The Effect of ICT on Economic Growth in Nigeria

Henry Chima Ukwuoma

National Institute for Policy and Strategic Studies, Jos, Plateau State, Nigeria

Abstract

Economic drivers of most developed and developing nations are believed to be anchored on their population growth, GDP per capita, inflation rate and most importantly ICT. This study examines these drivers for the Nigerian economy using secondary data obtained from World Bank and subjecting the data to Regression. Data gathered ranged from 2008 to 2018 and SPSS used for analysis using Regression as the test tool. The result reflects that increased inflation, population and GDP per capita have negative effects on the number of Internet Users thereby affecting the economic growth of the country. The study proffers recommendations that the Federal Government of Nigeria can adopt to enhance ICT in Nigeria for its economic growth which include enhanced funding and the development of an ICT masterplan for the Nigerian State.

Keywords: Economic Growth, Information and Communication Technology, Population Growth, Information and Communication Technology Index, Inflation, Gross Capital Product.

1.1 Introduction

Information Communication Technologies (ICT) can be described as an electronic means of capturing, processing, storing and communicating information. ICT may be computer hardware, software, networks and includes intermediate technologies like radio and television, literate technologies like books and newspapers and organic technologies based on human body like brain and sound waves (Heeks, 2002). In addition, ICT could be referred to as Information Technology (IT) that lays emphasis on the function of the role of unified communications and the harmonization telecommunications, which include computers telephone lines and wireless signals, as well as necessary applications software, storage, and audio-visual systems, which enable users to process information (Wallet, 2015).

Studies carried out, and still ongoing suggest that innovation and technology are the main indicators of improved economic growth realization in developed countries (Villa, 2005) and there is a relationship between productivity growth and technological progress (Alani, 2012)

The significance of ICTs in economic growth and development resulted from the fast growth of these technologies and their market in the nineties. The world's developed and developing countries started immensely to harness ICT for economic growth and sustainable development (Hodrab et al., 2016). Recently, ICT is believed to foster sustainable long-term growth as a production technology through carefully designed ICT systems (Alani, 2012). The principal function of ICT is in enabling humans, governments and organizations to transform information into knowledge as a strong driver in evolving lasting change in the economy and society (Kim, 2013; Lyon, 2013).

The role of ICT in economic growth has a critical place in economic research; although ICT has become an active area for investment because of its dwindling cost of services and equipment most especially with the innovation of cloud computing and the investment into ICT which includes computers and their peripherals, software, and telecommunications devices. (Hodrab et. al., 2016). Countries which comprise of the private and public-sector investors have invested in ICTs to improve their performance and to gain other benefits of ICTs thereby creating more jobs and information space for their citizens. It is pertinent to note that Worldwide ICT spending is expected to exceed $5.6T in 2021(IDC, 2018) and the amount of money spent on Information and Communication Technology Research and Development (R&D) in the United States is expected to reach 126 billion U.S. dollars and that of other countries (Germany, Russia, China, India etc.) cumulatively is expected to reach 228 billion US dollars (Statista, 2018). The amount expended in the sector, reflects the fact that the ICT sector contributes to an economy by creating job opportunities where this sector leads to create new job positions in the ICT production sector or ICT providing services. In Nigeria, for example ICT sector has created thousands of jobs directly and indirectly. The Director-General of NITDA, Dr. Isa Ibrahim categorically stated that Nigeria has been spending $2.8Billion annually for the importation of various ICT products and services (Vanguard, 2016).

