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Telecommunication Reform and Network Penetration in Nigeria

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Abstract: This study attempts to examine the performance in the Nigerian telecommunication sector, in terms of network penetration as a result of the implementation of reform policies and its determining factors. Time series data were obtained from secondary source and analysed using Ordinary Least Square (OLS) Regression, it was discovered that competition and GDP per capita significantly affected telecommunications performance positively as expected. Also, liberalisation, population density and the presence of an independent regulatory authority impacted negatively on telecommunication performance though not significantly. It is therefore, recommended that NCC should foster greater competition within the industry by licensing more operators with strict supervision in order to discourage anti-competitive conducts of operators.

Key words: Telecommunication, network, policies, GDP, population, Nigeria

INTRODUCTION

The world is fast becoming a global village and a necessary tool for this process is communication of which telecommunication is a key player. The need to keep pace with the global development and changes in the information technology and the telecommunications industry in general, necessitated the deregulation of the telecommunications industry so as to allow private sector participation in the supply of qualitative and efficient telecommunication services nation-wide.

Private investment was mere US$50 million as at 1999 with huge unmet demand and an average of just 1 telephone line to 250 inhabitants (Ernest, 2003). About half of the functional connected lines held by government organizations and corporate bodies. Lines concentrated mostly in select urban centres. Mobile telephone density in Nigeria was one of the lowest in the world, at 1 per 10,000 people as compared to 7 in Ghana and 225 in South Africa. Nigeria's teledensity ranked better than only those of Afghanistan and Mongolia. Political uncertainties and perceived policy inconsistencies, among other shortcomings prevalent at the time had combined to make for relatively unattractive investment climate in Nigeria. Despite the huge potentials offered by the Nigerian telecom market, progress was slow because military rule was not favourable for independent regulatory performance. Also, the sector was characterised by weak infrastructure base, poor quality of service, low call completion rates, billing inaccuracy, etc. The poor functioning of the sector in general has resulted in unreliable delivery and availability of services to both firms and individuals. This unpredictability and inaccessibility negatively impacts growth, productivity and investment. The poor performance of public enterprises has been due to; excessive bureaucratic controls and government intervention, inadequate policy and regulatory frameworks which impede competition and discourage private entry and private investment, weak capacity to implement reform and mismanagement, corruption and nepotism.

Recognising this, the federal government passed the Privatisation and Commercialisation Act of 1999. This act was based on the government's realization that far-reaching, market oriented reforms were necessary to achieve the efficiency gains of private participation.

The implementation of telecommunications sector liberalization, regulatory reform and privatization of NITEL opened the doors to competition and brought an end to a period when telecommunications was considered a natural monopoly. The increasing competition in the telecommunications market has greatly impacted on the telecommunication revolution; stimulating the growth of the market and the economy in general (Jerome, 2003). The democratic environment also promoted greater interaction and freer expression of ideas. The last few years have seen a notable increase in private sector involvement in the Nigerian telecommunications sector.

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They include large multinationals and major investors interested in mobile cellular markets, long distance carrier networks, fixed wireless/wireline networks, satellite communications networks or internet operations (Ernest, 2003). There has also been an increase in the number of cyber cafes, internet service providers, card calling centres and other value added services.

Factors affecting the provision of telecommunication services: Since, technologically advanced countries are also developed countries, indicators of economic development such as per capita GDP can be used as control variables. This indicator has implications for the demand for and therefore, supply of telecommunications reforms. Since, telecommunications services are normal goods with high income elasticity, countries with higher income demand a larger amount of telecommunications services. Satisfying this demand can be accomplished by privatization and competition. Therefore, an increase in per capita income is expected to contribute positively towards more reforms which will also influence telecommunications performance. Other factors that affect the provision of telecommunications services include the population density, this control for the cost of deploying services. Large populations tend to be more dispersed and thus harder to cover by telephone networks. By contrast, a high population density seems to be a factor of better mobile phone penetration as density is higher in urban areas where mobile networks are easier to build. Increased market competition boosts demand for fixed and mobile telephone services by lowering prices to users. This is more evident in the case of the mobile network, the size of which increases in step with market openness after accounting for other country-specific structural characteristics. This could reflect positive network externalities as cheaper mobile communications and broader network coverage are also likely to create incentives for incumbent fixed-line operators to lower prices, introduce new services and improve efficiency. Also, the liberalisation indicator captures the impact of market openness in telecommunications.

Greater market openness also props up expenditure on telecommunications by lowering prices to consumers and thus, boostering demand and also by expanding the size of the networks and the array of services offered to users. The evidence seems to confirm that increased market openness is indeed associated with greater performance of the telecommunications sector. Market openness turns out to significantly affect performance in telecommunications after controlling for other enabling factors (Ahmed and Nauriyal, 1995).

Review of empirical literatures: Wallsten (2002) analyzed telecommunications reform for a sample of 30 countries in Africa and Latin America. He tested how and to what extent variables like privatization, competition and regulation may have affected network expansion from 1984-1997. Using a Fixed-effect Model, he found that competition impacts main line penetration positively but that privatization is negatively associated with such penetration, although not statistically significant.

