ICT Development And Future Plans in Africa

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"School on Digital Radio Communications for Research and training in Developing Countries"

TRIESTE, ITALY

09TH-26TH FEB, 2003

Introduction

- There is no doubt that ICTs hold the promise of transforming the ways we live into new and more powerful ways.
- ICTs as a major facilitator in socio-economic development now play a major role in education, learning and research, agriculture, health, commerce and poverty alleviation.
- In spite of these enormous advantages, Africa as a continent is still besieged by poor infrastructural facilities in ICT.
- The continent therefore started later than the rest of the world in imbibing ICT as a tool for development and economic emancipation.
- But lately, there has been rapid changes in the rate of ICT development in the continent compared to what was obtainable some few years back.
- Africa is trying to "bridge the apparent digital divide" through marshalling resources to use ICTs for improving development.
- ICT is a convergence of Information, telecommunications, broadcasting and computers.
- With this convergence, ICT now embraces a large range of industries and services hence National Information and Communication Infrastructures must be developed

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African ICT Status
General

- Of the approximately 816 million people in Africa in 2001, it estimated that only:
  - 1 in four has a radio (200 million);
  - 1 in 13 has a television (62 million);
  - 1 in 35 has a mobile telephone (24 million);
  - 1 in 39 has a fixed line (21 million);
  - 1 in 130 has a personal computer (PC) (5.9 million);
  - 1 in 160 uses the Internet (5 million);
  - 1 in 400 has pay-television (2 million).
- These figures do not take into consideration the widespread sharing of media that takes place in Africa.
  - 10 people may read the same newspaper or share an Internet account.
  - A whole village may use a single telephone line or crowd around a television set at night.

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African ICT Status
General

- It is still misleading to generalise about Africa based on these statistics.
- The average given above obscure the great variation between countries.
- There is a marked divide in development efforts between the urban and rural areas.
  - Majority of Africans(70~80%) reside in smaller communities scattered across vast rural areas but in most countries, more than 75% of the telephone lines are concentrated in the capital city.
  - Irregular or non-existent electricity supplies are also common in Africa, especially outside major towns.

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African ICT Status

Internet Users

- In recent times, the Internet usage and its applications have continued to grow rapidly in Africa.
- In many countries in the continent the bulk of users who can afford a computer and telephone have already obtained connections.
- Each computer with an Internet or email connection usually supports a range of 3~5 users.
- Estimate is about 1 Internet user for every 250 people in Africa outside North and South Africa compared to the world average of 1 user in 15 people.

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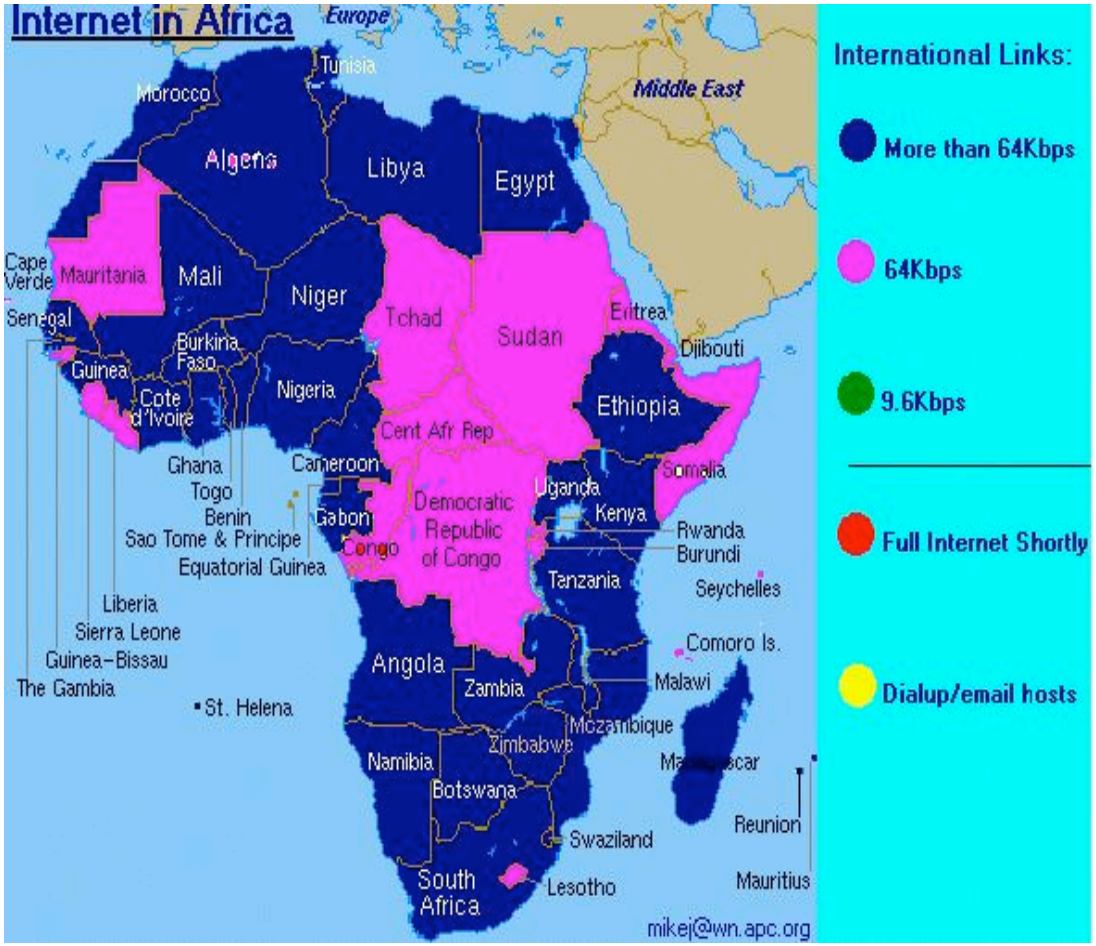
African ICT Status

