

The Role and Prospect of Information and Communication Technology in National Development

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Abstract

The information and communication technology (ICT) revolution has a role and prospect in national development. Over the past decade, new applications of ICT have improved service delivery, transparency, and public access in national development. This paper highlights some of the ways that ICT tools can be used in the sustainable economic and social development of the society. Effective integration of ICT into the community for information sharing can enable forces which lead to a sustainable societal development. This work aims is to enlighten professionals, especially those in the developing countries such as Nigeria about the benefits of ICT and how to cope with its challenges.

Keywords: ICT, National Development, Nigeria

Introduction

Information and Communication Technology (ICT) is a vehicle with great potential to improve or accelerate the developmental process of any developing nation. ICT can be examined as a system within a specialized framework to achieve particular tasks or objectives. From the functional perspective, ICT can be set up to actualize the specific objective of collecting, storing, analyzing, and presenting information in a systematic manner. Structurally, ICT is composed of vast interrelated components that include a combination of data, technical, and human or personnel resources. It can also be viewed as being made up of input, processing, and output sub-systems, all working according to a well-defined set of operational procedures [1]. ICT is one of the driving forces of globalization by fuelling the rapid transformation of remote and isolated information units into global interconnected superhighways. In addition, it is a transforming mechanism that can influence the way we live by converting our societies into truly knowledge based ones thereby leading to society equity.

Information is a vital key to national development and is a sine qua non in all phases of development from the birth to death. Today, the world, most especially developing countries like South Africa, Ghana, and Nigeria, have witnessed an info-technological revolution that has given birth to effective data flow, computer inter-connectivity and the ability to go beyond the national boundaries. All sectors of the economy (trading, manufacturing, services, culture, entertainment, education, medical, transportation etc.) have a lot to benefit from the existing information and

communication technologies such as micro-controllers, personal computers, internet access, mobile phones, digital video conferencing, e-mail, multimedia among others. In the light of this, a central theme for national development is the effective convergence of developmental data through appropriate information technologies in the society.

Invariably, people and nations that are technologically marginalized are consequently consigned to live in poverty and deprivation. Disparity between the availability and use of emerging ICT have frequently been cited as a primary cause of exclusion from global markets and ensuring economic advantages that flow there from. The world's least developed countries are poor because of their technological isolation, most especially in the area of ICT. Indeed, affordable and highly embraced information and communication technologies can give developing countries, especially Nigeria; the privilege to leapfrog some of the long painful stages of development that developed countries had to go through. However, if the gap between information "haves and have-nots" within a country keeps widening, the possibility of attaining a national development is not certain and can best be described as "living the object and chasing the shadow".

In this paper, we look at some of the roles and prospects of ICT in national development in different sectors of the society and attempt to address some of the challenges that dissuade its use in developing economies. We start our work with a critical look at current state of ICT application in Nigeria in the next Section followed by a discussion of the prospect of ICT in National Development. The challenges of ICT in Nigeria are then discussed before our conclusion on the contributions of this work.

ICT Development and the Place of Nigeria

The genesis of information and communication technology can be traced to the development of electromechanical calculators during the Second World War. Around 1970s, the first "processors on a chip" and magnetic disc were produced and this liberated the existence of ICT. The adoption of the microprocessors in a range of industrial products such as domestic air conditioning systems, traffic lights, fuelling injection systems and automatic doors, formed another notable era of ICT. The development of guidelines for a communication network among computers formed another interesting phase of ICT adoption in the world. The present internet access can be traced to this particular inter-computer connectivity; which most universities across the globe use for dissemination of information. Likewise individuals that have access to computers started using it to disseminate information using technologies such as email and other web services. This transformed into what is known as "Internet Services" in most developing countries, including Nigeria [2].