A survey carried out by the International Telecommunication Union (ITU, 2016) states that Nigeria has high population density and the sector of wires and wireless communication is considered as the main sector that creates job positions especially the mobile phone sector. Furthermore, in September, 2018, a survey carried out by the Nigerian Communication Commission (NCC) revealed that the contribution of the Telecoms Industry to GDP was rated 7.7% in 2012 as against 10.43% in the second quarter of 2018 (NCC, 2018). This shows a relatively contribution of the telecoms industry to GDP resulting to economic growth. Furthermore, the Executive Vice Chairman of NCC, Prof Umar Dambatta of Nigeria revealed that the ICT sector contributed N500 billion to the Nigerian economy in 2014 and created about 2.5 million jobs in 10 years and attracted $30 billion foreign investment between 2003 to 2014 (Vanguard, 2016). The revolution of ICT in developing countries is expanding and spreading giving the hope for these countries to achieve technological advances that contribute in advancing and developing their economies (Zwass, 2003). Nigeria not being an exception has benefitted from ICT in the areas of banking, fight against terrorism, e-governance and human resource development. Nigeria being a developing country is in need of radical change in governance and this can only be achieved by reengineering existing governance processes with the help of ICT. The uses of ICT can lead the nation to overall economic growth/development.

1.2 Aim and Objective of the Study

Evaluating the effect of ICT on the economy of a country as a whole is critical and associated with complex factors. This study examines the role of ICT in enhancing growth in Nigeria by evaluating the number of internet users in the country as a factor of population, GDP per capita and the inflation rate.

1.3 Significance of the study

World leading powers have shown yearly increase on the amount of money spent on ICT because these world powers have realized the role ICT plays in stablising and promoting their economies and this role reflected on the GDP in such countries. Nigeria exited from recession but Nigeria is still under abject poverty, threat and the large population of its youth not employed (Thisday, 2017). The increasing number of internet users should provide an avenue for Nigeria to adopt/provide ICT services that enhance communication with other countries. This study will present the effect of ICT on economic growth of the Nigerian economy considering that Nigeria is a developing country despite its various challenges.

1.4 Literature Review

Hodrab et al. (2016) examined how the drivers of economic growth can be categorized under the following; Information and communication technology (ICT), population growth, gross capital formation, openness and inflation in developing countries and used Arab countries as a case study. They examined within the scope of 1995-2013 the effect of the suggested factors on the economic growth of Arab 18 (eighteen) nations with the effect was tested using Econometric analysis. The research revealed an outcome which suggested that ICT and other suggested factors affect the 18 Arab nations' economic growth. Although, inflation had a negative effect on economic growth for 18 Arab nations.

Oladimeji and Folayan (2018), reviewed the growth benefits that the ICT sector has provided and its impact on the Nigerian economy and postulated that the growth rate as an apparatus to the progression of economies of emerging countries like Nigeria in the 21st century. ICT and ICT related facilities aid in the development of markets, decrease in transaction costs and increased productivity and management in both public and private sectors of the Nigeria economy. They postulated the numerous impacts of ICT in the four major sectors of the Nigerian economy, suggesting the prospects of the wireless technology platform in fostering economic and social impact for the populace.

Albiman (2016), reviewed long run effect of ICT on economic growth in the Sub-Saharan African (SSA) region. The analysis of the impact of ICTs use was assessed for a 27-year period (1990-2014), before the Millennium Development Goals (MDGs) era (1990-1999) and during the MDGs era (2000-2014). The nonlinear effect of ICT in the economic growth and their threshold values were also examined. The research showed that mobile phone and internet were found to have triggered economic growth. the results indicated that, except for financial development, human capital, institutional quality and domestic investment were the main growth enhancing transmission channels of ICTs use in the economy.

Oloruntoyin and Adeyanju (2013), postulated that Information and Communication Technology (ICT) is a tool that is capable of enforcing sustainable economic and social development in the society. They further stated that the resultant effect of ICT adoption can be seen in various sector in Nigeria. Such sectors include, e-banking, telemedicine, e-learning, tele-commuting, the use of ICT enhances the possibilities of developing countries to improve the standard of living thus promoting media networks, security, medical practitioners, governance, safety, agriculture producers, research institutions, financial organizations, and small business enterprises. They suggested possible ways to achieve ICT growth in Nigeria which include Human Resource Development, infrastructure development, Research and Development and Electronic Government.

Jakhar (2015), postulated that the Information and Communication Technologies (ICTs) play a major role in economic growth and economic development of India. He examined and analyzed how ICT has driven economic growth of India. More so, secondary data was to draw conclusion on data sourced collected from numerous statistical report and government websites. Findings showed an assessment of sectors of the IT industry and the and its effect on the economy.

