



## ICT FOR NATIONAL DEVELOPMENT IN NIGERIA: CREATING AN ENABLING ENVIRONMENT

**Ikponmwosa Oghogho<sup>\*1</sup>, Ezomo P.I.<sup>2</sup>**

Electrical and Information Engineering Department, Landmark University, Omu-Aran, Kwara State, Nigeria<sup>1</sup>  
Electrical and Computer Engineering Department, Igbinedion University Okada

<sup>\*1</sup>[oghogho.ikponmwosa@landmarkuniversity.edu.ng](mailto:oghogho.ikponmwosa@landmarkuniversity.edu.ng)

### ABSTRACT

In this paper, the author presents and emphasizes massive deployment, diffusion and use of Information and Communication Technologies (ICTs) in Nigeria as a necessary tool to enhance national development. A brief description of ICTs and the level of their adoption, diffusion and use in Africa and specifically in Nigeria were given. ICT's relationship with national development as well as roles of stake holders in creating an enabling environment (so that ICTs will be massively deployed, diffused and used in Nigeria to enhance national development) were analyzed. Technical solutions to foster an enabling environment in Nigeria as well as the implication of achieving this feat were also considered and relevant recommendations were made to position Nigeria strategically so as to benefit from the numerous advantages that massive deployment, diffusion and use of ICTs present to any nation.

### **Keywords**

ICT, Nigeria, National development, enabling environment, technical solutions

### **1.0 Introduction**

The need to communicate has become a necessary part of our everyday lives. The need to pass on timely and necessary information between doctors and their patients, government officials and the general public, business executives and their workers, etc cannot be overemphasized. People in organizations typically spend a large portion of their work time in an interpersonal situation hence. The emergence of numerous innovative digital communication application platforms such as e-governance, e-business, e-science and engineering, e-health, e-learning, e-democracy, e-agriculture, e-procurement, e-banking, etc has changed the way communication activities around the world is presently being done. Traditional means of communication are swiftly being replaced by digital platforms. Due to the fast adoption, diffusion and use of ICT in most parts of the world as well as the advances made in developing these technologies, you can send and receive information about your organization, government, products, ideas, etc, to (or) from others anywhere in the world. ICT has impacted our lives in a way that not having it means poor or low standard of life.

Different studies show that Nigeria and most developing African countries have not reached the high level of adoption, diffusion and use of ICT in developed nations of the world (Angelina, 2008; Etim, 2010;

InternetWorldStats, 2011). According to the World Internet statistics, Africa remains the continent with the least internet penetration rate (11.4%) which is a major factor in determining ICT diffusion, and usage as. Despite the growth in the users between the year 2000 and 2011 (2,527.4 %) which is higher than that of other continents, Africa's percentage of world users is still very low (5.7 %). Nigeria has an internet penetration rate of 28% which is lower than that of Morocco (41%) and Tunisia (34%) (Peter, 2010). The growth in the users between the year 2000 and 2011 (21891.1%) is however higher than that of many countries in Africa and in the rest part of the world.

Another key factor in determining ICT diffusion is the spread, cost and acceptance of wireless and fixed line communications systems. Africa is also lagging behind in the spread and diffusion of these key technologies. Large parts of Africa gained access to international fibre bandwidth for the first time via submarine cables in 2009 and 2010 (Peter, 2011). Nigeria's Internet sector has been hindered by the country's underdeveloped and unreliable fixed-line infrastructure, but this is changing as competition intensifies and new technologies are able to deliver wireless broadband access. The rapid spread of mobile phones with 3G capabilities as well as 3G broadband services with the mobile networks, is now bringing Internet access to many rural communities in Nigeria for the first time. This is good



for Nigeria but its accelerated growth and sustenance must be consciously pursued.

Radio and Television services in Nigeria are also helping to enhance distribution and availability of information in many parts of the country. DSTV has made reception of information (whether International or local) possible in many rural areas where there are no internet access and availability of mobile and fixed telephone networks. Although DSTV has this potential, the monthly charges and installation cost as well as the availability of power from Power holding Company of Nigeria (PHCN) or other alternative sources has limited its diffusion and use. The Nigerian Television Authority (NTA) in collaboration with some Chinese partners recently launched NTA Star TV Network, a new pay TV service in Nigeria at very low costs (WAZOBIANIGERIA, 2010) as an attempt by the Nigerian Government to promote the use of ICT in the country.