It is important to note that development of ICT in most African countries came into existence through mostly international research and educational institutions as well as international organizations including the World Bank, United Nations Development Programme (UNDP), United States Agency for International Development (USAID) and the World Health Organisation (WHO). This is based on the understanding that economic transformation or national development can best be driven by the development and diffusion of emerging ICT tools. This led the WHO to fund ICT development through the provision of personal computers to Aimaks in Mongolia in 1993 with the aim to support the health services in the country [3]. In Nigeria, the evolution of the use of internet in Nigerian tertiary institutions can be traced to the joint project handled by the International Centre for Theoretical Physics (ICTP), Trieste, Italy and Obafemi Awolowo University in 1999. The

introduction of ICT during the 21st century was later adopted by other sectors including the transportation sector, Commerce, Manufacturing and Banking. ICT into Nigeria teaching hospitals came into being as a result of the INDEHELA project by the computing centre of the University of Kuopio, Finland and the Obafemi Awolowo University Teaching Hospital in the late 1980s [4].

ICT development in Nigeria focused mainly on print and electronic media. This was attributed to the lack of emphasis on ICT development in the existing policy, that is, the full awareness of the potentials of ICTs to liberate the country from the shackle of poverty was totally absent. Meanwhile, only the private sectors demonstrated ICT initiative [5]. However, the quality of the existing ICTs in the country in the last decades was unreliable, unsatisfactory most especially the telephone systems which was unreliably congested, expensive and customer unfriendly.

The wireless era of mobile phone formed another notable phase in development of ICT in the Nigeria. Though initially big and bulky phones were used, these later transformed into small phones with so many functions (text messages, radio broadcasts, pictures, movies, music, etc.). In this phase of ICT development, Nigerians have only played the role of “users” of the finished products and thus participation in the advancement of the technology has been lacking [6]. The development in the telecommunications industry all over the world is rapid as innovations replace each other in a matter of days. In 2001, the National Information Technology Development Agency (NITDA) was established to deserve a bureau for the implementation of national policy on information technology. This agency aimed at penetration of internet in all levels in Nigeria. The present and global use of the GSM came into existence in Nigeria in January 2001. Initially, the development involved international private organizations (MTN and ECONET) but with the aim to totally liberated Nigeria from the information hidden corner, the local telecommunication GlobalCom mobile system came into being. Hence, Nigeria through the availability of GSM phones partially joined the ICT world leaders to effectively enhance the exchange of information vital for the development of the country.

Prospect of ICT in National Development

ICT is a unique tool capable of encouraging sustainable economic and social development in the society. Effective integration of ICT into a programme that envisions community or citizen participation and information sharing, becomes an enabling forces for sustainable societal development. The field of “communication for development” possesses a long legacy of the critical and effective application of technologies, particularly information and communication technologies, for development. Whether the developing countries like it or not, the new ICT tools are rapidly finding their ways into different sectors of the society and thus creating a global village. Conventional wisdom holds that the application of information and communication technologies is a good drive both in rural and urban areas towards economic, social and cultural development. The potentials of ICT application can be viewed from the common terminologies that are used in almost every sector in the society. For instance, telemedicine, e-learning, tele-commuting, e-banking, are ICT applications that make it ultimately possible for developing countries to improve the quality of living, especially in the rural and remote areas. Thus, ICT application is a silent and a bitter truth for safety, security and governance.

Internet is the first communication tool that allows every user to be a sender, receiver, narrow caster and broadcaster in a global sphere [7]. It has however encapsulated the Nigerian environment as a form of flexible, decentralized, information sharing tool and developmental potential mechanism. It offers the possibility of initiating economic development for agriculture

producers, research institutions, medical practitioners, financial organizations, media networks and small business enterprises. ICT applications go a long way to improve the well-being of man; they reduce transportation costs, improve availability of essential goods and contribute to improving living conditions and reduce pollution. They also contribute to saving of life in case of man-made or natural disaster and thus, reduce the harmful consequences of such disasters. A major breakthrough in ICT application in Nigeria is that of the wireless telephone systems which comes in form of fixed wireless telephone lines and the Global system of mobile communications (GSM) mobile phones. This has completely changed the tempo of the Nigerian businesses by creating countless opportunities for small and medium businesses in franchises, dealership, retailer-ships and value added services. Spontaneously, the development of wireless communication is directly or indirectly responsible for employment explosion witnessed in the country at present. Over 2.5 million Nigerians now have a convenient way of communication, which tactically have a positive effect on the developmental process of the country.

