THE ROLE OF INFRASTRUCTURE DEVELOPMENT ON NIGERIA'S ECONOMIC GROWTH: 1986- 2017

BY

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Being a research project submitted to the Department of Economics, Faculty of Social Sciences, and School of Postgraduate Studies, Nasarawa State University, Keffi, in partial fulfillment of the requirements for award of Postgraduate Diploma (PGD) in Economics

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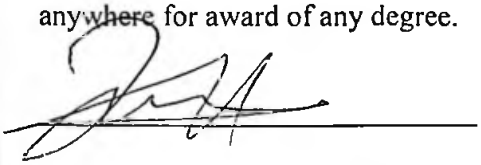
JUNE, 2020.

DECLARATION

I, ... declare that this study was purely a product of my research. It has never been presented anywhere for award of any degree.



15/2/2021

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CERTIFICATION

This is to certify that this study was carried out by Zephaniah Boyi with registration number NSU/PGD/ECO/0064/18/19 of the Department of Economics, Faculty of Social Sciences, Nasarawa State University, Keffi. It was read by myself and was found to meet the partial requirements for award of postgraduate diploma (PGD) in Economics.

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DEDICATION

This Research work is dedicated to Almighty God who in His infinite mercies gave me strength and resilience to carry out this research work through thick and thin.

May His name be praised.

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ABSTRACT

The study examines the role of infrastructure development in national economic growth. A model was specified for the purpose and secondary data was collected for the period 1986-2017. The objective of this research was primarily to investigate the level of telecom infrastructure development on the Nigeria economy. Statistical technique of ordinary least square (OLS) was employed for the estimation. Our result shows that developments in telecommunications sector provided by teledensity have positive and significant impact on economic growth in Nigeria. We recommend that increased infrastructure development in the telecommunications sector, and greater deregulation for competition among operations will bring about sustained economic growth

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

It takes little analysis to see that infrastructure plays a major role in the economy of a country, whether developing or developed. Mobile and land-line (fixed-line) telephones offer great promise for improving economic well-being in Africa. When a farmer in a remote village can get quicker information of the prices of his products in two different towns, he can put resources where they are most needed and most valued. Resources can be better coordinated between sectors and across geographies. Better information also allows for better long-term planning, as local producers can better assess global resource demands. The two technologies, however, are imperfect substitutes, offering different types of services. Clearly, mobile phones offer most, and possibly all, of the services of land-line telephones. The opposite statement is less true. Land-line telephones do not offer text message services or mobile internet access. Often, all that is required for an efficient decision to be made is a price quote. In this regard, a simple text message is far more cost-effective (Sang, John and Luis, 2011). Since a study by Hardy (1980) on the impact of telephones per capita on economic growth, a growing number of studies have attempted to identify telecommunications as an essential component of the economic infrastructure, fostering productivity and economic growth. The received implications of telecommunications infrastructure for economic development have evolved out of both direct and indirect benefits to economic growth of telecommunications expansion. For example, more efficient flow of information reduces communication and transaction costs, and accelerated information diffusion enhances market efficiency and competition as well as the potential for technological catch-up (Tisdell, 1981; Leff, 1984; Antonelli, 1991; Cronin et al, 1993a; and Greenstein and Spiller, 1995).

The need for good infrastructure management is of great importance to the economics of countries all over the world and the various sectors of the economy need to be understood. The world is fast becoming a global village and a necessary tool for this process is communication of which telecommunication is a key elements. Development in the telecommunication industry all over the world is very rapid as one innovation replaces another in a matter of weeks. Nigeria is part of this race for rapid developments, as the years of economic reversal via mismanagement have had adverse effects on its rate of growth and development.

On historical front, Ndukwe (2003) reports that the Nigeria telecommunications sector was grossly underdeveloped before the sector was deregulated under the military regime in 1992 and placed under the jurisdiction of the Nigeria Communication Commission (NCC). Since then, the NCC has issued various licenses to private telephone operators. These licenses allow private telephone operators (PTO) to roll out both fixed wireless telephone lines and analog mobile phones. The return of democracy in 1999 however paved the way for the granting of GSM licenses to three service providers, MTN, ECONET (which is now AIRTEL) and NITEL Plc in 2001 with GLOBACOM joining in 2003. Telecommunication is a major driver of any economy infrastructure which is therefore regarded as a vital instrument in ensuring economic development.