## 2.0 What is Information and Communications Technology (ICT)?

ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, mobile and fixed phones, computer and network hardware and software, satellite systems and so on, (as well as the various services and applications associated with them, such as videoconferencing, distance learning, etc) necessary for the delivery of information in the form of audio, data, video, image, etc from Point A to Point B. ICT consists of all technical means used to handle information and aid communication. Several reports underscore just how significant and extraordinary ICT productivity gains are not only for individuals and businesses, but for a nation (Microsoft, 1999; Oghogho and Ekekwe, 2011).

The importance of ICT lies less in the technologies themselves, but more in their ability to create greater access to information and communication in underserved populations (TechTarget, 2003). Many countries around the world have established organizations for the promotion of ICT with a focus on closing up the already-existing economic gap between technological "have" and "have not" areas. Internationally, the United Nations actively promotes ICT for Development (ICT4D) as a means of bridging the digital divide.

Despite its potential, ICT can introduce new ways for fraudulent practices and corruption to occur. When wrongly applied, ICT can hinder National development and economic prosperity, deepen existing inequalities between developed and developing nations, between high, medium and low class of the population and misdirect scarce resources. It is therefore necessary and crucial to foster an enabling, trustworthy, transparent and non-discriminatory environment that promotes the responsible and effective use of ICT for development for the benefit of all (Braund et al, 2006).

## 2.1 ICT and National Development

It is generally agreed that ICT can enhance national development (Heeks and Arun, 2009; IICD, 2004; Evan and Herman, 2011) but the clear cut link between the two has often been left vague (Harindranath and Sein; 2007) hence; many stake holders do no focus on the necessary ICT parameters that will make the most impact on national development. A frame work was developed by Sein and Harindranath (Sein and Harindranath, 2004) which aimed to describe how ICT should be viewed, used and what effects are to be observed. They raised three distinct but interrelated questions that can help to determine how exactly ICT affects national development:

1. How does national development take place? What are the specific factors (processes, practices, policies and measures) that tell us that a nation is developing?
2. How can these factors be influenced and affected in a "positive" manner so that national development takes place and is sustained?
3. What is the role of ICT in affecting these factors?

To answer these questions, they considered three main perspectives on which development has previously been centered: modernization, dependency and human centeredness (or human development). Modernization perspective which equates development with modernization has been discredited because it does not take cultural and local contexts into account (Sorensen, 2001; Reyes, 2001; Sein and Harindranath, 2004; Alvin, 1953). Dependency perspective which posits that poverty is not accidental but caused by the very processes that make developed countries rich has also been discredited because it threatens all underdeveloped countries uncritically and puts the onus of development on local government resources rather than global context (Reyes, 2001; Sein and Harindranath, 2004; Alvin, 1953). They supported the human development perspective which focuses on creating a society where individual potentials can be realized (Sudhir and Martin, 1993; Sein and Harindranath, 2004). They suggested key features of this perspective to include: enabling choices in health, education, standard of living, etc, building a democratic society marked by involvement, participation and transparency and last, better management of behavior and customs based on a better understanding of culture. These features agree with several development index specified in the United Nations development programme 2011: Human development report 2011(UNDP, 2011).

The use of ICT should therefore be focused on enhancing and enabling choices in improving the standard of living of all individuals in the population, health, education, governance, agriculture, businesses, management, maintenance and control of public utilities, etc. It should also be focused on enhancing processes,



practices, policies and measures involved in building a democratic society marked by involvement, participation and transparency. It should be focused to enhance better management of behavior and customs based on a better understanding of culture. Sein and Harindranath (Sein and Harindranath, 2004) also suggested four different conceptualization of the use of ICTs in national development: As a commodity to earn foreign exchange, as supporting general development activities, as a driver of the economy and as directed to specific development activities.

How then can these key factors be influenced and affected in a “positive” manner by ICT so that national development takes place and is sustained? How can ICTs enhance choices in health, education, governance, business, etc?