The term information system refers to information technology that is used by people to accomplish a specified organizational or individual objective. The technology may be used in the gathering, processing, storing, and/or dissemination of information and the users are trained in the use of that technology, as well as in the procedures to be followed in doing so. The specific technologies that collectively comprise information technology are computer technology and data communication technology. Computers provide most of the storage and processing capabilities, while data communications, specifically networks, provide the means for dissemination and remote access of information [8]. Clearly, developing countries which are unable to keep pace with the formidable development of ICT have not made much progress [9]. Their living conditions have in many cases deteriorated; at least partly due to difficulties in competing in the increasing global economy without access to ICT. It is pertinent to emphasize that investment in other infrastructures such as roads, railways, water supply and electrification is very important.

There is a potentially large market for advanced ICT tools needed by business, research institutions and public-services in developing countries [5]. Surprisingly, small enterprises and public institution in large cities in many developing countries are only vaguely aware of the possibilities offered by application of ICT and often considered themselves fortunate for having access to at least one ICT tool, mobile phone. Meanwhile, the efficiency of the inadequate public services (education, health care, security, transport and records processing and general statistics) could be greatly enhanced by improved access to ICT services. In particular, efficient mobility, banking, health and education which are crucial for development, depend heavily on the adoption of ICT tools.

According to Idowu [4], the use of ICT in Nigeria Teaching Hospitals will help all patients including the ones in life threatening situations based on the outcome of his study. Three ICT indicators namely: Personal Computers, Mobile phones, and internet facilities should be made available in Nigeria Teaching Hospitals. According to the study majority of the medical experts make use of public cybercafé and this was attributed to lack of connectivity in most teaching hospitals. Nevertheless, mobile phones have been playing a significant role in health delivery service. This is justifiable by its ability to access the communication gap between medical practitioners and patients as well as medical colleagues. Similarly, ICT can play a vital role in “e-commerce and freight distribution”. It has been suggested that ICT will reduce the number of vehicles on the road for non-work purposes as the need to physically travel is reduced. It is however

posed that the number of transaction using e-commerce will increase and generated extra good traffic. Application of ICT in freight transport involves the optimization of vehicles and rolling stock and consignments in Europe [10]. In terms of point to point delivery, an estimate of 5% improvement in time saving to the user of the system was observed. In UK, one of her biggest retail chain supermarket, Sainsbury, now use an ICT system (Isotrak) to track goods deliveries, which allows routing to be worked out according to individual store requirements and specific collections from suppliers. The system allows Sainsbury to prioritize movement and prepare for incoming vehicles, saving an estimated 90 minutes per vehicle per day [11].

Challenges of ICT in Nigeria and Possible Remedies

The myriad of problems and bottlenecks that have arisen in the provision of ICT especially in developing countries, especially Nigeria, include low tele-density, insufficient telecommunication infrastructures leading to congestion, unreliable network design, poor interconnectivity, insufficient human resources development, poor maintenance culture, vandalisation of facilities, and exorbitant / unjustifiable billings and poor recovery strategy. However, an important step for government to examine the challenges pose by ICT is to develop a policy that will facilitate the easy integration of ICT across the country. This is necessary because of the value of ICT in generating a significant turn over on investment though ICT infrastructures come with quite a substantial price tag. The application of ICT for development can be implemented in eleven sectors of the economy. These are i) human resource development, ii) electronic government, iii) infrastructure development, iv) education, v) health, vi) awareness, popularization and development, vii) agriculture, viii) private sector development, ix) governance and legislation framework, x) national security and law enforcement and xi) research and development. It is therefore obvious that a nation that strives to deviate from the traditional sources of exploiting and exploring natural resources for its development, to investing in ICT and the knowledge economy is in the contemporary path of sustainable rapid growth. We highlight some possible remedies under each of the eleven sectors of the economy below:

Human Resource Development: 1) Provide linkages, coordination and also providing accreditation between government and ICT firms. 2) Promote activities of ICT firms. 3) Research and Development activities in ICT and quality control. 4) Create a pool of highly trained professionals that drive the next generation of ICT development through research and development efforts in the private and public sectors. 5) Empowering the labour force with ICT skills 6) Encouraging massive local and global ICT skills acquisition through training and re-training in the public and private sectors.

