AN ASSESSMENT OF THE IMPACT OF GLOBALIZATION ON INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN NIGERIA

By

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CERTIFICATION

*This is to certify that this project titled: "**An Assessment of the Impact of Globalization on Information and Communication Technology (ICT) in Nigeria"** by MURTALA, Dalhatu Daboh meets the regulations governing the award of the Degree of Master of Business Administration (MBA) of Ahmadu Bello University, Zaria and it is therefore approved for its contributions to knowledge, and literary presentation.*

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DECLARATION

I hereby declare that this project is original to me, and to the best of my knowledge. No similar work has been presented anywhere for the award of Master degree. All various sources of data are acknowledged by means of references.

Murtala, Dalhatu Daboh

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DEDICATION

This work is dedicated to my beloved father Alhaji Murtala Daboh Zangon-Aya and Hajiya Hauwa Daboh (mother).

ACKNOWLEDGEMENT

In the name of Allah, Beneficient, the Most Merciful. All Praises be to Allah, Who taught by the pen, taught man that he knew not. Oh Allah! May Your Peace and Blessing be upon Prophet Muhammad (PBUH), amin.

I lack words to express my happiness and thanks to my parents. I will say 'Alhamdu-Lillah' for being my parent and Allah forgive them all their sins.

Also, my gratitude to my supervisor Mrs. Mary S. Akanet, for her encouragement, support, immeasurable assistance and audience. I equally thank her for her objective criticisms, corrections and suggestions despite her tight schedules.

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ABSTRACT

This research study titled: An Assessment of the Impact of Gloabilization on Information and Communication Technology (ICT) in Nigeria, examined the contributions of the global application of the information and communication technology in the development and growth of economic, political, cultural settings etc. in Nigeria.

Globalization is broadly characterized by the emergence of a global village activities for the whole world in which all peoples in all nations of the world are drawn together into increasingly closer and mutually beneficial political, industrial, financial, scientific, technological and even cultural relationships. This research closely assessed how Nigeria evolved within this global setting with its various national programmes, while acquiring and using the information and communication technology facilities in relating with the whole world to achieve its objectives as a nation.

To collect the desired data for this research work, four methods were used, these include, documentary, observations, questionnaires and personal interviews. In the analysis of the data collected, the study made use of descriptive and inferential statistics.

The findings of the study were drawn from the data presented and analysed and their implications were generally discussed relative to all stakeholders. It was found in the research that; National Information Technology Policy has been approved in 2001 but not much have been achieved. The liberalization of the Telecommunications industry resulted to an increased of 21 private operators and four (4) Global System Mobile (GSM) were issued licensed by the Nigerian Communication Commission. As a result, the total number of Teledensity rose to 8.5 by the end of 2004, from 0.42 in 1999. Internet penetration was very low with 0.1% in 1999 to 1.4% at the end of 2004. There were a lot of developments efforts in the IT sector. The ICT effort by the Federal Ministry of Education include; National Virtual Library Project, National Open Universities etc. Other developments in IT sector is the local assembly of branded computers and accessories by Nigerian companies such as Zinox Technologies Limited, Omatek and Unitec. Based on these findings and their implications, suggestions and recommendations were made as to how the country can strategically provide and use the information and communication technology facilities within the global

operative setting and to connect its activities economically to the rest of the whole world as a global village.

The recommendations of the study were that; the power supply has to be improved, revisit National IT policy for effectiveness, adequate funding of ICT sector, etc. It is expected that; if all the recommendations are operationalized, Nigeria and businesses operating within will be fully connected to relate and compete effectively with other developed nations of the world within the global perspective.

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CHAPTER ONE

1.1 INTRODUCTION

Globalization is one of the major phenomena of our times and its scope is very extensive and versatile affecting factors such as economics, political, cultural, lifestyle and most especially sciences and technological advancements

The process of globalization is said to include the information technology evolution characterized by advancement in electronics, computers and telecommunications made possible by the scientific and technological breakthroughs in miniaturization of integrated circuits, transistors and semi – conductors (Mike 1999:343).

Emerging technologies are playing a vital role in allowing globalization of economic and social activities to thrive. It is correct to say that the era of globalization has brought about the rapid spread and application of computers, the internet, satellite and the mobile phones innovations in the world, particularly in Nigeria where communication has been difficult and communication facilities were inadequate in our major cities, semi-urban and rural areas. Presently, with the introduction of mobile phones, many rural areas now have access to communication facilities and they communicate easily with the rest of the world.

It is important to note that globalization does not eliminate the scope and eliminate the scope and activities or nation or a state, but fundamentally redefines its role and affects its operations. The real issue today is not the debate about whether globalization is real or not, or whether it is desirable or not, but to analyse how the emerging technologies can be better channeled to promote more growth, more trade, greater modernization and better living standards of Nigerians with the aims of helping the country to re-emerge from its present social and economic difficulties. The challenges facing our nation are complex and they required good visioning, sound strategic plans that will correctly identify viable development paths and to resolve to translate such strategic plans into meaningful and fruitful and efficacious action (Abhulimen, 2000).

Globalization and growth of information technology and other emerging technologies do not imply the local production of technology hardware. Many

developing countries like India and Malaysia have embraced the emerging technologies, particularly information and communication technology (ICT), and are experiencing unprecedented economic growth as a result of this. Many developing countries however have yet to integrate successfully into global economy.

Some 2 billion people around the world particularly in Sub – Saharan Africa, the Middle East, and the former Soviet Union live in countries that are slow in getting onto the train and are thus being left behind. These countries have been unable to increase their integration into the global economy: their ratio of trade to GDP is either maintaining a flat trend or in some cases actually declining. On average, these economies have contracted; poverty has increased and education levels have arisen less rapidly than in the more globalized countries. (Abhulimen, 2002).

Considering the evolution in information and communication technology (ICT) in Malaysia, India, South Africa and other developing countries with remarkable achievement and comparing their potentials with that of Nigeria, one can say that Nigeria has a better opportunity of evolutionalizing its information and communication technology (ICT) sector than those countries mentioned above. This is obvious, with its teeming population of unemployed graduates, a vibrant labour force, rich crop of high netwoth of individuals imbued with different entrepreneurial spirit, all that is needed is very much available, but the stepping stone of information and communication technology (ICT) evolution is the schools.

1.2 STATEMENT OF THE PROBLEM

Emerging technologies as a result of globalization have effects on economic and social activities of nations, particularly in the area of information and communication technology (ICT). Therefore, the purpose of this research is to find out how some developing countries embraced information and communication technology? Does location of country affect its development in information and communication technology? What are the basic facilities needed to have a viable information and communication technology sector? What are the enabling policies and infrastructures for effective and efficient information and communication technology in Nigeria? These and many other questions are

raised from the problem areas that require solutions to enhance the effective assessment of the impact of globalization on information and communication technology in Nigeria. It is hoped that this study will provide the required solutions for effective assessment.

1.3 RESEARCH OBJECTIVE

For every action there are objectives. Therefore, the objective of the study is to examine the effect of globalization on information and communication technology (ICT) in Nigeria. And to assess and help Nigeria to be prepared to reap the ample economic and social benefits offered by the emerging information and communication technology that links the whole world together as a global village.

To achieve these objectives, the following were examined:

1. The awareness of the public on Information and Communication Technology in the country.
2. The availability of the required facilities for the full application of Information and Communication Technology in Nigeria.
3. The availability and adequacy of government of policies and strategies for the effective application and utilization of Information and Communication Technology.
4. The pricing strategies used for the services provided through the Information and Communication Technology in Nigeria.
5. To suggest how to enhance the effective application of the Information & Communication Technology to achieve adequate communication linkages in all aspects of human endeavour towards improving our standard of living in Nigeria.

1.4 THE SCOPE OF THE STUDY

This study covers only information and communication technology (ICT) as an emerging technology influenced by globalization. The spanned over a period of six years from 1999 – 2004. This is because, it was in the year 2001, that information technology (IT) policy was formulated tagged “IT 2001”. This period provides an ideal period for assessing the impact of the government

policies in encouraging the acceptance and utilization of Information and Communication Technology in Nigeria

1.5 THE RESEARCH METHODOLOGY OF THE STUDY

For the conduct of this research, secondary sources of data was employed. The population of the study is the Telecommunications which include; telephone (mobile and fixed), internet services and Vsat services. The method used in analyzing data was descriptive statistics; as percentage and barchates.

1.6 LIMITATIONS OF THE STUDY

This research work has its limitations, which posed to making; thorough and exhaustive conclusions. These are:

1. **Time:** The time available for the work was not enough for the researcher to travel to many places to gather data.
2. **Finance:** It is a known fact that; in any undertaking, availability of funds is very important adequate funds constrained the researcher from gathering enough data for the research.
3. There is also lack of up-dated statistics, this had constrained the researcher to make comprehensive research work.

1.7 THE SIGNIFICANCE OF THE STUDY

This study has a lot of significance to individuals (Public), government, and investors (business).

(a) INDIVIDUALS (PUBLIC)

i) The study will help in informing the general public the importance and contents of information and communication technology.

ii) Provide the public with employment etc.

(b) GOVERNMENT

i) It helps to bring out Information and Communication Technology problems for necessary actions by governments

ii) Provide means through which government can improve its foreign exchange generation.

(c) INVESTORS (BUSINESS)

i) Help businesses to spot problems and make necessary corrections for more profits.

ii) To explore areas of investments.

1.8 DEFINITION OF RELEVANT TERMS

- WEB SERVICES: web services are enterprise applications that exchange data, share tasks and automate process over the internet.
- INTERNET SERVICES: Pieces of software written in different languages, or running on different operating systems, to talk to one another cheaply and easily.
- E – MAIL: Electronic mail, means by which text, pictoral etc. messages are sent or received.
- IAP: Internet Access Providers
- ISP: Internet Service Providers
- FDP: Foreign Direct Investment
- 'BRIDGES': Is a research and an advocacy non profit organization that promote ICT: (Information and Communication Technology) in developing countries through research, testing and promoting best practices for sustainable technology use.
- SOFTWARES: Are components in computer which can not be touched e.g. program etc.
- HARDWARES: These are components in computer which can be touched e.g. Key board etc.
- WIRELESS PHONE: Phone that is not directly connected to wire (mobile).
- IT: Information Technology is the acquisition, processing, storage and dissemination of vocal, pictoral, textual and numeric information by a micro – electronics based combination of computing and telecommunications.
- TELE – DENSITY: Number of telephone lines to number of population.

FOOT NOTES

1. Mike, K. (1999): "Concepts and Dimension of Globalization," In: Globalization and Nigeria's Economic Development**,** Nigerian Economic Society.
2. Abhulimen, R. A. (2000) "Positioning Nigeria for Effective Response to the challenges of Emerging Technologies and Globalization" Vanguard. Vol. 1204, Dec. 2002.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

This chapter contains the literature review of the research topic and its theoretical framework. Under literature review; three countries' experiences of the impact of globalization on their information and communication technology (ICT). These countries are: Malaysia, South Africa and India. Also, information and communication technology evolution in three countries are discussed in addition to that of Nigeria. Under the theoretical frame work; the discussions centred on the concepts of globalization, its merits and demerits while on information and communication technology (ICT) discussions focused on its: unique characteristics and specific developmental goals.

2.2 LITERATURE REVIEW

Under literature review, three globalized ICT countries experiences are presented as well as its evolution in those countries.

2.2.1 THE EXPERIENCES OF THE IMPACT OF GLOBALIZATION ON INFORMATION AND COMMUNICATION TECHNOLOGY IN MALAYSIA

In an environment characterized by rapid advancement in ICT, globalization, liberalization and greater reliance on knowledge for value creation, Malaysia's planned to leapfrog into the post – industrial age by leveranging ICT as a strategy for national development and global positioning. In 1996, Malaysia launched a programme called "Vision 2020", which laid out a plan to build a fully developed, knowledge – rich Malaysian society by the year 2020 through the development of ICT sector and the use of ICT to increase global competitiveness. The intent behind Malaysia's multi-media super corridor (MSC) has been to create a high – tech environment and infrastructure that can attract national and international investors and create spill over effects in the rest of the Malaysian economy. (UNDP; 2000: Appdix 3).

ENTERPRISE: As a result of fair trade and investment policies, foreign direct investment (FDI) in Malaysia reached US $6 billion in 1997, but then dropped to US $3.8billion in 1998 due to the Asian economic crisis. In 1999, the flow of foreign direct investment again increased by 31% and GNP rose to 5.4% much

faster than initially forecasted. This increase was enhanced by the manufacturing sector, particularly in ICT related electronics (for export), and this sector is now the key driver force for growth in their economy. In 1999, the contribution of the ICT sector to GNP was approximately 36.5 percent.

A number of incentives and projects are under way to foster entrepreneurship and business efficiency in Malaysia. The government provides both financial and non – financial incentives to Malaysian businesses. Financial incentives included zero income tax for a period of 10 years, R&D grants and a 100% investment tax allowance on new investment in the MSC. Non – financial incentives include unrestricted employment of foreign knowledge workers, no restrictions on global capital and limited restrictions on ownership (Id).

HUMAN CAPACITY: The growing economy has created competent workers and professionals. Skilled labour is still in short supply, especially in the ICT sector and manufacturing industries. To address this issue, the Malaysian government is investing in a high – quality, comprehensive education system designed to meet the demands of the evolving work place. At the Multimedia University, for example, new skills such as information and knowledge management, as well as programming applications, are being incorporated into the education and training curriculum. Several additional efforts have been made to increase ICT literacy. The Computer In Education (CIE) programe has provided computer laboratories to 90 secondary schools and 20 primary schools. Between 1996 and 1998, about 1,230 teachers were trained to conduct the CIE courses, computer Aided Design and Computer Aided Manufacturing (CAD and CAM) courses were also taught in secondary and technical schools (Id).

CONTENT AND APPLICATIONS: Malaysia has made concerted efforts to provide relevant content to technology users through a number of specific initiatives: for example, Agritani is developing a gateway that serves agricultural communities, including farmers, agriculture agencies, consultants and agriculture service providers and cyber care enablement for orphanage communities in Malaysia to share news, barter goods, train volunteers and increase administrative efficiency (Id).

E. commerce initiatives are helping to provide Malaysian businesses with more efficient access to inputs and product marketing, both locally and globally. For example, MyBiz, an e-commerce platform designed for small and medium

enterprises helps facilitate collaborative marketing by linking 300 companies including 26,000 employees in a business community network. The same platform can be used for procurement process more efficiently and effectively (Id).

2.2.2 THE EXPERIENCES OF THE IMPACT OF GLOBALIZATION ON INFORMATION AND COMMUNICATION TECHNOLOGY IN S/AFRICA

South Africa's government has placed a strong emphasis on ICT sector development through the implementation of a National ICT strategy. This plan proactively addresses ICT penetration, particularly for disadvantaged segments of the society. The ICT sector is growing vibrantly, with ICT spending at US $9.6 billion, 6.9% of GNP. This reflects a comparative advantage in high-level professional skills over blue – collar manufacturing skills. The government has implemented a number of frame works for policies, infrastructure, partnerships and task forces that helped South African communities play a role in the global economy. The ICT sector is not directly responsible for a significant number of new jobs, but rather is positioned as an enabler of increasing competitiveness in other sectors and as a source of future export earnings, and as a key enabler to achieving developmental goals (Id).

ENTERPRISE: Many South African businesses now have access to both international and local financial institutions. Black empowerment start – up organizations to have access to financial means far beyond that available under the apartheid regime, and there was vibrant and growing local venture capital market accompanied by inflow of foreign direct investment from ICT multi nationals. A number of South African ICT – related businesses have obtained access to global markets through mergers and acquisitions with ICT companies in similar lines of business (UNDP, 2000: Appdx 3).

Free trade policies and tax incentives have allowed organizations such as Mecer, Acer and Compaq to start assembling ICT hardware and network equipment locally, creating a pool of ICT skilled technicians and programmers. There are also ICT tariff programs applied to the shipping of units or parts that encourage value – added assembly to take place in South Africa (Id).

