

Nigeria beyond Oil: Information Technology Pointing a Way to New Economy

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Abstract: Nigeria is an oil producing nation which have been relying heavily on oil revenue for its economic well being. Oil depletes and its price can crash making dependence on oil as a mono means for the country's future futile. Information and communication technology (ICT) on the other hand has impacted the economic growth of various nations such as India. ICT seems to be a key factor in stimulating the development of a country's productivity across most sectors of the economy and ensuring global competitiveness and a move to a New Economy. This Paper examines if a causal relationship exists between ICT and economic wellbeing (GCI) and if ICT can offer a way forward for Nigeria to move from oil based to service and product based economy. The paper also conducts an empirical analysis to find out if oil producing nations experience better growth against ICT innovative nations using 10 countries. The results of the analysis support the believe that ICT led development and of the existence of a causal link between ICT and economic growth and non-existence of a causal link between oil production alone and economic development.

Keywords: Beyond oil; Information Technology; Competiveness; ICT innovation; empirical analysis

1. INTRODUCTION

In the late 1950 Nigeria discovered oil in the Niger delta part of the country and started mass production just at the eve of its independence. Before oil, the developmental effort of the country was largely dependent on non-oil export, oil was just coming into play at that time. In the period between 1970 to 1980 the oil became the main stay of the economy making the country to almost abandon other sources of income and concentrating on oil. Oil have continued to fluctuate bringing in gallops on the economy.

The prospect of oil drying up in the nearest future is even a much more serious concern which the country and even the Niger Delta needed to pay more attention to. The Niger delta may not be totally cleaned up before the oil dries up and adequate plan needed to be put in place to find an alternative now before the anticipated evil day. In this paper the researcher intend to examine and proffer the adoption of ICT as a stimulant for the development of Nigeria's productive capacity across all sectors of the economy.

The question that continues to be of considerable theoretical and empirical interest is whether increased investment in ICT can leapfrog stages of Nigeria economic development. In a research by Maryam [1] it was suggested that ICT offers a unique opportunity for developing countries to free themselves from historical and geographic disadvantages allowing trade and economic activities to be conducted as efficiently as in the developed world. Moreover it is believed that an evolving and increasingly powerful *ICT* infrastructure has fundamentally changed the nature of global relationships, sources of competitive advantage and opportunities for economic and social development. Technologies such as the Internet, personal computers, broadband and wireless telephony have created an interconnected global network of individuals, firms and governments. For the developing world, a modern telecommunications infrastructure is not only essential for domestic economic growth, but also a prerequisite for participation in increasingly competitive

world markets and for attracting the much-needed new investments.

While there is substantial evidence that new information technologies are in many ways transforming how modern economies operate according to Organization for Economic Co-operation and Development (OECD), the impacts on productivity and economic growth have been much harder to detect. Recent literature about the role of *ICT* on economic growth has been mixed. Among the country level studies, Seo [2] found a significant relationship between IT investment and productivity growth with the data from 12 Asia Pacific countries. Shiu, and Lam, [3] used a data set from 36 countries for the period 1985-1993 and showed that IT investment is positive for developed countries but not significant for developing countries, conclusion that IT plays a significant role in economic growth in developed countries but no substantiated role in developing countries.

However, single country studies, Maryam [1] on Ireland; USA; Maryam [1]'s study of Singapore; and Joseph [4] on India, showed that ICT contributed to economic growth.

The empirical growth literature that developed, regressed growth in real per capita GDP on its initial level and a wide variety of control variables of interest. Within this literature many papers have included various measures of technology or telecommunication related variables among these control variables. Many of these papers found significant positive correlations across countries between growth and technology related variables, controlling for other factors. These studies have been influential in reinforcing the consensus among many economists that "*ICT* promotes growth".

However, the mixed results from empirical work in the *ICT* literature is due mainly to the omission of a relevant mechanism through which openness or the re-structuring of an economy promotes growth. Liberalization, in particular, is expected to increase foreign direct investment (FDI). If a complementary relationship between FDI and *ICT* exists, then

foreign investment or FDI may increase due to the existing *ICT* capacity within a country. FDI may also encourage greater *ICT* in intermediate inputs, especially between parent and affiliated producers as in the case of vertical trade as observed in developing countries where factor prices are lower such as India and China.

