An Evaluation of Influence of Infrastructure on Economic Growth, Life Expectancy and Death Rates in Nigeria

Peter Ngozi Amah
Department of Finance,
University of Lagos, Akoka

Abstract
Putting in place the right quantity and quality of infrastructure appears to be core pre-occupation of policy makers in most economies; and this is dire in the case of developing economies. In this paper, the author reviews the state of infrastructure in Nigeria and investigates the extent of variation in key growth and human development indicators as improvements are made in power, telecommunications, road and rail infrastructure using standard proxies typically employed by national and multilateral institutions. Data collected are analysed using Ordinary Least Squares method. Interestingly, most of the regressions turned out negative but insignificant when analysed on individual factor basis. However, when viewed from holistic perspective, the F-Statistics suggested strong statistical significance of the relationships at 5% level of significance. This suggests that piecemeal approach to the formulation and execution of infrastructure projects will not help much and efforts to build infrastructure in a manner to positively influence economic growth, welfare and general wellbeing of society must be approached in a holistic and integrated way.

Keywords: Infrastructure, Gross Domestic Product, Life Expectancy Rate, Death Rate, Transportation & Power Infrastructure, Road & Rail Infrastructure.

Introduction

By its constitutive definition, infrastructure is the basic framework or underlying foundation for growth and development of any edifice or activity. By nature, it is a "fixed installation" needed for such edifice or activity to function effectively. National Infrastructure are traditionally put in place by government, owned and maintained publicly. To put things in perspective, infrastructure can be classified into hard and soft infrastructure, the former being physical networks required to run industrial activities of the nation, whereas the latter comprises institutional base like the legal, health, educational and financial systems without which the physical networks cannot function properly (Spacey, 2017). It can also be classified into Social and Economic infrastructure (Hirshman, 1958; UKEssays, 2018).

Since 1999 when democratic governance was restored, Nigeria has come up with a number of development strategies and initiatives aimed at rejuvenating the commanding heights of the economy. In the key documents of National Economic Empowerment Development Strategy (NEEDS, 2004) and Economic Recovery and Growth Plan (ERGP, 2017), the government expressly recognized infrastructure inadequacy as critical inhibitor to growth and development. There is preponderance of views/evidence that the state of infrastructure is closely associated with the level of development in different economies across the globe (Diamond & Space, 1984; Santiago & Morozumi, 2013; Myers, 2015), although no clear consensus exists on magnitude of the relationship. This is because infrastructure is said to provide public input to production processes in the scale that assures relatively low-unit cost to producers and consumers in the society (David & Daniel, 2008; Dobbs et. al., 2013). Accordingly, productivity is expectedly high while societal consumption and happiness are maximized where infrastructure is adequate. Because of externalities involved in most infrastructure projects related to provision of roads, railways, power, water, sanitation, telecommunication, and security (which makes them public goods), the public sector had traditionally taken up the responsibility of providing most of the key infrastructure services while private sector found it difficult or unattractive to make such investments (Popov, 2019; Dobbs et. al, 2013).

As population increased, the need for infrastructure services increased but government revenues dwindled, just as other recurrent commitments expanded. The result is widened infrastructure gap and declined support base for sustainable growth and development (Wyman, 2017). In fact, Dobbs et al. (2013) reported that about $57 trillion would be needed to fill the gap between 2014 and 2030 just as shifting financing from public to private sector would be challenging. It would therefore appear that the state of infrastructure in Nigeria has not been able to support desired level of economic activities and there is concern that reliance on conventional infrastructure procurement systems will still prove inadequate to achieve goals set out under the recently launched economic recovery and growth plan.

Consequently, the author sets out in this paper to argue that firstly, infrastructure gap can significantly explain time series variation in national economic output; and secondly, that available infrastructure is not able to sustain desired level of societal welfare measured by life expectancy and morbidity rates.

The rest of the paper is organized as follows: we first lay out literature review (including state of infrastructure in Nigeria) in section two, including the gaps in funding; and views from previous studies on the relationship between the state of infrastructure and measures of economic performance. In section 3, we briefly outline the methodology adopted to obtain our empirical results. In section four, we analyse the data and discuss key results of analysis; while the final section concludes with summary of results, policy implications and recommendations.

