Impact of Economic Reform on the Nigerian Telecommunications Sector

Onakoya Adegbemi Babatunde[1]

Abstract

In the early days of nationalization, it seemed axiomatic that price and quality standards could be better managed by State Owned Enterprises (SOE). Subsequent experience, however demonstrates that public ownership and control are different as the challenges of imposing effective public interests over nationalized enterprise had proved intractable. This study tests the causal and reciprocal relationships between investment in telecommunications and GDP during the transitional period between 1985 an 2003 in addition to the impact of the reforms on the performance of the firms in the telecommunications sector. The research reveals strong and positive relationship between economic reform and firms' revenue and profit. The regression analysis shows that the telecommunications sector is statistically insignificant in explaining the GDP. Also, the impact of investment in telecommunications was found to be an insignificant predictor of GDP and vice versa even when the investment was lagged by one year. This paper recommends the provision of supporting infrastructure including electricity and the building of public data networks (PDNs) in concert with private telecommunications operators. The derailed privatisation of NITEL should also be concluded. Finally, the Nigerian Communications Commission (NCC) should address the issue of poor quality of service of the telecommunications service providers

---

[1]College of Social and Management Sciences, Tai Solarin University of Education, Ijebu Ode, Nigeria.
e-mail: adegbemionakoya@yahoo.com

1   Introduction

Economic Reform is a process of changing the status quo in order to foster desired changes by the government. It consists of variant approaches depending on the objective for embarking on such reform. Historically, public ownership has been the main mode of economic regulation in Europe and many non-European countries. Public enterprise can be traced back as far as the seventeenth century. However, its use as an instrument of regulation became widespread only in the nineteenth century with the development of gas, electricity, water and sewage services, railways, the telegraph and telephone services. In the early days of nationalisation it seemed axiomatic that price and quality standards could be better managed by public ownership. Subsequent experience, however, demonstrated that public ownership and control are different because the problem of imposing effective public interests over nationalized enterprise proved intractable Quiggin (2002). There are four approaches of economic reforms with respect to de-nationalisation. These are deregulation, privatisation, commercialisation and liberalization.

The GDP per capita of Nigeria expanded by 132 percent between independence in 1960 and 1969, rising to a peak growth of 283 percent between 1970 and 1979. The growth in GDP was however, accompanied by high inflation, high unemployment rate and fiscal imbalance. The stabilisation and austerity measures of the Shehu Shagari regime (1979-83) did not arrest the deepening crisis nor did they improve the country's balance of payment position. There was also an increase in external loans which further accelerated the debt over-hang situation. It was clear that the economy was suffering from stagflation as the structure of the economy made it vulnerable to external shocks and policies CIA (2011). According to Jerome (2002). Between 1980 and 1985, Nigeria's federal government invested N23.26 billion in, and provided subvention of about N11.6 billion to public sector enterprises. In addition, it guaranteed foreign loans in of DM 2.1 billion and US$16.2 million during the period. Against the huge expenditure backdrop, the federal government received a return on investment of only N933.7 million and from subventions, a repayment of only N67.96 million, with N25 million as interest. Overall, returns on investment of over N23 billion was a paltry 3%, made up mainly of dividends from the banking and oil sectors. The government was not receiving a fair return on its investment outlay Jerome (2002).

The problems were so severe that the restructuring of the economy was inevitable. The parlous state of affairs led to the adoption of the Structural Adjustment Programmes (SAP) by the government in 1986. In the period 1988-1997 which constitutes the period of structural adjustment and economic liberalisation, the GDP responded to economic adjustment policies and grew at a positive rate of 4 percent. Public Commissions and Study Groups have undertaken various studies on the performance of public enterprises in Nigeria. Adebo (1969), Udoji (1973), Onosode (1981) and Al-Hakim in 1984 chaired these commissions. The findings of the studies were consistent; indicating that public enterprises were infested with problems such as: abuse of monopoly powers, defective capital structures resulting in heavy dependence on the treasury for funding, bureaucratic bottlenecks, mismanagement, corruption, and nepotism. The continued failure of public owned enterprises was the compelling reason, which informed the government's decision to divest itself of the burden of running these companies at a loss El-Rufai (1999). Privatization of public enterprises came into the forefront as a major component of

Nigeria's economic reform process at the behest of the World Bank and other international finance organizations.