By the year 2000, Nigeria had only 400,000 connected lines and 25,000 analogue mobile lines and teledensity was 0.4lines per 100 inhabitants connection costs at this period were prohibitively high for as much as N60,000 for an analogue mobile line and waiting times for fixed lines could run into years. The increase in teledensity goes thus 0.4 lines per 1000 inhabitants in 2000, reached 1.96 in Dec. 2002, 0.33 in Dec. 2003, and in March 2004 100 inhabitants. The Nigeria population now stands at 140 million with GDP USD 52b, GDP growth of 3.7% and inflation rate of 10.4% (ITU, 2004)

The telecommunication regulator (NCC) estimated that in March 2004 the sector created 5,000

new jobs directly, in the same month, it was estimated that the spin offs in new businesses, dealer in retails outlets for GSM handsets and accessories and one, man phone both operations created no less than 400,000 new jobs. The licensed operators in Nigeria such as MTN, AIRTEL, GLOBACOM, ETISALAT and the likes are still recruiting workers. In Nigeria, the national economic empowerment development strategy (NEEDS) brought up the summary that the telecommunication sector has exceeded its teledensity targets under its body (NEEDS) this is due to the advent of the GSM services, between Nigeria's independence in 1960 and the end of 2000, the number of connected line grew at an average of 10,000 lines per annum, however since 2001 after the liberalization of the industry, the an average growth rate of over 12million lines per annum have been recorded. Teldensity has now grown from 0.4 lines per 100 inhabitants in 1999 and early 2000 to 68.49 per 100 inhabitants in 2011 and active telephone subscriptions has risen to 95,886, 714 as at December 2011.

On an aggregate basis the economy when measured by the real gross domestic product (GDP) is expected to grow by 7.98 percent in 2011 against 7.85 percent recorded in year 2010 by the National Bureau of Statistic (NBS).

The NBS in its economic outlook tagged "2011 GDP forecast for Nigeria" notes that the Nigeria telecom sector continues to be one of the fastest growing and most competitive in the world with over 86million subscribers.

Likewise, it is expected that the non-oil sector continue to drive the Nigeria economy in 2011. On overall GDP growth the report notes that the 0.13 percentage point increase in real GDP growth observed in the projected figure for 2011 would be accounted for by the increase in the activities of the wholesale/retail trade, building and construction, finance and insurance, and telecoms sectors of the economy.

The nominal GDP for the year 2011 is projected at N33.99 trillion as against the N29.10 trillion

recorded in 2010, thus indicating an increase. "The two major output groups of the economy, that is oil and non-oil sectors, are expected to witness an increase in output in 2011. A GSM activity along with growth in lines has become a boom in private investment in the telecommunication sector. Recognizing the seemingly insatiable appetite of consumers for phone services and the potentials of the Nigeria market, investors pumped USD 2.55billion into the sector by June 2003. This represents a phenomenal 5000% end of 1999. Today investment in the telecom sectors ranks second only to that in the oil industry so that fixed lines cost between N7,000-N30,000 in 2003 from over N100,000 in 1999 (Ndukwe 2003)

Owing to several factors including government deregulation policy, the worldwide trend of rapid development in telecommunications and information technology and the huge potential of the Nigeria market, the story is very different. The immediate past administration, through the government regulator, the Nigeria communications commission, has proved itself fully committed to the liberalization of the telecom market. Since the year 2000 NCC has licensed digital mobile service providers several private telephone operators, fixed wireless access operators, two long distance operators, internet provider and a second national carrier (Ndukwe 2003).

With regards to gross domestic product, the World Bank (2015) report that, it rose steadily from ₦37,281.82 billion in 2006 to ₦532,248.42 billion in 2014, after reaching all time high of ₦631,882.94 billion in 2015. The historical review above indicates that although teledensity in Nigeria has been generally rising, its effects on macroeconomic variables (including gross domestic product, imports and exports) have been mixed. In summary, a tentative conclusion emerging from the trend analysis is that telecommunications development has some association with economic growth in Nigeria. However, an empirical analysis is required to determine the exact relationship existing between these variables. This is the motivation to conduct this study on Nigeria during the 1986-2017.

