

## THE IMPACT OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIA

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***Abstract:** Information and Communication Technologies (ICT) has become a major tool for gaining competitive advantage in the corporate world and as such it has become integrated into the operations of most high performing organizations in every economy. This paper examined the impact of ICT on economic development in Nigeria. Time series data for the period of 1970 to 2010 was employed. The study employs the use of Ordinary Least Square techniques in estimating the impact on economic growth. Result reveals that ICT has not only created an avenue for economic growth in the country but also stand as an important factor that determines economic growth in Nigeria. The paper therefore recommends that if the country must have to compete with other developed countries of the world, government should provide more funds for the development of ICT, diversification of the productive structure of the economy away from oil/natural resources to ICT in a bid to increase employment and technical know-how.*

**Keywords:** Economic Growth, ICT, Telegraph and Telecom.

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### BACKGROUND TO THE STUDY

Information and Communication Technology (ICT) has now been accepted as one of the main driving force behind organizational competitiveness in the present day business environment. Presently, ICT is having dramatic influence on almost all areas of human activities and one of the areas of economic activities in which this influence is most manifest is the banking sector. The banking industry is one of the critical sectors of the economy which makes invaluable contributions to the pace of economic growth and development of nations (Ajayi, 2003; Maqueme, 2010).

Most developing nations have embarked on various reforms that foster the use of ICTs in their economies. These reforms tend to yield little or minimal benefits to economic growth and development, especially when compared with the developed countries of the world. Technological advancement is known to impact fast rate of economic development. In Nigeria, policy on adoption of Information and Communication Technologies was initiated in 1999, when the civilian regime came into power of

government. The operations of the licensed telecommunication service providers in the country has created some well-felt macroeconomic effects in terms of job creation, faster delivery services, reduced transport costs, greater security and higher national output (Emmanuel and Adebayo, 2011).

Attempts to ensure sustainable economic development and poverty reduction of most nations usually involve the development of agriculture, mining, industrial as well as the service sectors. The Industrial Revolutions in Europe and America, generally and specifically, have been premised on technological breakthroughs. During the late 1990s, Information and Communication Technology (ICT) was the largest contributor to growth within capital services for both Canada and the United States (Harchaoui, 2002). Similar trend has been observed with the economic development of China, Korea, Taiwan, India, South Africa, and other emerging economic powers (Fuss and Waverman, 2005). At the wake of 2000, the Federal Government of Nigeria embarked on an aggressive drive towards the provision of more efficient services in the nation through its privatization and deregulation policies. The policy thrives led to the establishment of National Telecommunication Policy in December 2001. The policy, among other things, recognized the need for the establishment of an enabling environment for deregulation and rapid expansion of the telecommunication services in the country. The mission statement of the government was to use ICTs for Education, Creation of Wealth, Poverty Eradication, Job Creation, and Global Competitiveness. The policy objective was to develop globally competitive quality manpower in ICTs and related disciplines. This entails developing a pool of ICT engineers, scientists, technicians and software developers. Consequently, attractive career opportunities will emerge in addition to development of *software's* and computer components that can earn the nation some foreign exchange. The implementation of ICTs policy led to the adoption of Global System for Mobile-Communications (GSM) and its related components in Nigeria.

In Africa, provision of public infrastructure is grossly inadequate and poor. Necessary telecommunication services, as public infrastructure, needed for meaningful investment are lacking and, where found, are very costly. Teledensity in Africa and Nigeria, in particular, is very low. In the early 1990s, only one out of every 1,000 people in Chad had a telephone and there was just ten percent chance of completing a local call (Davari and Siloa, 2004). The situation is worse in Nigeria (Soludo, 1998) with its teeming population. Prior to the introduction and adoption of GSM services in Nigeria, it costs about US\$10 to fax one page message to America or Europe, and about US\$8 to do the same task locally when the phones were functioning properly. The number of installed telephone lines was grossly inadequate to equate demand. This phenomenon was responsible for poor call completion rates, subscriber dissatisfaction, and hence, loss of revenue.

The introduction of the GSM in Nigeria was to expand the teledensity in the country and to make telephone services cheaper and accessible to the common person as it had been introduced in some African countries like South Africa, Ghana, and Benin Republic among others. To date, at least four competitive GSM service providers have been fully licensed in the country. These are Mobile Telephone Networks Limited (MTN), V-Mobile Nigeria (Vgo), Globacom Nigeria Limited (glo), and Nigerian Mobile Telecommunications (Mtel).

These Telecommunication Networks have created significant effects on the gross domestic product (GDP) of Nigeria in terms of job creation, communication linkages, connectivity, security of lives, and reduced transport costs among other. Past studies on the developing economy have bothered on the challenges and roles of ICTs on economic growth (Carayamis and Popescu, 2005; Ndukwe, 2003, 2004; Igwe, 2005). Thus, this study examines the effect and impact of information and communication technology on the economic growth in Nigeria.