The deregulation of the telecommunications sector in 1992 through Decree 75 was to allow for private sector participation in the sector and expand the nation's communication facilities (http/www/bondbank 2004). NITEL, the monopolistic state-owned enterprise was commercialized and floated as public limited company (PLC) in 1992, although its shares were fully owned by the government. The Nigerian Communications Commission (NCC) was established by statute in 1992. Full industry liberalisation which commenced in 2000 led to rapid growth and expansion. The telephone sub-sector of the industry has been the major beneficiary of this liberalisation exercise. Several new mobile telecommunications companies have emerged in the country such as MTN, Econet (now Airtel), Globacom, Etisalat, Multilinks, and Starcomms. These companies have increased the citizens' access to telephone services, in addition to providing a variety of telecommunications services such as Ethernet, Small Messaging Services (SMS), Global System of Mobile Communication (GSM) and mobile banking.

The liberalization of the economy has resulted in an increase in investment, especially foreign direct investment (FDI) in telecommunications infrastructure, which has consequently boosted productive and employment in several segments of the economy. Most studies have concentrated on the impact of reform on the global aggregate economy. This study seeks to identify the impact of economic reforms of the telecommunications industry on households; examine the implication of economic reform on the operational performance of the firms in the telecommunications industry and also identify the impact of economic reforms of the telecommunications industry on the Nigerian economy.

The study covers 1985 to 2003 providing opportunity for a comparative review of the impact of the economic reform on the telecommunication industry during the period of partial reform (commercialisation of NITEL) and the full privatisation of the industry when other service providers were licensed for operation. The remaining part of the paper is organized as follows: Section 2.0 reviews the relevant literature, with section 3.0 presenting the data and methodology employed. Section 4.0 covers the findings and analysis of the results and section 5.0 provides the concluding aspects of the study.

2 Literature Review

The literature is replete with studies and findings on the relationship between telecommunications infrastructure and economic growth. Many researchers have reported and have found a positive impact of telecommunications on economic growth. The direction of causality between telecommunications infrastructure and economic growth has been of interest in the literature. Hardy's (1980) influential paper was one of the first to attempt to test for causality. He analyzed the correlation between GDP and number of telephones per capita using data from 45 countries for the period 1960-1973. Time-lagged offsets of one year were used in order to see whether increases in telephone penetration predicted GDP growth; or whether GDP growth predicted telephone penetration. His study found that causality ran in both directions at statistically significant levels. Madden and Savage (1998). Further corroborate that telecommunications infrastructural investment is a strong predictor of economic growth. Beil, George and John (2008) also examined the lag relationship between the investment by telecommunication firms and gross domestic product in the United States. Based on Granger-Sim causality test with a

simple aggregate data set, they found that investment by telecommunications firms is not causing, but being caused by economic activity. They upheld a close correlation between telecommunications and economic growth as a growth driver. Using a panel data approach, Zahra, Azim, and Cieslik and Kaniewsk's (2004) study confirmed a positive and statistically significant causal relationship between telecommunications infrastructure and income at the regional level in Poland and found that the causality ran from the former to the latter. Lam and Shiu (2010) examined the contribution to economic growth of private telecommunications investment in 14 African countries and 13 countries in the Central and Eastern Europe consisting former communist states (CEE) for the period from 1999 to 2005. The regression results indicate that the contribution was positive but insignificant. They argued that this might be due to the relatively low level of telecommunications infrastructure in the selected countries, which diminished the effectiveness of private investment in telecommunications.

According to Tella, Amaghionyeodiwe, and Adesoye (2007) Information Communications Technology (ICT) contributes to economic growth by helping to strengthen the economy and playing crucial roles in specific processes that lead to economic growth. In addition, it impacts positively on the livelihood of the poor. Lam and A. Shiu indicate that there is a bi-directional relationship between real gross domestic product (GDP) and telecommunications development (as measured by teledensity) for European and high-income countries. However, when the impact of mobile telecommunications development on economic growth is measured separately, the bi-directional relationship is no longer restricted to European and high-income countries but also to developing countries. This is explained by the fact that mobile telephony has enabled hitherto low teledensity countries to leapfrog beyond the critical mass of 40 telephones per 100 persons hypothesis propounded by Röller and Waverman (2001).