The financial sector has been at the fore front of adopting ICT, contributing 50% of ICT expenditure. Major banks operate their own regional

networks, offering some websites with online banking services. Public enterprises are transformed and modernized. This movement has facilitated the development of an active entrepreneurial scene.

HUMAN CAPACITY: South Africa faced significant "brain drain" in technical and entrepreneurial ICT skills, with an estimated 200 – 300 ICT skilled resources leaving the country each month. This was caused by rapid growth in demand for ICT skills worldwide and little opportunity (jobs, renumeration and innovation) in South Africa made unemployment rates very high (30 – 35%), but it was also difficult to find sufficient supply of skilled ICT workers to meet the rising demand (Id).

Historically, the education infrastructure in South Africa has been segregated and unequal, and ICT provision in schools reflect this. Approximately 50% of schools have no infrastructure to support ICT use among students. In addition, educational system has been slow in meeting market needs. ICT courses are only available in the universities and in the technikons (technical colleges). Effort is being made by the Department of Education to revise the curricula to include ICT courses at the primary and secondary levels and to create ICT specific learning centres (Id).

To address the knowledge workers shortage, the South African government has created the Human Resources Development Fund. The fund is being used to provide grants and subsidies to promote the provision of adequately skilled human resources for ICT. The establishment of the Houwteq Learning Centre, which focuses on skill development for ICT, support this. The Department of Education has responded by creating school Net, strategic partnership that coordinates linking of schools to the internet (Id).

CONTENT AND APPLICATIONS: The lack of relevant content and applications was still a significant problem in South Africa. The incorporation of ICT into education has been hampered by the lack of relevant information and infrastructure. Several locally relevant programs were discontinued following a restructuring of the broadcasting industry. To address this, South Africa has created a local content taskforce that focused on the provision of content for broadcasting through TV and radio in local languages. The taskforce also ensured that there is wider participation of communities in the creation and maintenance of information and content services (Id).

2.2.3 THE EXPERIENCES OF THE IMPACT OF GLOBALIZATION ON INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN INDIA

A spate of reforms – post 1991 economic crisis have given impetus to the Indian economy, particularly to the ICT sector. As part of the reform agenda, the Indian government has taken major steps to promote ICT including the creation in 1988 of a world market policy, with a focus on software development for export; telecommunications policy reforms; privatization of the national long – distance and mobile phone markets; and development of a more comprehensive approach to ICT. Although India's success is commanding increasing attention and investment, it has yet to result in the contribution of social and economic benefits across a broader base of the population. Challenges include the perception of an unfavourable regulatory climate, an overloaded judicial system, poor infrastructure and costly access, and limited use of ICT remain. The emerging shift in government strategy, toward knowledge intensive services, has created a climate more conducive to addressing enterprise, domestic infrastructure, education and the use of ICT to meet development needs (UNDP, 2000: Appdx 3).

ENTERPRISE: India's well – established frame work for protecting intellectual property rights has been an important inducement to business investment: well known international trade marks have been protected by Indian laws, even when they were not registered in India. In 1999, major legislation was passed to protect intellectual property rights in harmony with international practices and in compliance with India's obligation under TRIPS. Much of the initial domestic demand stimulus for ICT and ICT services industries in India has come from government: 28% of total IT spending to date can be attributed to government and public sector expenditure. Major areas of government expenditure include: financial services, taxation, customs, telecommunications, education, defense and public infrastructure. As a result of growth in ICT use in India, the ICT industry itself has also increased its domestic economic activity, for example a number of ICT companies have developed accounting and word processing packages in Indian languages. The potential impact of this growth on the domestic economy was much broader than developing software for export only (Id).

HUMAN CAPACITY: Inspite of low literacy rates among the general population, India has several key advantages in human capital: large English – speaking population and world – class education, research and management institutions – a direct result of investment in self reliance in sciences and technologies. Establishment of Indian Institutes of Technology in various cities around India to create a large pool of technical skills, the government has computer policy to encourage R&D in personal computers. The IT training sector continued to grow at a rapid rate: total training revenues in 1988 were estimated at US $225 million, 30% up on the previous year. However, one of the biggest challenges to the Indian software industry remains the difficulty in attracting and retaining talented professionals (Id).

CONTENT AND APPLICATION: India has large population with great linguistic diversity. Creating and maintaining locally relevant content for a country with 418 languages is a challenge. Nevertheless, local language content made ICT more relevant and accessible to broader cross – section of the population. For example, India's centre for Development of Advanced computing has launched a scheme called ILEAP-ISP to create a free multi – lingual word processor to be made available to all internet subscribers. On other fronts, some states such as Tamil Nadu have launched their own initiatives to support the standardization of local language software through interface programs adapted to word processors, dictionaries, and commercial keyboard for use in schools, colleges, government offices and homes. An emphasis has also been placed on the development of relevant e – government applications in India. Some states such as Madhya Pradesh and Andhra Pradesh have introduced applications which allow citizens to have faster and more transparent access to government services, for example, the provision of information on laws and regulations, and the procurement of licenses and official documents on line (UNDP; 2000: Appdx 3).

2.3 INFORMATION AND COMMUNICATION TECHNOLOGY EVOLUTION

Certainly, world is dynamic that is to say it keep changing. It changes really cut across every aspect of human endeavour. The speed with which the evolution in information and communication technology (ICT) has taken place is, as we said earlier, truly phenomenal. The changes the ICT evolution has

wrought are not limited to one single sector of the society. Cars, offices, homes, etc., now carry microprocessors and computers serve as post offices, word processors, bank windows, shopping centres, CD-players, photo shops, news media, and of course, vast libraries (virtual libraries). The changes have been faster, deeper and more sweeping than any one could have imagined only two or three decades ago.

The first evolution in ICT started during World war II, with the first large (50 feet long, eight feet tall, and five tonnes, automatic, general electro mechanical calculator, called “Harvard Mark 1”. The second ICT evolution has its root in the 1970’s, when the first “processors have chip” and magnetic discs were constructed. The third evolution is that microprocessors have become embedded in an ever – increasing range of products: the steering systems of airplanes, the control panels of hydroelectric power stations, domestic air conditioning systems, traffic lights in streets, video players, credit cards, remote controls, cameras, hotel rooms, door locks, smart buildings, digital scale in bathrooms, electric tooth brush, car fuel injection systems etc. The fourth evolution can be traced to the late 1960s when the US Department of Defence drew up guidelines for a communication net work among computers. Universities in and out US were later hooked up to it and some people started to use it to send message. This has now transformed into the internet. The fifth evolution is the wireless phone – mobile phone. Although initially big and bulky, the phones have now been transformed into small devices with so many functions (transmission of messages, radio broadcasts, pictures, movies, music etc.) (Abhulimen; 2002).

2.3.1 INFORMATION AND COMMUNICATION TECHNOLOGY EVOLUTION IN NIGERIA

ICT evolution has transformed available technologies, the means and methods of studying, the modalities of school operations, the manner of investment and expenditure of resources and very way we think about what education could be and should do. With the internet it is possible to access learning materials anywhere. Nigerian universities are developing more interest in ICT and some have started to use telecommunications and computers for teaching as in the University of Benin. The opportunities available on the internet

are numerous and those institutions making use of them are better off for it. Course materials can now be posted on the internet for easy access to students and assignments can be communicated through e – mail messages. Teachers can be accessed around the clock by the new modes of transmission. But what strategies have the Nigerian educational system adopted to improve ICT facilities? Are current policies, strategies and funding good enough for the present and for the near future? Are Nigerian schools meeting up with the challenges open to them? These are some of the questions which our educational managers must strive to grapple with. The ICT evolution offers new intrinsic opportunities; it dramatically changes what can be learned and by whom, at what pace and with what ease; as well as what can be produced and provided by whom, with what speed and ease. These potential changes, however, pose very many new challenges for educational planners. The challenges fall into those that pertain to either equity or quality (Abhulimen:2002).

2.3.2 INFORMATION AND COMMUNICATION TECHNOLOGY EVOLUTION IN MALAYSIA

Malaysian government planned for the development of information and communication technology sector. As a result, the government launched a program called “vision 2020” which laid out a plan, formulate comprehensive policies, and establish world – class infrastructure in order to develop and encourage the use of ICT and building a full-knowledged ICT society.

POLICY: Comprehensive policies are developed to encourage ICT use in various sectors of the economy, as well as to accelerate the growth of the ICT sector. Trade and investment policies, such as financial and non financial incentives, a fair trade system, and import and export duties, promote local and foreign investment. The Malaysian government has also defined attractive process, unrestricted employment of foreign knowledge workers, and freedom to obtain capital globally. With the inception of the New Economic plan in the 1970s, the government made concerted effort to deregulate telecommunications industry. With the privatization of the government telecommunication department in 1987, and the market has now been fully liberalized. The Malaysian Government’s Master plan for the telecommunications industry provides

guidelines for competition, interconnection charges, tariff rates and network development. At the end of 1995, all operators signed interconnection agreement with Telekom Malaysia to provide seamless communication regardless of carrier, though most carriers have not signed agreements among themselves (UNDP; 2000:APPdx 3).

The computer and software markets have also been fully deregulated, though restrictions exist on participation in government bids, and there are equity requirements for setting up manufacturing facilities. These barriers did not pose an insurmountable barrier to competition, but encouraged the establishment of joint ventures and local distributorships with Malaysian companies (Id).

INFRASTRUCTURE: In terms of infrastructure, the Malaysian government established Multimedia Super Corridor (MSC) which create an environment for ideal ICT related production. The network consist of a link of (10 Gb/s net work) which connect (MSC) to Japan, ASEAN, US and Europe. The network is capable of supporting a number of activities such as education, public administration and business applications.

The telephone penetration rate – as a measurement of the ICT readiness of the country rose from 16.6 percent to 23.2% between 1995 and 1999, while fixed lines in the rural areas rose from 5.2% in 1994 to 11% in 1999. Malaysia aimed to continue the establishment of basic telecommunications infrastructure, and planned for 250 internet access points, 250 mobile phones and 500 fixed lines for every 1,000 people within the next 5years. This is an addition to the development of other primary physical infrastructure, such as; power supply, transportation, airports, office buildings and extended business areas (UNDP, 2000: Appdx 3) (Id).

STRATEGIC COMPACT: Malaysia's leadership recognized the need for a cooperative partnership to achieve its development objectives and its ambitious vision. To leverage and coordinate public, private and community sectors, the National Information Technology Agenda (NITA) was developed as a major strategy for national development. The National IT Agenda (NITA), launched in December 1996 by the National IT Council (NITC), provides the foundation and frame work for the utilization of ICT to transform Malaysia across all sectors, into an information society, then a knowledge society, and finally a "value based" knowledge society (Id).

2.3.3 INFORMATION AND COMMUNICATION TECHNOLOGY EVOLUTION IN SOUTH AFRICA

South African government has made strong plan to establish enabling policies, infrastructure and strategic compact that will make the communities play a vital role in the global economy. The government in an effort to transform ICT sector has launched a programme tagged “Info.com 2025”, designed to establish a vibrant networked information community.

POLICY: During the 1990s, the South African government separated the post, telecommunications and broadcasting functions to promote efficiency in the provision of services to rural areas, townships, squatter camps, and the remote parts of the country. At the recent telecommunications colloquium, an agreement was reached to end the monopoly of the current wire line operator in May 2002, and to introduce competition through a controlled and staged approach (UNDP, 2000; Appdx 3).

The government created the State Information Technology Agency to encourage the provision of information technology, information systems and related services in a managed secure environment. In addition, the government has launched “info.com 2025; which serves as collective programme for ICT projects designed to establish a networked information community and make South Africa globally competitive (Id).

INFRASTRUCTURE: Infrastructure was poorly linked and spread unevenly across the country. The development in the commercial zones contrasts with very low penetration of services in rural and remote areas (22 lines per 1,000 people). The South African Information Technology Industry Strategy (SATIS) and info 2025 vision include a focus on building infrastructure especially within secondary towns designated as export zones for both ICT and non-ICT products and services. Through the establishment of universal service fund, both wire line and wireless services provide access to previously disadvantaged areas with low income and geographic complexity. South Africa has also been involved in the Southern African and Far East (SAFE) initiative to promote the connectivity of African countries through regional backbones that do not leave the continent. This has reduced the cost of calls that are currently rooted through Europe (Id).

Internet penetration in South Africa was by far the highest in the continent, with 1.8 million users (90% of total in Africa). The proportion of households with

internet access was estimated to grow to 9.2% by 2002. This penetration was focused in urban areas close to major towns. Penetration was low or non existent in rural and remote areas due to lack of infrastructure and the high cost of access and equipment. The number of commercial ISPs was 150 by 1999. There are two NGO ISPs that focused on the provision of internet access within the NGO sector. All government departments and their ministries have established websites to disseminate information regarding their activities and are working for example, in education, the Ganteng province has provided 300 schools with computers, giving students access and free e-mail accounts (Id).

STRATEGIC COMPACT: Three important task forces have been introduced to address the development of ICT as an enabler of social and economic development. They include the presidential International Task Force on information society and Development (to focus mainly on global ICT markets), the National IT Task Force (which will deal with the issue of "brain drain" and the deployment of ICT initiatives locally) and the IT council (to handle local and provisional government IT functions) (Id).

2.3.4 INFORMATION AND COMMUNICATION TECHNOLOGY EVOLUTION IN INDIA

The Indian government has designed a policy and infrastructure to serve as a catalyst for the software industry. The government has exempted the ICT industry from corporate income tax for five years.

POLICY: Indian IT policy focused on self – reliant industrialization in the 1970s and 1980s has been replaced with reforms aimed at positioning India in the world economy: the foreign direct investment and ownership, and the government has exempted the ICT industry from corporate income tax for five years. In 1986, the Indian government announced a new software policy designed to serve as a catalyst for the software industry. This was followed in 1988 with the world market policy and the establishment of the Software Technology Parks of India (STP) scheme. As a result, the Indian software industry grew from a mere US $ 150 million in 1991 – 1992 to a staggering US $5.7 billion (including over US $ 4 billion worth of software exports) in 1999 – 2000 representing an annual growth rate of over 50% (Id).

The establishment of the Telecommunications Regulatory Authority of India (TRAI) was a key step towards effective implementation of telecommunications reforms. In 1992, the mobile phone market was opened up to private operators, in 1994 the fixed services market followed, finally in 1999, national long distance operations were opened to private competitors. Prior to these reforms, the Department of Telecommunications had been the sole provider of telecommunications services. In addition, to attract foreign direct investment, the government permitted foreign equity of up to 100% and duty free import on all inputs. Government created technology parks also offered professional labour services to clients, a cost – effective program for India since ICT labour was so expensive by global standards (Id).

INFRASTRUCTURE: Teledensity in India has reached 3.5% of the population. Approximately 1% of house holds have fixed line connections, compared to 10% in China. The mobile sector has approximately 3 million users, growing at 100% per annum, and is expected to outstrip the fixed line market in the near future. The number of internet accounts is around 1.5 million, growing at 50% per annum. India also has very high penetration rates of terrestrial TV, Cable and radio, voice and data wireless solutions, for both domestic and export markets, are increasingly produced and used locally. Access to telephones in Indian villages has improved in the last five to six years through the introduction of the Public Call Office (PCO) ran by local shopkeepers. More than 60% of the villages in India have at least one phone. This also includes over 800,000 Village Public Telephones (VPTs). Worldtel has undertake a pilot in four states to secure financing to up grade the Village Public Telephones in order to be internet accessible. In some urban locations, India's Software Technology Parks (STPs) provide infrastructure, buildings, electricity, telecommunications facilities and high speed satellite links to facilitate export processing of software (UNDP, 2000: APPdx 3).

STRATEGIC COMPACT: Public private partnerships, catalyzed by the IT ministry, have played a key role in India's ICT related development. One of the positive results of this effort has been the IT Act 2000, which was based on the recommendation of the National IT Task Force, and aims to set the overall strategy for the IT sector. In addition, the government and the private sector have started coming together to foster ICT development. For example, a joint

effort by the computer Science Information Automation at the Indian Institute of Science and a Bangalore – based private company have developed Simputer – a cheap micro computer that enables illiterate users to browse the internet (Id).