## 2.2 Examples of ICT's Influence on key Development Factors

ICT by itself cannot eradicate development challenges associated with poverty eradication, social inequality and environmental degradation but it can however contribute to the realization of development goals by enhancing the exchange of information, promoting the efficient use of resources and fostering individual and collective capacity development. Some specific examples include:

### 2.2.1 The Use of ICTs in Health

This has helped to enhance choices in medical care practices. Information sharing is easier, faster and timely. Consultants who are far away can view and give direct instructions and suggestions to other medical practitioners during operation, therapy, diagnosis and training sessions. The huge cost of transportation and the delay experienced during travelling as well as the risk of accidents are all eradicated. Capacity development is enhanced while available resources are efficiently utilized. Health practitioners and Patients easily find information about the latest health research findings and breakthroughs as well as best health services and practices that are available anywhere in the world thus enhancing their health choices. Public health threats are better monitored and responded to in a timely and effective manner. The efficiency of administrative systems in health care facilities is also improved using ICT.

### 2.2.2 The Use of ICTs in Governance

This helps in building a democratic society marked by involvement, participation and transparency. Electoral processes have been made more transparent and efficient. This was evident in the just concluded 2011 elections in Nigeria where majority of the Nigerian people and the International and local observers saw the elections as free and fair. This feat no doubt was achieved due to the use of

electronic voting machines to capture and verify voters data, use of the internet, mobile phones and other electronic means to send announced results at polling units to wards, Local governments, State and National collation centers as well as the wide coverage of the elections by the electronic media and other individuals with their video cameras and mobile phones. Many governments now have websites with e-mails, television programmes, communication lines or numbers, through which they can both send and receive information so as to allow participation of the public in governance. First Atlantic Semiconductors and Microelectronic Ltd (FASMICRO) is presently building an interactive website forum for Imo State government in Nigeria, where the general public can make suggestions, give advice, criticize, commend and draw the attention of the government to areas and issues where attention is needed (ImoSpeaks, 2011). This kind of forum will enable any sincere government to disseminate timely and important response information to her people as well as have first-hand information of the feelings and needs of her people and can therefore focus on areas that will make the most impact on the people. This will result in using the available limited resources in a transparent and more efficient way thus enhancing national development. Recognizing this fact, the government of Edo state, has also recently strengthened the ICT department established by previous administrations in order to enhance good governance to the people of Edo State (Okezie, 2011; Keri, 2011). According to the report, cost of governance is already being cut down due to discovery of many sharp practices.

ICT can also help to enhance provision of security (an important function of government) which is vital to national development. The appropriate use of GPS systems, CCTV, communication equipment, digital international and local ID cards and passports, fingerprint and other recognition systems, the electronic media, etc and the availability of a large data base which can be accessed from several locations all help to aid provision of security in any nation. One major challenge that Nigerian security agencies face is the lack of an adequate and reliable data base from which all forms of information can be retrieved. ICT by itself alone will not provide this database, but it can be used as a tool to acquire it with high reliability and speed.

ICT is also helping government to efficiently organize, coordinate and manage training and public enlightenment programmes such as workshops, seminars, etc that focus on human capital development. It is also being used by regulatory organs of government such as COREN, CPN, NAFDAC, EFCC, ICPC, CBN, NDLEA, etc to enhance their regulatory functions. The federal and many state governments in Nigeria today, make use of ICT to enhance revenue collection thus bypassing or limiting the possibility of losing revenue to fraudsters. Dissemination of information at no extra cost other than that of installation and maintenance is made possible by the use of Local area networks (LAN), Voice over Internet Protocol (VoIP) calls, Intercoms systems, etc in many government organizations



hence cutting down the cost of governance. These have all become possible because information is easily shared, available choices are accessible and hence a prompt and well thought out response can be initiated.

### 2.2.3 ICTs in Business

ICT is presently being used to enhance business planning and design, project management and construction, marketing and distribution of products and services, supply of technical solutions, training, revenue collection, sales and promotions, risk management, etc (Braund et al, 2006). Technology enhanced banking and payment methods have made business transactions easier, faster and available at reduced cost and improved efficiency.

The use of LANs, Intercom systems, VoIP networks, etc for communication within an organization and between two or more organization has greatly helped to enhance efficiency and performance of these organizations at only the cost of installation and maintenance of these networks and systems. Business organizations can market their products and services all over the world yet eliminating the need for a physical office location everywhere. Customer's choices are enhanced as different available products and services can easily be accessed.