Literature Review

Notwithstanding their basic or foundational nature in carrying out activities of any economy or society, specific models of infrastructure development and funding appear to be at a formative stage and scarce in literature. Pierre-Richard (2010) came up with a **theory of long run development** based on public infrastructure. The theory holds that degree of efficiency of infrastructure is non-linearly related to stock of public capital such that resource reallocation typified by increase in share of expenditure devoted to public works and programmes will move society to higher level of productivity and lower the rate of time preference. By implication, the theory suggests that societies can escape the low-growth trap and achieve a steady state growth equilibria characterized by high productivity and right allocation of talent (Pierre-Richard & Otaviano, 2015; Pierre-Richard, 2015). Nations that prove incapable of addressing challenges of infrastructure invariably get trapped on a low-growth trajectory over the long run. According to Gillanders (2014), corruption is a key factor that determines whether or not nations are able to have adequate infrastructure. Using World Bank's enterprise survey data on measures of transportation and electricity, it was established that countries with more corruption tend to have worse infrastructure. Such countries will accordingly find it more difficult to escape the low-growth trap according to prescriptions of theory.

Still on the importance of infrastructure in growth and development, Hirschman (1958) proposes the **social overhead capital view** which saw infrastructure as foundation capital of society and most important ingredient of production, economic development and societal progress. This is supported by Biehl (1986) in his **Regional Potential Approach** which focuses on the pull effects of infrastructure. The basic idea here is that physical infrastructure is one key potentiality factor which determines regional output and hence income, employment and development. The more developed a region, the more likelihood one would see infrastructure adequacy in terms of quality and quantity. However it should be noted that some cases of quantity may not guarantee adequacy and

performance. According to Diamond and Spence (1984), 'infrastructure is a necessary but not sufficient condition for development to take place'. This implies that existence of infrastructure should be in the right quantity and quality, and should be an enabler for other factors required for economic progress.

In his **Multi Sector Model of Public Expenditure**, Zhang (2015) gives an indication that the nature of forces unleashed by infrastructure expenditure will determine if it will lead to growth and development. The author develops the **endogenous growth model** in which public expenditure creates a unique balanced growth path resulting from differential effects of infrastructure spending on the many sectors of the economy. These differential effects cause adjustments in prices and reallocation of resources, rate and intensity of which will be related to rate of growth of the economy