2.4 THEORETICAL FRAMEWORK

Theoretical frame work focused on the concepts of globalization and its merits and demerits as well as the unique characteristics of ICT for specific developmental goals.

2.4.1 CONCEPT OF GLOBALIZATION

Globalization has many faces in trade, finance and production systems. It affects the developmental thinking and action, regulating ethical and social concerns beyond market consideration and reducing the autonomy of states.

Globalization is first and foremost apprehended in economic and financial terms. In this sense, it may be defined as broadening and deepening linkages of national economies into a worldwide market for goods, services and especially capital (John, 1998).

When distilled together, proponents of globalization described the process as one characterized by the emergence of a global village, drawing all peoples of the world together into increasingly closer and mutually beneficial political, industrial, financial, scientific, technological and even cultural relationships. They assert that the common universal benefits derived from globalization are specifically efficient utilization of world productive resources, establishment of efficient industries, production of cheap and high quality goods, fostering greater specialization among nations, boosting aggregate world's industrial output and turning developing countries with labour cost advantages into supplies of low cost products (Nemedia, 1998:407).

Globalization involves increased trade in goods and services, and enhanced financial integration. It also implies particular patterns of insertion of developing countries into the world economy. Neoclassical theory supports free trade on grounds that economic integration bolsters more efficient structure of production and expanded consumption opportunities that, in turn, must lead to higher national income (and world) and welfare (Solimano, 2001:6 – 7).

2.4.2 MERITS AND DEMERITS OF GLOBALIZATION

MERITS:

- Globalization certainly offers opportunities to developing countries and other actors in the world economy. The drastic reductions in barriers to international trade have opened the door for export – led growth. In fact, for small and medium size economies with limited international markets. This growth lie, basically in production oriented towards internal market. (Solimano, 2001:8-9).
- Also globalization favours expansion of freedom. The idea is that, globalization, by increasing opportunities also raises the possibilities to exercise freedom (I d).
- Globalization increases the potential access to a wide variety of consumption goods, new technologies, ideas and international best practices in different fields and realms. This can be new product design, new investment project, production technology, managerial practice etc (Ibid: 10).

DEMERITS:

- Every coin has two sides, therefore, it is important to recognize that globalization also poses some tensions and dilemmas to countries integrated to the world economy. It is clear that globalization has spread unevenly across the developing world. Private capital inflows are largely concentrated in a group of large middle income developing countries. For example Sub-Saharan Africa and other poor countries in other continents received less the benefits of trade, capital mobility and technological improvements developed in the North (Id).
- Another tension of globalization is associated with the fact that in a more interdependent and interlinked world economy any adverse global or regional shock, for example the Russian and Asian crisis of 1997 – 98 rapidly propagates to the economies. Economies that depend on a few main commodities as their main source of export earnings and fiscal revenue can be hit hard by these shocks (Ibid: 11).

- Another transmission is the asset markets. Highly integrated financial markets tend to transmit global, regional or local shocks much more rapidly than in past decades when financial markets were less integrated (Id).
- Another tension of globalization lies in its social effects. As globalization is often associated with increased instability of output and employment, these affects, among other things, job security. As labour income is the main source of earnings for the majority of population under capitalism, job insecurity is socially descriptive and brings tensions to the fabric of society. In addition, flexibility in labour markets required to compete successfully, in international markets, tends to erode long term work and personal relationships between firms and employees, workers and managers that traditionally give a sense of security to people (Id).

2.4.1 MERITS AND DEMERITS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

MERITS OF ICT:

- ICT offers opportunities to developing countries and other participants in the world economy.
- Also, allows free flow of information and easy access to information world wide.
- It ease learning processes in such away that you can receive lectures, assignments and undertake research, obtain research data and publish research findings.
- Attracts Foreign Direct Investment (FDI) e.g. Malaysia which in 1999 increased by 31%. (UNDP, 2000: Appdx 3)
- Improves social activities, particularly personal relationships.
- Encourages effectiveness and efficiency.

DEMERITS OF ICT

- Investment in ICT may draw resources away from traditional developmental goals. This is because investment in ICT requires a huge sum of capital.
- Encourage cyber crime.

- Encourage moral decay.
- Also, encourage "brain drain" from developing countries to developed countries e.g. in South Africa an estimated 200 – 300 ICT skilled human resource leave the country every month (UNDP, 2000: Appdx 3).
- Encourage cyber terrorism.

2.4.4 THE UNIQUE CHARACTERISTICS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

ICT can be a powerful enabler of development goals because its unique characteristics dramatically improve communication and the exchange of information to strengthen and create new economic and social networks:

- ICT is pervasive and cross cutting. ICT can be applied to the full range of human activity from personal uses to businesses and governments. It is multifunctional and flexible, allow for tailored solutions – based on personalization and localization – to meet diverse needs (UNDP; 2000: Appdx 3).
- ICT is a key enabler in the creation of networks and thus allows those with access to benefit from exponentially increased returns as usage increases (i.e. network externalities).
- ICT fosters the dissemination of information and knowledge by separating content from its physical location. These flows of information is largely impervious to geographic boundaries – allowing remote communities to become integrated into global networks and making information, knowledge and culture accessible, in theory, to anyone (Id).
- The "digital" and "virtual" nature of many ICT products and services allows for zero or declining marginal costs. Replication of contents is virtually free regardless of its volume, and marginal costs for distribution and communication are near zero. As a result, ICT can radically reduce transactions costs (Id).
- ICT's power to store, retrieve, sort, filter, distribute and share information seamlessly can lead to substantial efficiency gains in production, distribution and markets. ICT streamlines supply and production chains and makes many business processes and transactions learner and more effective (Id).

- The increased in efficiency and subsequent reduction of costs brought about by ICT lead to the creation of new products, services and distribution channels within traditional industries, as well as innovative business models and whole new industries. Intangible assets like intellectual capital increasingly become the key source of value. With the required initial investment being just a fraction of what was required in the more physical asset intensive industrial economy, barriers to entry are significantly lowered, and competition increased (Id).
- ICT facilitates disintermediation, it makes possible for users to acquire products and services directly from the original provider, reduces the need for intermediaries. This cannot only be a considerable source of efficiency, but has in fact been one of the factors leading to the creation of so – called "markets of one", leveraging ICT's potential to cater for the needs or preferences of users and consumers on an individual basis (Id).
- ICT is global. Through the creation and expansion of networks, ICT can transcend cultural and linguistic barriers by providing individuals and groups with the ability to live and work anywhere, allowing local communities to become part of the global network economy without regard to nationality, and challenging current policy, legal and regulatory structures within and between nations (Id).

The fore mentioned characteristics suggest that ICT has the potential, if conceived as a means and not as an end in itself, to be a vital and powerful enabler of development. Certainly, for the fact that ICT in theory, assists developmental efforts does not necessarily mean that it will do so. For success it has to be implemented effectively.

2.4.5 PROCESS AND CONTENTS OF GLOBALIZATION

PROCESS OF GLOBALIZATION:

Globalization is an integral part of human history, in its most generic and broadest sense; it is a part of the movement of history. All through the history of a man, we have noticed forces which seem to push for greater integration of human activities. Emphasis today is, however, more focused on economic aspect of the process. Globalization in this context is a process of increased

integration of national economies with the rest of the world to create a more coherent global economy (Mike, 1999:17).

Globalization is a process of integrating economic decision – making such as the consumption, investment and saving process all across the world. It is a process of creating a global market place in which free markets, investment flows, trade and information are integrated. It is a process of heightening the level of interconnections between nation – states (Id).

CONTENTS OF GLOBALIZATION

The key elements of globalization as a process are: the interconnection of sovereign nations through trade and capital flows, harmonization of the economic rules that govern relationship between these sovereign nations, creating structures to support and facilitate dependence and interconnection and creation of a global market place (I bid:18).

Globalization provides ample opportunities to the world for trade. Sine it links different countries and or communities of the world to markets through the information and communication technology for example, you can buy products through the use of internet. You can find prices of different commodities through the use of mobile phones.

The process of globalization opens up a world of opportunities for businesses. It links them to markets which were hitherto unknown to them and provides prospects for growth. This could be considered rather narrow concept of globalization. Information technology has made integration possible on more fronts, the opening which information technology has created impact on almost all aspects of human life, culture, value systems and even religious beliefs are all affected as people all over the world are exposed, more than ever before to different and alternative views (Id).

2.4.6 A USEFUL CONCEPT OF ICT

It depends on the local culture and the particular ICT available and how it is configured and managed. The understanding, management and configuration of the available technology might vary the concept of ICT from:

- a collection of tools and devices used for particular tasks, eg, publishing, course delivery, transaction processing…

- an organized set of equipment (like a 'workshop') for working on information and communication.
- Components of integrated arrangements of devices, tools, services and practices that enable information to be collected, processed, stored and shared with others.
- Components in a comprehensive system of people, information and devices that enables learning, problem solving and higher order collaborative thinking that is, ICT as key elements underpinning a (sharable) workspace.
  (www.edu.utas.edu.an/users/i/webb/research/ict.htm)

2.4.7 UNDERLYING PRINCIPLES OF ICT

Technologies do not exist in isolation.

- ICT contributes at various points along a line of activity.
- ICT is used in activities – the ICT use depends on the activities
- The key outputs of educational activities are context are knowledge, experience and products
- The output should be useful to users (self and other) (Id).

2.5 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR SPECIFIC DEVELOPMENTAL GOALS

Under this section reviews of the experience of efforts to apply ICT in five key areas identified by the UN (United Nations) Millennium Summit as development imperatives, health, education, economics opportunity, empowerment and participation, and environment.

2.5.1 ICT FOR HEALTH

Information and communication technology can be used for the improvement of healthcare delivery. There are a number of ways by which ICT can be applied to achieve better health.

ICT was being used in many developing countries and communities to facilitate remote consultations, diagnosis and treatments. In Gambia, for example, nurses in remote villages use digital cameras to download images of

symptoms onto a PC and transfer them to near by towns for examination by doctors. The same model was being applied to facilitate collaborations among physicians themselves. When an expert opinion is required, doctors in rural towns in Gambia send the images captured by the nurses to specialists in the United Kingdom for advice. The principle of ICT – facilitated collaboration extends to medical research also. This was illustrated in West Africa, where malaria researchers use a network of satellites and ground stations to submit data for clinical trials conducted at tropical disease research facilities in London and Geneva (UNDP, 2000: Appdx 2).

Health workers in developing countries assessed relevant medical training through ICT enabled delivery mechanisms. Several new Malaria Internet sites for health professionals include innovative "teach and test" self assessment modules. In addition, centralized data repositories connected to ICT networks enable remote healthcare professionals to keep abreast of the rapidly evolving stock of medical knowledge. In Bangladesh, for example, the local MEDINET system provides access to hundred of medical journals via e-mail for less than US $1.50 per month (Id).

When applied to disease prevention and epidemic response efforts, ICT can provide considerable benefits and capabilities. Public broadcast media such as radio and television have a long history of effectively facilitating the dissemination of public health messages and disease prevention techniques in developing countries. The Internet also can be utilized to improve disease prevention by enabling more effective monitoring and response mechanisms. For example, across Sub-Saharan Africa, the internet was used to monitor daily cases of meningitis and to help coordinate mass vaccination programs when threshold levels are reached (Id).

A number of countries, such as Estonia and Costa Rica, have invested in ICT to improve the administrative efficiency of the public health systems and ICT can be applied to improve the efficiency of medical facility administration through, for example, the streamlining of medical procurement or the creation of patient record database (Id).

ILLUSTRATIVE IMPACT:

HealthNet was used by 19,500 healthcare workers in more than 150 countries worldwide. The developmental impact of HealthNet has been most prevalent in

Africa, where the model has contributed to increased rural and urban connectivity, capability building among the user community, increased demand for IT services and in some cases, commercially viable IT service enterprises. For example:

- Surgeons from Mozambique, Tanzania and Uganda used Health Net to consult patient treatments and learn new re-constructive surgery techniques;
- In Zambia, healthcare workers who once traveled 700km each week to collect data for clinical trials used HealthNet to send this information via e-mail;
- Physicians in Ethiopia used HealthNet to schedule consultations, made unnecessary for ill patients to travel long distances with no guarantee of seeing a physician;
- Health workers in Democratic Republic of Congo used HealthNet to report progress on treating tripanasomiasis to publics health organizations in the north of the country; and
- In Gambia, malaria researchers used HealthNet to summit data to European medical schools for clinical trials.

Many physicians in developing countries rely on HealthNet as their sole source of information on the treatment of AIDS and tropical diseases, essential drugs, pediatrics and public health promotions (UNDP, 2000: Appdx 2).

CHALLENGES:

Although HealthNet has made a real contribution, important challenges remain. Implementations in Africa have not always delivered the hoped for level of success due to a number of factors, including: a lack of reliable and affordable telecommunications and power infrastructure; the failure and high cost of local internet service providers (ISPs); unfavourable regulatory, licensing and taxation regimes; insufficient grant sustainability; poor organizational design; and user dissatisfaction with low band – width and delayed response (Id)/**(www.healthnet.org)**.

2.5.2 INFORMATION AND COMMUNICATION TECHNOLOGY FOR EDUCATION

ICT is applied in a wide range of educational sector. This can be seen in the area of distance learning, the development of scientific research networks on a world wide basis, the delivery of technical and vocational training, and also in enhancing the efficiency and effectiveness of education administration.

One of the most clearly demonstrated applications is distance education. Distance education has been particularly successful model in developing countries where affordability and geography have been real barriers to access. The six largest distance-learning universities in the world are located in developing countries: Turkey, Indonesia, China, Thailand and Korea – all of which offer expanding virtual campuses. To date, distance learning has mainly been applied to tertiary education where the motivation and commitment of students is high. In the case of primary and secondary education, ICT has been found to significantly enhance the learning process by enabling increased access to knowledge and more collaborative and interactive learning techniques, but was not an effective substitute for close personal supervision from teachers and parents. In Chile, for example, the enlaces project wired 50% of the primary schools, enabling teachers within the schools to improve the quality of the curriculum and allowing students from different schools to conduct collaborative projects (UNDP, 2000: Appdx 2).

The development of scientific research networks on world wide basis, usually over the internet, also help to empower indigenous research and development programs in developing countries. Virtual research groups composed of interconnected specialists in different parts of the world allow databases to be shared, conferences to be organized, papers to be circulated and discussed, and collaborations occurred on both North – South and South – South basis. The African Virtual University, for example, provides online communication tools such as chat rooms, e-mail, bulletin boards and home pages to encourage shared research efforts among both academics and students (Id).

Another rapidly growing area of ICT-mediated learning was in the delivery of technical and vocational training. Because ICT can facilitate sophisticated and customized performance simulation at low marginal costs, many organizations

and vocational training facilities are employing ICT to train workers in an array of functional areas – from healthcare to IT services – even to train teachers themselves. For example, Cisco's Networking Academy program provides 280 hour technical training course over the internet. This course trains workers in developing countries in designing, building, and maintaining computer networks, enabling students to obtain jobs in the local IT industry (Id).

ICT- enabled solutions also present significant opportunities for enhancing the efficiency and effectiveness of education administration. Through the use of ICT data repositories and networks, curricula are developed collaboratively, educational materials can be procured more cost effectively, staff and students time is scheduled more efficiently, and individual student performances is monitored more closely. In South Africa, Educor, a private conglomerate of educational institutions, uses ICT networks to facilitate collaborative curriculum development among educators across its schools improving the quality of the curriculum and avoiding duplication of effort (Id).

University of South Africa (UNISA) is the illustrative and model of application of distance learning institution.