Isizoh et al. (2013), reviewed the notion of Information and Communication Technology (ICT) and its effects on the Nigerian economy. They further postulated with focus on the pros and cons of ICT in economic advancement as well as recommendations geared towards harnessing ICT for the overall development of the socioeconomic and political status of Nigeria. Their study revealed that for Nigeria to be socially, politically and economically competitive, Nigeria has to adopt ICT in areas of politics, health, business, education, poverty reduction and national security. They further postulated that Nigeria direct its focus on positive development, implementation and access of ICT to its populace.

Oju and Onyebuka (2016), investigated the major roles that ICT can contribute in enhancing the economies of rural areas in emerging countries, with its main focus on rural areas. They further postulated that in the last ten years, because of the quick spread of mobile phones, ICT has had a great impact on the economic development by enhancing the business activities of rural areas. ICT has provided access to information for the market men and women with financial services at the doorsteps of rural consumers and helped in the exchange of business know-how and thereby linking themselves. They also proffered practicable solutions in the disparity between the drivers of technology and the inherent beneficiaries in rural areas of developing countries and also the opportunities generated as a result of convergence of ICTs. Their study revealed that the provision of a less expansion and efficient tools for providing cheap and efficient tools for access to information and exchange of ideas and knowledge will serve as an enhancement tool for greater socioeconomic improvement and ICT could assist in knowledge sharing and information exchange.

Nirmala et al. (2012), stated that because of the slow developments in Africa, the continent has been hit by disease and poverty which has resulted to the current quality of cultural, social and political lives of inhabitants of the African continent. Although, they stated that with the coming of ICT, a new path for growth and development has been created, which comes with its pros and cons and its effects on social, cultural and political change. They researched on Africa with Eritrea in focus and the role of Internet in enhancing social change. Findings from their study revealed that Africa is still on the pipeline of achieving a superhighway technology and the need for creating tele-centers for Africa's goods and services to enhance economic development. The also postulated the urgent need for western powers to halt manipulating Africa as a continent that should surrender to western models of development.

1.4 Challenges of ICT in Nigeria

ICT which is the economic driver for most developed economy has been identified as the key player in economic/sustainable growth. The following are the challenges of ICT in Nigeria.

a. Inadequate ICT policy enforcing the use/adoption of ICT driven services- there are no adequate rules in place to ensure the safe use/adoption of ICT services in the Nigerian State, while sectors like the banking sector fully adopt ICT in the execution of its services, other sectors are yet to fully adopt the use of ICT services in its service e.g. education and tourism sectors.
b. High Cost of ICTs Equipment in Nigeria- the exorbitant cost of ICT equipment in Nigeria is a major challenge of ICT growth in Nigeria. The Federal Government of Nigeria(FGN) should has not adequately protected the ICT sector through price control and the ensuring the standardization of important ICT goods/services.

c. Inadequate funding of the ICT sector- According to ITU (2018), the amount of money been spent on ICT (Research and Development) in Nigeria is on the low side, therefore for the pursuance of economic growth through ICT, the FGN needs to urgently increase the amount spent on ICT to foster economic growth.
d. Low ICT Literacy Level and Lack of trained ICT Personnel- The low ICT literacy level of personnel in the country has slowed down economic growth, FGN needs to introduce the practical use of ICT services in Nigeria by establishing ICT internet driven centers with trained Personnel in every state of the Federation and the practical use of ICT in primary to tertiary institutions. This will encourage persons who cannot afford internet services the opportunity to enhance his/her skills in such area.
e. User Acceptance- since people have not been enlightened on the need to drive ICT with services, they find it difficult to accept ICT because of the fear of losing their jobs, so they frustrate whatever services that ICT can drive.
f. Inadequate synergy between Nigeria and other ICT driven developed Nations on the transfer/adoption of ICT knowledge to Nigeria- there is no cooperation between Nigeria and other ICT developed economies, this has led to poor transfer of ICT knowledge, without this transfer of ideas, Nigeria cannot enhance her ICT skills/knowledge.