The improvements in the living conditions of the people in the rural areas have provided the platform for them to communicate easily amongst themselves and with relatives, friends and business associates living elsewhere. Osotimehin, Akinkoye and Olasanmi (2010), using Nigerian data over 1992–2007 period employed the OLS Multiple regression method to estimate the system equation in testing the causal relationship between the likely interdependence of telecommunications and economic variables using the times series data. Anyasi and Otubu (2009) studied the economic impact of mobile banking (m-banking) in Nigeria. It concluded that the true measure of its importance requires multiple studies using multiple methodologies and theoretical perspectives before the issue of its economic implication can be fully outlined as technology alone is inadequate to make a difference. Awoleye Okogun, Ojuloge, Atoyebi, and Ojo (2012) explored the socio-economic effects of telecommunication in Nigeria measured by gross domestic product for 11 years (1999-2009). Their results show that telecommunication infrastructure measured by private investment in telecommunication is statistically significant and positively correlated with economic growth. However, telecommunication contribution to GDP has had a negative relationship to the economic growth in Nigeria. Onakoya, Tella and Osoba (2012) using simultaneous macroeconometric method reported that investment in telecommunications infrastructure in Nigeria had significant and direct impact on economic growth through the impact of the output of its own industry and also has indirect impact on economic growth through the output of the manufacturing, oil and services sectors. The results also suggest a bi-directional causality relationship between investment in and output of telecommunications infrastructure in Nigeria at 5 per cent and 1 per cent levels

3   Research Methodology

The two distinct analytical approaches for the review are macroeconomic and microeconomic. Whereas the former is designed to present an overview of the economy based on national statistical data, this is designed to evaluate the economic impact ate the household and firm levels. Both approaches can be used in complementary ways and have been applied by this study to measure the impact of the economic reform of the on the household, firms' revenue and profit and GDP.

Triangulation which is the use of different data collection technique within one study as advocated by Saunders, Lewis and Thornhill (2009), has been applied in order to achieve a more accurate results in a research. The study makes use of secondary data in addition to the deployment of survey questionnaires (primary data).

The deployment of questionnaire is geared towards capturing the perception of respondents on the of the licensed and operational telecommunications companies. The questionnaires were designed in such a way that they contained both open ended and closes ended questions. The structured questionnaire required respondents to tick their preferred choices among provided options and to give their unbiased answers where possible. Adequate care was taken to minimize ambiguity and bias while drafting the questionnaire. The study utilized a questionnaire which was in two parts, A and B.   The first part is the demographic information. The questions in the second part is a 5-point scale was analyzed using Likert's Summative Rating Scale before the mean rating was determined.

The target population for this study consists of all the licences operators during the study period. The sample consists of 10 companies. The telecommunications industry is categorised by service provisions licence granted by the Nigerian Communications Commission (NCC) in terms of types and breath of service provision. Consequently, this study has delineated and taken its samples accordingly. There are two national carriers - NITEL and Globacom. The former being the only operational national carrier during the study period has been selected. All the four Global System for Mobile Communications (GSM) operators were included Of the twenty two licenced Fixed Wireless Access Operators, only four were in operations, The two companies based in Lagos and Ibadan were included in the sample for ease of administration. Only three of the seven commercially operational domestic VSAT companies were included. 420 (Four Hundred and Twenty) questionnaires sent out to participants. 25% of which were to NITEL staffers because of its strategic standing as the National carrier and the only operator which existed before the commercialization exercise. Due to the increasing importance of GSM to the Nigerian teledensity 35% of the survey was deployed to the GSM companies.

In addressing the impact on firms' performance, secondary data on NITEL which is the only organization to have transcended the liberalisation of the industry was obtained from its annual financial statements. In order to address the impact of telecommunications demand on the economy, the study obtained secondary data from Nigerian Communications Commission -NCC (2012), Central Bank of Nigeria - CBN (2008), National Population Commission - NPC (2005) and Federal Office of Statistics - FOS, now National Bureau of Statistics - NBS. The research deployed the OLS Multiple regression method to estimate the system equation in order to expose the relationship and relative importance of the independent variables to the dependent variables.

