDP, the parameter estimate of RA shows that 1 % increase in RA will on the average bring about 29434.66 % decrease in GDP. This is attributed to the dilapidated and near comatose state of rail transport infrastructure in Nigeria due to years of neglect. Inflation (INF)also has a negative and insignificant relationship with GDP, the parameter estimate of INF shows that 1 % increase in INF will on the average bring about 83.06 % decrease in GDP. The R^2 and Adj. R^2 value 0f 0.62 and 0.56 respectively which show that the model has goodness of fit, that 62% of the variation in the dependent variable (GDP) is captured by the explanatory variables (K, GE, RA and INF). The f-calculated value (11.22) exceed f-critical value (2.53) at 5% significant level showing that the estimated parameters of the explanatory variables K, GE, RA and INF are jointly statistically significant, which validates the R^2. The Prob. (f-stat.) Value (0.0000), affirms the above statement. This implies that the model is fit for forecasting and prediction. The D-W statistic value of 0.67, indicates the presence of positive autocorrelation, implying that the error terms of the adopted econometric model are correlated.

In conclusion, since the impact of government expenditure on rail transport (GE) and rail and pipeline output are found to be statistically insignificant at 5% significant level, the null hypothesis H_0 is accepted, thus we conclude that rail transport has no significant impact on Nigeria's economic growth (GDP).

4.2 Major Findings

The ADF test shows that the variables under investigation K (capital) is stationary at levels, while GDP, GE, RA and INF are stationary at first difference implying that they are integrated of order one i.e. I (1). Government Expenditure on rail transport is statistically insignificant to the variation in gross domestic product at 5% significant level, implying that government expenditure on rail transport has no impact on Nigeria's economic growth (output).

Also, rail and pipeline output is statistically insignificant to the variation in gross domestic product at 5% significant level, an indication that rail and pipeline output has no contribution on Nigeria's economic growth. Inflation rate was found to be statistically insignificant to gross domestic product at 5% level of significance, implying that inflation rate has no impact on Nigeria's economic growth.

Capital stock was found to be statistically significant at 5% significant level in the variation of economic growth (GDP), this implies that capital stock contributes significantly to the growth of Nigeria's economy. The model was found to have a goodness of fit with 62% of the total variation in economic growth being explained by the regressed model. The f-statistics of 11.22 showed that the parameters of the model are jointly statistically significant at 5% significant level, thus the model is fit for prediction and forecasting.

5. Conclusion and Recommendations

5.1Conclusion

The study seeks to empirically analyse the impact of rail transport on Nigeria's economic growth. Rail transport according literature enhances economic growth. The study employed secondary data from 1980 – 2013, from NBS and CBN. Time series data employed for this study is analysed using ADF test statistic and OLS.

In the light of the above, we have been able to establish based on the research question and objective that rail transport contributes insignificantly to the variation or changes in economic activities in Nigeria, this is inconsistent with most of the findings in the empirical literature of Herranz-Loncán (2011) and Atack et al. (2009). This could be attributed to the fact that rail transport has been ignored over the years by successive governments and budgetary allocation for that sector has not been properly channelled. Also it can be deduced that the neglect of rail transport sub-sector over time is inimical to the growth of the economy. This explains the extent of decadence in the sector since the advent of crude oil in the economy.

5.2 Recommendations

For the rail transport sub-sector to enhance economic growth in Nigeria as in other clime, there is an urgent need to refocus on the following critical areas of the economy:

1. *Improved Government Funding:* In the short run, the financial situation of the NRC has to be drastically improved through better and sustained funding (through various sources including internally generated revenue).Public Private Partnership (PPP): Private transport companies with a strong financial base should be allowed to invest and participate in Nigeria's rail transport business, alongside NRC.

2. *Concessioning of Nigerian Railways:* This would involve segmental concessions of routes to two or more concessionaires. Under this arrangement, railway infrastructure will remain the property of the Federal Government, while the concessionaires are expected to lease the rolling stock and/or bring in additional rolling stock for their operations.

3. *Privatization of Nigerian railways:* This is the outright sale of different arms of the rail transport system to private sector operators. The operations of passenger railways should be transferred to private train operating companies (TOCs) by public auction on a franchise basis, while private rolling stock companies (ROSCOs) should own and lease rolling stock to TOCs.

5.3 Suggestions for Further Studies

For further studies on the impact of rail transport on Nigeria's economic growth, a sectoral analysis can be investigated e.g. Agriculture, Mining, manufacturing, etc. and estimation techniques such as VAR to capture the dynamic nature of the model, Granger Causality test to determine direction of causality, co-integration to examine long-run relationship between the independent and response variables, stability test etc. can be employed in order to draw a meaningful conclusion on the investigation.

References

Adesanya, A. 2002: "Reviving the Nigerian Railways" Text of a Lecture Delivered at the National Training Workshop on Transport Planning and Management in a Depressed Economy, Held at *NISER,* Ibadan.

Adesanya, A. 2010: "Bringing the Nigerian Railways Back on Track: Challenges and Options" Text of a Lecture Delivered at the Monthly NISER Seminar Series, Held at NISER, Ibadan.

Atack J., et al 2009: Did Railroads Induce or Follow Economic Growth? Urbanization and Population Growth in the American Midwest, 1850-60. *National Bureau of Economic Research Working Paper* 14640. http:// www.nber.org/papers/w14640

Bollinger, C. R. and Ihlanfeldt, K. R. 1997: The Impact of Rapid Rail Transit on Economic Development: The Case of Atlanta's MARTA. *Journal of Urban Economics* Vol. 42 pp. 179-204.