1.2 Statement of Problem

Road infrastructure has been found to be a significant factor of economic growth and development. The development of infrastructures like roads, telecommunications and others has a positive impact on the growth and developments of countries. There has been the problem of increased demand for telecom services in the face of falling supply due to lack of funds. Another factor that contributes to instability in FER in Nigeria was the high tariff rate which causes misallocation of resources in production and promotes investment of resources in rent-seeking and socially unproductive but privately profitable activities which reduces the growth rate of output.

Another problem that has effect on telecom in Nigeria in the recent times is terrorist attacks which induce a higher level of insecurity, risks and uncertainty and has negatively affected foreign direct investment, as well as caused lack of domestic production and even exportation of manufactured commodities from the country. There has also been the problem of the collapse of international oil market, which saw Nigeria foreign exchange earnings significantly fall relative to its imports demand. This has negative implication on Nigeria's FER as the foreign exchange intervention at the prevailing rate would only deplete the foreign reserves.

1.3 Research Questions

In this study, the following questions would be answered.

(i) What are the impacts of infrastructural expenditure on economic growth in Nigeria?

(ii) What are the impacts of teledensity on economic growth in Nigeria?

1.4 Objectives of the Study

The major objective of this study is to examine the role of infrastructural development on national economic growth using a study of the telecommunication sector in Nigeria during the 2001-2014.

The following are the specific objectives of this study:

(a) To analyze the effect of infrastructural expenditure on economic growth in Nigeria;

(b) To examine the effect of teledensity on economic growth in Nigeria

1.5 Research Hypotheses

In this study, the following hypotheses would be tested to validate the data

(i) Ho: Infrastructural expenditure has no positive and significant effects on economic growth in Nigeria

(ii) Ho: Teledensity has no positive and significant effect on economic growth in Nigeria

1.6 Scope and Limitations of the Study

This study focuses on the impact of telecommunication on economic growth in Nigeria during the 2001-2014. However the study has a number of weaknesses. Some factors may limit the level of accuracy and reliability of this study. Such factors include:

i. Difficulty in obtaining data from respondents
ii. Low response rate from involved parties
iii. Limited time frame for carrying out the research due to the period given to embark on the research work
iv. Resource needed foe the research work is insufficient
v. Rising cost of transportation and material.

1.7 Significant of the Study

The telecommunications sector of the Nigeria economy like any sector cannot function without funds. The Nigerian economy stands to derive lots of benefits if concrete steps are taken to salvage sector. It is also expected to serve as an impetus for further researchers in the area of study. It should not be considered as an end to research and policy making but is as a guide taking into consideration of it limitations. To the government and its agencies, it looks at earlier policies designed and why there failed. Therefore, it is hoped that it will provide useful guide to policy makers in telecommunication for study and consistent policies and programmes in terms

of funding. Moreso, it will enable Nigerian government to take advantage of suggestions and produce in Nigeria. To the society, this research work will create awareness on telecommunication- economic growth nexus. Finally the salient findings of the study will also make the farmers to be more oriented in agriculture.

1.8 Organization of the Study

The study is organized into five chapters. Chapter one is the introduction. Chapter two reviews the related literature. Chapter three contains research methodology. Chapter four is concerned with presentation and analysis of data while chapter five is the conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Concept of Infrastructural Development

It is difficult to define a single concept of infrastructural development and its components, used in economic literature. There is lack of definition accepted generally, abundance of structure components and relationship between them. Infrastructure is usually understood as basic public infrastructure, which forms the foundation for society and economics. As it is mentioned in World Bank report (2004): infrastructure is an umbrella term for many activities, it plays a very important role for industrial and overall economy. Various descriptions of infrastructure and its features create possibilities to analyzed infrastructure in different ways which result in different and hardly comparable conclusions. Clear definition of infrastructure is crucial in order to evaluate its possible impact. The authors of the article provide the analysis of scientific literature in order to build the most explicit description of infrastructure for further research. Economists and urban planners distinguish two types of infrastructure: economic infrastructure and social infrastructure. Economic infrastructure is defined as the infrastructure that promotes economic activity, such as roads, highways, railroads, airports, sea ports, electricity, telecommunications, water supply and sanitation. Social infrastructure (such as schools, libraries, universities, clinics, hospitals, courts, museums, theatres, playgrounds, parks, fountains and statues) is defined as the infrastructure that promotes the health, education and cultural standards of the population – activities that have both direct and indirect impact on the welfare. All of these institutions entail capital goods that have some public use (Fourie, 2006). The author also argues that infrastructure consists of two elements – "capitalness" and "publicness". According to this specification, infrastructure would include goods that have a capital character, but are not necessarily public. Thus, a common feature of infrastructure seems to be that infrastructure goods are strongly used