The working hypothesis from literature (starting from Jipp (1963), demonstrated the positive relationship between measures of GDP per capita and telephone density

indicators, including DEL. The data for all countries tend to generally fall within a small band along a straight line on a logarithmic chart (Alleman et al., 1986). The telephone density is assumed to be related to GDP per capita by the following relationship:

ln(GDP) = α + β ln (DEL$_{-1}$)   (1)
ln (DEL) = α + βln(GDP)   (2)

Where:
DEL = Teledensity (number of telephone connections for every 100 individuals)
GDP = Gross Domestic Product
α = the intercept and β is the slope

Equation1 represents the absolute relationship between the GDP and telephone density. Equation 2 analyzes the growth rates of GDP with rate of growth of telephone penetration lagged by one period. Where telecommunications investment has an impact on the growth of GDP, [23] argues that it will most likely occur with a lag. In the next section the findings are presented and analyzed.

4   Result and Analysis

The number of responses received was 369 (88%) which is considered adequate for drawing empirical inferences. The survey result shows that about 58% of the respondents were holders of tertiary education degrees/certificates. It is important to state that all the lower level respondents (School Certificate and P&T Technical Certificates) are NITEL employees. This can be alluded to the fact that the low level of personnel were required to manage the analogue and pedestrian telephony hitherto provided by NITEL before the advent of GSM and other mobile and data driven telephonic services. The GSM companies pay the highest in the industry comparable to the salaries obtainable in the downstream oil sector and exceeding banking. Average total compensation of staffers working for other private telecommunications operators is roughly half of the compensation obtainable in the GSM companies. The combined average the two segments of the industry range from 72% to 366% more than those obtainable in NITEL. Even though NITEL increased salaries by 10% across the board at the advent of GSM operations in year 2001. The results relating to the impact of economic reform on the household, firms' revenue and profit and GDP are and are discussed in turn in the subsequent sections.

4.1 Impact of Economic Reform on Household

Majority (91%) of the respondents agree that the there is significant difference in the level of wages and salary wages and salary before and after the economic reform of the telecommunication industry. They (90%) also agree that there is significant difference in the level of employment before and after the economic reform of the industry. Other findings derived from the respondents (89%) are that the prices being charged by telecoms operators are excessive. 88% also believe that the intense competition amongst operators in the telecommunication industry was considered beneficial to the economy and has increased the welfare of the people. The quality of service of the telecom operators was also considered inadequate for the level of the country's development (46%)

and banks and other lending institutions are not considered to be adequately funding the telecommunications industry (52%).

4.2 Impact of Economic Reform on Firms' Revenue and Profit

The financial performance in terms of revenue and profitability of NITEL which is the only company transcending the deregulation programme is presented in Figure 1.

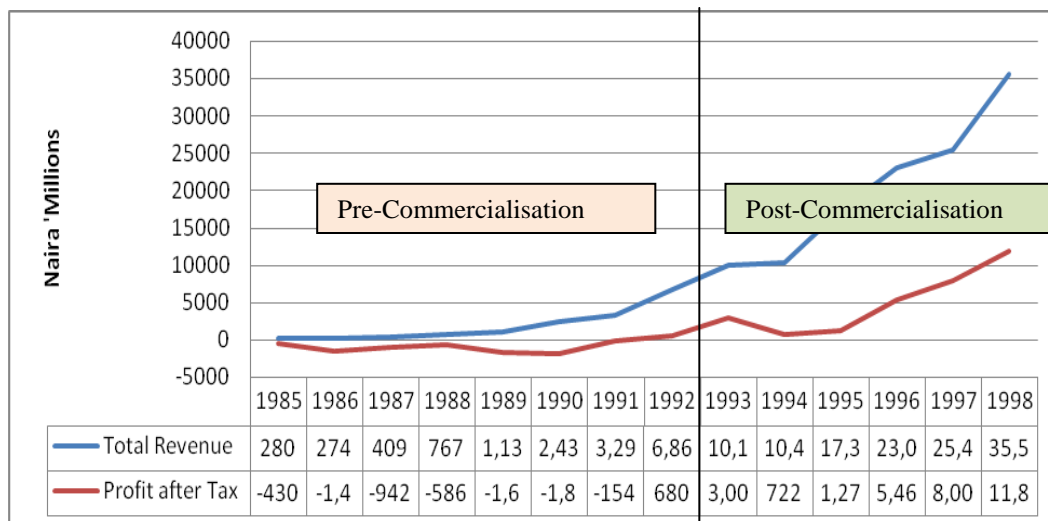|	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total Revenue	280	274	409	767	1,13	2,43	3,29	6,86	10,1	10,4	17,3	23,0	25,4	35,5
Profit after Tax	-430	-1,4	-942	-586	-1,6	-1,8	-154	680	3,00	722	1,27	5,46	8,00	11,8