In developed countries there already exists an *ICT* capacity which causes inflow of FDI, while in developing countries *ICT* capacity must be built up to attract FDI. The inflow of FDI causes further increases in *ICT* investment and capacity. The rapid expansion in world FDI resulted from several factors including technical progress in telecommunication services and major currency realignment. Technical progress in telecommunication services facilitates international communications involving parent companies and their overseas affiliates, while major currency realignment has provided companies with the opportunities for making profits by undertaking FDI. Along the same lines, Blomström, Globerman and Kokko [5] argue that the beneficial impact of FDI is only enhanced in an environment characterized by an open trade and investment regime and macroeconomic stability. The contention that investment is correlated with economic growth is evidenced in the case of the South East Asian Tigers - the investment rates were the engine of growth for these countries [6]. The objective of this paper is to investigate if a causal relationship between *ICT* (using investment in telecommunication as a proxy) and economic growth (measured as output growth) in a sample of selected Latin American countries exists. This issue is analyzed using time series and panel data analysis tools of cointegration and error-correction models. If non-stationary time series variables are not cointegrated, then a high degree of correlation between the two variables does not mean a causal relationship between the variables. Time series methodology empowers us to recognize and avoid spurious results, which might happen using a simple OLS method. These techniques, as successfully applied in studies by Bahmani-Oskooee and Alse [7], Addison and Heshmati [8], and Gholami, Tom Lee and Heshmati [9] demonstrate their econometric robustness and their ability to root out spurious relationships. Our attempts to study the causal relationship between *ICT* and economic growth in Latin America adds to the expanding body of literature on this topic. Also the long time series for these variables we use in this study is quite unique.

2. PURPOSE, RATIONAL AND PROSPECT

2.1 Purpose

In this section the provision of answers to some of the questions by developing and employing an innovative analytical framework that can be used to evaluate empirical data in this area. Using a case-study design, this analysis focuses on Nigeria 2001-2013. Nigeria is an essential study for five important reasons. First, in 2001 Nigeria engaged in one of the major telecommunications policy restructuring processes which placed it as one of the fastest growing telecom penetration country in the world and have created a more liberalized telecommunications sector and promoting the development and use of information infrastructure. Second, Nigeria is an Oil producing nation with reputé as one of the largest producers in the sub-Saharan Africa. Third, there has been a gradual increase in e-commerce in Nigeria from Lagos to other parts of the country. Fourth, the south-north divide of Nigeria with south more educationally advanced and more IT

savvy than the North is a legacy of dichotomy in the economy and society that has elements of both a highly developing and lowly developing country.

2.2 Rational

There are very few countries in the world where situations of Nigeria occur, in Sudan where a similar case occurred in Africa long war has made the south go its separate way. Societal acceptance of a development model tailored towards IT education and development are viewed with suspicion in the Northern part of the country as being western culture. But the researcher believes that via diffusion the North catches up with what they view successful in the South even if it means giving it an Islamic coloration. For instance between 1982 to 1999 most state Universities in Nigeria are in the south but later the middle belt embraced it and gradually most Northern states today own a state university educating the populace in various disciplines including IT.

3. NEW E-ECONOMY

New E-economy is an economy where electronic-based information and communication technology has been the driving force behind economic transformation [10]. It is 'a knowledge and idea-based economy where the keys to job creation and higher standards of living are innovative ideas and technology embedded in services and manufactured products. It is an economy where risk, uncertainty, and constant change are the rule, rather than the exception' [11]. Within that, software and human capital are the brainpower that drives the new economy. Hence its importance as a crucial new economy sector with strong potential for Nigeria beyond Oil.

3.1 IT Human Capital

Human capital in IT involves the skill and other human based knowledge which is required for handling the operations needed in making the computer and the telecommunication equipment work effectively. It also involves the level of development of the citizens residing in the country of reference who are capable of managing, handling and improving upon the information technology hardware and software components available within the economy.

3.2 Software

In India software industry contributes 1 per cent of India's GNP, but has accounted for over 7 per cent of growth of its GNP [1]. In 1997, the software industry employed 160,000 of the total employed workforce of 28.245 million. Employment in the industry, although constituting only a small fraction of the total, has grown quickly and estimated to be over 2 million IT professionals employed in India. Software services are intensive in human capital and the abundant supply of engineers in India provided not only an absolute wage advantage, but also a comparative advantage. The software growth contributed much to human capital formation. There is also a reasonable impact of software on productivity improvements which induces organizational improvement in other sectors of the country's economy. The organizations that employ software developers are not just software firms but also large banks, insurance companies, and virtually every organization above a certain size all develop a great deal of software either directly or by customizing existing software.

Nigeria can replicate Indian success not by competing with India (the competitiveness is lacking) but by collaboration with Indian software organizations. Indian software companies are no longer new comers and the Fortune 500 companies outsource many of their software production to India. Similarly established Indian firms leverage their reputation and capability by outsourcing to Egypt, China and elsewhere as Infosys, TCS and Wipro are tilted doing [3]. Nigeria if well positioned can start by receiving Indian and Chinese outsourced development activities thereby attracting foreign inflow or income and further developing its own human capital.