APPLICATION MODEL:

UNISA is the oldest and largest university in South Africa and one of the largest-distance-learning institution in the world. UNISA has internationally recognized certificate, diploma and degree courses up to doctoral level across six faculties: Arts, Economics and Management Sciences, Law, Science, Education and Theology and Religious Studies. In addition to on – campus instruction, UNISA provides educational programs via internet and on line classrooms, video lectures and correspondence instruction. Students also access UNISA's well equipped library over the internet (Id) or **(www.unisa.co.za)**.

ILLUSTRATIVE IMPACT:

UNISA's distance learning programs provide education to over 120,000 students per annum, mostly from Africa and other developing countries.

The distance education programs are less expensive (80% less) than those of residential universities.

The programs allow students to obtain higher education at their own pace while they work to support their families.

The organization provides professional employment opportunities within South Africa: there are 3,000 staff members including academic, administration and support staff (Id).

CHALLENGES:

While UNISA has a key strength in the quality and relevance of its educational content, a number of key challenges must be over come before it can achieve critical scale with it online offering chief among these is securing the skills and capabilities required to develop and maintain a rich and broad program of educational content. The development of applications to deliver content to a broader and more diverse audience is also a priority (Id) or **(www. unisa. co. za.)**

2.5.3 ICT FOR ECONOMIC OPPORTUNITY

ICT contribute to income generation and poverty reduction. It enables improved business efficiency and productivity, facilitate global connectivity, enhance rural productivity. ICT plays a vital role in providing employment opportunities.

There are a number of ways ICT is enhancing rural productivity. ICT enables solution sharing between local people and communities, providing access to practical information on small business accounting, weather trends and farming best practices, For example. Timely access to market information Via communications networks also helps farmers make astute decisions about what crops to plant and where to sell their produce and buy inputs. In Chile, for example, an Internet network among farmer organizations has dramatically increased farmers' incomes by providing information about crop status, weather, global market prices and training ICT also provide unprecedented access to rural finance. The financial and information service network provided by pride Africa offers micro-finance opportunities for local people and small enterprises that previously had no access to flexible financing due to rigid banking regulations and the information monopolies of government and large businesses (Id).

ICT enables improved business process efficiency and productivity. Businesses reduced operational costs by decreasing material procurement and

transaction costs, resulting in lower prices for intermediate and finished goods, and they can also use more and better information to improve the value of their output. Utilities Afrique Exchange, for example, provides an e-trading platform to utilities companies in Africa and helps both sellers and buyers simplify their procurement processes and reduce costs. In another example, a number of companies in developing countries are using the Global Technology Network, provided by the US Agency for International Development (USAID), to find comparable small and medium sized US companies to share business solutions that satisfy their existing technological needs (Id).

ICT facilitates global connectivity, resulting in new ways of creating and delivering products and services on a global scale. New business models and market configurations enabled by ICT, including business process outsourcing, value chain integration and disintermediation, provided developing countries with access to new markets and new sources of competitive advantage from which to drive income growth. Through PEOPLink's global artisans trading exchange, for example, local crafts people in developing countries are increasing their incomes not only through access to new markets, but also because the wholesaling intermediaries for their produce have effectively been moved. Local craft people can now receive up to 95% of the selling price of their produce where previously they received only 10%. Viatru is a similar initiative offering indigenous peoples opportunities to globally market their traditional crafts and farm products (Id).

ICT contribute to better employment opportunities in developing countries both through improved labour market facilitation and direct employment. Using electronic job marketplaces, employers and employees match labour skills and availability to satisfy their demands. For example, TARAhaat, a portal designed to serve villages in rural India, provides job opportunity information on local web sites in local languages. In addition, the establishment of local telecenters in countries such as Bangladesh, India and Senegal has created direct employment for thousands of local women and men (Id).

APPLICATION MODEL: VILLAGE PAY PHONES, BANGLADESH

Village payphone is an initiative of the Grameen Bank aimed at reducing poverty through the economic empowerment of women in rural Bangladesh. The Grameen Group manages the entire phone system, operating the GSM network

and loaning money to village women to purchase GSM cellular phones. Phone owners rent the phones out to village farmers and other community members for a fee and also provide messaging and incoming call services.

ILLUSTRATIVE IMPACT:

- Phones have been placed in 1,100 villages. The 6-7 year goal is to serve 500,000 subscribers, including 68,000 phones dedicated to serving rural areas.
- Village phones have increased incomes and savings accumulation among phone owners, mostly women.
- Phone users, mainly local farmers, have increased their productivity through access to market information, weather reports and pests and disaster alerts.
- Farmers in phone villages receive up to 10% higher prices for farm products and improved security of supply for inputs.
- A significant portion of phone owners' profits have been spent on paying for improved education and health services for their families.
- The phone service has also contributed to improvements in disaster response, crime rates and livestock mortality through better access to public services.

CHALLENGES:

While village payphone is a model for community development, the Grameen network is not integrated with the national fixed line network. This was due to telecommunications regulations in the country which, to a large extent, was being challenged by the rapid expansion of Grameen phone. The wireless technology chosen by Grameen, based on well-known international standards, was expensive and not optimal for rural areas. Service quality has been inconsistent among phone owners and may have a negative impact on customer satisfaction. (Id) or **(www. devmedia.org.documents/ace1055.htm).**

2.5.4 ICT FOR EMPOWERMENT AND PARTICIPATION

ICT contribute to fostering empowerment and participation by making government processes more efficient and transparent through encouraging

communication and information sharing among people and organizations and within government.

Using ICT, governments improved the quality and responsiveness of the services they provided to their citizens as well as expand the reach and accessibility of services and public infrastructure. This was facilitated by e-government applications that provide services and information to citizens over the internet and other communication networks. In Indian state of Madhya Pradesh, the government has introduced an experimental intranet computer network for government services and local information. This allows citizens to have faster and more transparent access to government services. For example, farmers get copies of land titles for 10 cents that previously cost as much as US $100 from corrupt officials. Andhra Pradesh in India has also launched internet enabled integrated service centers providing access to different types of government service (UNDP, 2000: Appdx 2)

ICT connects individuals and local communities with information and resources beyond their geographic boundaries, encouraging dissemination, information exchange and communication. Citizens are encouraged to participate in the democratic process through ICT mechanisms such as electronic forums and bulletin boards, which enabled participation in public discussions. This is especially relevant for marginalized communities and groups such as women, youth and ethnic minorities: they can share and exchange information of mutual interest, strengthen their collective power and shape their own development solutions. A women's group in Mexico City, for example, used e-mail to ask sympathizers in California to do research on the textile factory where they worked. When the women's jobs were threatened, they came to management armed with information on the company, its profits and its ownership to negotiate better conditions and more secured tenure (Id).

Organizations in developing countries also find it increasingly feasible to participate in information sharing that strengthens governance and collective power, allowing them to influence political and institutional decision making processes. Trade Unions, for example, have used the Internet as a campaigning tool to organize labour globally in the fight against exploitation. Global networks played a crucial role in helping unionized Guatemalan workers to join with other

union groups and lobby governments and multilaterals to gain recognition and wage increases from Pepsi – Cola in the Mid – 1990s (Id).

APPLICATION MODEL: SANGONet

SANGONet is an electronic information and communications network for development and human rights workers in Southern Africa. It provides relevant information to people working on developmental issues by allowing them to communicate with each other on its website and by building capacity in electronic communications with non-governmental, community based.

ILLUSTRATIVE IMPACT:

- SANGONet empowers people and organization to make decisions based on relevant information.
- NGOs and other organizations communicate more efficiently and effectively using e-mail software and services provided by SANGONet.
- NGOs, especially small to medium – sized organizations which faced lack of ICT skills, are taking advantage of SANGONet's low cost support services and training programs to improve their internal capabilities and operations. (Id)/ ***(www.sn.apc.org/sangonet).***

CHALLENGES:

The lack of reliable and affordable telecommunications and power infrastructure was a barrier to encouraging widespread utilization of SANGONet's functions. In addition, although people and organizations can effectively use ICT to improve their information exchange and communications, strong leadership and management capabilities are required to translate information into co-ordinated action. (Id).

2.5.5 ICT FOR THE ENVIRONMENT

ICT made vital contributions to sustainable environmental management, facilitating environmental management, facilitating environmental activism and enabling more efficient resource use.

Scarcity of relevant and reliable information has always been a substantial obstacle to more effective environmental management. Used to collect, process and disseminate information, ICT enables a better understanding of issues such as climate change and biodiversity and helps to monitor ecological conditions so that prevention and mitigation measure can be activated. SIDSNet, for example provides a medium for sharing information and good practices among the forty – three small Island Development States (SIDS) on common issues such as biodiversity, climate change, coastal and marine management and energy source. In Nepal, computer imaging has been used to build a land resource database for the Arun River basin. This has generated the first ever basin – wide map of land use indicating forest degradation hotspots. The database, together with simulation models, was crucial to designing and implementing the land management program for the area (UNDP, 2000:APPdx:2).

ICT was being deployed extensively to monitor and respond to environmental disasters in developing countries. This was demonstrated in Mexico, where fire emergency services are using satellite images to direct response teams to critical areas resulting in significant reductions in casualties and property loss. (Id).

The power of ICT as an information and net working medium also enabled citizens to act as environmental enforcement agents, alert decision makers to compliance infringements and leveraging the power of ICT to reach and influence public opinion. In Indonesia, officials discouraged by weak enforcement of water pollution standards created a public access database for rating the degree of factory compliance. Citizen groups have used the ratings to pressure under-performing factories. Within the first 15 months of activism, one-third of non complying factories had met regulations. (Id).

ICT applications can be used to reduce the consumption of energy, water and other essential natural resources through more efficient agriculture and industrial procedures. For example, precision agriculture technique using GIS (geographic Information Systems) and GPS systems can facilitate weather and soil monitoring, crop forecasting and the ability to optimize farm return on investment ensuring more efficient use of scarce resources (Id).

In the future, ICT may also play an important role in the fight against pollution not only by providing more useful metrics and information, but also by enabling population decentralization and large scale telecommuting (Id).

APPLICATION MODEL: GLOBAL FOREST WATCH (GFW)

Global Forest Watch is an international network of more that 90 local forest groups linked by the Internet. It aims to slow forest degradation around the world as well as infuse transparency and accountability into the industry. The initiative was started by the World Resources Institute around 1997 to give the general public a clearer picture of the threats to the world's forest. GFW uses combination of satellite imagery, Geographic Information Systems (GIS), mapping software, the Internet and on-the-ground observation to record forest coverage and condition, including where and how forest product companies are cutting. GFW compares the activity to forest leases to identify illegal cutting. These maps are posted on the Internet, naming specific companies that failed to comply with environmental policies and agreements (Id) or **(www: igc.org; www.globalforestwatch.org.)**

ILLUSTRATIVE IMPACT:

GFW ensuring fair and objective scrutiny of the practices of forest product companies. The group was already operating in 8 countries, and plans to cover 25 countries within a few years. It has negotiated with IKEA, Home Depot, Loews and other major forest products retailers that constitute 40% of the North American markets. The retailers have pledged to source only from sustainably managed forests and forest companies and have agreed to use GFW's expanding database to guide their buying. GFW also provides governments, local communities, consumers and activists with information about what is happening to the forests, enabling the promotion and establishment of successful forest management practices. Results in a few countries demonstrate that GFW can provide information that is not obtainable by satellite systems and exceeds that currently available to governments and United Nations agencies. (Id) or (**www: globalforestwatch.org.)**

CHALLENGES:

Key challenges for GFW are: limited Internet access among concerned groups who have information to contribute and are also target information recipients; and securing political support and sponsorship among governments,

industry groups, and NGOs in new geographic markets. If successful in the North American markets was an indication, this challenge was not insurmountable (Id).

2.6 SUMMARY

In this chapter, it was discussed that Malaysia, South Africa and India adopted different strategies as a result of the impact of globalization on information and communication technology (ICT), in order to create an enabling environment for the establishment of firms related to the manufacturing of information and communication technology products. The incentives used by the Malaysian government were in the form of financial and non-financial incentives, these included zero income tax for a period of 10 years, a 100% investment tax allowance and R & D grants. Non-financial included unrestricted employment of foreign knowledge workers, limited restriction on ownership and no restriction on global capital. The contribution of ICT to Malaysian GNP was approximately 36.5%. In South Africa, the government developed National ICT strategies. As a result, the sector had the spending of $9.6 billion i.e 6.9% of GNP. With black empowerment organizations have access to financial means much better than under the apartheid regime. Indian government has taken a number of steps in order to reap the advantage of ICT, these steps included: creation in 1988 a world market policy with focus on software development for export, telecommunication policy reforms and privatization of the national long distance and mobile phone markets.

The evolution process in information and communication technology sector has changed the means and methods of studying, way of life, thinking and other economic and social activities. In Nigeria, with the help of internet learning materials are accessible easily from anywhere. On the issue of ICT evolution; Malaysia, South Africa and India formulate policies which encourage investment in ICT sectors, provision of infrastructural facilities for ICT and strategic compact by each of the countries.

The concept of globalization is simply the integration of world economy, making the world as a global village i.e. without barriers and restrictions. This is more visible in the communication particular internet, mobile phones etc that you can communicate easily throughout the world. The concept of ICT is that, it is an

organized set of equipment for working on information and communication. Both globalization and ICT offer opportunities to developing countries and other participant in the world economy.

ICT improve communication and exchange of information by it unique characteristics as an enabler of development; it fosters the dissemination of information, it is pervasive, cross cutting and global.

ICT is useful for specific developmental goals e.g. Health, this is used through a website HealthNet contributed by health workers to collect data for clinical trials from rural areas and send them through e-mail. This HealthNet was used mainly by surgeons in Mozambique, Zambia, Tanzania, Ethiopia and Uganda. Other specific areas where ICT is applicable included: education, economic opportunity, empowerment and participation and the environment.

FOOT NOTES

1. UNDP (2000). Creating a development dynamic: final report of the Digital opportunity initiative. Appendix 3. National ICT Approaches: Malaysia, India & S/Africa, Malaysia: www. opt – init.org/framework/pages/Appendix 3 case5.html.

   1b. India:www.opt-init.org/framework/pages/Appendix3case4

   1c. S/Africa:www.opt-init.org/framework/pages/Appendix3case6.html

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3. John, F.E.O. (1998) "The South in the Era of Globalization". In: The South and Globalization. UNDP. No. 128 pp 6.

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6. WWW.opt-init.org/framework/pages/2.1.1 html.

7. UNDP (2000) Creating a Development Dynamic: final report of the Digital Opportunity Initiative. Appendix 2 ICT for specific Development Goals. Or

   WWW.Opt-init.org/framework/pages2.2html

   Health, illustrative impact: www.healthnet.org

   Education, illustrative impact: www.Unisa.Co.Za

   Economic opportunity, illustrative impact: www.devmedia.org/documaent/ACF1055.htm

   Empowerment and participation, illustrative impact: www.sn.apc.org/Sangonet.

   Environment, illustrative impact: www.globalforestwatch.org.

8. Mike, K. (1999) "Concepts and Dimension of Globalization". In: Globalization and Nigeria's Economic Development. Nigerian Economic Society Journal. Seminar held on 11/2/99 pp 17-18

9. WWW.edu.Utas.edu.am/users/i/webb/research/ict.htm

CHAPTER THREE

BACKGROUND OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN NIGERIA

3.1 INTRODUCTION

This chapter covers the background on information and communication technology (ICT) in Nigeria. In these discussions contained historical focus issues in communication in Nigeria before the introduction of G.S.M, benefits and problems of ICT in Nigeria and the National Information Technology Policy of government in Nigeria.

3.2 COMMUNICATION IN NIGERIA BEFORE THE INTRODUCTION OF GLOBAL SYSTEM MOBILE (GSM)

The communication industry in Nigeria operated as a monopoly. The cost of providing communication services was one of the highest in the world. Out of the 1, 195 of local exchange in existence in early 1999, only 55 were digital and of 400, 000 telephone lines connected only 50% were working. Only 100 local government headquarters had telephone services out of the 774 local government areas in existence (Economic direction, 2000)

3.3 ICT OBJECTIVES IN NIGERIA

There are no specific ICT objectives as regard to Nigeria, but, since IT is now ICT. Therefore, IT objectives would be considered as ICT objectives.