1.5 Materials and Methods

The study adopts SPSS version 24 to analyse the indicators (sourced from World bank) of the Nigerian economy which include GDP, GDP per capital, inflation rate, internet users, population, and thereafter draw recommendation from the findings of the study.

1.5.1 Indicators of the Nigerian Economy

The indicators of the Nigerian economy from the year 2007 to the year 2017 will enable this study to ascertain the role ICT has played in the enhancement of economic growth in Nigeria. The study will ascertain if the progression or retrogression of ICT will enhance economic growth. This will be achieved by running a Regression analysis on the economic indicators below.

1.5.2 Regression

The study adopts regression for estimating the relationship between data source form the World bank, more so regression analysis is a group of statistical procedures used for estimating the relationships among variables used for predictions and forecasting. The table below presents data sourced on the indicators of the Nigerian economy.

Table 1: ICT goods export (percentage of total goods export)

Year	China	United Kingdom	United States	South Africa	Nigeria
2016	27.709	5.843	10.616	1.088	0.002
2015	29.651	3.423	10.708	1.257	0.01
2014	29.125	5.782	10.555	1.198	0.005
2013	26.76	4.667	9.509	1.01	0.017
2012	27.056	4.236	9.032	1.18	0.004
2011	27.422	3.823	8.877	1.217	0.012
2010	25.939	4.162	8.966	1.59	0.02
2009	26.563	4.101	9.439	1.435	NA
2008	26.493	4.502	9.663	1.396	NA

Source: UN, 2018

The table 1 above depicts the ICT goods export as a percentage of total goods export. There is a clear indication that Nigeria's ICT export for ICT has been dwindling since 2010 as compared to other developed countries represented in table 1. This has had a significant effect on the Nigeria economy.

Table 2: Indicators of Economic Growth in Nigeria

Year	GDP (Billion USD)	GDP per capita (%)	Inflation (%)	Population(million)	Internet users (million)
2017	375.8	0.8	16.5	190.89	NA
2016	404.7	-1.6	15.7	185.99	25.67
2015	481.1	2.7	9.0	181.18	24.5
2014	568.5	6.3	8.1	176.46	21.0
2013	515	5.4	8.5	171.83	19.1
2012	461	4.3	12.2	167.3	16.1
2011	411.1	6.7	10.8	162.88	13.8
2010	369.1	7.8	13.7	158.58	11.5
2009	169.5	7.0	11.0	154.4	9.3
2008	208.1	6.3	11.6	150.35	8.0
2007	166.5	6.8	5.4	146.42	6.77

Source: World Bank, 2018

The table 2 shows Nigeria's GDP, GDP per capita, Inflation rate (%), population and internet users between 2007 and 2017. There is a clear indication that the number of internet Users have increased, which implies that ICT services can be deployed to drive activities in the country, although it should be noted that as of 2017, the number of internet users does not reflect up-to 20% of the country's population. There was a sharp increase on the inflation rate from the year 2015, which implies increased cost of goods and services. In 2017, the GDP per capita increased significantly which, implies a growth on the economy

The table below shows regression analysis of variables in table 2

Table 3: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.760[a]	.578	.366	24337544.500
a. Predictors: (Constant), Population, Inflation, GDP				

The Model Summary table above depicts the values of the *R*, R^2, adjusted R^2 and the standard error of the estimate, the above values can be used to determine how well a regression model fits the data. More so, the "R" column signifies multiple correlation coefficient. The value of R can be reflected as one measure of the quality of the prediction of the dependent variable (Population), in this case a value of 0.760, which implies a good level of prediction.

The "R Square" column depicts the R^2 value (coefficient of determination), which is the proportion of variance in the dependent variable that can be explained by the independent variables. One can see from our value of 0.578 that our independent variables explain 57.8% of the variability of our dependent variable, Population.