Figure 1: NITEL Financial Performance 1985 to 1998
Source: NITEL Annual Financial Statements and Accounts various years
Growth rates calculated by the author.
Note: The Annual Financial Reports for 1999 to 2003 are yet to be published

NITEL which had never broken even since it came into being in 1985 recorded a profit for the first time in 1992 which coincided with its commercialisation. The turn-around of fortune was 540% reversal of the loss of =N=154 million recorded in 1991. The company continues to be profitable. However, the rate of its profit growth has been on the down ward trend ranging from -76% in 1994 to 342% in 1993. The average annual Profit after Tax of the post-commercialisation period (1992-1998) was =N=4.4 billion which is 546% higher than the pre-commercialisation period (1985-1991) of =N=1 billion loss. The bulk of the profits generated in NITEL could be attributed to price increases because the profitability trend coincided with periods of price increases. Given its new commercial nature and its dominant position in the years prior to the advent of GSM in 2001, NITEL was able dictate prices without any credible opposition in spite of its puerile service delivery. With the removal of subsidies by the Federal Government upon its commercialization in 1992, NITEL became a net contributor to the national treasury through annual tax flows. The total tax paid to the government coffers in the seven years ended 1998 was =N=7.1billion. The economic reform appears to have released the entrepreneurial potentials of the NITEL management and staff. The revenue and the profit improved considerably after economic reforms by annual average of 1500% and 163% respectively.

The research finds that given the conversion of the average annual loss of =N= 1 billion in the pre-commercialization period to profit of =N= 4.4 billion in the corresponding period in the post commercialization era. We can conclude that there is significant difference in the firm's revenue and profit. This position is also corroborated by the views expressed by about 91% of survey respondents who agree that the economic reforms in the telecommunications sector has considerable positive impact on the revenue and profitability of NITEL.

4.3 Impact of Telecommunications Investment on GDP

The regression analysis showed that although, the relationship is a positive, telecommunications sector only explained 0.05% (R^2 = 0.0499) of the GDP. The telecommunications contribution is therefore not statistically significant at 95% and 99.5% confidence levels. (Appendix 1). An interesting point to note is that the rate of growth of telecommunications to GDP (0.43%, 0.70% 0.51%) have been consistently higher than that of GDP itself (0.14%, 0.16% 0.12%) in the three years of the existence of the GSM operators since the year 2001 (Appendix 2).

The result of the regression analysis in the one year lagged period time showed that investment in telecommunications sector as proxied by teledensity also provided explanations for only 0.01% of the GDP. The degree of explanation is insignificant, in which case, other variables are almost as important as teledensity in accounting for the growth in GDP. Both calculated '*f*' ratio and '*t*' statistics exceed their corresponding tabulated values thereby confirming the existence of linearity between the two variables. The correlation is insignificant but positive (Appendices 3 and 4). When the variables were reversed in order to determine if the GDP as the independent variable is also a predictor to teledensity, the result obtained is quite similar. In effect, it appears that teledensity is neither a cause nor an effect of economic growth. The inference is that telecommunications investment is a not a sufficient condition for economic growth. Many factors other than telephone investment are critical to growth.

5   Discussion and Recommendations

The results of this study have shown that there is significant difference in the sampled individual income (proxy of household income) and employment before and after the economic reform of the telecommunication industry. Also, majority of the respondents perceived that increase in telecommunications investments has led to significant increase in the welfare of the people and that overall, the economic reform of the telecommunication industry is beneficial to the country. The findings of this research is supported by the result of Hsu and Balasubramanian (2003)[24] which adopts Barua's (1998) three-tier Business Value Complementaries (BVC) model to study the performance of telephone companies. They report that the telecommunications infrastructure investment is positively related to the firm performance.