OBJECTIVES

- To ensure that information Technology resources are readily available to promote efficient national development.
- To guarantee that the country benefits maximally, and contributes meaningfully by providing the global solutions to the challenges of the information age.
- To empower local production and manufacture of IT components in a competitive manner.
- To empower Nigerians to participate in software and IT development.
- To improve accessibility of public administration for all citizens, bringing transparency to government processes.

- To establish and develop IT infrastructure and maximize its use nationwide.
- To improve judicial procedures and enhance the dispensation of justice.

3.4 NATIONAL INFORMATION TECHNOLOGY POLICY.

As a result of the increasing importance of information Technology for National Survival and development. Federal Government of Nigeria has approved an IT policy in 2001, as a result leads to the establishment of National Information Technology Development Agency.

VISION STATEMENT: *"TO MAKE NIGERIA AN IT CAPABLE COUNTRY IN AFRICA AND KEY PLAYER IN THE INFORMATION SOCIETY BY THE YEAR 2005, USING **IT** AS THE ENGINE FOR SUSTAINABLE DEVELOPMENT AND GLOBAL COMPETITIVENESS."*

MISSION STATEMENT TO USE: TO 'USE IT' FOR:

i. Education
ii. Creation of wealth
iii. Poverty Eradication
iv. Job Creation
v. Global Competitiveness

OBJECTIVES:

- To improve food production and food security.
- To improve healthcare delivery systems nation wide
- To integrate IT into the mainstream of education and training.
- To create an enabling environment and facilitate private sector (NATIONAL and Multinational) investment in the IT sector.
- To generate additional foreign exchange earnings through expanded indigenous IT products and services (www.nitda.org)

National Information Technology Policy has been chapterized into sixteen chapters on the basis of sectoral applications.

Chapter 1, Human Resources Development

Chapter 2: Infrastructure

Chapter 3: Governance

Chapter 4: Research and Development

Chapter 5: Health

Chapter 6: Agriculture

Chapter 7: Urban and Rural Development

Chapter 8: Trade and Commerce

Chapter 9: Fiscal Measures

Chapter 10: Government and Private sector partnership

Chapter 11: Arts, Culture and Tourism

Chapter 12: National Security and Law Enforcement

Chapter 13: Legislation

Chapter 14: Global Consideration

Chapter 15: IT Popularization and Awareness

Chapter 16: Policy Implementation

For the purpose of this research, the following sectors of IT policy will be discussed: human resources development, infrastructure, research and development, health, agriculture, trade and commerce, and policy implementation. The National IT policy for the seven sectors are as follows:

CHAPTER 1: HUMAN RESOURCE DEVELOPMENT POLICY STATEMENT:

The nation will endeavour to develop globally competitive quality manpower in IT and related disciplines.

OBJECTIVES:

i. To increase pool of IT engineers, scientists, technicians and software developers.
ii. To increase the availability to trained personnel
iii. To develop requisite skills in various aspects of IT.
iv. To develop made in Nigeria software to earn foreign exchange.
v. To develop domestic computer components.
vi. To provide attractive career opportunities.

STRATEGIES:

i. Making the use of IT mandatory at all levels of educational institutions through adequate financial provision for tools and resources.
ii. Developing relevant IT curricula for the primary, secondary and territory institution. Such curricula will be based on the appropriate national syllabus at the selected level and other global certification syllabi, to tie

into key elements of Governments Universal Basic Education (UBE), the proposed digital Virtual library scheme, and related educational initiatives. A virtual University system shall be established.

iii. Establishing facilities for electronic distance learning networks and ensure effective internet connectivity, which will provide opportunities for educationally disadvantaged areas to educationally leapfrog into the modern era.

iv. Encouraging IT companies with appropriate incentives to compel them to invest in education and training through certification for tax rebates through existing government bodies experienced in such matters such as Industrial Training Fund (ITF) and centre for Management Development (CMD).

v. Establishing study grants and scholarships to deserving Nigerians.

vi. Promoting "Training the Trainers" scheme using existing establishments such as the National Youth Service Corps(NYSC), the NATIONAL Directorate of Employment (NDE) to boost capacity building in IT.

vii. Empowering IT institutions and development centers to develop IT capacities initially at zonal, state and Local Levels.

viii. Facilitating the growth of private and public sector dedicated primary, secondary, and tertiary IT educational institutions.

ix. Working in partnership with related domestic and international initiatives such as " Nigerian Human Professionals in the Diaspora" and the United Nations "Transfer of Knowledge through Expatriate Nationals" (TOKEN) program. (www.nitda.org)

CHAPTER 2: INFRASTRUCTURE POLICY STATEMENT:

The government through National Information Technology Development Agency (NITDA) shall establish and develop a National Information Infrastructure (NII) backbone as the gateway to the Global Information Infrastructure (GII) interconnecting it with state Information Infrastructure (SII) and the Local Information Infrastructure (LII)

OBJECTIVES

i. To provide leadership direction and vision to guide IT infrastructure development.

ii. To provide equitable access to all users and stakeholders.

iii. To guarantee the privacy, integrity, accuracy, confidentiality, security, availability and quality of personal information.

iv. To create an ubiquitous and affordable technology with an "open standard" approach, scalable and capable of adapting to changes.

v. To provide a reliable and secured gateway to the Global Information Infrastructure.

vi. To stimulate the creation and sharing of national and international knowledge.

vii. To encourage private sector investment in IT particularly in Information Infrastructure.

viii. To ensure that interoperability and openness are promoted through the utilization of efficient, high – capacity and multi – media technologies.

ix. To promote electronic trade, business and commerce (Id).

x. To facilitate the opening of overseas markets for Nigerian businesses and enterprises.

xi. To encourage the private sector to invest, design, deploy, and operate independent information infrastructure.

xii. To close the continuous widening gap, with its attendant grave consequences between the rich and poor nations, otherwise known as the digital divide.

xiii. To pursue and attain cultural diversity.

xiv. To empower the citizenry to better compete in the information societies. (Id).

STRATEGIES

i. Government will establish a National Information Technology Development Agency (NITDA) that will foster the growth and development of IT in Nigeria. NITDA will in part be funded from the taxes levied on imported IT equipment.

NATIONAL IT BACKBONE

i. Declaring the establishing of NII as a fundamental national mission.

ii. Planning, designing, and configuring a scalable National Information Infrastructure Backbone (NIIB) to achieve a minimum capacity of 2.5Gb/s, using combination of optical fibres, satellite communications and wireless technology.

iii. Adopting the open system approach in selecting an appropriate, easy to use and scalable Information Infrastructure Technology over a long period.

iv. Involving through consultations, the IT professionals, Experts, Universities and Research centres, industries and business enterprises in the establishment processes (Id).

v. Promotion high band witch physical connectivity using broadband technologies as effective pipelines for large and multi-media applications.

vi. Using existing facilities such as power grids railways infrastructure to enhance the creation of NII backbone.

vii. Encouraging the private sector, through relevant incentives to build interfacing NII of fibre transmission systems designed strictly to provide transmission capacities on lease basis to service providers essentially for data transmission and not primarily for telephony.

viii. Ensuring that the entire country is linked by information network system by the year 2005.

ix. Utilizing private sector investment.

x. Establishing “Backbone By Anyone” project for a period of 5 -8 years through tax – free incentives to accelerate and encourage investment in the development of NIIB (Id).

CHAPTER 4: RESEARCH AND DEVELOPMENT

POLICY STATEMENT: IT Research and Development will be used for sustainability, leapfrogging and competitiveness.

OBJECTIVES:

i. To ensure Nigeria’s contribution to IT Development and her competitiveness in the international market.

ii. To guarantee sustainability of IT in Nigeria and use it to stimulate industrial growth.

iii. To promote self-reliance and export of IT products and services.

iv. To identify key technological areas as well as others and provide fiscal support and incentives to encourage local technology development.

v. To encourage transfer of technology through exchange of visits between expatriate IT experts and Nigerian IT experts in Diaspora on one hand and IT institutions and experts in Nigeria.

vi. Funding to be coordinated via NITDEF.

vii. To encourage joint R&D efforts between the private sector and the universities such as software development.

STRATEGIES:

i. Developing local expertise and resources through adaptation.

ii. Developing market oriented software for local market and export.

iii. Cultivating/upgrading the maintenance culture.

iv. Developing low cost PCs solutions, services and accessories in order to increase PC accessibility to at least 30% of the populace by the year 2003.

v. Encouraging and funding R&D in identified Universities, Industries (including those in the oil sector) are to be encouraged to set up R&D centers at University level, through faculty chairs, matching grants and focused joint projects.

vi. Requesting for research projects that will be made open to both research institutes and universities in order to select good and innovative projects for National Development.

vii. Funding Vacation or sabbatical, visits of expatriate IT experts and educationists in order to transfer knowledge and share their experiences.

viii. Introducing “Innovative ideas” competitions, on country wide basis covering all levels (from primary schools to tertiary institutions) and R&D centres to instill the spirit of innovation and excellence in our young professionals.

ix. Stimulating growth for local IT industries through government patronage of local IT industries, products and services.

x. Establishing R&D institutions in IT in Abuja and in each of the six geopolitical zones of Nigeria with clear mandate. States shall be encouraged to establish similar institutions, which are to be properly funded (Id).

CHAPTER 5 HEALTH

POLICY STATEMENT: Government shall invest in IT based healthcare systems to ensure that Nigerians have access to good healthcare delivery.

OBJECTIVES:

i. To use IT for the establishment of Healthcare Information Systems (HIS) cutting across primary, secondary and tertiary healthcare systems.
ii. To improve the efficiency of patient care and reduce cost of healthcare delivery.
iii. To deploy IT for the development of during information, records and bibliographic records.
iv. To deploy IT for the study and control of epidemics.
v. To deploy IT as a research tool and means to disseminating information.
vi. To reduce costs and improve productivity of healthcare administration and delivery.
vii. To deploy IT for use in distance learning for medical professionals.
viii. To use IT based healthcare information system to educate on preventable diseases.

STRATEGIES:

i. Capitalize on existing global IT infrastructure such as the free Health net satellite “nearly real time” e-mail facilities that connect, via email, medical personnel at all levels in the developing world to each other, and to select health experts in developed countries.
ii. Networking all healthcare institutions to collate information, share data and communicate on-line (Id: 11)
iii. Establishing full Internet connectivity and access for healthcare professionals at all levels (Primary, secondary and tertiary).

iv. Making IT skills acquisition mandatory for all healthcare professionals thus achieving computer literacy within twenty four (24) months.
   a. Including IT courses in the curricula of all medical and paramedical education institutions.
   b. Establishing a network of cooperating centres/institutions for training education, software development and research to produce the software and necessary human resources needed.

v. Developing software packages for;
   a. The three levels of healthcare delivery, primarily to support the clinical work and hospital management within the health facilities, so that the state/federal information statistics is produced as a natural by – product of the daily operations.
   b. Mandating Local/State/ Federal government authorities to accumulate the information coming from all levels of healthcare delivery and also to produce the combined statistics primarily to support the decision making by the authorities.

vi. Establishing in all hospitals, healthcare, epidemiological and administrative records.

vii. Use IT to combat serious national health threats such as HIV/AIDS, leprosy, physical disabilities among many others by using IT:
   i. To teach the youth on ways to prevent the transmission of HIV.
   ii. To educate the victims of HIV and their families on palliative measures and provide them with information through on – line conferences so that they can share their fears and experiences (Id).

CHAPTER 6: AGRICULTURE

POLICY STATEMENT: The nation shall use IT to re-engineer agriculture for the purposes of maximizing food production, improving food self sufficiency and security, increasing output for industrial raw material utilization, providing empowerment, economic growth and minimizing environmental abuse and degradation.

OBJECTIVES:

i. To optimize land use for food production.

ii. To provide employment for the citizenry.

iii. To minimize urban migration.

iv. Develop and protect a sustainable agricultural environment.

STRATEGIES:

i. Developing Geographical Information systems (GIS) to monitor the environment and plan sustainable environmental usage: IT is used in land and water management, offshore resource exploitation, yield assessment and livestock management. Governments will revitalise agricultural extension services by empowering and equipping farm extension workers with IT Skills to support farmers through the use of IT in areas such as:

   a. Digital Mapping
   b. Land use
   c. Soil types
   d. Meteorology
   e. Ecology
   f. Oceanography particularly off-shore fisheries exploitation
   g. Hydrology
   h. Agricultural records.
   i. Establishing an agricultural information system to provide support for planning, production, storage and distribution of horticultural crops, livestock and fisheries products.
   j. Creating IT awareness for all types of farmers at all levels nation wide (Id).

CHAPTER 8: TRADE AND COMMERCE

POLICY STATEMENT: Create an enabling environment that empowers stakeholders in trade and commerce with the underlying infrastructure to improve productivity and positively position the nation for global competition.

OBJECTIVES:

i. To develop transparent, stable and effective legal operating environment that promotes private sector business and investment in IT.

ii. To cultivate a culture of electronic commerce, which makes business transaction easy, quick and cost effective, for both national and international transactions.

iii. To positively raise the local and international visibility of Nigerian businesses.

iv. To encourage foreign and domestic private sectors investment to build information infrastructure and related assets and develop subsequent down market activities (Id).

v. To stimulate the proliferation of private sector led information technology services and consequently generates meaningful employment opportunities for Nigerians.

STRATEGIES:

i. Firmly address the protection of intellectual rights by bringing the copy right laws in line with the needs of a globally competitive economy (Id).

ii. Government through NITDA will collaborate with the private sector in the development of information infrastructure.

iii. Permitting the private sector to establish internet communication "backbone" facilities stimulated on market demand with minimal governmental encumbrance.

iv. Encouraging the development of alliances of communities and non governmental organizations to enhance efficient and appropriate grass – roots development efforts.

v. Raising the profile of small and medium scale Enterprises (SMEs) in exports through e – commerce by providing low cost accessibility to markets and services.

vi. Encouraging manufacturers and suppliers to utilize bar codes on items sold in the country.

vii. Establish a high profile National Electronic Commerce Council (NECC), to govern all the electronic commerce (e-commerce) affairs in Nigeria, and facilitate international trade through an e-commerce infrastructure. The NECC will be operated and supervised by NITDA with the cooperation of relevant Ministries and organization (Id).

CHAPTER 16: POLICY IMPLEMENTATION

POLICY STATEMENT: Recognizing IT as strategic imperative for national development and taking cognizance of its immense benefits, Government shall provide considerable national resources, both financial and otherwise, for the realization of the National IT Vision Statement.

OBJECTIVES:

i. To develop an efficient and cost effective infrastructure that provides equitable access to national and international networks and markets.

ii. To develop an extensive pool of trained IT manpower at all levels to meet local and export requirements.

iii. To promote the widespread use of IT applications in governance.

iv. To provide business incentives for both local and foreign investors to ensure the development of Nigeria's IT sector, including the software, hardware and service industries, and the use of its products (Ibid)

v. To develop an encouraging legislative and regulatory frame work for IT related issues.

vi. To give maximum opportunity to the private sector to lead the thrust in the development of IT in Nigeria.

vii. To establish a traditional of electronic commerce for both national and international transaction.

viii. To establish institutional mechanisms for the control, regulation and monitoring of IT activities in Nigeria.