by public. Economists label such goods physical infrastructure, or infrastructure capital. In scientific literature the role of infrastructure is understood through services which are provided using the assets of physical infrastructure. Infrastructure services, such as power, transport, telecommunications, provision of water, sanitation and safe disposal of waste, are fundamental to all activities of households and to economic production. Baldwin and Dixon (2008) distinguish three categories of infrastructure assets: - infrastructure assets that combine with labour to produce capital or intermediate goods; - infrastructure capital that combines with labour to produce final goods an services; - infrastructure capital that combines with other forms of capital and improves their productivity, f. e. roads with trucks. Prud'homme (2004) defines that infrastructure consists of capital goods which are not consumed directly; they provide services only in combination with labour and other inputs. The author names diverse sections of infrastructure sector and services they provide.

2.1.2 Concept of Economic Growth

Economic growth is defined by Ijirshar (2015) as an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. It can be measured in nominal terms, which include inflation or in real terms which are adjusted for inflation. In another words, economic growth is the increase in the amount of goods and services produced by an economy over time. It is conventionally measured as the percentage of rate of increase in real gross domestic product.

2.2 Theoretical Review

The theoretical analysis of the effect of infrastructure on growth and on development outcomes is mostly found in growth theory and the new economic geography literature. Authors (Agénor and Moreno-Dodson, 2006, Fourie, 2006) argue that infrastructure impacts on economic growth primarily in several ways: (i) Infrastructure lower the cost of input factors in production process. This effect is called the direct productivity effect. - Infrastructure improves the productivity of

workers, and this effect is known as the indirect effect. (ii) Impact of infrastructure on growth is obtained through the initial building and construction period: working places are created in construction and related industries. As infrastructure investments require maintenance, it further boosts the long time creation of jobs.

(iii) Infrastructure also has positive effect on education and health outcomes: good health and high education of labour force induce economic growth.

2.3 Empirical Review

In empirical literature, the relationship between infrastructural development in general and telecommunications in particular and economic growth has been examined in various ways. Several studies have employed time series analysis such as Granger causality tests and modified Sims tests, and have focused on the strength and direction of the causal relationship between telecommunication infrastructure investment and economic growth. For instance, Cronin et al. (1991, 1993b) and Wolde-Rufael (2007) confirmed a two-way causal relationship in the US between telecommunications infrastructure investment and economic growth. In a similar study, however, Beil et al. (2005) conducted Granger–Sims causality tests for a time series of 50 years in the US, and suggested a one-way causality from economic growth to telecommunications investment. Dutta (2001) applied Granger causality tests for a cross-section of 30 developing and industrialized countries in three different years, and found a bi-directional causality for both developing and industrialized countries. Perkins et al. (2005) also identified a bi-directional causality in South Africa using a PSS F-test (Pesaran et al., 2001).

On the other hand, a few studies have attempted to quantify the impact of telecommunications on economic growth by incorporating telecommunications infrastructure investment explicitly into a macro (aggregate) production function or a cross-country growth framework. Madden and Savage (2000) extended Mankiw, Romer and Weil (1992) to develop a supply-side growth model where teledensity (the number of main telephone lines per 100 persons) and the share of

