

**INFORMATION AND COMMUNICATIONS**  
**TECHNOLOGY SCIENCE AND MEDICINE IN THE**  
**21<sup>ST</sup> CENTURY NIGERIA**

**BEING PAPER DELIVERED**

**BY**

**ENGR ERNEST C. A. NDUKWE, OFR, FNSE, FNIM**  
**EXECUTIVE VICE CHAIRMAN/CEO**  
**NIGERIAN COMMUNICATIONS COMMISSION**

**AT A**  
**LANDMARK PUBLIC LECTURE EVENT**

**HELD BY THE**  
**COLLEGE OF MEDICINE**  
**UNIVERSITY OF NIGERIA**  
**ENUGU CAMPUS**

**ROTARY HALL, THURSDAY, OCTOBER 21, 2004**

## **GREETINGS**

Ikwu na Ibe, Ekene Kwam unu!

It is indeed a great pleasure to be here today as guest of the College of Medicine of the University of Nigeria, Enugu Campus.

It is an institution that I have been associated with for a very long period of time spanning over 40 years. My uncle Prof. Chukwuedu Nwokolo, is a Professor Emeritus of this institution. My elder brother Dr. Azu Ndukwe, the Chief Physician to the Vice President graduated from here and I was a regular visitor to the hospital during the period he served his housemanship. My younger sister, Dr. Chito Obowu and my sister-in-law, Dr. Mims Ndukwe also graduated from here. So did several cousins, relatives and friends.

As can be appreciated, I am from a family where the medical profession is very popular and the College of Medicine of the University of Nigeria no doubt has provided the environment for the required medical training. I am therefore happy to be here today.

I wish to thank the Provost of the College for this kind invitation to me to deliver this lecture on Information and Communications Technology, Science and Medicine in the 21<sup>st</sup> Century Nigeria.

**INFORMATION AND COMMUNICATIONS**  
**TECHNOLOGY SCIENCE AND MEDICINE IN THE**  
**21<sup>ST</sup> CENTURY NIGERIA**

**INTRODUCTION**

In the biological sciences, the word cell refers to a very small unit of a living matter. All plants and animals are composed of cells or cellular tissues. In the telecommunications world, the word cellular is used to refer to a communications network that is composed of interconnected radio communications cells. So cellular phones refer to wireless terminals which are phones built to work with a cellular network.

The global Information and Communications Technology (ICT) infrastructure is in fact composed a network of small networks or cells. A Wide Area Network (WAN) is in fact a connected network of Local Area Networks (LAN) or ICT cells. Just as a national telecommunications infrastructure is in fact a network of cells which can either be local exchanges or radio base stations (or cell sites).

The ICT cell just as in the biological sciences therefore describes a small unit of the ICT infrastructure that supports the networked information society of today.

In the 21<sup>st</sup> Century, information is at the very core of many human activities and to be a significant player in the information society of today, will depend on the speed at which information can be accessed and shared cost-effectively.

The ICT cells are the infrastructure supporting the Information Society of the 21<sup>st</sup> Century and together represent a sector where evolution is tremendously rapid.

In the modern world, ICTs have become a vital element in the infrastructure of nations and economies. Indeed, no modern economy can be sustained today without an adequate and pervasive ICT infrastructure. ICTs open the door to e-commerce, e-education, e-health, and e-government.

In the new world order that is driven by knowledge and exchange of information and ideas, surviving in today's information age therefore depends on access to national and global information networks.

# **ICT & DEVELOPEMENT**

## **Economic/Industrial**

ICTs have had a major impact on the full spectrum of commercial activities throughout the world. It is now accepted that the productivity and competitiveness of all economic sectors and their capacity to innovate in terms of products, services and processes increasingly depend on Information and Communications networks. In manufacturing, ICTs are responsible for accelerating elements of the production process to improve quality and reduce inventory levels.

Computer networking has taken over localized computing all over the world thus allowing for resources and information sharing. The interconnection of computers and the internet have brought about greater efficiency and better information sharing and management.

Clearly, ICT is driving the new global economy. People, businesses and communities with ready access to information technologies are better equipped to participate actively in the global economy.

ICT networks are now making it possible for Nigeria to participate in the world economy in ways that simply were not possible in the past – by enabling her to take advantage of her intellectual, human, material and cultural resources.

International investors that demand efficient and reliable access to ICTs as basis for investing are now taking Nigeria seriously because telecom access is now more readily and speedily available.