### 2.2.4 ICTs in Education

Many reports and analysis have shown the importance of ICT in the Nigerian education sector (Jegade, 2009; Akudolu, 2007; Osei, 2007; Iloanusi and Osuagwu, 2009; Achimugu et al, 2010). Education is a major factor to becoming a knowledge based economy. If Nigeria must compete effectively in today's global world, we need an educated and skilled labor force that can create, share and use knowledge. This will result in a vibrant human capital (supported by a system of research and innovation) that is able to tap into and assimilate global knowledge and adapt it to meet our local needs. Online payments and registrations have eliminated long queues for payments (which wastes student's time) and loss of uncollected revenue by dubious means (Iloanusi and Osuagwu, 2009).

Osei (Osei, 2007) gave an analysis of the ICT conditions of Nigerian Primary, Secondary and Tertiary Institutions. In his analysis, majority of Nigerian Schools do not yet have access to adequate ICT facilities. We however advocate that the computers should not be confined to the computer laboratory but be made part of each classroom and hence should be used as part of each lecture session so as to facilitate blended learning. The curriculum should be reviewed to accommodate this change. This will further help to integrate ICT in the teaching and learning process.

From the discussions given above, ICT should not be viewed as a monolithic and homogeneous entity but as having a rich and multifaceted nature. Five views of ICT artifact was proposed by Orlikowski and Iacono (Orlikowski

and Iacono, 2001). ICT being viewed this way will unleash its potential for differential impacts on development Initiatives and inventions.

## 2.3 ICTs Impacts or Effects

Malone and Rockart (Malone and Rockart, 1991) proposed a model which has also been adopted by Sein and Ahmed (Sein and Ahmed, 2001) that new technologies impact the society through three effects:

1. The first order or primary effect which is basically the replacement of an old technology by a new one perceived to have better features and impacts on development. Primary effect does not necessarily indicate development but is very essential for higher order effects to take place. Examples of primary effect includes: the replacement of Analogue television by digital satellite television (DSTV), the replacement of Landlines by GSM, etc.

2. The second order or secondary effect is an increase in the phenomenon enabled by technology. An example to illustrate this is the cost savings which results as a secondary effect when communication using GSM phones in an organization is replaced by communication using VoIP calls or Intercom systems (primary effect).

3. The third-order or tertiary effect is the generation of new technology-related businesses services, training, structures etc and societal change. A more open society that results due to more sharing of information which may impact societal norms is also a tertiary effect.

## 2.4 Creating an Enabling Environment

The United Nations-sponsored World Summit on the Information Society (WSIS) clearly recognizes the importance of fostering good governance and an enabling environment to unleash ICT's rich and multifaceted potential (Braund et al, 2006). All stake holders must also focus on and contribute to fostering the needed good governance and providing the required enabling environment for ICT's differential impact on the identified key factors to be unleashed which will in turn lead to national development. This will facilitate reaping the benefit that ICT presents to any nation.

### 2.4.1 Roles of the Government

The government has the role of providing regulatory stability that will ensure ease of doing business, low prevalence of corruption, trust in ICT processes, legal protection, etc (Braund et al, 2006). The Nigerian telecommunications market experienced unprecedented growth only after the Federal government of Nigeria took the initiative to deregulate the sector. This has yielded many dividends to the Nigerian people as was analyzed by Adeyinka et al (Adeyinka et al, 2007).





In a World Bank study in 2006, inadequate legal protection is seen as one of the top obstacles of ICT diffusion and usage (Braund et al, 2006). The government must ensure and encourage investment in ICT, eliminate barriers in competition as well as establish an independent regulatory authority. The government must ensure that laws, regulations and ICT initiatives are implemented in a transparent, consistent and effective manner. Weak governance comprising corruption and bureaucracy was identified by executive managers in both developing and developed world as the most binding constraint for doing business in their country (Kaufmann, 2004).

Weak governance and prevalence of corruption, distorts the rule of law, weakens the institutional foundations of countries, disrupts the provision of public services, deters the growth of markets, and is therefore one of the main challenges to the effectiveness and sustainability of developmental efforts (Braund et al, 2006). The government also has the role of providing ICT transaction and concession design, subsidies, Infrastructure strategies, access to development finance, and a legal framework for freedom of information (Braund et al, 2006).