Internet Status

- **Characterised by a large number of shared accounts and high use of public access services.**
- **Significant improvement in International Internet bandwidth: 750 Mbps in 2001 ~ 1,500 Mbps in 2002**
- **The 28,000 Km SAT-3/WASC/SAFE submarine network launched in 2002 added 30Gbps to the Internal bandwidth capacity of the continent**



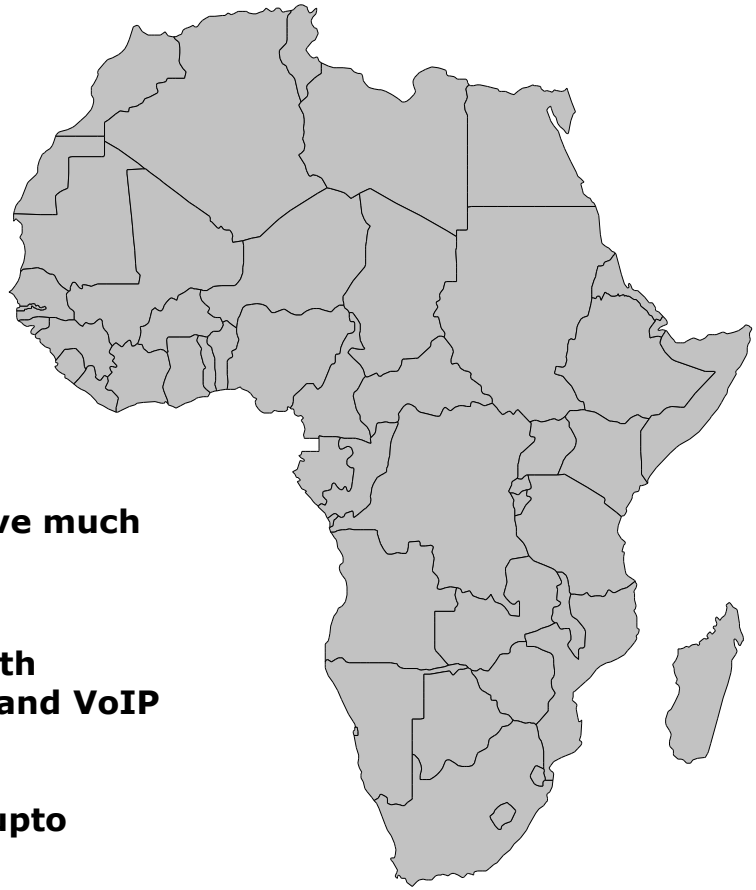
Source: www.apc.org

African ICT Status

Internet Statistics

- **There are about 39 countries in Africa with 1,000 or more dialup subscribers.**
- **20 Countries with more than 5,000**
- **16 countries with 10,000 or more subscribers.**

A number of countries in North Africa and South Africa have more highly developed economies and better infrastructure – resulting in larger populations of Internet users.