### **Education**

The global economy today is based more than ever before on knowledge and innovation than natural resources and manual labour for wealth generation. Educated and well trained human capital has therefore become a primary determinant for economic development and international competitiveness.

Perhaps one of the most beneficial applications of ICT is in the education sector. Using ICT applications, a number of educational institutions are not only able to run courses concurrently, but lectures can also be received simultaneously, as they are being delivered, in different lecture rooms that are located in places far away from the actual point of delivery.

Distance education provides opportunities for learning to students, that for a number of reasons such as geographical distance to centers of education, work schedule, lack of financial resources etc, are excluded from the formal educational system.

The Internet has also become a Universal Library, where books, journals, articles and other materials can be sourced right within the confines of individual's homes in any part of the Globe. Education

today no longer begins and ends with school and university. Internet indeed has limitless potential for education and access to information.

At many Nigerian Universities, Polytechnics and secondary schools, students, lecturers, etc, can be afforded the benefits of constant and easy access to updated information on different subjects via the internet.

### **Transportation**

Transportation, as a medium of establishing contact between people and of exchanging goods, is another major beneficiary of developments in telecommunications. Be it in air, sea or land transportation, telecommunications facilities have been developed to facilitate these businesses. The commercial airline industry, for example, will certainly grind to a halt without telecommunications facilities. ICTs have already transformed airline booking systems permitting on-line reservation to be made in real time at a cost less than 10% of the non-computerised equivalent.

### **Governance and Government services**

Governance and the delivery of public services can be performed more efficiently through the use of ICT, which may include mobile/fixed telephony, internet, broadband and local/wide area networks.

A number of government agencies at federal, state and local government levels are deploying ICT facilities to improve service delivery, share of information, and reduce delay.

The place of telecommunications in the development of rural communities is also generally appreciated. At all levels, concerted efforts are being made at improving access to telecommunications services in the rural areas, hence the various Rural Telecommunications and Universal Service initiatives.

The availability of telecommunications services to rural communities is essential to Nigeria with about 80% of our population located in rural areas. Improvement in communications links to our rural areas is set to bring the following benefits of rural telecommunications to the populace:

- (i) Improvement of the living conditions of the people in the rural areas by allowing them to communicate easily amongst themselves and with relatives, friends and business associates living elsewhere.
- (ii) Easier and faster access to up-to-date market and price information thereby assisting farmers and rural-based traders in their businesses.
- (iii) More rural businesses and better employment opportunities that can greatly reduce the problem of rural-to-urban migration.

- (iv) Better access to agricultural extension services such as prompt information on improved seeds, availability of fertilizers, weather forecasting and pest control.
- (v) Improved health services including remote diagnosis and treatment advice.
- (vi) More efficient handling of civil emergencies and natural disasters.
- (vii) Wider access to education resources, especially through distance learning.
- (viii) Easier access to government and wider awareness of government programmes and activities.
- (ix) Enhanced security of lives and properties.
- (x) Improved patrolling and monitoring of border villages and towns.

## **ICT & MEDICINE**

### **Telemedicine**

The development of mobile communications, teleconferencing facilities, multi-media capabilities of telecommunications and the internet, has been of immense benefit in healthcare delivery. By this revolution, spatial differences between medical specialists, medical centers and patients have been eliminated. ICTs permit valuable professional expertise to be made available to remote areas.

It has now become a common phenomenon for doctors on call duty not to be restricted to their homes waiting for a call or within the coverage distance of a local paging facility. Today the doctor on call can move freely with his/her mobile phone and can easily be reached, in case of emergency, to give initial instructions on how to manage the patient while he is on his way to the hospital if necessary.

Through the internet, it is possible to set up facilities for intensive patient monitoring service which can enable doctors to watch their patients at a remote site, monitor their vital signs in real time as well as give advice for treatments. ICTs can also be used for exchange of information between different health professionals. For example, they can be used to transfer patient information between different sites thereby improving clinical effectiveness.

With broadband facility and video conferencing, doctors in one part of the country, or in any part of the world for that matter, can consult with other specialists in any part of the world on any medical case of interest.

### **E-medicine**

Medical equipment is becoming increasingly more sophisticated principally as a result of advances in ICTs. However, while these systems offer powerful tools for diagnosis; they require certain economies of scale for their effective usage. Tele-radiology offers an effective means for achieving this by giving wider access to diagnostic equipment.