STRATEGIES

i. Establishing coordinated program for the development of a National, State and Local government Information Infrastructure Backbone by using emerging technologies such as satellite including V-SAT, fibre optic networks, high – speed gateways and broad band/multimedia within the next eighteen months but not later than the fourth quarters of 2002.

ii. Providing high speed connectivity to the global information infrastructure by 2002.

iii. Increasing the telephone line penetration rate by expanding the existing telecom networks and providing new networks by employing modern technologies in order to minimize the cost of expansion (Id).

iv. Removing the barriers to the introduction of new technologies such as Wireless Local Loop (WLL) by the private sectors in order to ensure the spread of Telecom services to underserved areas of the country.

v. Developing an integrated, flexible, robust and reliable transmission network covering the entire country and capable of voice and data by 2003.

vi. Establishing IT Parks as incubating centres for the development of software/hardware application at national, state, and local levels.

vii. Encouraging further deregulating of the Telecom industry with a view to providing affordable, competitively priced internet connectivity (low and high bandwidth) for a large community of users by the end of 2002.

viii. Communication with internet POPs should be regarded as local calls, to reduce the costs and make such services affordable to the populace.

ix. Reducing the rates and tariff for all Telecom services to a level reasonable and consistent with economic realities of the country and the global trends.

x. Reducing the bandwidth rates both domestic and international, dramatically to encourage the rapid launch of new services and distance learning and also provide a competitive edge to local companies trying to break into established international markets (Ibid).

xi. Restructuring the educational system to all levels with a view to developing relevant IT curricula for the primary, secondary and tertiary institution in order to respond effectively to the challenges and imagined impact of the information age and in particular the allocation of IT development fund to education.

xii. Encouraging massive local and global IT skills acquisitions through training in the public and private sectors as well through joint venture and alliances with a view to achieving a strategic medium term milestone of at least 500, 00 IT skilled personnel by the year 2003.

xiii. Bringing Government to the doorstep of the people by creating virtual forum and facilities to strengthen accessibility to government information an facilitating interaction between the governed and government leading of transparency, accountability and strengthening of democracy (Ibid).

xiv. Making IT skills acquisition mandatory for all government employees and achieving computer literacy for all civil servants by the end of 2002.

xv. Networking all government organizations to share data, information and reporting online by the end of 2002.

xvi. Establishing full internet connectivity and access for most government employees by the end of 2002.

xvii. Establishing websites for improved government image and as information centers for citizenry.

xviii. Establishing an overseas strategic Advisory Board of Nigerians in Diaspora in IT and related industries not only for advice but also for investment and participation in IT projects and activities in the country (Id).

xix. Giving ISPs approval to develop light speed gateways with no licensing fees.

xx. Encouraging the Private sector to develop software for government and non/classified defence projects.

xxi. Enacting Bills and Acts to stimulate and protect the right of users and developers including intellectual rights.

xxii. Establishing Government IT Procedure Act (GITPA) to enhance equipment standards, performance and security (Ibid).

xxiii. Establishing a Data Protection Act (DPA) for safeguarding privacy of National computerized records and electronic documents.

xxiv. Establishing a National Information Development Technology Agency (NITDA) to implement, monitor, evaluate, regulate and verify IT activities on an on-going basis under the supervision and coordination of the Federal Ministry of Science and Technology.

xxv. Establishing a National Information Technology Development Fund (NITDEF) with a view to achieving the short to medium term objectives of the Policy by earmarking, in the first instance, at least 2% of the Federal Capital Budget with effect from (2002) for the implementation of the policy thrust to be administered by the National Information Development Agency.

xxvi. Encouraging Internet telephony as well as Voice Over Internet Protocol (VOIP), to reduce the cost of telephony and make such services affordable to the populace (Ibid).

3.5 BENEFITS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) NIGERIA

ICT evolution has transformed available technologies, the means and methods of studying, the modalities of school operations, the manner of investment and expenditure of resources, and the very way we think about what education could be and should do with the internet, it is possible to access learning materials anywhere. Nigerian Universities are developing interest in ICT and some have started to use telecommunications and computers for teaching as in the University of Benin (Abhulimen, 2002)

The opportunities available on the Internet are numerous and those institutions making use of them are better off it, course materials are now posted on the internet for easy access to students and assignments can be communicated through e-mail message (Id).

Certainly, the benefits of ICT to Nigeria is immense, as we can now see, the use of mobile telephone set, which is used to send, receive and or store messages that can be either oral, textual and or pictorial.

Many banks now are on line which enables customers to withdraw cash at any branch or town without any difficulty. Also, through the use of e-mail a lot messages can be sent or received with ease.

The benefit is more glaring in the opportunities it provides, for example provision of employment to many through the computers printing, cyber cafes and mobile phones renting. These provided employment for thousands of our unemployed citizens. ICT benefited Nigeria in investment, for example the GSM operators, that is MTN, Globa Com, M – Tel and Vmobile invested billions of naira.

Also, these mobile phone operators provided employment to thousands of Nigerians. ICT helps to strengthening relationships between friends, families and other social relations.

3.6 PROBLEMS OF ICT IN NIGERIA

There are many registered private companies providing fixed telephone, mobile telephone, fixed satellite, paging, payphone, internet and GSM services. Despite the availability of the services their level of penetration and services provided, much is still needed to make the services efficient and affordable to all.

The myriad of problems and bottlenecks that have arisen in this connection included: low teledensity, insufficient trunks leading to congestion, unreliable network design and or deployment, poor interconnectivity, insufficient band- width, insufficient human resource development, poor maintenance culture, vandalization of facilities and exorbitant and sometimes, unjustifiable billing. The National Telecommunications infrastructures are largely built around NITEL, a government parastatals which in its modes of operation exhibits the entire characteristics tendencies or disabilities of a government monopoly (Abhulimen, 2000).

3.7 SUMMARY

Based on the discussion above that, before the inception of GSM, Communication in Nigeria, there was 400,000 telephone lines and only 50% were working. Teledensity was very insignificant and only 100 local government headquarters had telephone service out of 774 Local government. Information and communication Technology offers opportunity for providing employment, investment and made learning materials easily accessible anywhere through internet. It improves the social activities of the citizens. Information and communication Technology as an emerging technology has problems which included; poor interconnectivity, insufficient bandwidth, unreliable network design etc.

Objectives of ICT are many but include the following among others; to ensure Information Technology resources available, to empower local production and manufacture of IT components, to establish and develop IT infrastructures and maximize it use nationwide. Federal Government approved the National Information Technology Policy in the year 2001 and establish the National Information Technology Development Agency (NITDA) to implement, monitor, evaluate, regulate and verify IT activities. National IT Policy has vision statement as “To make Nigeria an IT capable country in Africa and key player in the

information society by the year 2005, using IT as the engine for sustainable development and global competitiveness". To use IT for

i. Education
ii. Creation of Wealth
iii. Poverty Eradication
iv. Job creation and
v. Global Competitiveness

The policy consists of 16 chapters covering virtually every aspect of economic and social activities of the citizens.

FOOT NOTES

Obasanjo Economic Direction 2000

Abhulimen, R. A. (2002) " Positioning Nigeria for Effective Response to the Challenges of Emerging Technologies and Globalization" Vanguard Vol. 1204, Dec., 2002.

www.globalpolicy.org/globaliz/econ/2002/1204ictafricahtm

www.nitda.org.

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter discussions covered research methodology of this study. General discussions are presented on research methods, research methods used for data collection, data collection procedures and methods used in analyzing the data collected.

4.2 GENERAL RESEARCH METHODS

There are various means of classifying research processes. This is because research problems differ and the setting in which they occur. Research can be classified in two broad classes, that is, Basic and Applied research. Under these classes, there are different types of research methods which include: historical, descriptive or survey and experimental research.

HISTORICAL RESEARCH

Historical research is concerned with being able to understand and explain the present and predict the future through an evaluation of available records of past events. (Austin and Ogwo, 1990:63).

This research analyses the past event and make projection of the future based on the past records available. The research attempts to discover generalizations that may help in clear understanding of the past and the present and then provide a means by which the future can be predicted and make concise plan for the future, to avoid reoccurrence of bad situations that happened in the past.

Historical research, has two sources of data i.e. primary sources; which consists of eye witness accounts, oral testimony etc. while secondary sources consists of written evidence, audios etc.

Historical research is considered akin to that of science, historical research must:

i. Identify and define the problems.
ii. Formulate probable hypothesis.
iii. Identify and collect relevant data.
iv. Analyse these data

v. Interpret and report findings (Id).

However, as the name suggests historical research, the fact is that; the data are hardly verifiable completely, since it was said to be historical it can not be repeated. But in physical and be repeated.

The method of evaluating historical research data consist of two groups: those concerned with external criticism and those concerned with internal criticism.

EXTERNAL CRITICISM

This implies attempting to establish the authenticity of a document or artifact, that is to say, determining whether the document of artifact is what it purports to be. It seeks to arrive at a judgment on the authenticity based on the following:-

i. What is known about the authors of a document or artifact.
ii. What is known about the time of its purported time.
iii. What is known about the occasion or special happenings of its origin.

This establishes the work of records, meaning and truth of the events reported or observations made in the document (Ibid: 65)

SURVEY OR DESCRIPTIVE RESEARCH

Survey or descriptive research usually consists of methods of gathering data from usually a large number of respondents, who themselves constitute a sample. The purpose of survey research is not the collection of data per se, but the discovery of meaning in the data collected, so that facts and events can be better understood, interpreted and explained (Ibid: 69).

Descriptive research seeks to find out the relationship that exists, opinions that are held, the effect that are evident and processes that are going on or trends that are developing (Akuezuilo, 1993: 8).

Descriptive research also called non-experimental research interpretes and describes what is? That is, describes the characteristics of the subject matter of any research undertaking Descriptive research is mostly undertaken on phenomenon that the researcher had little knowledge on and of matter of interest to him.

Descriptive studies or research can be said to be of three main types; case study: longitudinal, and cross-sectional.

(a) **CASE STUDY:** This is the intensive analysis of one purpose of a greater understanding of the phenomenon and the possibility of the generalization. A case study allows indepth analysis of phenomenon and also present a method of simplifying and improving hypotheses before they are tested in a wide scope.

The main advantage of a case study is that, it allows the collection of data on large variables, which improves the validity of the findings. The main disadvantage of a case study is that; due to the limited number of cases or single case examined, there is problem of reliability or generalization of findings.

(b) **LONGITUDINAL ANALYSIS:** Longitudinal studies rely on a fixed sample of respondents on a particular phenomenon. This fixed sample is known as a panel is surveyed repeatedly for data on identified phenomenon over a period of time (Austin and Ogwo; 1990: 70).

The panel of members are selected from a population of consumers, households, firms, retailers etc, depending up on the phenomenon on which the study is conducted on. There are other variant of the longitudinal study. These are trend studies and cohort studies. Trend study is concerned with the study of changes over time within a population, for example sales trend over five years, financial ratios for five years etc. of a firm(s). While cohort studies are concerned with examining a more specific sub-population as it changes over time. For example under financial ratios, you consider the profitability ratios only for five years.

Longitudinal studies have a number of advantages; per unit observations or comparison of data over time, better quality study, enhanced comprehensiveness of data collected and a more accurate data.

The major disadvantage is that; the panel may not be representative enough of the population.

(c) **CROSS – SECTIONAL ANALYSIS:** A cross-sectional study usually consist of gathering data from a sample of elements from the population

of interest; these elements in the sample are measured once a number of characteristics which are thought to be relevant to the area of research interest.

This is thought to be of two types; field studies and survey. The difference between field studies and surveys is that; survey has greater scope or width while field study has greater depth. Survey tries to be fairly representative in the indepth study of few cases (Id).

EXPERIMENTAL RESEARCH

This method of research attempts to the question, if this is done under carefully controlled conditions, what will happen? (Akuezuilo, 1993:11).

Experimental research compares the effect of a particular experimental stimulus, that is, independent variable on the dependent variable. Here there are two groups; an experimental group and a control group. The experimental stimulus or variables, that is dependent variables, while the control group has not been exposed to stimulus or variables.

4.3 RESEARCH METHODS USED FOR DATA COLLECTION

Data can be described as an information, statistics, diagrams, observations, obtained by a researcher. There are many methods of data collection these are: through documentary source, observations, questionnaires, interviews, rating scales and performance tests. But we are going to consider four methods, that is documentary sources, observations, questionnaires and interviews.

1. **DOCUMENTARY SOURCES:** This consists of documented materials which can be published and unpublished. The documentary sources include: journals, magazines, newspapers, official gazette, digest of statistics, staff lists, economic indicators, etc.
2. **OBSERVATION:** Observation can be listening, watching and recording the behaviour of others without interference, in such a way as to be able to analyse and interprete it. Observation can be participant and non-participant observation. This is where observer did participate and where he did not in observation.

3. **INTERVIEWS:** Interview, simply is the oral conversation between the researcher (interviewer) and the other person (interviewee), where by the interviewer asks questions which he wants response from the interviewee.

An interview can also be through telephone. When an interview is well conducted it is better than other research instruments base on the following reasons:-

- **i.** People are usually more willing to talk than to write and rapport may be well established between the interviewer and the interviewee.
- **ii.** The interviewer can explain more purpose of his research to the interviewee.
- **iii.** The interviewer can be able to evaluate the sincerity and insight of the interviewee.

4. **QUESTIONNAIRE:** This is a series of questions of which the respondents are expected to answer in writing. The questions are relevant to the aims and objectives of the research or study.

Questionnaire can be used to obtain information about the past, present and anticipated future events. When opinions are desired opinions are used.

Questionnaires consist of the following categories:-

a. The closed or structured form
b. The open or unstructured form
c. The pictoral form.

4.4 DATA COLLECTION PROCEDURES

Data collection procedure deals with the procedures through which the researcher decide from whom and where and how to collect the data. This decision is done, after deciding on what information or data to collect. The procedure for data collection is base on sample of group 'representation' that the researcher used to make sure that the data collected provide unbiased, suitable close estimates of the characteristics of the population from which the sample was taken. A sample had limited elements chosen from a population as its representatives in all dimension of the population.

SAMPLING PROCESS:

The process of sampling consists of three phases:

1. Defining the population: it is important to define the population which the hypothesis being tested will be referred.
2. Drawing a sample from the population: the sample in which hypothesis testing will take place should be selected from the population to which one plans to generalize the research findings. The selection should be done by randomization scheme.
3. Statistical Inference: this involved the estimation of the means, standard deviation, proportion or other parameter values from the knowledge obtain from the sample statistics (Ndagi, 1999: 82).

TYPES OF SAMPLING METHODS

The following sampling methods will be discussed:-

Simple random sampling,
Stratified random sampling,
Proportional sampling,
Non-proportional sampling,
Double sampling
Systematic sampling and
Area or cluster sampling.

SIMPLE RANDOM SAMPLING

Here, every element of the population has an equal probability of being selected. This means that, no element is intentionally omitted except by chance.

STRATIFIED RANDOM SAMPLING

This is a process whereby the population is divided into strata or sub-population. After, samples are selected randomly which are independent from each stratum. This procedure allows variability of elements selected within each stratum to be more homogeneous than the variability of elements from each strata. This procedure is used where the population is very large and spread over a wide area for e.g. Universities academic staff in Nigeria. As a stratum you may choose federal universities.

PROPORTIONAL SAMPLING

This method requires the selection of units at random from each stratum base on the proportion to the size of the group to the total population. E.g. Suppose the total number of population is 500. The groups may have the following size: 50, 80,170, 200 and 100 to have the proportion you divide the size of each stratum to the total number of population.

NON – PROPORTIONAL SAMPLING

This is a method used where there is need to over sample some elements from one or more strata when the elements occurs frequently in the population. However, this method requires that the favourable responses should be multiplied by the ratio of the number of cases in each stratum to the number of cases in the population.

DOUBLE SAMPLING

This is a method used when a mailed questionnaire is used to obtain data. This is done because some subjects do not return their questionnaire. The missing data will make the result biased, therefore, to correct this, a second sample is drawn at random from the non – respondents and interview those people to obtain the required data.

SYSTEMATIC SAMPLING

This is used where the population is well structured, which made possible to select a sample by counting every certain number for example 5^{th}, 10^{th} etc. up to attainment of the desired sample size. The sample size is obtained by dividing number of population by number of sample.

AREA OR CLUSTER SAMPLING

This involves sampling an area or cluster and their sampling the individuals within the cluster.

4.5 METHODS USED IN ANALYZING DATA

Data analysis refers to those techniques whereby the investigator uses to enable him draw out information that was not apparently there before enable the understanding of the subject studied in order to draw out finding conclusions and recommendations. There are many methods of analyzing data, these include; statistical, pictoral, histogram etc.