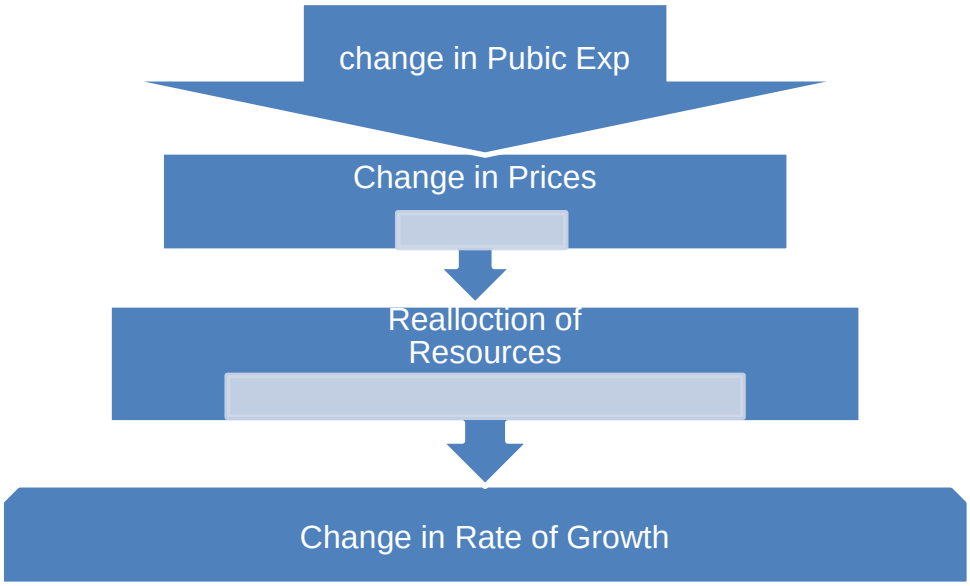

Figure 1: Endogenous Growth Process
Source: *Author's Concept*

Other important factors that could effectuate infrastructure spending are underlying politics and technology. Daldo and Ken (2013) developed a **model of dynamic interaction** between economic decisions of production, technology and political decisions which could be used to explain how an economy with initial low economic condition can outgrow another with higher initial condition. The authors alluded to the fact that many South Asian economies moved from low to

high growth trajectory on account of production and governance rooted in local conditions and culture.

Another evidence of conditional relevance of available infrastructure could be found in Santiago and Morozumi (2013). The authors studied 56 countries for causal effect of changes in composition of infrastructure expenditure on growth and found that increase in public spending on physical infrastructure does not appear to enhance growth when there is a corresponding fall in spending on education and health. This suggests that an appropriate composition of physical and social infrastructure will be required to achieve the right development outcomes. A healthy and skilful workforce would be required to transform inputs in the production process afforded by investments in physical infrastructure. Clearly there is abundance of models and evidence that infrastructure is positively linked to growth just as it is with other development variables. Sapkota (2014) studied a set of human development indicators and found expected regularity. Using dynamic panel estimation of data from 91 developing countries for the period 1995 – 2010, the study found that all 3 infrastructure variables have significant positive impact on human development indicators. The author concluded that eradication of all forms of infrastructure poverty is a necessary condition to eliminate human poverty considerably. This again would seem to explain why most nations that suffer infrastructure decay and poverty would be found at the lowest rungs of the development ladder.

The State of Infrastructure in Nigeria

What is the current stock of infrastructure available to serve Nigeria (a country of more than 185 million people and the biggest economy in Africa) that was expected to drive recovery of gross domestic product at an average rate of 4% as envisaged in the Ministry of Budget and Planning document (ERGP, 2017)?

A look at the nation's respective rankings on the global 'ease of doing business' and 'competitiveness' may reveal quite a lot on the comparative state of its infrastructure. According to World Economic Forum Report (WEF, 2017), Nigeria ranked 127th out of 138 countries surveyed for the 2016-17 period on competitiveness just as it ranked 169th out of 190 countries surveyed on ease of doing business. In fact data on the later suggested sustained deterioration as the country slipped from 108th ranking in 2008, through 133rd in 2012 and down to 169th in 2017. It was revealed in the Economic Recovery and Growth Plan document (ERGP, 2017) that infrastructure as at 2016 represents 35% of Gross Domestic Product against 70% average for peer emerging market economies;

South Africa is reported to have 87%, China recorded 76% while Brazil had 47%. Virtually all aspects of infrastructure showed non-trivial gaps and state of inadequacy.

The **power sector** is typical and has expectedly attracted enormous interest. As at 2014, Nigeria had electricity production capacity of 9.95 million Kwh compared to South Africa's 44.46 million Kwh (WEF, 2017). Access to electricity was reported at 57.7%, a ranking of 153rd out of 196 countries surveyed. South Africa had access rate of 86% just as about 89 countries including Algeria could boast of 100% access. Interestingly, the World Economic Forum also reported that 48 countries of sub-Saharan Africa, including Nigeria, with a population of 800m generated roughly the same quantity of electricity as Spain with only 45m people, giving a paltry 124 kwh per capita annually. The National Bureau of Statistics survey (NBS, 2017) showed that in 2015, PHCN could only meet 44.8% of national energy requirement on the average. The rural average was abysmally low at 25.6%. In 2005, government passed the Power Sector Reform Act which changed the structure of the sector, privatized generation and distribution but left transmission in the hand of government. Interestingly, it is reported in the NBS survey that only about 15% of quantity generated is successfully transmitted.