4. ANALYTICAL FRAMEWORK, METHODOLOGY AND DATA

QUESTION: The question that continues to be of considerable theoretical and empirical interest is whether increased investment in ICT can leapfrog stages of Nigeria economic development and lead to a new e-economy.

4.1 Analytical framework

In order to explore the impact of global and domestic pressures on national economies, particularly in periods of rapid change and crises, Gourevitch [12] developed a useful analytical framework. This framework went beyond limited analyses of looking at either global or domestic variables to include both and beyond simply looking at narrow economic variables to include a range of socio-political and cultural components, providing a fairly comprehensive understanding of national responses to economic crises. The analytical framework developed in this study finds its roots in Gourevitch [12] but considers a more contemporary understanding of the processes and nature of globalization and the emergence of a global knowledge-based economy. A similar analytical framework has been applied previously to an empirical analysis of hightechnology policy formulation in South Africa, particularly in telecommunications [13]. The Global innovation-mediated paradigm shift (GIMPS) draws heavily on the basic assumptions and approach found in the Gourevitch model, but combines it with other relevant literature on global political economy and international regime formation [13].

The framework, called the global innovation-mediated paradigm shift (GIMPS) is used in the analysis. It employs four major themes to enhance our understanding of the impact of the digital economy on Nigeria. These themes are:

- (i) *Technology*—the structure and orientation of its system of production and distribution, including its information and communications infrastructure and the promotion of small, medium, and micro-sized enterprises (SMMEs);
- (ii) *Policy*—the policy approach of the state, including its promotion of an appropriate legal and regulatory environment for the digital economy;
- (iii) *People*—the human capacity operating within the sector, the existing income and employment distributions, and the degree to which civil society is organized in response to the new economy; and finally
- (iv) *Strategy*—the development and implementation of national, regional, and global strategies for confronting the challenges and exploiting the opportunities of IT within the constraints of the world-system.

4.1.1 Technology: Technology considers the status of ICT infrastructure within Nigeria, and how it is influenced by its system of production and distribution. The infrastructures include:

(i) *Telecommunications infrastructure* : Started by P and T (Post and Telecommunication) and then Nitel and now Mtel, Globacom, MTN, Etisalat and Airtel .

(ii) *Computing infrastructure*: As a base for the digital economy, the computing infrastructure of a country can be explored in terms of hardware, software, services (e.g. consulting, training, systems development and integration), and Internet access charges. The number of installed personal computers in Nigeria has risen dramatically but internet charges are still very high.

4.1.2 Spending on information and communications technologies : In 2000, the OECD argued that the two factors most likely to influence the future expansion of e-commerce are:

(i) the extent to which IT companies invest in network capacity, and

(ii) the speed of data transmissions (OECD 2000). In Nigeria, the private sector have been investing more than public sector to harness the digital economy.

Current e-commerce market in Nigeria: The degree to which companies can emerge to produce and distribute e-commerce products and services, and the degree to which consumers, even ‘connected ones’, have the capacity to easily download and use digitized products and services. In Nigeria the Cashless policy of the CBN is a move to drive such technology.

4.1.3 Policy

The policy approach in Nigeria is encouraging but it has not allowed for broad input into the policy formulation process.

(i) The **National IT policy** spearheaded by ITAN and CPN are instances.

(ii) The **CBN cashless policy** is still at its infancy stage but even within the two year application in Nigeria more Laptops, Tablets, ATM and POS machines are now around the country and more banks are driving internet banking and provision of understanding and promotion of the development of e-commerce and the information economy. However the gap between the North and South is even becoming greater. For instance in recent CBN report Lagos, Ogun, Anambra, Abia, Abuja, Rivers and Kano are declared cashless environment only Abuja and Kano are in the North the rest are in the south. This causes a ‘digital divide’ in the country with skewed access to ICTs.

(iii) Nigeria policy need to support a knowledge-based society and help create an information economy

4.1.4 People

IT equipment without human capacity—people—to build and use the applications makes the technologies and policies to be for naught.

(i) *Human capacity and skills shortage* : Perhaps one of the greatest challenges for Nigeria’s ability to harness the digital economy comes in the form of human capacity. There is a severe shortage of persons

(ii) *Income inequality and poverty* : Nigeria has an estimated population of over 160 million, the population is relatively young unemployed with more people poor and illiterate.