In addition, the suggestion of Im et al. (2001)[25] that in evaluating the investment impact of Information Technology, of which telecommunications is one, the time lag effect should be given adequate consideration bodes well for the approach and result of this study. The study by Jerome (2002)[3] which appraised the technical efficiency of some privatized enterprises in competitive sectors in Nigeria provide empirical support that privatization

is associated with improved technical efficiency. It thus validates the theoretical preposition that privatization might improve efficiency, as is suggested by both the property rights and public choice literature. It appears clear from our findings that the deregulation of the telecommunications has led to considerable improvement in the performance of NITEL since there was a significant difference in the firm's revenue and profit before and after economic reform operational of the telecommunication industry as at 2003.

However, NITEL has since gone comatose. Landline services have ceased to operate. Its successor, mobile operator MTEL controls only 0.03% of the market (Nigeria Communications Commission - NCC, 2012). The Bureau of Public Enterprises, the body charged with the privatisation of state-owned enterprises has not successful in selling off the company and the licensed private operators now control the industry. From this, we can deduce that although the commercialisation of NITEL was successful in the era of its monopoly, it could not garner the requisite resources to compete with private sector companies once the industry was opened up for competition.

The insignificant causal relationship between investment in telecommunication (as proxied by telephone density) and GDP is not consistent with the findings of Hardy (1980) [6] which found that "causality" ran in both directions at statistically significant levels. The empirical result is also contrary to the perception of surveyed respondents. The negligible contributions of telecommunication industry to the GDP during the period under review may be due to the fact that the liberalisation exercise was new and its impact was yet to be felt as at the end of the study period. Subsequent literature has attested to the positive and significant contributions of the investment in telecommunications to the economy [26], [14], [16], [13] and [11].

Telecommunications liberalisation brings clear benefits to countries, both directly through lower call charges and a better range of services and indirectly through the opportunities for business development and economic growth which a fully developed communications infrastructure creates (Onakoya, Salisu & Oseni, 2012). However, the challenges and opportunities of telecoms liberalisation are different for every country. One finding is universal: telecoms liberalization requires planning and forethought, consultation with all the affected participants, a clear view of the objectives, and, above all, the political vision and courage to start the process and keep it going in the face of obstacles. It is therefore imperative that the provision of supporting infrastructure including electricity and the building of public data networks (PDNs) in concert with private telecommunications operators be considered by the government. Moreover, the derailed privatisation of NITEL should be concluded in order to bring to a close the era of public utility provision. Finally, the Nigerian Communications Commission should address the issue of poor quality of service of the telecommunications service providers.

References

[1]   J. Quiggin, Privatisation and nationalisation in the 21st Century, *Growth,* **50**, (2002), 66–73.

[2]   CIA, The World Factbook, (2011). http//www.cia.gov/library/public

[3]   A. Jerome, Public enterprise reform in Nigeria: Evidence from the telecommunications industry, *African Economic Research Consortium Research Paper* **129**, (2002)

[4]   O.A. Anya, Privatization in Nigeria, *Proceedings of the Nigerian Economic Summit at the Netherlands Congress Centre*, 2002.

[5]   N. A. El-Rufai, $50m World bank assistance for bureau for public   enterprises (BPE). Workshop on Privatization Kaduna, 1999.

[6]   A. Hardy, The role of the telephone in economic growth,   *Telecommunications Policy,* December (1980), 278-86.

[7]   E. Madden, E. and J. Savage, CEE (Central and Eastern Europe) telecommunications investment and economic growth, *Information Economics and Policy*, **10**, (1998), 173–195.

[8]   R. O. Beil, S. F. George, and D. J. John, On the relationship between telecommunications investment and economic growth in the United States, *Telepolicy   Working   Paper* (2003). Available   Retrieved   from http://dx.doi.org/10.2139/ssrn.422521.

[9]   K. Zahra, A. Cieslik and M. Kaniewsk, Telecommunications infrastructure and regional economic development: The case of Poland, *Regional Studies*, **38**, (2004), 713-725.

[10] P. Lam and A. Shiu, Economic growth, telecommunications development   and productivity growth of the telecommunicationssector : Evidence around   the world, *Telecommunications Policy*, **34**, (2010), 185–199.