The **transport infrastructure sub-sector** is another critical area with enormous potential to stimulate economic activity across most sectors. Nigeria overwhelmingly relies on the road networks to move people and goods from one place to another. However, commensurate efforts at improving the sector appeared to be lacking resulting in the nation having one of the worst quantity and quality road adequacy metrics globally. Nigeria was reported in 2014 to have built 22km of road per 1000 square kilometre compared to 62km in South Africa, 28km in Kenya and 158km in India (WEF, 2017). As at 2015, the World Economic Forum reported that the country had 197,000km of roads with only 18% paved. The quality of roads was not any better as it was in 2015 rated low at quality index of 2.6 (on a scale of 7) against 5.0 by South Africa, and ranked 125th globally. It is expected that inadequate road infrastructure would be tantamount to increased accidents, loss of man-hours, the wear and tear of vehicles and high cost of goods and services.

Sea transportation is key to growth of most economies of the world as it forms the backbone of international trade and accounts for 80% of global trade by volume and 70% by value (UNCTAD, 2015). To give practical effect to this, Nigeria had about 11 years ago initiated a series of maritime reforms and

introduced the PPP model of infrastructure development in the sector. Some improvements were recorded in terms of availability of port facilities, reduction of wharf rats, increase in number of passengers and cargo through-put. As at 2015, Port traffic hit 1.06m in volume terms for the first time and moved Nigeria to 57th position globally out of 118 surveyed (WEF, 2017). After attaining 3.5 (on a scale, of 7) in 2012, port quality rating reduced again to 2.98 in 2015 which ranked 112 globally, creating concerns of maintenance and sustainability. South Africa had a rating of 4.87 and ranked 36th. Other transport sub-sectors like air and rail did not significantly reveal better outcomes. In fact, rail appeared worse in most measures with paltry coverage of just 3,500km and quality rating of 1.45 on a scale of 7 in 2015 according to the survey.

In 2001, **telecommunication sector** witnessed major developments with the introduction of GSM technology. Remarkably, the number of telephone users increased from 1.6m in 2002 to 154m or 82% of population in 2016 (NBS, 2017). Although the number of lines in Nigeria could be compared to those of UK and Germany put together, penetration rate still ranked low having ranked 145th out of 193 surveyed (WEF, 2017). Equally, the percentage of population that use internet rose from 0.56% in 2003 to 47.44% in 2015 while penetration rate still continued to fare badly in comparative terms just as issues of efficiency remained a serious challenge. It was reckoned that Nigeria had efficiency gap of 40% compared to zero by South Africa (Briceno-Garmenda & Foster, 2009) and the situation appears to have deteriorated with sustained operational losses arising from increased reliance on off-grid energy sources and security of installations.

The **water sector** is one often neglected but critical component in the development equation of any modern society. The household needs of safe drinking water, requirements for irrigation and industrial use underscore its imperative for society's survival. Accordingly, serious countries invest heavily in water storage capacity and irrigation facilities to ensure year-round availability of the critical resource in appropriate quantity and quality. In 2009, Nigeria was reported to have water storage capacity of 339m^3 per capita compared to the sub-Saharan Africa average of 838m^3 (WEF, 2017). It appears that enormous gap exists to be filled in this sector considering the rapid growth in population and near stagnant capacity over the years. The need for expansion of water infrastructure cannot be over-emphasized. The WEF report also had it that only about 300,0000sq meters of land area was equipped for irrigation, less than 1% of cultivated area. This implies acute dependence of farmers on traditional

seasonality of agricultural activities and lack of competitiveness of most agro-based products.

Nigeria: Growth and Development Outcomes

Over the past two decades up to 2014, Nigeria had seen phenomenal growth in economic activities and output, but existence of what appears to be sub-optimal infrastructure support base suggests great potential for even higher rates of growth. Between 2000 and 2014, the economy grew at rates that range between 5% and 7% (NBS, 2015), and following a re-basing of gross domestic product in 2014, it emerged as the biggest economy in Africa. Following developments arising from oil price decline, and governance decisions, the economy recorded negative growth in the first quarter of 2016 and sustained this trajectory of decline for the succeeding quarters up to first quarter of 2017 (NBS, 2017). The less desirable economic output may be explained by infrastructure-related variables if the views of established agencies are considered. According to the World Economic Forum, every investment in infrastructure is expected to generate 5% to 25% economic returns (Ogunbiyi, 2017). The National Bureau of Statistics had it that infrastructure project had actually contributed 1.9% or $4b annually to GDP over the years. According to the World Bank, every 1% increase in infrastructure investment will lead to approximately 1% increase in GDP (Estache & Garsous, 2012).