Carapetis S, Beenhakker H, Howe J 1984: The Supply and Quality of Rural Transport Services in Developing Countries. *World Bank Working Paper* 654 www.scribd.com/doc/2423416/Role-of-Transport-in-Economic-Development. Retrieved 4.1.2011.

Edward, E. 2001: "Taking Railways to a New Standard" in Rail News, *Quarterly Journal of Nigerian Railway Corporation*, Vol. 2, No. 3, pp 5-10.

Enebeli-Uzor, S. 2012: "Rail System: Nigeria?s Neglected Critical Transport Infrastructure" *Zenith Economic Quarterly*, Vol. 8, No. 1, pp. 47-51

Esfahani .H. S. &M. T. Ramirez (2003): Institutions, infrastructure, and economic growth. *Journal of Development Economics* 70 (2003), pp.443– 477. http://www.elsevier.com/locate/econbase.

Haines, M. R. & Margo, R. A. 2006: Railroads and Local Economic Development: The United States in the 1850s. *National Bureau of Economic Research, working paper* 12381. http://www.nber.org/papers/w12381

Herranz-Loncan, A. 2011: The contribution of railways to economic growth in Latin America before 1914: A Growth Accounting Approach. *MPRA Paper* No. 33578. Online at http://mpra.ub.unimuenchen.de/33578/

Ijaiya G. T.& Akanbi S. B. 2009: An empirical analysis of long run effect of infrastructure on industrialization in Nigeria. *Journal of International Economic Review*, Vol. 2: pp. 135-149.

Jaekel, F. 1997: *History of the Nigerian Railway* (Vol.2), Ibadan: Spectrum Books Limited.

Lugard, F. D. 1965: *The Dual Mandate in British Tropical Africa.* London: Frank Cass.

Mankiw, G.N., Romer, D., Weil, D.N. 1992: A contribution to the empirics of economic growth. *Quarterly Journal of Economics* 107 (2), 407–437.

Mustapha Muktar 2011: *Impact of Transportation on Economic Growth: An Assessment of Road and Rail Transport Systems*, Bayero University, Kano

Nwanze, E. 2002: "Conceptualization of the Nigerian Transport Problems and the need for an Integrated National Transport System", *A Paper presented during the Conference on Revitalization of Railway Transport in Nigeria* at the Centre for Transport Studies, Olabisi Onabanjo University, Ago-Iwoye, August, 2002.

Odeleye, J. A. 2000: "Reviving the Nigeria Railway – Options and Challenges", *Japan Railway and Transport Review,* Vol. 21, 8, pp. 12-18.

Olanrewaju, S. 1983: *The Economic Regulation of the Road Haulage industry in Nigeria*, *Odu* 24 (1): 30-43.

Oni, S. 2000: Encouraging a multimodal Transport System in Nigeria, presented at a seminar titled *Towardsa Competitive and Sustainable shipper-friendly shipping Environment*. 15 (1)

Oni, S. & Okanlawon, K. 2006: Nigeria's transport infrastructural development: an integral part of the national economic empowerment and development strategy (NEEDS), *Journal of Social and Policy Issues* 3(2): 7-13.

Romer David 2012: *Advance Macroeconomics,* 4th ed., New York: McGraw-Hill Companies inc.

Solow Robert M. 1957: 'Technical change and the aggregate production function'. *Review of Economics and Statistics* (MIT Press) 39 (3): 312 – 320.

World Bank 1994: "Infrastructure for Development", *World Bank Report*, World Bank, Washington, D.C.

Appendix: Regression Analysis Data

YEAR	GDP	GE	K	RA	INF
1980	49.63	2.4	-	-	9.9
1981	94.3	1.6	18.2	0.2	20.9
1982	101.0	1.3	17.1	0.2	7.7
1983	110.1	1.1	13.3	0.2	23.2
1984	116.3	0.3	9.1	0.2	39.6
1985	134.6	0.2	8.8	0.1	5.5
1986	134.6	0.5	11.4	0.1	5.4
1987	193.1	0.4	15.2	0.1	10.2
1988	263.3	0.7	17.6	0.1	38.3
1989	382.3	0.7	26.8	0.1	40.9
1990	328.6	0.9	40.1	0.1	7.5
1991	545.7	0.4	45.2	0.0	13
1992	875.3	0.6	70.8	0.0	44.5
1993	1,089.70	1.4	96.9	0.0	57.2
1994	1,399.70	1.2	105.6	0.0	57
1995	2,907.40	3.8	141.9	0.0	72.8
1996	4,032.30	8.8	204.0	0.0	29.3
1997	4,189.20	7.2	242.9	0.0	8.5
1998	3,989.50	6.2	242.3	0.0	10
1999	4,679.20	3.3	231.7	0.0	6.6
2000	6,713.60	3	331.1	0.0	6.9
2001	6,895.20	19.2	372.1	0.0	18.9
2002	7,795.80	17.1	499.7	0.0	12.9
2003	9,913.50	6.6	865.9	0.0	14
2004	11,411.10	7	863.1	0.0	15
2005	14,610.90	15.6	804.4	0.0	17.9
2006	18,564.60	8.2	1,546.5	0.0	8.2
2007	20,657.30	31.4	1,937.0	0.0	10.9
2008	24,296.30	80.1	2,053.0	0.0	11.4
2009	24,794.20	106.2	3,050.6	0.0	15.29
2010	54,204.8	68.9	4,012.9	0.0	15.81
2011	63,258.6	58.8	3,908.3	0.0	10.30
2012	71,186.5	59.6	3,357.4	0.0	12.00
2013	80,222.1	-	633.2	0.0	11.3

Source: *CBN Statistical Bulletin, 2013.*