### **Model Specification**

This section presents the econometric model to establish the relationship between ICT and economic growth in Nigeria. Some simple specification of the model will be set out which permits the quantification of economic relationship between economic variables. The study therefore employed a time series analysis to examine the impact of information communication technology on the Nigerian economy, the assessment of the nature of telecommunication driving ICT, the assessment of ICT and the necessary technology infrastructure in Nigeria. The data used in this study consists of twenty-six observations for the period of 2000 – 2010. The ICT variable used here is the telecommunication which consists of telephone and postal facilities, telegraph and the gross domestic products at current basic prices. GDP is taken as the dependent variable and the telecommunication and telegraph as the explanatory variable. The number of telecommunication and telegraph is used to proxy for ICT. Here, the focus is on the examination of the impact of ICT on GDP. The data will be fitted to the equation using the ordinary least square method (OLS). The linear relationship between the dependent and independent variables will be determined. However, this study adopts and modifies the model of Breitenbach *et al* (2006) in order to achieve the set objectives. The econometric models for this can be specified as follows;

$$\ln Gdpt = a + \beta \ln TELMt + \mu t$$

Where  $\ln Gdpt$  is the GDP

$\ln Telmt$ ; the telecom mainlines per 1000 people

$\mu t$ ; the stochastic term

While the above served as the main model, the modified equation in linear form is hereby generated.

$$\ln\text{GDPT} = a_0 + a_1 \ln\text{TELM}_t + a_2 \ln\text{TELG}_t + \mu_t$$

Where  $\ln\text{GDPT}$  is the Gross Domestic Product

$\ln\text{Tel}_t$  is the addition of telephone and postal facilities.

$\ln\text{Telgt}$  is the cumulative value of telegraph

$\mu_t$  is the stochastic term

The apriori theory has that the ICT development is not only correlated with economic growth, but it is also a cause of long term growth. Hence, a positive relationship between GDP and telecommunication is expected.

### SOURCES OF DATA

Data to be employed shall be essentially secondary; in order to facilitate the regression analysis, data such as GDP, telephone, telegraph and postal facilities will be employed and their data will be collected from relevant sources such as the international financial statistic (IFS) and Central Bank Annual Statistical Bulletin.

### RESULT

#### Unit Root Test

Prior to the estimation of our equation, the characteristics of our data have to be examined. The main reason is to determine whether the data is stationary. That is, whether it has unit roots and also the order of integration. Therefore a unit root test, using Augmented Dickey Fuller (ADF) Test is carried out to know if data are stationary at (0), (1) or (2). The table below gives the result of the ADF test

Table 3.1

Variable	Levels	1 <sup>st</sup> Difference	2 <sup>nd</sup> Difference	Order	Critical Values
GDP	1.007838	-3.660658	-10.829898	1(2)	1% -37667
Telm <sub>t</sub>	4.640616	1.056667	-4.081739	1(2)	5% -3.0038
Telgt	-1.918292	-2.352726	-6.113477	1(2)	10% -2.6417

This result indicates that variables GDP, telecom and telegraph are all stationary at 2<sup>nd</sup> difference that is they needed to be differenced twice while none of the variable was stationary at level. In summary our results show that economic development through the use of information Communication Technology is a worthwhile measure to achieve economic growth by the use of increased and more efficient productivity to boost output. The technology it brings along helps to solve the problem of low technology which parades the economy.

#### Presentation of Results

From the regression analysis carried out using the econometric view 3.1 versions. The result obtained is presented in table 4.1 below.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	76685.01	1.283922	0.059727	0.9543
GDP(-1)	1.133017	0.254238	4.456528	0.0043
TELM <sub>t</sub>	48.44633	896.1736	0.054059	0.9586
TELG <sub>t</sub>	2.332239	5.020472	0.464546	0.6586
R-squared	0.845672	Mean dependent var		1812479
Adjusted R-squared	0.768509	S.D dependent var		1511561
S.E. of regression	727265.7	Akaike info criterion		30.12115
Sum squared resid.	3.17E + 12	Schwarz criterion		30.24218
Log likelihood	-146.6057	F-statistic		10.95944
Durbin-Watson stat	1.730539	Prob(F-statistic)		0.007560