There are few surprises though;

Countries like Senegal and Cape Verde have much higher levels of connectivity than their GDP/Capita would suggest

Nigerian Internet market is opening up with thousands of cyber café offering Internet and VoIP services.

The GSM subscriber base has increase to upto 2million in less and 3years.

There is also a new national operator – GlobaCom to compete with the incumbent National operator – NITEL.

African ICT Status

Internet Statistics

- Nevertheless, some cellular operators are providing value added services, such as data transmission, short message sending, WAP based Internet access and even financial transactions.
- While data transmission is limited to 9.6Kb at the moment, the new GSM data protocol, GPRS, will soon be widely available in places like South Africa, which pushes data speeds to 384Kbps.
- This will substantially advance the utility of the GSM network, especially when combined with the sophisticated GSM handsets that are essentially becoming a multi-function personal computing and communication device.
- Smart-cards or "scratch-card" and other PIN-based public and cellular phone are becoming more widely adopted across the continent, creating a new revenue stream in the sale of telephone air-time by small shops and telecentres.

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African ICT Status

Bandwidth

- The use of fibre optic cable for international traffic is still in its infancy in Africa and most international telecom connections are carried via satellite.
- Currently, 2 submarine cables provide some international fibre connectivity to Africa.
- These cables are Sat-2/3 WASC, and SEA-ME-WE1/2 connect most of the North African and West African coastal countries from South Africa to Morocco, to the global backbones in Europe.
- All remaining international bandwidth is provided by satellite providers, primarily Intelsat, New Skies and Panamsat.
- According to the ITU, the total number of 64Kbps international circuits in Africa was close to 59 000 in 2000, 4% of the world total.

African ICT Status

ICT Training

- Currently the availability of specialist training in telecommunications is extremely limited on the continent.
- In Africa there are only two major regional centres for training in telecommunications - ESMT in Senegal for francophone countries and AFRALTI in Kenya for Anglophone countries. Through an ITU support programme they are expected to be transformed into Centres of Excellence in Telecommunications Administration (CETA).
- CETA is intended to provide senior-level, advanced training and professional development in the areas of telecoms policies, regulatory matters and the management of telecommunications networks and services.
- The National Information Technology Development Agency (NITDA) is collaborating with Hewlett Packard (Hp) in setting up six pilot centres of excellence around the six geo-political zones of the country. The centres will offer specialised training in various areas of Information Technology and Telecommunications.
- A number of telecommunication operators maintain their own training schools but these usually suffer from the same lack of financial resources being experienced by the operators themselves.
- In Nigeria, the Nigerian Communications Commission (NCC) recently put up a International Training Institute for telecommunications training. The centre will start operations in few weeks.

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African ICT Status
Broadcasting

- Radio Communication
  - Radio communication is the most dominant mass medium in Africa - there are over 200 million radio sets in the continent and only about 62 millions TVs.
  - Liberalization of this sector in many countries has resulted in an increasing number of commercials stations.
- Satellite-based broadcasting has seen major activity on the continent in the last few years.
  - M-NET digital-to-home subscriber satellite service DSTV offers over 30 video channels and 40 audio programmers in both C-and Ku-bands.
  - South Africa's Public Broadcaster (SABC) offers satellite-based news and entertainment channels
  - North Africa receives Direct-to-home (DTH) TV broadcasts from Egyptian Nilesat – capable of 72 simultaneous digital TV programmes.

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African ICT Status

Broadcasting

- US-based company, World Space, launched a digital radio broadcasting satellite AfriStar in late 1998.
- AfriStar now broadcasts about 40 channels using uplink hubs in South Africa, Ghana and London.
- World Space ultimately aims to make a suite of over 80 audio channels available to anyone on the continent who can afford a $50 special radio.
- Other features of the satellite include 128kbps CD quality music channels and data services through the Direct Media service.
- World Space has developed an Interface card and simple antenna that provides receive-only information from the Internet via their satellites.
- Subscribers to World Space can access information from the Internet by connecting the interface card to a computer.