#### **2.4.2 The Roles of the Civil Society**

The participation of the civil society is geared towards fostering transparency and good governance. They must continuously monitor government policies on ICT and where necessary point out areas of flaws and strengths using ICT platforms. By providing local knowledge and capacity building assistance their involvement is important in implementing and sustaining ICT-related initiatives for development. They have the capacity to network thus forming a strong front with a strong voice which cannot be ignored by the government when properly coordinated and channeled towards achieving a set goal. They can also foster ICT skill development and innovation by establishing community telecenters where ICT skills and innovations are acquired and developed. They have knowledge of user demand and hence can help to direct the government and the private sector on areas to focus on.

#### **2.4.3 The Roles of the Private (or Business) Sector**

The private sector is critical in developing, financing and diffusing ICT for infrastructure, content and applications (Braund et al, 2006). They are also responsible for bringing a drive in innovation and experimentation. They can also advocate for a positive business environment that unleashes the development use of ICT as well as contribute to the monitoring and evaluation efforts of Government in this regards. They can give advice on effective business process models that help to create sustainable ICT programmes. They should engage in ICT research and development, promotions, capital investments, operations and maintenance of ICT infrastructure, planning

and design, providing technical solutions and training of personnel and the civil society as the case may be.

#### **2.4.4 The Roles of the Media**

The media has the role of shaping public and government opinion on ICT issues. They provide a platform for the stake holders to make their policies, programmes and plans on ICT known to the public. They also provide the opportunity for timely and appropriate response by the public. The media has the responsibility to put a check and balance on government's policies, programmes and plans on ICT for development by raising issues on them.

#### **2.4.5 The Role of the Academia**

The academia has the main responsibility to engage in research and development that will foster innovative and successful applications of ICT in development. They can also contribute to the building of skills and enterprise by advancing human capacity development using ICT. They also have the responsibility of sharing new research findings with the industry so that they can be developed to a form where they become relevant to society as finished goods or services.

#### **2.4.6 The Role of International Community and Intergovernmental Organizations**

The International community and intergovernmental organizations have the responsibility of promoting internationally compatible ICT tools thus ensuring global standardization of processes and systems (AAU, 2011). They are also to initiate ICT development programmes at an international and regional level in order to bridge the digital divide between the developed and the developing countries (AAU, 2011). They should strengthen and contribute to policies and mechanisms that guarantee mutual and equitable recognition of qualifications (AAU, 2011). This will be in response to the increasing internationalization of higher education also enhanced by the use of ICT. They are also to ensure that existing or renewed legal framework in regards to the protection of intellectual property and copyright are applied and respected (AAU, 2011).

#### **2.4.7 The Roles of International and Regional Associations**

They are to act as a platform for information sharing with regards to the use of ICT among their members and where possible the general public. This will facilitate sharing of experience, information materials, and where possible ICT facilities. They should also encourage the



development of a code of good practice for the exchange of information using ICT (AAU, 2011). They are also to promote corporation and consortia for the design and dissemination of information materials in non-dominant languages.

## 2.5 Technical Solutions to Foster an Enabling Environment for ICT

Some technical solutions which can foster an enabling environment for ICT are as follows:

### 2.5.1 Availability of Sufficient Bandwidth for Users

Bandwidth or capacity, which determines the speed of access, refers to the amount of data a given technology or infrastructure can transmit over time. It is usually expressed in kilobits per second (Kbps) or megabits per second (Mbps). The problem of bandwidth arises when the available bandwidth is used by more users than it was practically designed for. This will result in congestion and low quality or grade of access which leads to frustration and discouragement to users, impeding research output and stranded developmental efforts. This problem usually arises because of the high cost of acquiring necessary infrastructure and services that make large bandwidth available to meet the demands of the users.

If the Nigerian ICT environment is to compare well with that of developed countries of the world, it is not just enough to have access to bandwidth but access to sufficient bandwidth at reasonable cost for a reasonable amount of users. Diffusion and availability of 3G and 4G supported devices and services must be pursued so as to ensure fast data transfer rates that support the major radio technologies and their applications.

### 2.5.2 Ensuring an Adequate and Skilled Manpower

Nigeria must ensure provision of an adequate and skilled manpower that will support and maintain ICT infrastructures and services both in the rural and urban communities. ICT training which should include service usage, support and maintenance should be incorporated into our school curriculum from the primary to tertiary levels (Osei, 2007). Training centers where ICT support skills can be acquired should be supported by all stake holders in both urban and rural communities. Incentives should be introduced to encourage participants who enroll for the programmes and are willing and able to stay for a predetermined period of time in their assigned communities after the completion of the course. In this way ICT diffusion and use will be sustained in both urban and rural communities.