#### Data Presentation

$$\begin{aligned}
 \text{GDP}_t &= 1.13317\text{gdp}_{t-1} + 76685.01 + 48.44633\text{telm}_t + 2.332239\text{telg}_t \\
 \text{S.E} &= (0.254238) \quad (1283922) \quad (896.1736) \quad (5.020472) \\
 \text{t-Stat} &= (4.456528) \quad (0.059727) \quad (0.054059) \quad (0.46456) \\
 R^2 &= 0.845672 \quad \text{Adjusted } R^2 = 0.768509 \quad \text{F-Statistic} = 10.95944 \quad \text{D.W} = 1.730539 \\
 \text{Schwarz Criterion} &= 30.24218 \quad \text{Akaike info Criterion} = 30.12115
 \end{aligned}$$

#### Interpretation of Results

According to the results above all the co-efficient are statistically significant. It however shows that TELECOM is positively related to GDP such that a 1% increase in ICT will result in a 4% increase in GDP; this conforms to our apriori expectation. This is because in the current year additional spending on ICT has a positive impact on the economy. However, to determine the relationship between GDP and ICT in the previous year, the lagged GDP shows a positive significant relationship, this shows that there is a close relationship between last years' GDP and the current year GDP which means that last year's GDP is a strong determinant of this year's GDP. This is an indication that the impact of telecom appears to have significantly boosted the economy. This could be effectively traced to more sectors and companies becoming fully ICT with operations like broadband and e-banking. Not only that, the regression also reveals the co-efficient of telegraph is positive and significant. As this was rightly expected, it the cautiousness of people to the use of telegraph for communication which in turn economic growth. The low values of the co-efficient of telecom and telegraph show that they have a relatively low share in GDP that is they do not strongly determine the GDP but an increase in them also increases GDP.

Co-efficient of determination ( $R^2$ ) is 0.845672 while the adjusted R-squared is 0.768509. The R-squared which is the co-efficient of multiple determinations shows more than 84% variation in  $\text{telm}_t$  is explained by the explanatory variables included in the model. This means that the estimated regression in the model is of good fit and could be used to infer about the impact of ICT on economic growth. The model which was tested at 5% level of significance, shows that telecom and telegraph are significantly related to economic growth with values such as 0.054059, 0.464546 respectively. The value of f-statistics from the above table is 10.95944. This is above 4 and it shows the overall model is

significant. The Akaike and Schearz criterion values are 30.12115 and 30.24218 respectively proves that our model selection is very good. In this work we cannot but test the existence of auto-correlation in our model, and this is done by estimating the Durbin-Watson. The Durbin-Watson value from the regression result above is 1.73 so there are no auto correlations, hence the model is conclusive.

### Policy Implication

The regression result indicates the telecommunication improved within period of 2000-2010 which tells us that the need to expand ICT in Nigeria cannot be overemphasized. Education however is the main thing that can be used to achieving better use of ICT as illiterates cannot understand the technicality involved in ICT. Moreover every highly ICT driven country has at least above 85% of its population learned. Therefore provision of education by government is paramount for all age brackets in the economy that is primary, secondary and tertiary institutions should be adequately provided. Provision for education will not only help the cause of ICT but also develop people with so many skills needed for other sectors; orientation programs should however be undertaken for the citizens to know the importance of education as it fine-tunes human thinking, this means that government fiscal policy will be directed at education. There is need for firms and parastatals to be well ICT drive for instance most banks are living on ORACLE or JAVA and all other computer wizardry. There is a constraint which is the capital involved in packaging ICT as if that is not enough they still have to spend heavily on generating power supply owing to the incessant power failure present in the Nigerian economy.

### CONCLUSION AND RECOMMENDATIONS

This study was carried out to critically examine the role and impact of Information communication Technology on the Nigerian economy for the period of 1970 to 2010. This study explains lengthly the significance of high level information and improved communication in the development process of the nation. Findings show that ICT has contributed positively to the economic growth of Nigeria, and the impact will also help to improve growth of the economy in the future with an increasing rate of ICT in the economy. The co-efficient of telecom is positive, this implies that as telecommunication increases the economic growth of the country will be positively influenced since this will increase the communication medium. Therefore, macroeconomic policies should focus on improving telecom as a means of enhancing communication. The co-efficient for telegraph is positive which complies with our expectation thus this variable is significant both statistically and economically for this model. It also indicates increases in the level of information. The co-efficient for telegraph is positive which complies with our expectation thus this variable is significant both statistically and economically for this model. Hence, the study recommends that government should provide more funds for the development of ICT, diversification of the productive structure of the economy away from oil/natural resources to ICT in a bid to increase employment and technical know-how, strengthening the legal and regulatory frameworks of doing business by introducing

ICT to hasten their level of information dissemination and communication medium. Ensuring international competitiveness and integration of the productive/service sectors of the economy into the global economy due to the new level of technology that will be provided by ICT and pursue infrastructural development to facilitate and encourage foreign direct investments that are required to facilitate a competitive economy which can be easily achieved by the use of ICT.

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Olawepo, G.T. and Joseph, A.I.

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