[11]   S. A. Tella, L. Amaghionyeodiwe and B.A. Adesoye, Telecommunications infrastructure and economic   growth: Evidence from Nigeria, *Proceedings of the UN-IDEP and AFEA joint conference on Sector-led Growth in Africa and Implications for Development* Held in Dakar, Senegal from November 8-11, (2007).

[12] L. H. Roller and L. Waverman, Telecommunications infrastructure and economic growth: A simultaneous approach, *American Economic Review*, **91**(4), (2001), 909-923. DOI:10.1257/aer.91.4.909

[13] [13] K.O. Osotimehin,   E.Y. Akinkoye, and O.O. Olasanmi, The effects of investment in telecommunications infrastructure on economic growth in Nigeria (1992-2007*), Oxford Business and Economics Conference Program.* (2010). http//www. gcbe.us /2010_ OBEC/data /confcd /index.htm

[14] F. I. Anyasi and P. A. Otubu, Mobile phone technology in banking system: Its economic effect, *Research Journal of Information*, Maxwell Scientific Organization Technology, **1**(1), (2009), 1-5.

[15] O. M. Awoleye, O. A Okogun, B.A. Ojuloge, M. K. Atoyebi and B. F Ojo, Socio-economic effect of telecommunication growth in Nigeria: An exploratory study,   *Interdisciplinary Journal of Contemporary Research in Business*, **4**(2), (2012), 256 - 262.

[16] A. B. Onakoya, S. A. Tella and A.M. Osoba, Investment in telecommunications infrastructure and Nigerian economic growth, *British Journal of Economics, Management & Trad*e, **2**(4), (2012), 309-326.

[17] M. Saunders, P. Lewis and A. Thornhill, *Research methods for business students*, fifth edition, FT Essex, Prentice Hall, 2009.

[18] Nigeria Communications Commission, *Trends in telecommunications in   Nigeria,* 2012. http//www.ncc.gov.ng/ industry statistics.

[19] Central Bank of Nigeria, *Statistical Bulletin (Golden Jubilee Edition),*   2008. http//www.cenbank.org.

[20] National Population Commission, 2005. http// *www.population.gov.ng/*

[21] National Bureau of Statistics, *Sector Statistics of Price and Price Index*,   2008.

http://www.nigerianstat.gov.ng/index.php//sectorStatistics/ facts and figures about Nigeria2008/33-35

[22] D. J. Jipp, The cost and benefits of regulations: Implications for developing countries, The World Bank   Research Observer, **14**(1), (1963), 137 – 158.

[23] J. O. Ajiboye, E.O. Adu, and J. I. Wojuade, Stakeholders' perceptions of the impact of GSM on Nigeria rural economy: Implication for an emerging communication industry, *Journal of Information Technology Impact*, **7**(2), (2007), 131-144.

[24] H.S. Hsu and S.K. Balasubramanian, Telecommunication Infrastructure Investments and firm Performance, *Proceedings of the 36th Annual Hawaii International Conference on System Sciences*, **8**(8), (2003), 247.1

[25] K.S. Im, K.E. Dow and V. Grover, Research report: A reexamination of IT investment and the market value of the firm – An event study methodology, *Information Systems Research,* **12**(1), (2001), 103-117.

[26] J. Alleman, C. Hunt, D. Michaels, M. Mueller, P. Rappoport, and L. Taylor, Telecommunications and economic growth: Empirical evidence from Southern Africa, *Technical Report presented at International Telecommunications Society Sydney*, (1997). http//www.colorado.edu /engineering /alleman/ print_files/soafrica_ paper.pdf.

[27] A. B. Onakoya, A. Salisu and I.O. Oseni, Infrastructure and economic growth in Nigeria: A multivariate approach. *Research Journal of Business Management and Accounting*, **1**(3), (2012), 30 -39.