4.1.5 Strategy

If Nigeria have adopted a strategy it may not be clear what the initiative may be and the strategic nature of these initiatives within a global context . In this research looking at India:

India software industry contributes to its GNP and has accounted for over 7 per cent of growth of its GNP [1]. In 1997, the software industry employed 160,000 of the total employed workforce of 28.245 million. Employment in the industry, although constituting only a small fraction of the total, has grown quickly and estimated to be over 2million IT professionals employed in India. Software services are intensive in human capital and the abundant supply of engineers in India provided not only an absolute wage advantage , but also a comparative advantage.

The software growth contributed much to human capital formation. There is also a reasonable impact of software on productivity improvements which induces organizational improvement in other sectors of the countries economy. The organizations that employ software developers are not just software firms but also large banks, insurance companies, and virtually every organization above a certain size all develop a great deal of software either directly or by customizing existing software.

5. DATA AND SOURCES

The data is sourced from the Global Information Technology Report 2013 and Global Information Technology Report 2012 (Courtesy World Economic Forum). The data is edited by Beñat Bilbao-Osorio, World Economic Forum Soumitra Dutta, Cornell University Bruno Lanvin, INSEAD.

The Global Information Technology Report 2013 is a project within the framework of the World Economic Forum’s Global Competitiveness and Benchmarking Network and the Industry Partnership Programme for Information and Communication Technologies [14]. It is the result of a collaboration between the World Economic Forum and INSEAD. Professor Klaus Schwab Executive Chairman Børge Brende Managing Director, Government Relations and Constituents Engagement Robert Greenhill Managing Director, Chief Business Officer EDITORS Beñat Bilbao-Osorio, Associate Director and Senior Economist, Global Competitiveness and Benchmarking Network, World Economic Forum Soumitra Dutta, Dean, Samuel Curtis Johnson Graduate School of Management, Cornell University Bruno Lanvin, Executive Director, eLab, Printed and bound in Switzerland by SRO-Kundig. Visit *The Global Information Technology Report* page at www.weforum.org/gitr.

6. ANALYSIS

In the paper we selected ten countries which include five main crude oil exporting nations-Iran, Venezuela, Nigeria, Libya and Yamen and five non-crude oil exporting nations-Finland, Singapore, Sweden, Netherland, and Norway. We intend to compare this nations using data from the world economic forum report 2012 published 2013. The analysis is carried out based on Network rating, Innovation in each country, information technology Policy and Infrastructure. Other factors considered include the IT skill level of the country and the Global Competiveness Index (GCI).

In figure 1 the plot of the ten countries against the factors considered where presented.

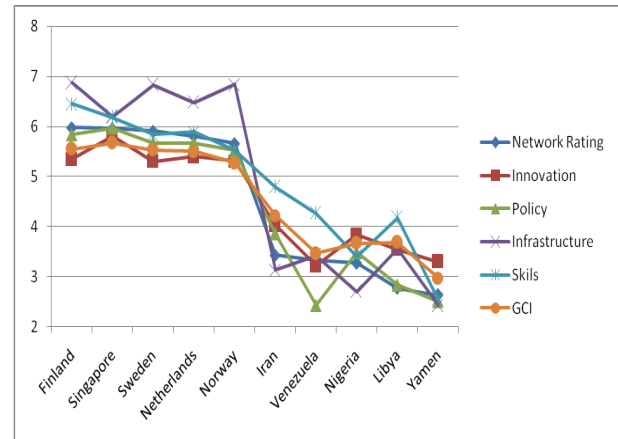


Figure. 1: Scatter Plot of Countries against the factors for GCI

It was clear that the five non-oil exporting countries performed better than the oil exporting countries in all the parameter considered in the research. In Nigeria innovation is the highest of all the factors while infrastructure faired as the worst for Nigeria among the factors.

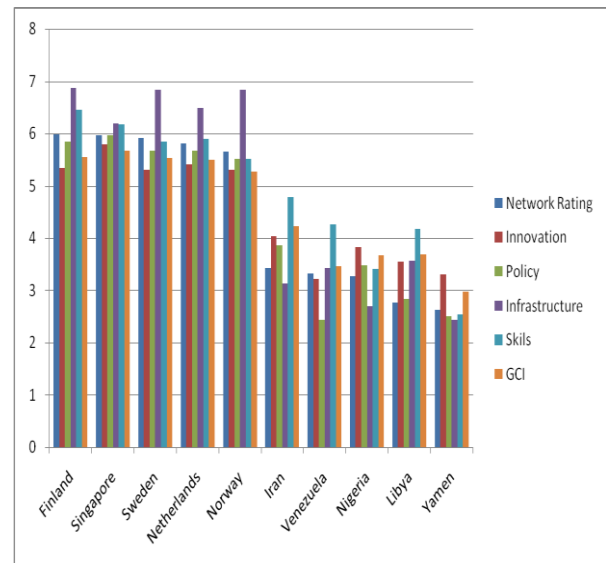


Figure 2: Column Plot of Countries against the factors for GCI

In figure 2 the Column plot of the ten countries against the factors considered where presented. It was clear that the five non-oil exporting countries performed better than the oil exporting countries in all the parameter considered in the research confirming the plot of figure 1. In the graph Nigeria performance is clearly shown in innovation and other factors while infrastructure faired as the worst for Nigeria among the factors.