Table 4: ANOVA Table

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4859360775000000.000	3	1619786925000000.000	2.735	.136[b]
	Residual	3553896435000000.000	6	592316072500000.000		
	Total	8413257210000000.000	9			
a. Dependent Variable: Internet-Users						
b. Predictors: (Constant), Population, Inflation, GDP per capita						

The ANOVA table presents values that can be used to ascertain the relationship between the dependent and independent variables. The *F*-ratio in the **ANOVA** table 3 tests whether the overall regression model is a good fit for the data. The table shows that the independent variables statistically significantly predict the dependent variable, $F\ (3, 6) = 2.735$, $p > .0005$ (i.e., the regression model is a good fit of the data).

Table 5 Coefficients Table

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	511870187.600	183342836.200		2.792	.031
	Inflation	-2053674.917	3064244.187	-.200	-.670	.528
	GDP per capita	-7213427.284	4824454.067	-.661	-1.495	.185
	Population	-2.510	.944	-1.095	-2.660	.038
a. Dependent Variable: Internet-Users						

Estimated model coefficients

The general form of the equation to predict Internet-Users from Population, Inflation, GDP per capita is:

predicted Internet-Users = 511870187.600 - (2053674.917 x Inflation) - (7213427.284 x GDP)

This is extracted from the Coefficients table, as shown above. Also, the "**Sig.**" column shows that all independent variable coefficients are statistically significantly different from 0 (zero) excluding Population.

1.6 Findings

Findings from the regression showed that Unstandardized coefficients signify how much the dependent variable varies with an independent variable when all other independent variables are held constant.
For the effect of inflation, the unstandardized coefficient, B_1, for Inflation is equal to -2053674.917. This means that for each one-year increase in inflation, there is a decrease in "Internet users" by 2053674.917.
For the effect of GDP, the unstandardized coefficient, B_1, for Inflation is equal to -7213427.284. This means that for each one-year increase in GDP, there is a decrease in "Internet users" by 7213427.284.
For the effect of Population, the unstandardized coefficient, B_1, for population is equal to -2.510. This means that for each one-year increase in population, there is a decrease in "Internet users" by 2.510

Nigeria is ranked 157 in the Human Development Index rating in the world, findings showed that with a population of 190 million, only an estimated 25.67 million people do have access to the worldwide network (UNDP, 2018). Nigeria still has a lot to do to stand out in the rankings by the United Nations to promote her Human Development Index (HDI), ICT which has helped countries like China, USA and India can also be replicated in Nigeria to promote her economic growth thereby increasing its world ranking on HDI. Also, the number of internet users increase with increasing population and decreasing cost of ICT infrastructure, which implies that in the years to come ICT will provide sufficient jobs and services to drive the Nigerian economy.

1.7 Recommendation

ICT in Nigeria has had a slow growth, as a result this study proffers the following recommendations in order meet other ICT driven developed economies.

1. The FGN should allocate more funds for the realization of an ICT driven Nigeria.
2. The provision of cheaper Internet facility can be achieved with the collaboration with the private sector (Telecommunication Companies)
3. Development of a knowledge base with developed ICT driven economies, thus the promotion of indigenous ICT products and services which can be exported to other countries.
4. Develop an ICT masterplan for Nigeria
5. Training and retraining of Staff of the ICT Regulation Agencies
6. Encourage youth to go into ICT by creating an enabling environment.
7. Research on ICT driven economy with the collaboration of the Academics.
8. The application of ICT services in all sectors of the country thus promoting transparency and accountability
9. Awareness/Provision of ICT services in rural areas.

1.8 Conclusion

Information and communication technology (ICT) activities are necessary elements of any development activity in this present age. The study reviewed the role of ICT has played in Economic Growth and used SPSS as a statistical tool and Regression as an analytical tool for the secondary data sourced from the world bank to predict the effect of Population, Inflation and GDP per capita on the number of internet users in Nigeria. It was gathered that increasing inflation affects the number internet users and a reduction in GDP per capita also affects the number internet users.