Regulation alone is negatively and significantly associated with network expansion. In a similar vein, Fink *et al.* (2002) found significant impact of privatization, competition and regulation on sectoral performance in an analysis of 86 African, Asia and Latin American countries during 1985-1999. They also found that telephone penetration is lower if competition is introduced after privatization rather than simultaneously. Using panel data techniques, Luis and Berg (2000) found that the regulatory framework index is always positively associated with the level of network deployment and the efficiency level. Those countries where regulatory reform has been intensified showed significantly higher levels teledensity irrespective of their income level. Also, those countries that have allowed competition in basic telecommunications services had more main network expansion and better efficiency level. They also found teledensity to be positively related to population density and GDP per capita while liberalisation is negatively related. Ros (1999) also discovered that teledensity increased with GDP per capita. Li and Xu (2001) examined the impact of liberalization on telecommunications sector performance using a sample of 40 countries for the analysis of the effects of competition.

They found that their competition variable, an index measuring the extent of competition in both the fixed and mobile sectors was not significantly correlated with higher network penetration. Hamilton (2000) examined the effect of relevant demographic, economic, political, institutional and competitive factors on performance in basic telecommunications in Africa.

Her study is a 1st step in exploring the effects of certain institutional political and competitive factors on the performance of basic telephony in Africa. She found that a strong institutional framework in which investors are guaranteed property rights, reduced risk of expropriation and credible contractual security is associated with improved telecommunication performance. High per capita GDP is also associated with improved performance but by itself is not as strong as expected.

Canning (1998) ran regressions that related stocks of infrastructure to demographic (population, land area, level

of urbanization) and economic (per capita domestic product) variables. For a total of 79 countries around the world in the period 1965-95, he found that the growth rate of telephone main lines although, negatively associated with the area was positively associated with the growth of GDP per capita, population and change in the urbanization ratio.

The International Telecommunications Union's CCITT (International Consultative Committee on Telephone and Telegraph) has sponsored several studies which establish a strong correlation between teledensity and variables such as Gross Domestic Product (GDP) per capita as well as a positive relationship between teledensity and economic development. On the other hand, the same studies found a negative correlation between teledensity and population density. The results indicated that as GDP per capita increases, telephone density increases more rapidly (Saunders *et al*., 1994).

MATERIALS AND METHODS

A time-series data obtained from secondary source were analysed using Ordinary Least Square (OLS) Regression. The empirical model allows for the examination of the determinants of telecommunications performance. The period under consideration is 1997-2008.

Model specification and estimation: The dependent variable used in this study is teledensity while the explanatory variables are: Gross domestic product per capita, population density, cellular subscriber per capita, liberalisation and regulation dummy:

$$TELD = f(GDPPC, POPDEN, CELLPC, LIB, REGDUM) \quad (1)$$

Econometrically, the model can be presented as:

$$TELDt = \beta_0+\beta_{1GDPPCt}+\beta_{2POPDENt}+\beta_{3CELLPCt}+\beta_{4LIBt}+\beta_{5REGDUMt}+\mu_t \quad (2)$$

Where:

TELDt = Teledensity at time t
GDPPCt = Gross Domestic Product Per Capita at time
POPDENt = Population Density at time t
CELLPCt = Cellular subscriber Per Capita at time t
LIBt = Liberalisation at time t
REGDUMt = Regulation Dummy
μ_t = Error term and β_0-β_5 are parameters to be estimated

Using Minitab package, the regression shown in Eq. 3 (Table 1):

Table 1: Using Minitab package the regression analysis

Predictor	Coefficient	SD	t-test	p-values
Constant	1.548000	4.995000	0.31	0.767
GDPPC	0.004933	0.002934	1.68	0.144
POPDEN	-0.018690	0.037260	-0.50	0.634
CELLPC	0.899950	0.057910	15.54	0.000
REGDUM	-0.147700	0.476100	-0.31	0.767
LIB	-0.108000	1.842000	-0.06	0.955

S = 0.3613; R^2 = 100%; R^2 (Adj) = 99.9%; Durbin-Watson statistic = 2.22

$$Teledensity = 1.55+0.00493\ GDPPC-0.0187\ POPDEN+0.900\ CELLPC-0.148\ REGDUM-0.11\ LIB \quad (3)$$

RESULTS AND DISCUSSION

As expected, competition was found to be significantly and positively associated with network penetration in Nigeria; meaning that the opening up of the telecommunications market to cellular operators improved. This is consistent with results of previous studies (Luis and Berg, 2000; Wallsten, 2002). This point to the fact that countries that were always competitive have the most years of reform.