Statistical techniques: there are several basic types of statistical measures include:

1. Descriptive Statistics
2. Inferential Statistics

DESCRIPTIVE STATISTICS

The major aim of descriptive statistics is to described characteristics of a group or groups. Examples of descriptive statistics are:

Percentages

Measures of central tendency or averages

Measures of dispersion or spread.

INFERENTIAL STATISTICS

Inferential statistics, unlike descriptive statistics, are tools for analyzing data in a fashion that will address the research question or hypothesis. (Ibid:85).

Examples of inferential statistics are:

Measures of relationship e.g. correlation coefficient

Measures of comparison e.g. chi – square and ANOVA.

4.6 SUMMARY

The chapter discusses general research methods which include; historical research, descriptive research and experimental research. There are various research methods used for data collection such as; documentary source, observation, interviews and questionnaire. On the issue of data collection procedures which the researcher decides from whom and where to collect the data, this is base on sample. Sampling process consists of defining the population, drawing a sample from the population and statistical inference. The various sampling methods include; simple random sampling, stratified random sampling, proportional sampling, non-proportional sampling, double sampling, systematic sampling and area sampling. Also, methods used in analyzing data include statistical technique, pictoral etc. Statistical technique consists of descriptive statistics technique and inferential statistics.

FOOT NOTES

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CHAPTER FIVE

DATA PRESENTATION AND THE FINDINGS OF THE STUDY

5.1 INTRODUCTION

This chapter focused on data presentation, analysis and the findings of the study. Data collected relate to the following: the impact of liberalization of Nigerian Telecommunications Industry, GSM Roll-out, growth in telephone service and teledensity in Nigeria, growth in Internet users, and VSAT Networks, Impact of competition on tariffs, changes in connection and airtime charges for mobile in Nigeria, infrastructure expansion and revenue generation.

5.2 IMPACT OF LIBERALIZATION ON NIGERIAN TELECOMMUNICATION INDUSTRY

Since May 1999, the Federal Government has pursued an aggressive market liberalization policy, and today, Nigeria is perhaps the most liberalized telecoms market in Africa. Since the introduction of competition in the fixed line market segment, 21 private operators have added about 520,000 new lines (representing 51% of total fixed lines connected) to the national fixed telephone network of about 1.03 million as at December, 2004. This shows a decline in the market share of the incumbent operator, the Nigerian Telecommunications Plc (NITEL), to about 49% of the total connected fixed lines, is however, a far cry from what the market requires considering the huge demand for telecommunications services (www.ncc.gov.ng).

Recognizing the benefits of market liberalization, NCC's strategies have been rather aggressive but phased, allowing for relevant experiences to be developed, internal capacity built, and adequate resources mobilized. Initially, emphasis were placed on services, but with the licensing of the second national carrier in 2002 and National Long Distance Operators, there has been a deliberate effort to promote sustainable development of core infrastructure. To a large extent the effect of the deregulation of the telecommunications sector over the last 4 years has been largely positive, giving rise to:

- Increased level of private sector participation;
- Increased range and quality of services available to citizens;
- Effective lowering of costs of acquiring and using services;

- Increasing level playing field for service providers via the removal of bottlenecks hitherto created by the monopoly operator;
- Drastic reduction in the waiting time for telephone installation and service delivery;
- Improved service penetration to a larger and growing number in under-served and unserved urban and semi-urban and rural areas alike;
- Creation of direct and indirect employment opportunities for skilled, semi-skilled and unskilled citizens;
- Additional revenue for government through spectrum and numbering fees, import duties, VAT etc.;
- Increased participation of the banking sector in the financing of telecommunications network development and roll-out of the services;
- Increased foreign investment from private companies, international and multinational institutions based areas (www.ncc.gov.ng).

5.3 GLOBAL SYSTEM MOBILE (GSM) ROLL-OUT

Resulting From the regulatory actions, the Nigerian Telecommunications Industry has experienced significant growth in the last four years following the successful take-off of digital mobile telephone services in the country. Nigerian Communication Commission auctioned four (4) licences to operators to roll-out a GSM network for the country. These are: MTN Nigeria Limited with operative date 9th February 2001 and expiry date 8th February 2016, Vee Networks Limited (formerly Econet wireless Nigeria Limited) with operative date 9th February 2001 and expiry date 9th February 2016, Nigeria Telecommunications Limited (popularly M-Tel) with operative date 9th February 2001 and expiry date 8th Febroary 2016 and Globacom Limited with operative date 1st September 2002 and expiry date 30th February 2017 (Id).

5.4 GROWTH IN TELEPHONE AND TELE-DENSITY IN NIGERIA

The licensing of Digital Mobile Operators, a Second National Operator (SNO), the licensing of 25 Fixed Wireless Access (FWA) operators (on a state-by-state basis). The measures evolved to redress the sub-optimal level of access to telecommunications services in the country. The total number of

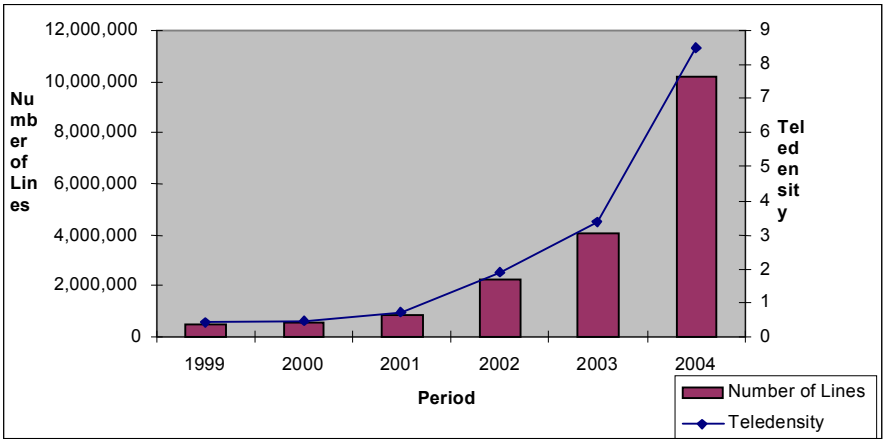
connected mobile telephone lines of 10.2 million, as at the end of 2004, represents 291% increase over the 3,149,472 lines recorded in December 2003. On the other hand, the number of fixed telephone lines connected as at the end of 2004, increased by a mere 17.77% from 872,500 in 2003 to about 1.03 million in December 2004.

Table 5.1: Growth in Telephone and Tele-Density in Nigeria

Service Category	NUMBER OF SUBSCRIBERS					
	1999	**2000**	**2001**	**2002**	**2003**	**2004**
Fixed NITEL	450,172	497,019	540,662	555,4666	555,466	507,268
PTOs	23,144	56,355	59,659	146,534	333,0658	520,251
Sub-Total	473,316	553,374	600,321	702,000	888,534	1,027,519
Mobile	35,000	35,000	266,461	1,669,050	3,149,472	9,174,209
Total	508,316	588,374	866,782	2,271,050	4,038,006	10,201,728
Teledensity	0.42	0.49	0.72	1.89	3.36	8.50

Source: (www.ncc.org.ng)

Figure 5.1: Telephone Subscribers Growth & Teledensity in Nigeria



From the statistics, the total number of connected phone lines (fixed and mobile) in Nigeria, as at end of 2004, was about 10.2 million, which is more than doubled the number recorded at the end of December 2003, i.e. 253%. The cumulative effect of the increases in the number of connected fixed telephones and the number of mobile subscribers, as at the end of December 2004, was that the teledensity profile of the country increased dramatically to about 8.5 from

1.89 in 2002 and 3.36 in 2003. These results notwithstanding, there are evidences to show that more could have been achieved but for the constraints in lack of backbone capacity to meet demand. (WWW.NCC.org.ng).

Reasons for sudden increase in mobile phone subscribers against others are:

1. Its costs is lower than fixed phones
2. It is easy to walk about with
3. Wider coverage of mobile phone services

5.4.1 Growth in Internet Users & Penetration and VSAT Networks

The number of Internet operators and service providers in Nigeria was encouraging. This was because the number of Internet services as at 1999 was 18 and 36 in 2004, i.e. increase by 200%. While, VSAT Networks was not available until 2003 with 51 operators, and 52 in 2004 respectively.

Table 5.2: Number of Operators and Service Providers

Service Category	NUMBER OF OPERATORS & SERVICE PROVIDERS					
	1999	2000	2001	2002	2003	2004
VSAT Networks	N/A	N/A	N/A	N/A	51	52
Internet Services	18	30	30	35	35	36
Internet Users	N/A	107,194	153,350	420,000	1,163,258	1,769,661
Internet penetration	N/A	0.1%	0.1%	0.3%	1.3%	1.4%

In the area of data services, there had been emergence of a good number of network operators deploying VSAT and fiber optics Local Area Networks as well as wide Area Networks for corporate bodies, telecommunications Value Added Service providers and institutions. In addition, in spite of the serious limitations posed by lack of adequate infrastructure and cost of bandwidth, users of Internet Services in the country is currently estimated at about 1.8 million showing an average annual growth rate of 130% from a mere 107,194 in 2000. Consequently, Internet penetration has increased from a mere 0.1% in 2000 to about 1.4% at the end of 2004. This is so because of the increase in number of the Internet service providers and lower charges to users. There is also an ever increasing demand and more understanding of the importance of the internet.

5.5 IMPACT OF COMPETITION ON TARIFFS

The entrance of multiple operators in the telecom sector, particularly the mobile segment, coupled with intensifying competitive rivalry, has had resounding successes in the industry in terms of growing subscriber base, decreasing tariff, widening coverage areas, improving quality of service levels, expanding product range and innovativeness and increasing employment opportunities.

At the beginning of sector liberalization in 2000, telephones were either not available or outrightly not affordable as in the case of PTOs. The PTOs charged as high as one hundred thousand naira (₦100,000.00) each for fixed lines to the very few people that could afford them. However, by August 2001, when the newly licensed mobile operators deployed services, digital mobile lines became available at a range price of ₦10,000.00 to ₦20,000.00 in a sale transaction devoid of long procedures and waiting times. Telephone lines could now be bought off the shelf in a matter of minutes compared to same transactions that took months (in some instances years) to accomplish before now (WWW.NCC.gov.ng).

Today, mobile lines, which sold for between ₦60,000.00 and ₦70,000.00 between 1996 and early 2000, for analogue services, are available in the market today at less than 2% for basic prepaid digital (GSM) services. The most expensive SIM Pack in the market as at the end of 2004 is ₦1,000.00 and now the least price is ₦350.00, out of which about half is given as free airtime. Similarly, the acquisition cost of fixed lines have crashed, over the same period, by about 90% from over ₦100,000.00 in 2000 to an average of about ₦13,000.00 (Id).

5.5.1 Changes in Connection & Airtime Charges for Mobile Phone in Nigeria

With respect to call rates, there has equally been some significant drop, particularly in mobile telephone, especially since mid 2003 when the fourth operator commenced operations. From an initial ₦50.00 per minutes for basic

prepaid service, the mobile call tariff has dropped to between ₦25.00 and ₦35.000 per minute. Consumers also enjoy significant price slashes as a result of several tarriff-based promotion packages, which has driven the cash rate further down to ₦20.00 per minute (with booster or bumper cards). (WWW.NCC. gov.ng). However, as a result of the tariff rebalancing carried out by the incumbent operator in 2003, the tariffs for local calls have been increased by about 50%, to give room for a proportionate reduction in international call rates, which dropped from ₦99.00 to ₦45.00 per minute to most overseas destination (Id).

5.6 INFRASTRUCTURAL EXPANSION AND REVENUE GENERATION

NITEL has been effective in revenue generation and collection within the circumstances and environment in which it operates. It has been self-financing in its projects and recurrent expenses through internally generated revenue.

The percentage digitalization of lines has increased from 67.52% in February 2001 to 74.3% in October 2001. Total installed capacity as at December 2001 was 827,308 lines.

Total connection as at December, 2001 was 547,308 lines. The capacity utilization achievement as at the beginning of 2001 was 70.48% while at the end of year 2001 it was 75.48%.

Total revenue generated as at October 2001 stood at ₦38,342,421,470.00 approximately ₦38.34 billion.

Total revenue collection as at October 2001 stood at ₦31,000,179,670.00 approximately ₦31.00 billion.

PAY PHONE INSTALLATION: As at the end of October 2001 4,571 payhone out of which 3,245 are working.

PAY PHONE GENERATION: As at November 2001, the revenue stood at ₦2,632,317,816.58.

INTERNET: cloning has been stamped out in the Celullar Network and number of lines in this analogue (TACS) Network stood at 40,593 lines. Extension of coverage of the Celullar Network to twelve (12 towns) (a) Jos/Bukuru (b) Yola (c) Bauchi (d) Maiduguri (e) Calabar (f) Warri (g) Benin (h) Awka (i) Nnewi (j) Ilorin

(k) Ogbomosho. Expansion of the base stations in Area 1 corresponding to 14 numbers (Victoria Island, Apapa, Amuwo, Iponri, Odunlami, Ketu, Agege, Ilorin, Oshogbo, Shomolu, Isolo and Benin City). Provision of a digital Radio Link between NECOM House and Mabamu RBS (www.nepa.net/communications).

INCREASE IN THE NUMBER OF SUBSCRIBERS

Engineers from the Mobile Directorate re-planned the TACS network and implemented the frequency, Bandwidth for Areas III, and I thereby saving NITEL over ₦500 million. The total cost of implementation (including the design) was less than two million naira. A quotation of ₦267 million was received for Area III frequency Bandwidth Reduction alone. This job made the launching of GSM possible (Id).

The three International gateway earth stations TDMA Burst time Plans (BTP) were changed successfully in compliance with InterSat Plans for accommodating new circuits viz:

New Carriers: The year witnessed the establishment of new International Carriers viz: 1x2 Mbps IDR Carrier to Germany through Kaduna Gateway 1x1 Mbps IDR Carrier to Belgium from Enugu Gateway, 1x2 Mbps (IBS) Carrier to France from Lagos Gateway 1x152 Kbps IDR Carrier to South Africa.

N-Sat Networks: At Kujuma V-Sat Hub Station in Kaduna Gateway, there are total of 119 terminals in the network. A total of 2,315 International trunks were maintained within the 3 Gateways by the year ending 2001 as against 2,268 in year 2000 showing a marginal increase of 47 circuits.

Signalling Protocol Upgrades: Planning upgrade of Signalling Protocol on all our International routes from CCITT/5 to CCITT/7 is still progressing barring limitations in necessary equipment (Id).

5.7 OTHER DEVELOPMENTS IN THE IT SECTOR ICT DEVELOPMENT EFFORTS IN THE MINISTRY OF EDUCATION

- The National Virtual Library Project
- Education Management Information System (EMIS) Programme
- National Open University of Nigeria and Distance Learning Programmes
- Computer in Schools Initiative
- Nigerian Universities Network

- National Teachers Institute Teachers Training Programme by Distance Learning

DEVELOPMENTS IN IT SECTOR

There has been local assembly of branded computers which are Zinox Technologies Limited. Other indigenous vendors like Omatek and Unitec have also launched their own brands of locally assembled computers systems (www.nitda.org).