Nigeria would appear to have recorded below-par outcomes in other human development indicators recorded by the World Economic Forum report (WEF, 2017). On life expectancy, the nation in 2014 reported 52.8 years, a figure that ranked 183rd out of 196 countries analysed. South Africa was not significantly better at 57.2 years while Algeria was the top African country with 74.8 years. The picture for death rate was not different as 12.7 Nigerians are expected to die in a cohort of 1000 as at 2015. Interestingly, from the report, many seemingly crisis-ridden countries appeared to enjoy longer life expectancy than Nigerians do. For Afghanistan, about 8 persons out of 1000 died in 2015, Yemen recorded average of 6.83 while Palestine reported 3.5. Literacy rate at 51.1% in 2008 was lower than 54.8% reported for 2003. From the NBS living Standard Survey, (NBS, 2016), poverty incidence was as high as 64.2% in 2003/2004 and improved slightly to 62.6% in 2009/10. Rural poverty was, according to the survey, as high as 69.1%, with absolute poverty line drawn at ₦55,235.20 in 2010 when as many as 112.47m Nigerians were classified as absolutely poor. Not surprisingly, Nigerians, historically seen as happy people, have in the last few years slipped in the happiness index going below 5 (in a scale of 10) for the first time in 2016

(WEF, 2017). From 5.27 in 2015, the index dropped to 4.88 in 2016 as the people continued to face incidences of power outages, high death rates, drop calls, diseases and poverty prevalence. By this WEF report, Nigeria was 92nd in the happiness ranking which was not significantly different from 99th position taken by South Africa. Norway, with a rating of 7.54 ranked as the happiest people on earth while Iceland was third. It would appear that the magnitude and nature of the link between infrastructure and these development outcomes have not been fully explored. This problem lies at the heart of the empirical study and discussions that follow in this paper.

Methodology

In this paper, the author investigates the nature of parameters of quantitative relationship between infrastructure and selected growth and development variables using a survey design approach. Accordingly, we rely on time series data of relevant variables collected from data bases of National Bureau of Statistics, World Economic Forum Reports and World Bank for the period 2006-2016.

We formulate models of 3 growth and development measures on 4 infrastructure variables constructed from established local and international indicators The Infrastructure variables are Electricity Index (E), Transportation Index (TR), Telecom Index (TC) and a composite infrastructure index (ifi), while Growth and Development indicator variables include Gross Domestic Product (GDP), Life Expectancy (LE), and Death Rate (DR). For the GDP growth model, inflation rate (INF) is used as a control variable.

GDPR	=	f(TR, TC, E, Inf, ifi)	----------	(1)
LE	=	f (TR, TC, E, ifi)	----------	(2)
DR	=	f (TR, TC, E. ifi)	----------	(3)

The Transportation Index is constructed as the mathematical average of Road, Rail, Air and Port infrastructure quality indexes as contained in the Global Economy ratings (WEF, 2017). The electricity and Telecom Indexes were derived from the access and usages data contained in National Bureau of Statistics Panel Survey (NBS, 2017).In order to investigate the impact of the infrastructure categories, we parameterize the model by adapting the Social Overhead Capital and Regional Potential Views (Hirschman, 1958; & Biehl, 1986) which had established its linkage with growth and development variables, as follows:

GDPR = $a_1 + a_{11}TR + a_{12}TC + a_{13}E + a_{14}Inf + a_{15}ifi + u_1$ ------- (4)

LE = $b_1 + b_{11}TR + b_{12}TC + b_{13}E + b_{14}ifi + u_2$ -------- (5)

DR = $c_1 + c_{11}TR + c_{12}TC + c_{13}E + c_{14}ifi + u_3$ -------- (6)