### 2.5.3 Power Provision

ICT infrastructure and services requires adequate and steady power supply which is presently far from available in Nigeria. If the power availability problem is solved or reduced to its barest minimum in Nigeria, we would have succeeded in reducing the overall cost of providing ICT services as there will be no need for ICT service providers to run continuously on generators as it is presently being done.

### 2.5.4 Spectrum Management

Proper spectrum planning should reflect national priorities and international goals. The communication needs of Nigerians have to represent a top priority, which must be reflected in planning. There should be reserved areas of the spectrum for Indigenous radio and television broadcasting to foster dissemination of local content information especially in the rural communities. Licenses can be given for VSAT and ISP services in rural areas, at a lower nominal cost per year. All charges for voice over IP (PC-to-PC and IP-to-IP) will be eliminated thus culminating in facilitating the deployment of communication in rural areas. Proper spectrum management will reduce the problem of interference which is presently the norm today in Nigeria where Subscribers are indiscriminately assigned channels by ISPs without following necessary requirements and securing corresponding licenses to operate in the chosen frequency band or spectrum.

## 2.6 Implication of Having an Enabling Environment for ICT to Thrive

The natural consequence of having an enabling environment for ICT to thrive is that efforts being put in from all fronts to develop our economy will yield maximum results. There will be less difficulty in ICT's adoption, diffusion and usage both in rural and urban areas thereby increasing the effects it has on national development. An increase in national development will further impact the adoption, diffusion and usage of ICT which will in turn impact national development because more people will have the capacity to afford and use ICT for different purposes. This process continues as long as the enabling environment is sustained.

## 3.0 Conclusion and Recommendations

ICT no doubt has a direct and well acknowledged impact on national development. We believe that availability of information itself as a result of ICT diffusion and usage is not as important as the impact or effects that this information availability and spread has on the lives of the people who receive it. Having knowledge of the available choices as a result of information received, helps to position an individual, an establishment or a government to make informed choices (from available options) bearing



in mind the limited resources available to pursue the set out goals which will then lead to national development. The level of impact however varies from one nation to the other depending on the environment created for it to thrive. Nigeria in particular has a lot to do in creating an enabling environment for ICT. We believe that implementing the following recommendations will help to position Nigeria to be among the leading countries in ICT deployment, diffusion and usage:

1. All stakeholders should focus on performing their roles efficiently with the available limited resources since they are all vital to creating the enabling environment for ICT. They should develop feedback mechanisms by which they can assess their inputs to implementing policies, programmes and plans aimed at enhancing national development using ICTs so as to identify areas of weaknesses and strengths in other make the necessary changes that will make the most positive impact to the outcome.

2. Nigeria needs to take a revolutionary approach instead of an evolutionary approach in pursuing this goal. Revolutionary strategies will have lots of casualties in terms of obsolete skills, out-of-touch and old technology. This may be harsh but sometimes the only way to new life is the death of the old.

3. We must focus our effective strategies on solutions to human, social, political, health, business, etc problems, not on infrastructure and technology. The choice of infrastructure and technology to deploy should be determined by the solution being pursued.

5. ICT should be brought into our classrooms and not just computer laboratories. Virtual Learning environment and online testing should be encouraged. Blended learning should also be introduced.

6. We should pursue availability of sufficient bandwidth at reasonable cost as well as diffusion and availability of 3G and 4G supported devices and services. This will ensure faster data transfer rates that support the major radio technologies and their applications.

7. Proper spectrum planning that will reserve some areas of the spectrum for Indigenous use should be pursued. This will ensure availability of frequencies for communication in remote areas and reduction of signal interference in Urban centres.

8. ICT units should be separate from the core organizations in because they represent a force that wants to change the status quo. This decoupling should largely free the ICT unit of any stifling bureaucracy and enable it quickly learn from its mistakes and correct its course.

9. Recognizing the fact that ICT can hinder national development and economic prosperity in any nation when applied wrongly, we must ensure its appropriate and legal use so as not to stall national development as ICT diffusion and usage becomes widespread.

10. We must fight corruption from all fronts as all efforts to massively, diffuse and use ICTs to enhance national development will fail if the prevalence of corruption remains high in our nation.