telecommunications investment in national income were controlled for as telecommunications capital proxies. Their results from data on 43 countries over the period 1975 to 1990 suggested a significant positive cross-country relationship between telecommunications capital and economic growth. In another study, Roller and Waverman (2001) endogenized telecommunications infrastructure into aggregate economic activity. They first specified a micro model of the demand for and supply of telecommunications infrastructure, and jointly estimated the micro model with the macro production function. They found a significant causal relationship between telecommunications infrastructure and aggregate output. More recently, Datta and Agarwal (2004) extended the cross-country growth framework of Barro (1991) and Levine and Renelt (1992) to examine the effects of telecommunications infrastructure on economic growth. In a dynamic panel model built upon Islam (1995), they controlled for lagged real Gross Domestic Product (GDP) per capita to test for convergence while testing separately the direction of causality between the teledensity and economic growth, using the first-lagged values of teledensity. While previous studies attested the fact that telecommunications infrastructure investment is positively correlated with economic growth, far fewer studies have investigated how mobile telecommunications specifically have played a role in economic growth, especially in a region where a disproportionate rate of growth of mobile telecommunications is present relative to the level of land-line telephony. The growth of mobile telephony in Africa, especially in sub-Saharan Africa, epitomizes such a case. Due to the high investment-intensive nature of land-line telecommunications infrastructure deployment, Africa accounted for less than 2% of the main telephone lines worldwide in 2006, while Asia had a 48% share (International Telecommunication Union (ITU), 2007). However, the breakthroughs in mobile phone technology in the last decade, combined with relatively cheap mobile phone infrastructure, have led Africa to achieve a significant annual growth in mobile telephone penetration. For instance, the number of mobile subscribers in Africa passed the number of landlines in 2001 (Gray, 2006)

and the number of mobile subscribers in the region increased by 46.2% between 2001 and 2005 (ITU, 2007). In addition, mobile penetration in Africa by the end of 2006 was 22.0 subscribers per 100 persons while Asia had 29.3, and Africa was the only region where mobile telephone services generated more revenues than land-line telephone services in 2005, accounting for more than 60% of total telecommunications revenues in the region (ITU, 2007). The world development report (1994) shows that a1 percent increase in the stock of infrastructure is associated with a1 percent increase in the gross domestic product across all countries. And as countries develop, infrastructure must adapt to support changing pattern of demand as the shares of power, roads and telecommunications in the total stock of infrastructure increase. As the economy develop an increasing proportion of the country would need to be opened up by the construction of roads, there would be increased demand for power supply for industrial and domestic consumption and telecommunications facilities. The empirical evidence shows that infrastructural stocks expand with output growth, which infrastructure coverage and performance increase with income level.

By year 2000, Nigeria had only 400,000 connected lines and 25,000 analogue mobile lines and teledensity was 0.4lines per 100 inhabitants connection costs at this period were prohibitively high for as much as N60,000 for an analogue mobile line and waiting times for fixed lines could run into years. The increase in teledensity goes thus 0.4 lines per 1000 inhabitants in 2000, reached 1.96 in Dec. 2002, 0.33 in Dec. 2003, and in March 2004 100 inhabitants. The Nigeria population now stands at 140 million with GDP USD 52b, GDP growth of 3.7% and inflation rate of 10.4% (ITU, 2004)

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

This chapter therefore describes the methodology of the research work. The source of data collected, procedures and method of gathering data as well as techniques for testing the hypothesis. Research design involves the systematic process of collecting, analyzing and interpreting data with a view to finding solutions to the problem being investigated. The research is design such that the purpose of the research shall be made easy for whoever goes through it, also to make serve as a guide to the growth of the economy. As such the telecommunication factor shall be the independent variable while the development in national economic growth shall be the dependent variable.

3.2 Theoretical Framework

In this study, we closely follow the cross-country growth framework of Datta and Agrwal (2004), which was built upon Barro (1991) and Levine and Renelt (1992) as follows:

$GDPPCGRit = A + \alpha GDPPCGRit + X^{1}it\beta + Ut + Vt$.....3.1

where

$X^{1}it$ = A(GDPPCit, TRADE/GDPit, GDI/GDPit, GC/GDPit, POPGRit/GDPit, LANDPHONES100it, CELLPHONES100it, LANDPHONES100it xCELLPHONES100it)....3.2

And

$E(Uit) = E(Vit) = E(UitVit) = 0$

In the above growth equation, Uit and Vit are the unobserved country-specific effects and idiosyncratic shocks, respectively. GDPPC is GDP per capita and GDPPCGR is the growth rate of GDP per capita. Assuming a dynamic process in which the current value of the dependent variable may be influenced by past ones, the lagged value of GDPPCGR is controlled for on the right-hand side. As a standard measure to test for convergence, the lagged value of GDPPC is