Appendices

Appendix 1:

Result: Significance of Telecommunications to GDP

Regression Statistics	
Multiple R	0.002392746
R Square	5.72523E-06
Adjusted R Square	0.04999399
Standard Error	0.274498215
Observations	22

ANOVA	df	SS	MS	F	Significance F
Regression	1	8.62789E-06	8.62789E-06	0.000114505	0.99156825
Residual	20	1.506985406	0.07534927		
Total	21	1.506994034			

	Coefficients	Standard Error	t Stat	P-value	
Intercept	0.274482047	0.076416981	3.591898612	0.001822309	
X Variable 1	0.00282572	0.264068418	0.010700715	0.99156825	

	Lower 95%	Upper 95%	Lower 99.5%	Upper 99.5%
Intercept	0.115079093	0.433885002	0.033508738	0.515455356
X Variable 1	0.55366253	0.54801109	0.835539077	0.829887636

Appendix 2:

Nigeria's Teledensity and GDP 1985 to 2003

Year	Fixed Lines Connected	Mobile Connected	Total Connected	Population in '00	DEL	GDP	Annual Growth GDP	Annual Growth DEL
1985	194,499	n/a	194,499	876,656	0.222	70,633		
1986	215,255	n/a	215,255	878,853	0.245	71,859	0.02	0.10
1987	232,582	n/a	232,582	881,056	0.264	100,813	0.40	0.08
1988	256,743	n/a	256,743	883,264	0.291	142,618	0.41	0.10
1989	281,419	n/a	281,419	885,478	0.318	220,200	0.54	0.09
1990	294,075	n/a	294,075	887,697	0.331	271,908	0.23	0.04
1991	294,166	n/a	294,166	889,922	0.331	316,670	0.16	(0.00)
1992	320,934	n/a	320,934	915,107	0.351	536,305	0.69	0.06
1993	363,285	n/a	363,285	941,004	0.386	688,137	0.28	0.10
1994	398,066	n/a	398,066	967,635	0.411	904,005	0.31	0.07
1995	405,073	6000	411,073	995,019	0.413	1,934,831	1.14	0.00
1996	405,100	13000	418,100	1,023,178	0.409	2,703,809	0.40	(0.01)
1997	414,177	16,000	430,177	1,052,134	0.409	2,801,973	0.04	0.00
1998	438,619	18,000	456,619	1,081,909	0.422	2,721,178	(0.03)	0.03
1999	473,316	25,000	498,316	1,112,527	0.448	3,313,563	0.22	0.06
2000	553,474	30,000	583,474	1,144,012	0.510	4,727,523	0.43	0.14
2001	600,587	400,000	1,000,587	1,176,387	0.851	5,374,335	0.14	0.67
2002	702,000	1,594,179	2,296,179	1,209,679	1.898	6,232,244	0.16	1.23
2003	724,790	2,900,000	3,624,790	1,243,913	2.914	6,969,311	0.12	0.54

Sources: Nigerian Communications Commission (2012), Central Bank of Nigeria (2008), ADCG Industry survey (1995), National Population Commission (2005), National Bureau of Statistics(various Annual Digest of Statistics).
(Growth rates calculated by the Author.)

Appendix 3:

Result: Teledensity (one year lag) and GDP

Regression Statistics	
Multiple R	0.258236007
R Square	0.066685835
Adjusted R Square	0.0083537
Standard Error	0.278786946
Observations	18

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.08885269	0.088852692	1.143209226	0.300841306
Residual	16	1.24355458	0.077722161		
Total	17	1.33240727			

	Coefficients	Standard Error	t Stat	P-value	
Intercept	0.356866275	0.0764102	4.670401184	0.00025592	low correlation
X Variable 1	0.2271167	0.2124155	1.06920963	0.300841306	

	Lower 95%	Upper 95%	Lower 99.5%	Upper 99.5%
Intercept	0.19488393	0.51884862	0.108381135	0.605351414
X Variable 1	-0.67741735	0.22318395	-0.91788964	0.463656234

Appendix 4:

Result: Teledensity and GDP

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.258236007
R Square	0.066685835
Adjusted R Square	0.0083537
Standard Error	0.278786946
Observations	18

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.088852692	0.08885269	1.14320923	0.300841306
Residual	16	1.243554579	0.07772216		
Total	17	1.332407271			

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.356866275	0.076410197	4.67040118	0.00025592
X Variable 1	0.227116701	0.212415504	1.06920963	0.30084131

	Lower 95%	Upper 95%	Lower 99.5%	Upper 99.5%
Intercept	0.19488393	0.51884862	0.10838113	0.60535141
X Variable 1	0.677417351	0.223183949	0.91788964	0.46365623