Thus from policy perspective, it will be correct for policymakers to continue to open telecommunications markets and put in place policies that are pro-competition. Also, having a separate regulatory agency which is not directly under the control of Communications Ministry, negatively determine telecommunications performance in Nigeria though not statistically significant. This is the findings of Wallsten (2002). Though the reverse is the case with the findings of Luis and Berg (2000) where regulatory indicators were found to be positively related to telecommunications performance. This implies that the Nigerian government have to show credible commitment towards the reform in telecommunications sector so as to spur investors on to increase their investment in the sector. This will give them the assurance that the possibility of policy switch as a result of possible change of government will have no effect on their investments since the regulatory agency is independent of government interference.

The result also showed that GDP per capita positively determine telecommunications performance; meaning that the high GDP per capita lead to higher performance. This conforms the result of pervious empirical studies (Luis and Berg, 2000; Ros, 1999; Hamilton, 2000; Canning, 1998). Despite the fact that Nigeria is a peculiar nation with unequal income distribution, the gap between the poor and the rich is been bridged in recent times, coupled with the fact that is one of the most populous nations in the world. Telecommunication services are seen as normal good unlike in the past when they were considered as luxury good. Also, the influx of telecom providers and

affordable handsets made it possible for the poor to access telecom services even in remote areas. The present situation is such that people have as many telephone lines (fixed and mobile) lines as possible in order to get connected all the time. From the outcome of the studies carried out by International Telecommunications Union's CCITT (Canning, 1998; Luis and Berg, 2000), telecommunications performance is negatively determined by population density. The result obtained in this study conforms to these studies therefore, a higher performance is expected when the cost of service deployment is low. This is so because investment in the sector is capital intensive and irreversible, besides finance is not easily accessible therefore, investors will want to provide services at least cost in order to recoup their capital outlay an time and make reasonable profit, since that is their main aim of investing.

Liberalisation is another factor, the more open the sector; the lower the performance as revealed in the result. This conforms to the findings of Luis and Berg (2000) and Li and Xu (2001). Infrastructures needed for the provision of telecommunications services are imported also the Nigerian government has provided an enabling environment for network expansion by reducing import tariff for telecommunications equipment. Moreover, the persistent devaluation of naira makes imports cheaper. Lower cost of imports encourages investment which translates into increase in the provision of telecommunication services.

CONCLUSION

From the study, it is said that no modern economy can be sustained today without an integral telecommunications infrastructure is widely acknowledged because every human society from the most primitive to the most advanced depends on some form of telecommunications network. Access to telecommunications is therefore, critical to the development of all aspects of a nation's economy. The chronic shortage of mainlines in Nigeria was a major impediment to economic development, hence the need to restructure the economy to enhance diversification and attract domestic investment as well as direct foreign investment in the telecommunication industry.

Nigerian telephone consumers are beginning to get a better deal from their telecoms providers. Business customers are also benefiting from increased competition and the country's relative position has also greatly improved. Communication networks make society a reality. It makes it possible for people to cooperate to produce and exchange commodities, to share ideas and information and to assist one another in times of need. It is generally acknowledged that the d reform of the Nigerian telecommunications sector is a success story bearing in mind the state of the state of the sector before the reform process took place however, there is room for significant improvements.

RECOMMENDATIONS

A major goal of telecommunication reform is to increase the level of competition within the sector. The current market for GSM services which is essentially oligopolistic is not ideal for a country size of Nigeria. Therefore, more operators in fixed and mobile services should be licensed with strict supervision from NCC to avoid the situation where existing operators will push out new entrants. Also, anti-competitive conducts by operators (emergence of private monopolies cartels to frustrate natural interplay of market forces) should be discouraged. The privatisation of NITEL should be concluded in other to increase private participation in the sector and also improvement on the provision of services to the populace.

NCC should also ensure that the regulatory process is impartial and transparent, make an effort to play a strong pro-active role especially in providing regulatory safeguards for interconnection, price control rules, lincensing and frequency management. Incentives should also be put in place by all relevant agencies to lure investors to the sector; this will result in long term investment in the capital intensive high technology business which in turn will boost telecommunications facilities and services supply in quantity, quality as well as achieve the desired level of services penetration for the Nigerian people, the country's economy and global cooperation.

The regulatory agency should ensure improved quality services to the consumers of (especially) the GSM services. Operators should also be mandated to deploy infrastructures to rural areas since this is part of the conditions for granting them licenses. This may also require the government to provide additional basic infrastructure such as improved electric power supply in as much as the government is not funding the sector, it should come in the area of subsidising solar energy which would be sourced from outside the country to power the switches in the rural areas in order to enhance the efficiency of operators of networks. The agency should see to it that consumers are made to pay for only services actually enjoyed.

In addition, NCC needs to beef up its outreach activities by among others, educating the customers in

particular and the public in general about their rights and how to have legitimate complaints and concerns addressed. The agency should also supervise the activities of networks. The priority of such supervision should be to ensure that customers get value-for-money charged by the GSM networks operating in the country. Finally, NCC should from time to time, develop a framework for determining the appropriate risk-adjusted rate of return expected in the telecommunications sector. This will facilitate appropriate pricing of services in manners not injurious to the realisation of the aims and aspirations for deregulating the telecommunications sector.

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