African ICT Status

ICT Hardware and Software

- Statistics in 2001 has it that Africa has about 7.5 million personal computers.
- But due to limited capacities for industry monitoring and the large number of machines smuggled in to avoid duties, these figures are notoriously unreliable.
- Some studies, such as the ACCT (1995) survey, indicate that official figures may be an overestimate by between 3 and 6 times, making the average closer to 1 per 500 people.
- Account should also be taken of the number of users sharing a single computer, which is much greater than in the more developed regions.
- Almost all of the PC equipment uses Intel or Intel-compatible processors except for the publishing industry where there are significant numbers of Apple Macintosh PCs.

African ICT Status

ICT Hardware and Software

- With the great lack of resources in the public sector in Africa, the penetration of computers is generally much lower in government, with by far the majority of PC equipment being used by private companies.
- The limited number of database systems often use Microsoft Access, but many national documentation centres and archives, as well as small university and NGO libraries, use the UNESCO/IDRC developed ISIS / microISIS package for bibliographic data. Geographic Information Systems (GIS) and digitization facilities are beginning to be installed by some universities, and ministry planning departments and municipalities.
- Outside of South Africa there are only handfuls of mini and mainframe computers, and most of these are confined to Ministries of Finance for government payroll, and a few of the larger parastatals, telecom operators, banks and insurance companies.
- Few of the international companies operate offices in Africa, but Bull, Compaq, IBM, NCR, Oracle and Microsoft have some form of local representation in most countries. Microsoft now has its own offices in Cote d'Ivoire, Kenya, Morocco, Nigeria and South Africa.

Problems with Diffusion of
ICTs in Africa.

- **Communication Regulatory environment.**
- The national regulatory environment in Africa varies greatly, from relatively open competition in Internet service provision or even mobile services and local loops to long-term monopolies in all these areas.
- The extent of the existing ICT infrastructure and the cost of access to it. This affects both the potential new entrants in the provision of basic services and those to provide value-added services.
- The existing usage of the radio spectrum. Many of the countries in Africa do not have adequate facilities to manage their radio spectrum allocation for use by telecommunications and Internet operators, either nationally or regionally. This has resulted in congestion in some wavebands and lack of a transparent process and difficulties in obtaining spectrum from the regulators.
- The market orientation and openness of the national government to private sector investment. Many countries in the continent are still coming up from "nationalisation era" and many sectors of the economy are still dominated by inefficient parastatals with close links to government executives.

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Problems with Diffusion of
ICTs in Africa.

- The general investment climate in the country, such as the level of inflation, import duties, access to local capital and foreign currency
- The resources the national government and their international cooperating partners are allocating to national information and communication projects.
- **Electricity Supplies**
  - Irregular or non-existent electricity supplies are a common feature and a major barrier to use of the ICTs, especially outside the major towns. Many countries have extremely limited power distribution networks, which do not penetrate significantly into rural areas, and power sharing (regular power outages for many hours) is a common occurrence.
- **Transportation**
  - The road, rail and air transport networks are limited, costly and often in poor condition, resulting in barriers to the increased movement of people and goods, needed both to implement and support a pervasive ICT infrastructure.
  - Also for the increased economic and social activity which would be stimulated through greater use of ICTs. Congested border posts and visa requirements add to these difficulties. These barriers make it all the more difficult for e-commerce and other Internet-age developments to blossom.

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ICT Development in Africa

Present & Future Prospects

Access to the Internet

- In Sub-Saharan Africa, Internet can actually help break the deadly information famine that besets the continent. Some of the recent trends attests to that:
  - In National Library of France's paper archives, scanned pages are beamed by satellite from Paris to the data centre in Rabat where they were processed by a large team of low-cost keypunchers and then sent back.
  - In Senegal, more than 10,000 small businesses across the country that provide public telephone services now provide Internet access and other PC-based business services.
  - The African Virtual University (AVU) project, based in Nairobi Kenya has over 34 Learning Centers in 17 African countries. Students are linked to classrooms and libraries world-wide via satellite..

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Access to the Internet

- Craft-makers around Africa are selling their wares all over the world via the Internet through such non-profit groups like **PeoplLink**, which sends digital cameras into the bush so that pictures of the crafts can be emailed back to the web site (www.peoplelink.org).

- Miners use the AfriOne Internet Centre in Jos, Nigeria as a showcase for selling their merchandise to foreign prospectors. Using the facilities in the centre, they scan pictures of their wares which are then sent electronically to their overseas customers. Valuing and other negotiations are done through emails and business conducted through different forms of electronic money transfer.