5.8 THE GENERAL FINDINGS OF THE RESEARCH STUDY

1) Approval of National Information Technology Policy: The research found that the National Information Technology Policy has been approved in 2001 by the Federal Government (See: Chapter 3.4). The policy is being monitored and implemented by National Information Technology Agency (NITDA). Considering the policy provisions what has been achieved was not much. For example, there was a policy statement to establish and develop a National Information Infrastructure backbone gateway to the Global Information Infrastructure Interconnecting it with States Information Infrastructure and the Local Information Infrastructure (see chapt. 3, National IT Policy, chapt. 2). The strategies for the establishment of Federal IT Park, States IT Park, Local IT Park. (see chapt. 3, chapter 16 of National IT Policy; Strategy Item [iv]). Non have been achieved with the exception of states IT Parks where Jigawa and Akwa Ibom States developed their own National IT Policy on other chapters discussed in the research are yet to bring a fruitful result, as it was understood from the research.
2) Local Assembly of branded computers and accessories: There has been local assembly of branded computers and accessories by Nigerian companies, among which are Zinox Technologies Limited. Other indigenous vendors like Omatek and Unitec have also launched their own brands of locally assembled computer systems (see: chapt. 5.7).
3) ICT Development Efforts in the Ministry of Education: The Federal Ministry of Education has made significant progress in the planning and

implementation of the following ICT-driven educational programmes/projects:

(a) The National virtual Library Project

(b) Education Management Information System (EMIS) Programme

(c) The National Open University of Nigeria and Distance Learning Programmes

(d) Computer In Schools Initiative

(e) Nigerian Universities Network (see chapt. 5.7).

4) Liberalization of Telecommunication Industry: As a result of aggressive liberalization of telecom industry, 21 private operators have added about 520,000 new lines which constitute about 51% of the total fixed lines as at December 2004 (see chapt. 5.2). This causes decline in the market share of Nitel by 49% of the fixed lines. The licensing of Mobile telephone, has drastically increase the number of telephone lines by remarkable proportion considering the total telephone lines as below:

$$\frac{\text{Mobile Lines}}{\text{Total phone lines}} \times 100$$

1999:	$\frac{35{,}000}{508{,}316}$	x 100 = 6.89%
2000:	$\frac{35{,}000}{588{,}378}$	x 100 = 5.95%
2001:	$\frac{2661{,}461}{866{,}784}$	x 100 = 30.74%.
2002:	$\frac{1{,}569{,}050}{2{,}271{,}050}$	x 100 = 69.1%
2003:	$\frac{2{,}149{,}472}{4{,}038{,}006}$	x 100 = 78%
2004:	$\frac{9{,}174{,}209}{10{,}201{,}728}$	x 100 = 89.9%

From the above calculations, it is understandable that, the mobile telephone lines dominated the fixed telephone lines in the country. And teledensity recorded 8.5 (see table I). With an improved backbone capacity, more could be achieved in few years to come. In the area of data services (Internet), there was inadequate infrastructure and cost of bandwidth which hinder users from benefiting of the services. This can be visible through the number of Internet users with only 1.7 million users as at the end of 2004 (see table 5.2) which was too small considering the population of Nigeria. This number is not even up to the total number of tertiary institutions students in the country.

5) The Impact of Competition on Tariffs: It was found that competition has brought about a lot of advantages which ranges from growing subscriber base to 21 private operators and 4 GSM operators were added (see chapt. 5.2 & 5.3). Improving quality of service, widening coverage areas and decreasing tariff. Also, changes in airtime charges for mobile telephone was achieved from ₦50 and dropped to between ₦25 to ₦35 per minute though there is still need for reduction in the airtime charges and increase in the access time for mobile services (see chapt. 5.5.1).

6) Infrastructural Expansion: There was successful change of three (3) International Gateway Earth Stations burst time Plan (BTP). These are 1x2 Mbps IDR carrier to Germany through Kaduna gateway; 1x1 Mbps IDR carrier to Belgium from Enugu; 1x2 Mbps (IBS) carrier to France from Lagos gateway; 1x152 Kbps IDR carrier to South Africa (see chapt. 5.6).

5.8.1 GENERAL DISCUSSIONS ON THE IMPLICATIONS OF THE FINDINGS

The findings of the study has many implications to the stakeholders such as; government, users, investors, economy and workers.

A. GOVERNMENT

i. Approval of National Information Technology Policy in 2001 indicated the government readiness to develop the sector for viable economic development.

ii. Liberalization of Telecommunications industry has many implications to government. First, it reduced the government expenditure in the industry. Second, government gave private individuals to participate in the industry.

And thirdly, government through liberalization of Telecommunication hopes to increase NItel's efficiency. Also, government sources of revenue generation is increased in two ways. First Nitel's efficiency will bring in more revenue to government. Second, through licensing of the GSM operators and Private Telephone Operators (PTOs) revenue was generated. There is increased availability and provision of social infrastructure to citizens, by allowing private operators to participate. Also, increased foreign direct investment.

iii. Expansion of infrastructure means increasing the provision of basic social amenities by the government. It will also bring in revenue to government from the users. On the other hand, it implied expenditure by the government to expand the infrastructure.

iv. Local assembly of branded computers will reduce importation of computers into the country, also increased the country's foreign reserve. Employment of the citizens by the companies help the citizens skill acquisition.

v. The efforts of the Federal Ministry of Education in ICT-driven programmes will enhance the literacy level of the citizens.

B. USERS

i. Approval of National Information Technology Policy implied improvement in the IT facilities to users for efficiency. It implies job creation and skills acquisition.

ii. Liberalization of Telecommunication Industry has been positive to users by; increasing the range and quality of services available to users, lowering the costs of acquiring and using the services, reduction in the writing time for telephone installation and services delivering, improving the service penetration to a large and growing number in under-served and unserved urban and semi-urban and rural areas.

iii. Local assembly of branded computers implied low price of computers to users.

iv. Infrastructural expansion implied improved service penetration to a large and growing number in underserved and unserved urban and semi-urban and rural areas. It also improve the efficiency in delivering the services to users.

v. ICT-driven programmes by the Federal Ministry of Education, users have easy access to facilities in skills acquisition and at affordable fees.

C. INVESTORS

i. National Information Technology approval gave prospective investors green light about the investment in the sector. Also, government incentives to the investors in Information and Technology Sector.

ii. Liberalization of the Telecommunication Industry provided an opportunities for private investors to invest in the industry. There is an increased playing fixed for service providers by removal of hurdles created by monopoly operator.

iii. Local assembly of branded computers and accessories

5.9 SUMMARY

As a result of liberalization of telecommunication industry, 21 private operators added 520,000 fixed lines (representing 51% of the total fixed lines). This liberalization has brought about a lot of benefits which include; lowering costs of acquiring and using service, increase in private participation improved service penetration etc. Also deregulation of the industry made it easy for the successful take off of the digital mobile telephone services. This brought about four licensed operators. Due to this development in the industry there were drastic increase in mobile telephone lines from 35,000 lines in 1999 to about 10 million lines as at December, 2004. This also increases the teledensity from 0.42 in 1999 to 8.50 in 2004. With regard to Internet, the number of Internet services increases by 200% from 18 in 1999 to 36 in 2004. While the penetration rate was 0.1% in 2000 to 1.4% by the end of 2004. Competition has causes a drastic reduction in both connection and airtime (service) charges for both fixed and mobile telephones. Also, the waiting time for fixed phones has been reduced.

Infrastructure expansion was successful, more especially in digitalization of lines. This recorded an increase of 6.78% between February and October 2001 and the total installed capacity as at December 2001 was 727,308 lines, while the total connection on the same date was 547,308 lines. The capacity

utilization as increase by 5% by the end of 2001 from 70.48% to 75.48% revenue generated as at October 2001 was approximately ₦38.34 billion.

FOOTNOTES

1. www.ncc.gov.ng
2. www.nopa.net/communications
3. www.nitda.org

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter contains the summary, conclusions and recommendations of the research study. The summary is done chapter by chapter. The conclusion highlighted the main issues in the findings of the research. And the recommendations were based on the findings and their implications to all stakeholders and the country at large.

6.2 SUMMARY

Chapter one introduces the research work; globalization has been the phenomenon that influenced the people's life. It has changed lifestyle, culture, science, technology etc. This makes the emergence of new technology possible i.e. Information and Communication Technology (ICT) which is imperative for economic and social development of nations. The research problem is to find out how Information and Communication Technology (ICT) was embraced by some developing countries and find means by which Nigeria can benefit. The research objective is to examine the effect of globalization on Information and Communication Technology (ICT) in Nigeria. The scope of the study covers the period of 6 years (1999 – 2004). The methodology of the research was based on the secondary data and consider the number of telephone lines, GSM service providers etc. limitations of the study was lack of available data, time constraint and finance to make thorough research. Relevant terms were also defined.

Chapter two contains the review of relevant literature and theoretical framework. Literature review discussed the impact of globalization on Information and Communication Technology (ICT) in; Malaysia, South Africa and India also, the evolution of Information and Communication Technology (ICT) in the aforementioned countries. These countries used different incentives, which include financial and non financial in order to encourage investment/establishment of ICT related industry. These incentives include: zero income tax for a period of 10 years, a 100% investment tax allowance and R&D grants, unrestricted employment for foreign knowledge workers, unrestricted ownership etc.

The evolution of Information and Communication Technology (ICT) has affected all facets of life. In Nigeria, ICT evolution changed the available technology, the means and methods of studying, the modalities of school operations, and manner of investment. The ICT evolution has made countries to formulate enabling policies, provide infrastructures and developed strategic compact to fully developed the ICT sector, these countries include Malaysia, South Africa and India.

Theoretical framework discussed issues such as; concept of globalization, useful concept of Information and Communication Technology (ICT), merits and demerits of globalization as well as that of Information and Communication Technology (ICT), unique characteristics of ICT and Information and Communication Technology (ICT) for specific developmental goals. Merits of Information and Communication Technology (ICT) include: it offers opportunities to developing countries and other participants, attract Foreign Direct Investment (FDI) etc. While demerits includes; cyber terrorism, encourage moral decay, etc. Information and Communication Technology (ICT) has certain unique characteristics these are: key enabler in the creation of network, foster dissemination of information, increase in efficiency and costs reduction etc. ICT can be used for specific developmental goals i.e. ICT can be used in five specific areas namely; education, health, economic opportunity, empowerment and participation and ICT for environment.

Chapter three focused on the background of Information and Communication Technology (ICT) in Nigeria. The benefits of ICT to Nigeria, problems of ICT in Nigeria and the National Information Technology Policy. Communication in Nigeria before the introduction of GSM was inefficient and grossly inadequate. There was only 55 digital telephones, 400,000 lines connected only 50% were working Information and Communication Technology (ICT) has many benefits to Nigeria; transformation of the available technologies, the means and methods of studying, manner of investment and expenditure of resources, provision of employment, online banking services, internet services etc. Problems of ICT in Nigeria include: poor infrastructure, low teledensity, insufficient trunks leading to congestion, insufficient bandwidth etc. Objectives of ICT in Nigeria include: to empower local production and manufacture of IT components in a competitive manner, to empower Nigerians to participate in

software and IT development etc. National Information Technology Policy was approved in 2001 and consists of 16 chapters.

Chapter four focused on research methodology which consists of general research methods, research methods used for data collection, data collection procedures and methods used in analyzing data.

Methods of conducting research can be historical which is concerned with the understanding the present, past and predict future by evaluating records. Survey research consists of gathering data from a large number of respondents which constitutes a sample. This can be done in three different ways i.e., case study, longitudinal analysis and cross-sectional analysis. Experimental research attempts to the question, if this is done under carefully controlled conditions, what will happen? The methods used in data collection can be through documentary sources, observations and questionnaire. Data collection procedures deal with the sampling procedures. And the methods used in analyzing data are descriptive statistics and inferential statistics.

Data presentation, analysis and findings of the study is the main focus in chapter five, and addresses issues like impact of liberalization of Telecom industry in Nigeria, GSM Roll-out, growth in telephone subscriber and teledensity in Nigeria, growth in Internet users and penetration and VSat Networks, impact of competition on tariffs, changes in connection and airtime charges for mobile in Nigeria and infrastructure expansion and revenue generation.

As a result of liberalization of Telecom industry, 21 private operators added about 520,000 new lines (increase by 51%) of the total fixed lines. Nigerian Communication Commission auctioned four (4) licenses to operators to roll-out a GSM network for the country. There is rapid growth in telephone and teledensity in Nigeria since the introduction of GSM in 1999 total fixed lines was 473,316 while mobile lines was 35,000, teledensity was 0.42 but by the end of 2004 total fixed lines was 1,027,519 while mobile lines reached 9,174,209 lines with teledensity of 8.5. Internet services increases by 200% from 18 in 1999 to 36 in 2004, while the penetration rate was 0.1% in 2000 but rose to 1.4% by the end of 2004. Competition has caused a drastic reduction in both connection and airtime charges for both fixed and mobile telephones. Infrastructure expansion was successful, especially in digitalization of lines. This recorded an increase of 6.78% between February and October 2001 and the total installed capacity as at

December, 2001 was 727,308 while the total connection on the same date was 457,308. The revenue generated as at October, 2001 was approximately N38.34 billion.

6.3 CONCLUSION

It is evidenced from the data gathered and analysed that the National Information Technology Policy approved in 2001 and its policy provisions have not been achieved, for example, there is a policy to establish an IT Parks for federal/state/local governments. Unfortunately up to the time of writing this report the federal government has not established its own, and among the states only Jigawa and Akwa Ibom States have established their IT Parks. Also, the strategy of planning, designing and configuring a scalable National Information Infrastructure Backbone to achieve a minimum capacity of 2.5 Gbps using combination of optical fibres, satellite communications and wireless technology is yet to be achieved.

As a result of liberalization of Nigerian communication caused positive result; increase in the number of 21 private operators, increasing of 51% of fixed telephone lines. Licensing of 4 GSM operators. This brought about a lot of advantages in the telecommunications; increase in telephone lines with about 9.1 million lines which makes the teledensity to 8.5 from 0.42 in 1999. Vsat networks was not available in 1999 and 2000, but in 2003 there were 51 and 52 in 2004, Internet services was 18 in 1999 while by the end of 2004 there were 36, that is, increased by 200%. Competition has drastically reduced the tariff for both fixed and mobile telephones connection and airtime charges. Expansion of infrastructure, engineers from the Mobile Directorate re-planned the TACS network and implemented the frequency, bandwidth for Areas III and I. This made the launching of GSM possible.

There has been local assembly of branded computers and accessories by Nigerian companies, among which are Zinox Technologies Limited. Other indigenous vendors like Omatek and Unitec have also launched their own brands of locally assembled computer systems.

The Federal Ministry of Education has made significant progress in the planning and implementation of the following ICT-driven educational programmes/projects:

- The National Virtual Library Project
- Education Management Information System (EMIS) Programme
- The National Open University of Nigeria, and
- Distance Learning Programmes.

6.4 RECOMMENDATIONS

Information and Communication Technology (ICT) is an emerging technology that is vital to social and economic development of every country in the world. ICT's contributions to economic development cannot be overemphasized, for the fact that; in India software exports and earned over US $4 billion in 1999-2000 representing an annual growth rate of over 50%. For Nigeria to reap the benefit derivable from ICT sector, there are needs to:

1) Improve on power supply in the country, as there is low inadequate power supply and improve railway infrastructure. This is basic for any country to be an industrial country (see chapt. 3, National IT Policy chapt. 2).
2) There is the need to revisit the National Information Technology Policy that was; it is now four years after its approval, but some of the policy provisions were not achieved. This shows poor implementation of this policies (see chapt. 3: National IT policy).
3) Funding is also inadequate, this is because Information and Communication Technology sector is a sector which requires huge amount of capital investment for the sector to be viable (see chapter 3, National IT Policy chapt. 16; Strategies xxv).
4) There is the need to restructure National Information Technology Development Agency (NITDA) and assign adequate responsibilities as regards Information and Communication Technology (ICT) development in Nigeria (see chapt. 3; National IT Policy).
5) The Government; Federation, State and Local should encourage the Nigerian companies that are locally assembling computers and accessories. This can be by buying their products and other incentives (see chapt. 5.7).
6) Federal Government should enter into agreement with the companies; Zinox Technologies Limited, Omatek, and Unitec for Research and Development, to a point where softwares can be manufactured in Nigeria and then exported to earn foreign exchange for Nigeria (see chapt. 5.7).

Obviously, when the above mentioned recommendations are considered and implemented Nigeria would be as Malaysia, India or even better than them. Because Nigeria has the resources both human and materials to fully benefit from the Information and Communication sector. This sector can equally earn foreign exchange for Nigeria as Petroleum or better than petroleum.

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