also included. TRADE/GDP is a country's trade volume as a share of its GDP and is a proxy for the degree of openness of a country's economy. POPGR is the Growth Rate of Population (POPGR) and GDI/GDP is the Gross Domestic Investment as a share of GDP. GC/GDP is government consumption expenditure for goods and services as a share of GDP. GC/GDP is included to estimate the effect on economic growth of the proportion of GC expenditure relative to GDP. As widely evidenced in the economic growth literature, negative coefficients are expected for POPGR, the lagged values of GDPPCGR, and GDPPC while positive coefficients for TRADE/GDP and Gross Domestic Investment (GDI)/GDP. LANDPHONES100 is the number of main telephone lines per 100 people and serves as an indicator of the penetration of conventional land-line telephony. Similarly, CELLPHONES100 is defined as the number of mobile phone subscribers per 100 people. Both LANDPHONES100 and CELLPHONES100 are expected to be positively correlated with economic growth. Finally, we include an interaction term between LANDPHONES100 and CELLPHONES100. The interaction term is included in order to allow the marginal impact of cellular phones to vary with the level of landlines that are already in place. In a region like sub-Saharan Africa where cellular phone penetration far exceeds that of landlines, a negative coefficient is expected. This implies that the impact on economic growth of mobile telecommunications is more pronounced when the penetration of landlines is relatively low.

3.3 Model Specification:

Using equations (3.1) and (3.2), and taking into consideration a single country situation, the structure of Nigeria economy as well as the changes in macroeconomic conditions, the necessary variables of interest are then introduced as presented below:

$A = h(PEI_t, TELt)$..... (3.3)

Integrating equation (3.3) and equations (3.1) and (3.2), we have:

$Y = F(PEI_t, TELt, L_t)$..... (3.4)

Since Barro (1990) model adopted in this research is an optimization model, it is suitable for application in Nigeria. The regression form of the model is stated in a linear form as:

$Y_t = \beta_0 + \beta_1 PEI_t + \beta_2 TELt + \beta_3 Lt + Ut$..... (3.5)

We decompose equation (3.4) by dropping labour force (L_t) and replace output (Y) by gross domestic product (GDP). Thus, the linear model stated in the log form is:

$\ln GDP_t = \beta_0 + \beta_1 PEI_t + \beta_2 TEL_t + U_t$..... (3.6)

Where:

ln= Logarithm;

GDP = Gross domestic product;

PEI=Public Expenditure on Infrastructure;

TEL=Teledensity

β_0= Intercept of the regression model;

$\beta_1 - \beta_2$ = Coefficients of the explanatory variables; and

U = Error term.

3.3.1 A priori Expectation

Our a priori expectations are that $\beta_0, \beta_1 > 0, \beta_2 > 0$.

It is expected that all the inputs namely (labour force, teledensity and Gross Domestic product) have positive effects on economic growth. The choice of the independent variables excludes measures of government deficits or of the trade openness which the literature shows affects

national output. This is because it is not the determinants of national output that is being estimated.

3.4 Nature and Sources of Data

Secondary data used for the study was obtained from various sources like central bank of Nigeria Annual Report and Statement of Accounts (various years), and the Nigeria Communications Commission (website).

3.5 Method of Estimation

Equation (3.6) will be estimated using the Ordinary Least Squares (OLS) multiple regression technique. Annual data on the included variables during the 2001-2014 shall be used. Before estimation, we will determine whether the variables are stationary or not. This will determine the underlying properties of process that generate our time series data. In addition, the Johansen method of cointegration test shall be used to determine the order of integration.

3.6 Method of Data Analysis

3.6.1 Economic A Priori Criterion

This is an examination of the signs and sizes (magnitude) of the estimated parameters. Their conformity with theoretical economic expectations is very important for value judgment. This means that the size and signs of parameter estimate are thus evaluated and expected to meet the standard economic expectation.

3.6.2 First Order Statistical Test.

The model will be evaluated based on statistical (first order test) and econometric (second order test) .

(i) The F-test which will evaluate the significance of the over al regression.

(ii) The coefficient of multiple determinations R^2 will measure the goodness fit of the whole regression. It is expressed in percentages.

The coefficient of multiple determinations R^2 will measure the goodness fit of the whole regression.

3.6.3 Econometric (Second Order) Test.

In this study one econometric test of Durbin-Watson statistic should be carried out to check the presence of auto regression in the model, we also normally test will be carried out to know whether the error term is normally distributed. The decision rules for these tests are to be stated in chapter four.