ICTs also offer a powerful capability for simulation and modelling in the medical sphere. Surgery can be made easier and more effective by giving surgeons the ability to visualize the area of the body that will be the subject of the operation. Using the endoscope, images of tumours or other areas of abnormal growth can be obtained with minimal surgical interventions

There are also a range of information, transaction and technology solutions that help consumers, physicians, providers and health planners navigate the complexity of the healthcare system including software solutions that facilitate medical practice generally. 'Clinical Chart' for example, is a full suite of electronic medical records applications that allows healthcare providers to computerize their patient records without disrupting the way they practice medicine,

thus providing a seamless transition from the paper chart to the fully electronic medical record. It also embodies a powerful clinical tool that brings a snapshot of the patient's medical record to a single screen and gives the healthcare provider instant access to almost any level of underlying detail. Often used as a main menu, the 'Chart view' allows providers to view and modify many different components of a patient's medical record including recent health factors, lab results, medications, and other components of the chart.

## **CONCLUSION**

In Nigeria today, our daily activities such as shopping, banking, entertainment, office work, healthcare delivery, governance and even commuting are increasingly becoming dependent on information and communications networks.

The rapid deployment of digital mobile services across Nigeria and speed at which they are being subscribed to, has demonstrated the importance of ICT services to the people. Access to telecommunications and information technology holds the key to the nation's ability to respond to the demands of its position in the new world order.

Regrettably, many of our educational institutions still do not have ICT facilities that they require to access up to date information to enable

them sharpen their skills, exchange ideas with colleagues, and teach well. Good education is a key factor in the knowledge based information society of today in determining who will succeed and who will be left behind.

Government must as a matter of priority ensure that all educational institutions (schools, colleges, universities and public libraries), no matter how remotely located are ICT enabled with computers and fast broadband internet connections. By so doing we can have the future generation adequately prepared for the information age. Education, exposure and training are essential to transfer the ICT skills to the young people to enable them make the most of the opportunities brought by internet and facilitate the bridging of the digital divide.

The Government of Nigeria is conscious of the role ICT can play in national development and is therefore committed to ensuring that telecommunications and information technology facilities and services are expanded rapidly.

Since the democratic government of President Obasanjo was ushered in on the 29<sup>th</sup> of May 1999 and the giant leap in the telecommunications industry, the attention of the world has returned to Nigeria as the Country with the highest potential for investment in the continent.

Nigeria today has attained a subscriber base of over 8 million lines, about 7 million of which were digital mobile lines. This no doubt is a

major leap forward from a level of less than half a million lines only four years ago. Cost of connection to mobile lines has also crashed to such a level that sim packs are now available virtually free of charge. However there still remains a lot to be done. We still need a pervasive fiber optic transmission infrastructure spanning across the whole of Nigeria. We still need a much higher penetration of internet and broadband facilities at business premises, educational institutions and homes. An information economy can only be built on a solid and dependable ICT infrastructure.

While we are increasing access to and the use basic telephone services, the more advanced countries are increasing access to new technologies such as internet and broadband at such an exponential rate. As at March 31, 2004, the total broadband connections worldwide had reached 111.7m lines. The world's biggest or "G7" economies are now in the broadband "top ten". Broadband is no doubt an accelerator of social and economic development in the modern world with its applications enabling economic and social benefits such as Public Safety, National Security, Telemedicine, E-government, distance learning, utility applications etc.

There is already a major broadband divide between Africa and the rest of the world. There is therefore an urgent need to initiate national policies aimed at promoting ubiquitous broadband deployment. We must continue to work hard at narrowing the information gap to make sure that Nigeria is a knowledge centre in the information age.

Referring back to the ICT cell concept I described earlier on, it is perhaps common knowledge that our medical facilities and hospitals nationwide are generally not well equipped and leave much to be desired. It may therefore be pertinent at this point to enquire about what type of ICT cell exists at the College of Medicine, UNEC. The ICT cell ideally should be of such a standard that it empowers students and staff to participate effectively in the global information society. Could the College of Medicine at UNEC be aiming at being an oasis of sanity in the desert of inadequacies? I believe it is possible to establish that oasis within a short time if there is the will. It will indeed be my pleasure to be part of that process of establishing that ICT cell of international standard for the College of Medicine, UNEC.

The Nigerian Communications Commission is committed to ensuring a regulatory environment that will continue to accelerate the creation of a robust, pervasive and ubiquitous ICT infrastructure across the nation in the next few years. This is essential to drive socio-economic development and improve the living standards of the citizenry. Access to modern telecommunications services should necessarily be within easy reach of every person, corporate or individual, that lives within the shores of the 21<sup>st</sup> century Nigeria.