#### 4.0 References

1. AAU. (2011). Universities and information and communication technologies. Association of African Universities. Retrieved 27/09/12 at [www2.aau.org/ledev/kigali08/docs/readings/ict/univ\\_and\\_ict.pdf](http://www2.aau.org/ledev/kigali08/docs/readings/ict/univ_and_ict.pdf)
2. Achimugu, P., Oluwabemi, O. and Oluwaranti, A. (2010). An evaluation of the impact of ICT Diffusion in Nigeria's Higher Institutions. *Journal of Information Technology Impact* Vol 10 No1, pp 25-34
3. Adeyinka, T., Ajiboye, J.O., Emmanuel, A. O. and Wojuade J. I. (2007). Stakeholders' Perceptions Of The Impact Of A Global System For Mobile Communication On Nigeria's Rural Economy: Implications For An Emerging Communication Industry. *Journal of Community Informatics*. ISSN: 1712-4441.
4. Akudolu, R.L. (2007). The place of ICT in the Successful Implementation of the Education Reform Under NEEDS and Millennium Development Goals (MDGs). All Nigeria Conference of Principals of Secondary Schools (ANCOPSS). Retrieved 27/09/12 at <http://www.lilianrita.com/lr3/INTRODUCTION%20NATION.pdf>
5. Alvin, S.Y. (1953). *Social Change and Development: Modernization, Dependency and World System Theories*. SAGE Publications Inc, pp 11-261
6. Angelina, T. (2008). An analysis of information technology adoption situation in Botswana secondary schools and its impact on digital scholarship initiatives in institutions of learning. Retrieved 12/09/11 at [http://www.ais.up.ac.za/digi/docs/totolo\\_paper.pdf](http://www.ais.up.ac.za/digi/docs/totolo_paper.pdf)
7. Braund, P., Frausher, K., Schwittay, A. and Petkoski. (2006). A Report on the Global E-Discussion: Information and Communications Technology for Economic Development; Exploring possibilities for Multi-Sector Technology Collaborations. World Bank Institute Business, Competitiveness and development Team and RiOS Institute. Retrieved 27/09/11 at <http://www.riosinstitute.org/RiOSWBIediscussio.pdf>
8. Etim, A. S. (2010). The adoption and diffusion of information and communication technology in the Base of the Pyramid population of Sub-Saharan Africa: A study of Nigerian university students" ProQuest® Dissertations & Theses. Retrieved 12/09/11 at <http://gradworks.umi.com/34/08/3408791.html>
9. Evan, D. and Herman, A. (2011). Embracing ICT for national development. *The Gleaner*. Retrieved 21/09/11 at <http://jamaicagleaner.com/gleaner/20110814/cleisure/cleisure2.html>
10. Harindranath, G. and Sein, M. K. (2007). Revisiting the role of ICT in development. Proceedings of the 9<sup>th</sup> International Conference on social implications of Computers in developing countries, Sao Paulo Brazil.
11. Heeks, R. and Arun, S. (2009). Social outsourcing as a development tool: outsourcing to social enterprises for poverty reduction and women empowerment in Kerala. *Journal of International development*. 22, 441-451.
12. IICD. (2004). Integration of ICT in the National Development Planning Framework of Uganda. IICD. Retrieved 21/09/11 at <http://www.iicd.org/articles/iicdnews.2006-08-31.8421623518>