References

Albiman, Z. S. (2016). The role of ICT use to the economic growth in Sub Saharan African region (SSA). *Journal of Science and Technology Policy Management, Vol. 7.*

Daveri, F. & Silva, O. (2004). Not only Nokia: what Finland tells us about new economy growth. *Economic Policy. Volume 19, Issue 38.*

Dedrick, J., Gurbaxani, V. & Kraemer, K.L. (2003), Information technology and economic performance: A critical review of the empirical evidence. ACM Computing Surveys (CSUR), 35(1), 1-28.

Heeks, R. (2001). Understanding E-Governance for Development. *Government Working Paper Series, Paper No 11, Manchester Institute for Development Policy and management. University of Manchester.*

Hodrab **,** R., Maitah**,** M. and Luboš, S. (2016). The Effect of Information and Communication Technology on Economic Growth: Arab World Case. *International Journal of Economics and Financial Issues, 2016, 6(2), 765-775.*

Isizoh, A. N., Anazia, A.E., Okide S. O. & Okwaraoka C.A.P (2013). Impacts of Information And Communication Technology in The Nigerian Economy. *International Journal of Engineering Research & Technology (IJERT). Vol. 2 Issue 1.*

IDC, (2018). Worldwide ICT Spending Including New Tech Expected to Exceed $5.6 Trillion in 2021, According to New IDC Black Book. Available at: https://www.idc.com/getdoc.jsp?containerId=prUS43737918 . Accessed 27th June 2018.

ITU, (2016). Internet Users. Available at https://www.itu.int/. Accessed at 27th October, 2018

Jakhar S. (2016). Role of ICT in Economic Growth of India. *International Journal of Science and Research (IJSR) Volume 6 Issue* 9.

Kim, S. (2013*). E-policy and e-government: Theories and Strategies*. Seoul: Bumnoonsa.

Lyon, D. (2013). *The Information Society: Issues and Illusions.* New York: John Wiley & Sons.

NCC, (2018). Industry Statistics. Available at: http:// www.ncc.gov.ng. Accessed: 12th June, 2018

Nicoletti G. & Scarpetta S. 2003.Regulation, productivity and growth: OECD evidence. Economic Policy. Volume 18 Issue 36.

Nirmala M., Karthikeyan, K., Appalabatla, S. and Patharaj, J. (2012). The Role of ICT in the Economic Development of North East Africa: Eritrea*. Journal of Emerging Trends in Computing and Information Sciences VOL. 3, No. 3.*

Oladimeji T.,T. and Folayan, G.,B. (2018). ICT and Its Impact on National Development In Nigeria: An Overview. *Research & Reviews: Journal of Engineering and Technology e-ISSN:2319-9873*.

Oloruntoyin S.,T and Adeyanju I.A (2013). The Role and Prospect of Information and Communication Technology in National Development. *International Journal of Computing Academic Research (IJCAR) ISSN 23059184 Volume 2, No 3.*

Oju, O., & Onyebuka, C. (2016). ICT For Sustainable Economic Development And Growth In Rural Areas. *International Journal of Computer Science and Mathematical Theory Vol. 2 No.1.*

Statista, (2018). ICT research and development expenditure in U.S. and worldwide 2015-2018. Available at: https://www.statista.com/statistics/732308/worldwide-research-and-development-information-communication-technology/. Accessed 27th September, 2018

UNDP, (2018). Internet users, total (% of population). Available at http://hdr.undp.org/en/indicators/. Accessed 14/07/2018

Villa L. E. 2005. The Outcomes of Investment in Education and People's Well-being. *European Journal of Education. Volume 40, Issue 1*.

Vanguard Newspaper, (2016). Broadband is the next Revolution. Available at: https://www.vanguardngr.com/2015/12/broadband-is-the-next-revolution-danbatta/. Accessed 31st October, 2018.

Walter, P. (2015). Information and Communication Technology (ICT) In Education in Sub-Saharan Africa: A Comparative Analysis Of Basic E-Readiness in School. Available at http:// http://www.uis.unesco.org

Zwass, V. (2003), Electronic commerce and organizational innovation: Aspects and opportunities. *International Journal of Electronic Commerce, 7(3), 7-37.*