In terms of *apriori* expectations, we expect all infrastructure variables to have positive and significant relationship with growth rate and life expectancy but negatively associated with death rate. The inclusion of inflation rate (inf) in the functions is to act as control variable. To estimate parameters of the hypothesized relationships, we use the Ordinary Least Squares method of estimation (corrected for errors in data)

Data and Results

Table 1: Infrastructure, Growth & Human Development Indicators

Year	GDPR*	LE+	DR+	TR+	E+	TC+	IfI	Inf*
2006	6.7%	49.2	15.5	0.26	0.49	0.23	0.33	8.20
2007	7.3%	49.8	15.1	0.24	0.50	0.27	0.34	5.40
2008	7.3%	50.4	14.7	0.26	0.50	0.42	0.40	11.60
2009	8.4%	50.9	14.3	0.28	0.52	0.48	0.43	12.50
2010	11.3%	51.3	14	0.27	0.48	0.55	0.43	13.70
2011	4.9%	51.7	13.7	0.29	0.56	0.58	0.48	10.80
2012	4.3%	52.1	13.4	0.31	0.56	0.63	0.50	12.20
2013	5.4%	52.4	13.2	0.29	0.56	0.69	0.51	8.50
2014	6.3%	52.8	12.9	0.26	0.58	0.75	0.53	8.00
2015	2.7%	53.1	12.7	0.26	0.58	0.79	0.54	9.01
2016	-1.6%	54.6	12.5	0.26	0.58	0.77	0.54	15.70

Sources: ** Extracted from NBS Annual Reports*
+ Extracted from WEF Database

It is clear from data (see table 1) that the growth measure had fluctuated during the review period. GDP growth rate attained a peak of 11.3% in 2010 although it reflected some adjustments arising from later year re-basement of GDP. During the same period, data on proxies of transportation and electricity infrastructure which reflected more of quality ratings did not show any appreciable improvements. In fact, the transport index showed initial uptick signs between 2006 and 2012 largely as a result of public private partnership that came in as a

major component of port reforms. The trend showed that quality of transportation infrastructure declined to 0.26 in 2016, a rating comparable to 2006 level. Road and Rail infrastructure quality continued to face serious dilapidation with quality standards that situate in the lower rungs of global rankings. Efforts to modernize ambitious infrastructure could not be sustained. Access to electricity saw only marginal improvement. From 49% in 2006 to about 58% in 2016, many Nigerians remained shut out from the national grid. The telecom infrastructure received enormous boost in 2001 when General System for Mobile technology debuted in Nigeria. From less than 1 million lines, the number increased to 154 million in 2016 or 82% penetration (NBS, 2017). In absolute numbers, Nigeria had more users than each West European nation including UK, Germany and France. However penetration and efficiency measures still lagged behind. Data on internet usage shows similar trend.

Economic Growth and Infrastructure

Table 2: GDP Regression Output

Variable	Coef	Std Error	T-stat	Prob Value
C	0.9373	0.2824	3.3187	0.0210
E	-4.1431	1.9256	-2.1516	0.0841
TR	-1.7945	1.5949	-1.1251	0.3116
TC	-1.8335	1.3167	-1.3925	0.2225
INF	-0.0094	0.0038	-2.4928	0.0550
IFI	6.4588	4.3163	1.4964	0.1948
R Squared	0.86			
Adj R Squared	0.72			
F Stat	6.17			
Prob (F)	0.03			
DW	2.37			

Source: *Author's Eviews Result*

A regression of the economic growth model (see table 2) shows that, working separately, all 3 infrastructure indexes relating to Transportation, Electricity and Telecom are negatively related to growth in Gross Domestic Product. But the composite infrastructure index (ifi) saw a positive link with growth suggesting that working together, the entire system can stimulate growth. However, all the measures were not statistically significant at 5% level of significance. Only the electricity index was statistically significant and negative on growth rate at 10% level of significance which is clearly an interesting result.