13. Iloanusi, O.N. and Osuagwu, C.C. (2009). ICT in Education: Achievements so far in Nigeria. Research reflections and innovations in integrating ICT in Education. Retrieved 21/09/11 at [www.formatex.org/micte2009/book/1331-1335.pdf](http://www.formatex.org/micte2009/book/1331-1335.pdf)
14. Imospeaks. (2011). Ideas for sustainable development. Imo State Government. Retrieved 21/09/11 at <http://imospeaks.fasmicro.net/>
15. InternetWorldStats. (2011). Internet world Stats: Usage and Population Statistics. Miniwatts Marketing Group, Retrieved 20/09/11 at <http://www.internetworldstats.com/stats.htm>
16. Jegede, P.O. (2009). Assessment of Nigerian Teachers' Educators ICT Training. Issues in Informing Science and Technology, Vol 6. 2009: 415-420
17. Kaufmann, D. (2004). Corruption, Governance and Security: Challenges for the Rich Countries and the World. Global Competitive Report 2003/04, Geneva: World Economic Forum.83-103. Retrieved 20/09/11 at <http://mpr.ub.uni-muenchen.de/8207/>
18. Keri, O. W. (2011). ICT Initiatives" Edo state Government. Retrieved 27/09/11 at <http://www.edostate.gov.ng/ict-initiatives>
19. Marlone, T. W. and Rockart, J.F. (1991). Computers, networks and the corporation. Scientific American 265: 128-136.
20. Mehdi, K. (2003). Information Technology and Organizations: Trends, Issues challenges and solutions. Adoption and Diffusion of Information Technology in Africa, Idea group Incorporated (IGI). pp 434-439
21. Microsoft. (1999). Technology and Our Economy Increasingly, the high-tech industry is playing a key role in building a productive and successful American economy. Microsoft corporation. Retrieved 07/07/11 at <http://www.microsoft.com/issues/essays/1999/09-20tech.msp>
22. Oghogho, I. and Ekekwe, N. (2011). Embedded systems design and development and Achieving Vision20:2020. FASMICRO, Retrieved 07/09/11 at <http://fasmicro.com/files/uploads/Fasmicro-Landmark-presentation.pdf>
23. Okezie, L. (2011). How Governor Oshiomhole is Repositioning Edo State With Technology. Techloy. Retrieved 27/09/11 at <http://techloy.com/2011/07/13/how-governor-oshiomhole-is-repositioning-edo-state-with-technology/>
24. Orlikowski, W. and Iacano, C.S. (2001). Research commentary: Desperately seeking "IT" in IT research- A call to theorizing the IT artifact. Information systems research 12: 121-134
25. Osei, T. A. (2007). ICT for Education in Nigeria InfoDev. Retrieved 07/07/11 at [www.infodev.org/en/Document.422.pdf](http://www.infodev.org/en/Document.422.pdf)
26. Peter, L. (2010). African Fixed and Wireless Broadband and Internet Markets. BuddeComm. Retrieved 20/09/11 at <https://www.budde.com.au/Research/African-Fixed-and-Wireless-Broadband-and-Internet-Markets.html?r=51>
27. Peter, L. (2011). Africa - Internet, Broadband and Digital Media Statistics. BuddeComm. 9<sup>th</sup> Edition. Retrieved 21/09/11 <https://www.budde.com.au/Research/Africa-Internet-Broadband-and-Digital-Media-Statistics-tables-only.html?r=51>
28. Reyes, G. E. (2001). Four Main Theories of Development: Modernization, Dependency, Word-System, and Globalization. University of Pittsburgh, Graduate School of Public and International Affairs –GSPIA. Retrieved 21/09/11 at <http://www.ucm.es/info/nomadas/4/gereyes1.htm>
29. Sein, M.K. and Ahmed, I. (2001). A framework to study the impact of information and communication technologies on developing countries: The case of cellular phones in Bangladesh. Proceedings of the BITWorld International conference, Cairo, Egypt, 4-6 June.
30. Sein, M.K; Harindranath, G. (2004). Conceptualising the ICT artefact: Towards understanding the role of ICT. The Information Society 20: 15-24
31. Sorensen, L. (2001). Modernization and the third world. Global Studies Program, National University, La Jolla, CA. Retrieved 21/09/11 at [http://the\\_imperfect\\_planet.tripod.com/sorensenportfolio/id10.html](http://the_imperfect_planet.tripod.com/sorensenportfolio/id10.html)
32. Sudhir, A. and Martin R. (1993). Human development in poor countries: On the role of Private Incomes and Public Services. The Journal of Economic Perspectives Vol. 7(1): 133-150.
33. TechTarget. (2003). ICT (information and communications technology - or technologies). TechTarget. Retrieved 21/09/11 at <http://searchcio-midmarket.techtarget.com/definition/ICT>
34. UNDP. (2011). Human development reports: human development Index (HDI). United Nations Development Programme. Retrieved 22/09/11 at <http://hdr.undp.org/en/statistics/hdi/>
35. WAZOBIANIGERIA. (2010). NTA Star TV StarTimes Decoders Packages Prices Channels. WAZOBIANIGERIA. Retrieved 27/09/11 at <http://wazobianigeria.com/tech/jobs-abuja/8559-nta-star-tv-startimes-decoders-packages-prices-channels.html>