CHAPTER FOUR

DATA PRESENTTION AND ANALYSIS

4.1 PRESENTATION AND ANALYSIS OF RESEARCH FINDINGS.

In this chapter, the result of the ordinary least square (OLS) regression is presented. The analysis of the result involves subjecting the parameters estimate to theoretical statistical and econometric test to determine their robustness.

Table 4.1: Regression Results

Log(GDP)	Coefficient	Std. error	T-statistic	prob
CONS	32.68355	6.142730	5.320688	0.0000
TELD	0.120715	0.022201	5.437276	0.0000
PEI	-3.156407	0.889747	-3.517006	0.0011

Source: Author's computation 2020, using E-views 10.0

$R^2 = 0.569169$

F- Statistic = 27.08244

Durbin-Watson stat= 0.420514

Source: Author's computation using E-views 7.1, 2018

4.2 Analysis of the Regression Results

This involves checking the signs and magnitude of the parameter to ascertain whether it agrees with the economic theory. As shown in the table above the co-efficient of teledensity (TELD) is positive. This implies that teledensity impacts positively on gross domestic product (GDP). In other words, an increase in infrastructural development proxied by teledensity brings about increase in economic growth. This is in line with the economic theory because increase in the teledensity (increase in the use of mobile phone) has both economic and social benefits that lead to economic growth. For instance and increase in teledensity brings about reduction in costs for businesses and therefore increase profit which can be ploughed back into business and thereby encourage economic growth. It also brings about increased access to health and education which bring about improved productivity and efficiency which makes an economy to grow.

The coefficient of public expenditure on infrastructure (PEI) is negative which suggest that increase in public expenditure on infrastructure is detrimental to economic growth.

Table 4.2: A priori expectation

Variables	Expected sign	Obtained sign	Remark
TELD	Positive(+)	Positive (+)	Conform
PEI	Positive (+)	Negative(-)	Non-conform

Souce: derived from Table 4.1

From the table above, teledensity (TELD) conforms to the a priori expected signs, the negative sign on labour does not conform to the a priori expectation because a higher labour suppose to contribute positively to the growth of an economy, we attribute this non conformity to the error from the data used

4.3 EVALUATION BASED ON STATISTICAL CRITERION

This involves testing the explanatory power of the estimated parameters.

4.3.1 The Student t-Test

This involves company the estimated t-statistic with the critical t-value of the estimated parameter if the estimated t- statistics is greater than the critical T- value, we conclude that variable attached to parameter is statistically significant, otherwise the variable is statistically equal to zero.

T-Test table.

Variable	Coefficient	T-value	T-Tab	Result.
C	32.68355	5.320688	2.021	Significant
TEL	0.120715	5.437276	2.021	Significant
PEI	-3.15E	-3.517006	2.021	Insignificant

Source: Author's computation 2020, using E-views 10.0

The test will be carried out under the following criteria.

Ho: $\beta=O$

H_1: $\beta \neq O$

β= coefficient of the parameter

Ho= Null hypothesis

H_1= alternative hypothesis

Decision rule

Reject Ho if T- cal > T- tab and

Accept H_1 if T-cal < T-tab

N=44

4=3

Therefore n-k=44-3=41 at 5% significant level K-1=3-1=2

This result implies that teledensity has a statistical significant impact on real gross domestic

product at 5% level. Therefore a unit increase in the teledensity brings about 0.1207 growth in real gross domestic production.

The absolute value of the estimated t- statistic for labour force is statistically insignificant ie has a significant negative influence on real gross domestic product.

Coefficient of determination is used to measure the goodness of fit of the model. It tells how the variation in the dependent variable is being explained by the independent variable. Given that R2 = 0.569109, it means that about 57% of variations in real gross domestic product is being explained by teledensity and labour force.

THE F. STATISTICS TEST

This measure the joint significance of all the variables used in the model by comparing the estimated F-statistic with the critical f-statistic.

F statistic table

F-cal	F-tab	Decision
27.08244	3.23	Reject

Source: Derived from table 4.1

From the above result, it is observed that the f-cal is greater than f-tab (that is 27.08244>3.23) thus we reject the null hypothesis and conclude that the joint impact of teledensity and labour force on real gross domestic product is significant.

4.4 Evaluation Based on Econometric Criterion

Under the econometric criterion we test the reliability of the estimated parameters by using the following.