The graph in figure 3 illustrate the plot of the various countries on Software and software engineering activities. Iran is the only oil exporting country that made some showing which is a little close to Norway. We expect Nigeria to come

close to Iran but it still lag behind in a value extremely low. The importance of software in the development of other sectors of a nations economy is too crucial as to find Nigeria lagging behind.

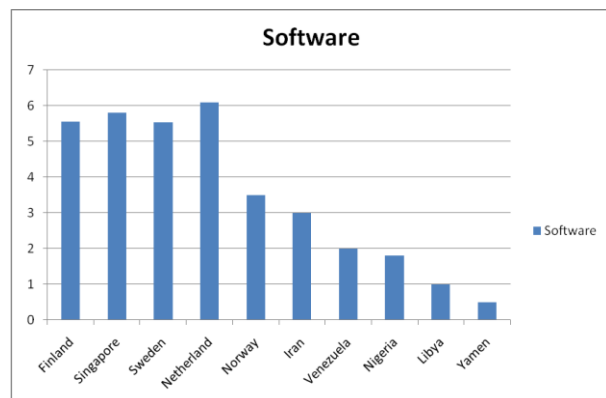


Figure. 3: Column Plot of Countries against the Software factors for GCI

7. FINDINGS: PROSPECTS FOR THE DIGITAL ECONOMY IN NIGERIA

In the research some of the observations and finding made which has prospects at pointing a road map for the Nigerian digital economy include:

- (i) It is clear that Yamen is at the bottom yet it is an oil producing nation whose oil is expected to dry up in less than 7 years [2].
- (ii) Finland, Singapore, Netherland are not oil exporting nation but they are doing well on an index scale maximum of 7.
- (iii) Nigeria is best at innovation but the skill and other factors are low and need rapid improvement now. Nigeria may find itself in the situation of Yamen if nothing is done quickly.
- (iv) India is already arriving in the new economy as shown by the Fortune 500 companies outsourcing many of their software production to India. This have created Indian firms with repute such as Infosys, TCS and Wipro [4].
- (v) Nigeria can replicate Indian success not by competing with India (the competitiveness is lacking) but by collaboration with Indian software organizations.
- (vi) Nigeria if well positioned can start by receiving Indian and Chinese outsourced development activities thereby attracting foreign inflow or income and further developing its own human capital.

7.1 The call for action: Local, national, regional, and global

The transition to a global information-oriented economy has created new challenges for global governance and regulation of these processes. While there have been problems with this strategy, on occasion, Nigeria's presence has always been noted. Often, Nigeria has been thrust into a leadership role in West Africa and other international conference and sometimes asked to 'represent' the interests and perspective of the developing world. It is therefore expedient for the country to fast track the improvement on the factors examined in this research to make sure that the country occupies its rightful place in the committee of nations in information technology

especially now that the country seem to be getting its polity and democracy right.

8. CONCLUSIONS

Nigeria has made significant strides towards embracing the digital economy and the prospects for its development in the country are good (the recent downturn in the global technology markets and the so-called 'dot.bomb' implosion in the global e-commerce sectors notwithstanding). A key element in this generally positive outlook is the country's high level of investment in information and communications technologies and infrastructure. The recent CBN move at cashless society must equally be followed with pressure on the banks to innovate in providing web merchant accounts at little or no cost to encourage the complete take-off of e-commerce in the country. We make a wake-up call before the oil dries up.

8.1 Recommendation

In the light of the research we make the following recommendations:

- (i) Nigeria in general and the Niger Delta in particular must start acting NOW before Yamen will repeat itself in our land.
- (ii) Skill development need to go first, followed by Software development support effort and then application of IT byproducts in Manufacturing, Agriculture eg snail production etc and other sectors.
- (iii) Oil money must not be put in banks but must be used in infrastructure, quality education and IT equipment.
- (iv) Youths must not wait for government, students must not wait for staff, rather self-help must start NOW.

9. ACKNOWLEDGMENTS

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