Human Development Indicators and Infrastructure

Table 3: Life Expectancy Regression Output

Variable	Coef.	Std Error	T-Stat	P. Value
C	50.4925	4.9281	10.2459	0.0001
E	-30.6859	29.5038	-1.0401	0.3384
TR	-49.3024	29.6189	-1.6646	0.1471
TC	-23.7636	22.5941	-1.0518	0.3334
IFI	96.8839	71.6332	1.3525	0.2250
R Sqd	0.94			
Adj R Sqd	0.90			
F Stat	25.04			
Prob (F)	0.0007			
DW	1.6985			

Source: *Author's E-Views Output*

Several authors have questioned the relevance of growth as a measure of society's economic performance and wellbeing. In this paper, the author extended the search-light to 2 human development indicators that relate to existentiality of human beings in the society. Global data on life expectancy shows that Nigeria ranked so poorly at 183rd out of 190 countries in 2014 with a slight advance to 177 in 2016. An average Nigerian had life expectancy of 52.8 years at birth in 2014, and 54.9 years in 2016. As was the case in the GDP growth regression, table 3 shows the result of estimation of the Life Expectancy model with all components of infrastructure indexes relating to transport, telecommunication and power turning out negative while the composite measure was positive. However, none of these results was separately significant at 5% and 10% levels of significance. This suggests that any increase in the measures of infrastructure used here could not be relied upon to improve the abysmal life expectancy data observed.

Table 4: Death Rate Regression Output

Variable	Coefficient	Std Error	T-Statistic	Prob Value
C	17.5501	1.3453	13.0457	0.0000
E	-1.2179	8.0539	-0.1512	0.8848
TR	4.3019	8.0854	0.5321	0.6138
TE	-2.6568	6.1678	-0.4308	0.6817
ifi	-6.0299	19.5545	-0.3084	0.7682
R Squared	0.99			
Adj R Squared	0.98			
F Stat	142.25			
Prob (F)	0.0000			
DW	2.19			

Source: Author's E-Views Output

For regression involving death rate as dependent variable, all infrastructure variables except the transportation index showed negative results as should be expected but they are insignificant. Transportation index was positive but also insignificant (see table 4). The result could underscore the typical link between transportation system, accidents and death. Although the signs are well-behaved, they remain doubtful.

Summary of Findings

A clear pattern has been revealed in the reported empirical results.

a) Virtually all the infrastructure indexes taken on sectoral level had negative relationship with all the growth and development measures.
b) The composite infrastructure index (ifi) had positive relationship with most of growth and development measures.
c) All the relevant regressions showed results that are not statistically significant at 5% level of significant.
d) However, the F-statistic suggests that, taken as a whole, the infrastructure variables could collectively explain variations in each of the growth and development measures in a significant way.

Implications

A large section of literature holds that a link exists between infrastructure and growth. This is logical, and this paper had attempted to show that it is also empirical.

a) The evidence, though tentative, of insignificant relationship of infrastructure and growth and development variables implies that infrastructure policy when taken on piecemeal basis may not lead to desired outcomes.

b) Implementation of certain infrastructure plans may be working against attainment of macroeconomic objectives.
c) The insignificant results found in the regressions involving transport, power and telecom infrastructure proxies implies that the way they have been funded and managed may have made them weak instruments in the hands of policy makers to exert appropriate influence on direction of growth and development.

Recommendations

a) A comprehensive infrastructure development policy should be formulated and implemented. All existing disparate policies and plans should be integrated under a designated Ministry of Infrastructure.
b) A new funding and management approach should be integrated into the policy framework for all sectors on a sustainable basis. The public-private partnership model should be adopted for all sectors, particularly the economic infrastructure sectors. In doing this, political considerations should have no place in the implementation.

References

Estache, A. & Garsous, G. (2012). The impact of infrastructure on growth in developing countries, *IFC Economics Notes, 1*, 1-11.

Biehl, O. (1986). *The contribution of infrastructure to regional development: Final report.* Luxembourg: Office for Official Publications of the European Communities.

Briceno-Garmendia, C. & Foster, V. (2009). Africa's infrastructure: A time for transformation (English). Africa Development Forum. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/246961468003355256/Africas-infrastructure-a-time-for-transformation.