4.4.1 Autocorrelation test

Null hypothesis	Decision	IF
No positive autocorrelation	Reject	O< d < dø
No positive autocorrelation	No decision	Dl< d< dø
No negative correlation	Reject	4-dl<d<4
No negative Correlation	No decision	4-dø<d<4-dø
No autocorrelation, positive or Negative	No not reject	Dø<d<4-dø

To perform the autocorrelation test, we used the Durbin-Watson statistic to check whether the residuals from the regression result are correlated the null hypothesis is as follows:

Where: DL=lower limit

Du=upper limit

D=Durbin Watson (calculated)

From the Durbin Watson table:

Dl= 1.338 and do= 1.659 and the estimated Durbin Watson d- statistic d= 0.420514. Since 0<d=0.420514 < dl=1.338, we reject the null hypothesis of no positive autocorrelation. This implies that the residuals are autocorrected.

4.4.2 Heteroscedasticity Test

This test is used to check whether the errors have constant variance. The null hypothesis is that there is no heteroscedaticity in the errors. Note that this tests follows chi-square distribution, so we compare NR^2 (number of observation multiplied by $\mathbf{R^2}$) with the critical chi-square statistic under two degree of freedom. From the regression result NR^2= 40 32105 and is greater than the critical chi-Square statistic of 5.99 since NR^2 is greater than the critical chi-square statistics; we reject the null hypothesis which implies that the errors are heteroscedaticity.

4.4.3 Normality Test.

This test is used to determine whether the error term is normally distributed the null hypothesis is that the error term follows normal distribution. We use the Jarque Bera statistic by comparing it with the critical chi-square statistic under two degrees of freedom from the estimation, the Jarque Bera statistic is 0.6919 which is less than the critical chi square statistics of 5.99. Following this we accept the null hypothesis and conclude that the error follows normal distribution.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Major Findings

The aim of this study centered around the role of telecommunication development in national economic growth of Nigeria for the period 2001-2014. The study focused on finding the relationship between the explanatory variables and the dependent variable using secondary data.

(i) The result of the analysis revealed that development in telecommunications proxied by teledensity has positive and significant impact on economic growth in Nigeria.

(ii) It also shows that a rise in the public expenditure on infrastructure is detrimental to economic growth in Nigeria that this interpretation of the analysis can be deduced from the statistical insignificance of a number of variables.

5.2 Conclusion

From the study, it has been established that infrastructure development is an important aspect of the economic growth of a nation. Infrastructure development can be used to influence economic activities and also achieve economic objectives of the governments. Therefore, it is important that sound policy measures should be put in place to improve infrastructure on the country, this will greatly influence the economic activities and growth of the nation.

5.3 Recommendations

Based on the findings, our results suggest that developments in the telecommunication infrastructure are positively related to economic growth, while increase in public expenditure is detrimental to economic growth. From the above analysis, we make these recommendations:

a) There is the need for increased investment in the telecommunication industry. This can be achieved through full liberalization of the sector as that will further increase the number of private participation, thus reducing costs incurred by subscribers thereby increasing

teledensity and growth.

b) That the government should ensure greater regulation of telecom sector in other to ensure greater competitions among operators thus will increase consumers' sovereignty.

c) Public expenditure on infrastructure should be monitored to avoid mismanagement, misappropriation, embezzlement and wastages.

5.4 Suggestion for further study

Every Research is not an end, but a means to an end. However, the following areas were suggested for further studies by the researcher; The role of Telecommunication on Nigeria's Economic Growth.

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APPENDIX A

Growth Rate of the Nigerian Telecoms Industry 2000-2010.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Teledensity	0.49	0.72	1.89	3.35	8.50	16.27	24.18	29.98	45.93	53.23	63.11
Fixed growth	16.9	8.5	16.9	26.60	15.60	19.0	37.9	45.2	48.9	N/A	N/A
Mobile growth	00	661.3	488.8	100.70	191.30	102.6	73.9	70.9	182.3	N/A	N/A
Total growth	15.7	47.3	162.0	77.8	152.6	94.2	71.7	69.4	78.8	N/A	N/A
Teledensity Growth	16.7	46.9	162.5	77.80	153	84.9	54.5	69.7	45.93	53.23	63.11
	48.98	158.9	77.25	153.7	91.4	48.6	23.99	53.2	15.9	18.6	8.5

Source Nigeria communication commission. NCC (2010)