Electronic Government: 1) Provide stakeholders with enhanced access to government information. 2) Facilitate enhanced citizen interaction with public officials and organizations. 3) Enhance public sector accountability and transparency while minimizing corruption by opening up government operations to public scrutiny feedback. 4) Provide communities with developmental opportunities.

Infrastructure Development: 1) Provide leadership direction and vision to guide ICT infrastructure development. 2) Provide equitable access to all users and stakeholders. 3) Guarantee the privacy, integrity, accuracy, confidentiality, security, availability and quality of personal information. 4) Create an ubiquitous and affordable technology with an “open standard” approach,

scalable and capable of adapting to changes. 5) Stimulate the creation and sharing of national and international knowledge.

Education: 1) Re-engineer teaching and learning using ICT. 2) Development of ICT education. 3) Provision of adequate instructional materials, ICT driven teaching and learning facilities. 4) Provision of adequate staff development programmes for sustainable career structure and job security. 5) Mass capacity building for both teaching and non-teaching.

Health: 1) Deploy and increase access to ICT within the National Health system to improve health delivery and provision. 2) Use ICT to improve network and collaboration in the health sector of the nation. 3) Promote the acquisition of ICT skills within the Nigerian health system. 4) Deploy ICT to address major issues of national health threats.

Awareness, Popularization and Development: 1) Encourage ICT skills acquisition for all officers at all tiers of government. 2) Educate the Nigerian work force to use computers within their work environments such as farmers, nurses, exporters and office-workers. 3) Facilitate research and development of appropriate and affordable ICT. 4) Ensure the integration of ICT into poverty reduction strategies at all tiers of Government.

Agriculture: 1) Use ICT tools such as Global positioning system (GPS), Geographic Information system (GIS) software to gather, store, view and analyses vast amount of data which can be converted to other usable information media for better farm management, weather forecasting, water level management and crop production. 2) Use ICT tools that integrate geographical, soil, weather, market and human to assist the farmer not only to better his lot, but also in getting the very best out of the soil and of course as bottom line from his/her efforts.

Private sector development: 1) Develop an economy characterized by a large commercial services sector with a reasonably large and vibrant ICT services sector and industry. 2) Develop an economy characterized by a technology-based knowledge-driven industrial sector. 3) Develop an economy characterized by a wide-spread deployment and exploitation of ICT within the Society to support the delivery of health, education, government and social services.

Governance and Legislation Framework: 1) Facilitate electronic communication, governance and commerce. 2) Promote and foster security in computer networks generally. 3) Maintain the security and integrity of data, records and information in digital form. 4) Enact and enforce laws to combat computer crimes. 5) Promote acceptable standard, authenticity and integrity in ICT use nationwide.

National security and Law Enforcement: 1) Enhance national security and law enforcement. 2) Ensure that ICT resources are readily available to promote efficient national development. 3) Create ICT awareness and ensure universal access in order to promote ICT diffusion to all sectors of our national life. 4) Eliminate waste and ensure that governance and businesses are done in the global standard of using ICT for easier, faster and cheaper delivery of services.

Research and Development: 1) Ease the difficulty in accessing relevant and up-to-date information on research in similar areas/sectors. 2) Reduce or eliminate duplication of R&D activities by different bodies in Nigeria. 3) Ensure coordination within the different levels of government. 4) Need for institutionalized relationship with local and international R& D bodies. 5) Need for ICT capacity building.

Conclusion

The world of ICT applications in all sectors offers great opportunities for gross national development; most especially in developing countries. The global economy era facilitates easy

collection, processing documentation, analysis and presentation of information in all sectors; Health, Transport, Commerce, Industrial and education. This invariably presents a pleasing working environment for the individual and improved governing process in the country. ICT, most importantly in Nigeria through the adoption of mobile phones and internet access makes distance to be transparent. Thus, ICT have direct positive relationship with economic growth with social and all round national development.

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