Daldo, K., & Ken, T. (2013). Public infrastructure, production organization and economic development. *Journal of Macroeconomics, 38*, 330-346.

David, J., & Daniel, H. (2008), Infrastructure investment: The supply chain connection. *CSCMP's Supply Chain Quarterly* 4. Retrieved from www.supplychainquarterly.com/topics/logistics/scq200804/infrastructure/

Diamond, D., & Spence, N. (1984). Infrastructure and regional development: Theories. *Built Environment 10*(4), 262-269, Retrieved from https://www.jstor.org/stable/23286635

Dobbs, R, et al (2013). Infrastructure productivity: How to save $1 trillion a year. McKinsey Global Institute. Retrieved from https://www..mckinsey.com/insights/engineeringconstruction/infrastructure-productivity

ERGP (2017). Economic growth and recovery plan, Federal Ministry of Budget and National Planning Document. Retrieved from https://budgetoffice.gov.ng/index.php/economic-recovery-growth-plan-2017-2020

UKEssays, (2018), Economic and social infrastructure. Retrieved from https://www.ukessays.com/essays/economics/economic-and-social-infrastructure-economics-essay.php

Gillanders, G. (2014), Corruption and infrastructure at country and regional level. *Journal of Development Studies, 50*(6), 803-819.

Hirshman, A. O. (1958). *The strategy of economic development.* New Haven and London: Yale University Press.

Myers, J. (2015). These economies have the best infrastructure, Retrieved from https://www.weforum.org/agenda/2015/10/these-economies-have-the-besr-infrastructure/

NEEDS (2004). National economic and empowerment development strategy (Abridged), National Planning Commission, Reproduced by Central Bank of Nigeria.

NBS (2016, 2017), National Bureau of Statistics Household Panel Survey, Retrieved from https://www.nigerianstat.gov.ng/elibrary.

Ogunbiyi, T. (2017). Addressing Nigeria's Infrastructure Deficit. *BusinessDay* Newspaper, February 5.

Pierre-Richard, A. (2015). Public Capital, Health Persistence and Poverty Traps. *Journal of Economics, 115*(2), 103-131.

Pierre-Richard, A. & Otaviano, C. (2015), Middle Income Growth Traps. *Research in Economics, 69*(4), 641-660.

Pierre-Richard, A. (2010). A theory of infrastructure-led development. *Journal of Economic Dynamics and Control 34*(5), 932-950.

Popov, V, (2019), Infrastructure investment and growth: Market failures can be corrected by the government. Retrieved from https://www.oecd-ilibrary.org/transport/infrastructure-investment/indicator/english-bo6ce3aden?parentid=http%3A%2F%2Finstance.metastore.ingenta.

Santiago, A. O. & Morozumi, A. (2013), Can a government enhance long run growth by changing composition of public expenditure. *International Monetary Fund Working Paper 13*/162.

Sapkota, J. B. (2014), Access to infrastructure and human development: Cross country evidence. *Working Paper 70*, Jica Research Institute.

Spacey, J. (2017), Hard Infrastructure Vs Soft Infrastructure, Simplicable, February 15, Retrieved from https://simplicable.com/new/hard-infrastructure-vs-soft infrastructure.

UNCTAD (2015), Review of Maritime Transport, Retrieved from https://unctad.org/en/pages/Publicationwebflyer-aspx?publicationid=1374.

WEF (2017), Retrieved from www.reports.weforum.org/global-competitiveness-index-2016-2017/the-executive-opinion-survey-the-voice -of-business-community?doing_wp_cron=1557934937.4539430141448974609375 and www.weforum.org/reports/the-global-human-capital-report-2017.

Wyman, Oliver, (201), Bridging the infrastructure gag: engaging the private sector in critical national development – benefits, risks and key success factors. Retrieved from https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2017/sep/report-on-engahing -the- Private-Sector-in-infrastructure-development.pdf.

Zhang, L. (2015). A multi sector model of public expenditure and growth. *Journal of Economics, 115*(1), 73-93.