- Products from research efforts like the web-to-email should be exploited for low bandwidth access to the Internet. www4mail is an Open Source application written in Perl. It was developed at The Abdus Salam International Centre for Theoretical Physics (ICTP).

Solving Connectivity Issues

- Satellite Technologies
  - **VSATs:** Small satellite earth stations operating with GEO satellites can be used for interactive voice and data communications.
  - 2-way C-Band satellite-based Internet services using VSATs connected to US and Europe has been quickly adopted by African ISPs wherever regulations allow.
  - Nigerian PSNET is based on VSATs and has connected 9 states of the federation, with the Federal Government.
  - **Internet via Satellite**
    - **DirecPC :**Uses a combination of VSAT high-speed downlink and telephone line upstream connectivity.
    - **High Bandwidth LEOs** being planned to provide bandwidth on demand Internet access, video conferencing and distance education.
    - **Others include the GPRS, Store-and-Forward Messaging etc.**

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Solving Connectivity Issues

- **Wire-line Technologies**
  - **ISDN Services: Have not been available in most parts of africa. But are now available in Botswana, Cote d'Ivoire, Egypt, Kenya, Ghana, Mauritius, Morocco, South Africa etc. Except in SA most of these countries don't have ISPs capable of providing ISDN connections.**
- **Digital Subscriber Line (DSL):** Capable of providing data rates of up 1.544Mbps over existing copper wire line.
- Other technologies that could be used in improving connectivity in developing countries include:
  - **Digital compression, Internet telephony (voIP)**
  - **Community Radio for broadcasting educational radio programmes for small communities.**
  - **Inmarsat Regional BGAN which delivers GPRS-compatible data services in up to 99 countries worldwide.**

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Governance and Policy Issues

- Poverty could be blamed as one of the major impediments to Internet use in Africa, but it isn't…African governments are big barriers to progress in many areas of ICT development.
- Moribund state-owned monopolies that are wary of change for a long time has hampered ICT development in many countries in Africa especially sub-saharan Africa.
- Fortunately there has been some signs of progress.
  - Six years ago, only 11 countries had any Internet access at all.
  - Now all the 54 countries in the continent have permanent connections to the Internet.
  - Nigeria with a fifth of sub-sahara's population is opening up its Internet market.
  - Many African administrators are beginning to streamline their operations and improve internal efficiencies by adopting ICTs.

Academia

- The Internet has become a major tool for research and collaboration within the academia.
- It is becoming increasingly important to support the large number of scientists working in remote areas and having low bandwidth access to the Internet.
- But adequate network capacity or performance and awareness alternatives make it impossible for many scientists in Africa to benefit from electronic science.
- Efforts however have been made from various research centres to ameliorate connectivity problems experienced by scientist in africa. These include:
  - **PingER/eJDS Monitoring:** This application makes it possible for researchers in the world's poorest nations to receive scientific papers free of charge via e-mail based ICTP electronic Journal Distribution Service (eJDS)
  - **Virtual Laboratory Approach:** This geared at promoting research and education in developing countries through tools like
    - **Person-to-Person (P2P) communication tools**
    - **Shared Scientific data – synchronization**
    - **Shared WorkSpace tools**
    - **Instrument Control/Data Sharing tools and peer-to-peer co**

Check details in the main paper

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General Factors

- **Tax**
  - Most tax regimes still treat computers and cell phones as luxury items which makes these almost exclusively imported commodities all the more expensive and even less obtainable by the majority.
- **Brain-Drain**
  - Perhaps an even greater problem is that the brain drain and generally low levels of education and literacy amongst the population have created a great scarcity of skills and expertise (at all levels, from policy making down to end-user).
- **Bureaucratic Bottlenecks**
  - Finally, the general business climate for increased investment in Africa, acutely needed for the ICT sector, has suffered from the well known problems of small markets divided by arbitrary borders, non-transparent and time-consuming procedures, limited opportunities (due largely to the historic pattern of monopolies and high levels of state control), currency instability, exchange controls and inflation.

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General Factors

- The African Union and their programme, the New Partnership for African Development (NEPAD), supported by the international community, is addressing these systemic issues.
- This many-faceted effort is aimed at accelerating Africa's development and could as a result help to create an environment more conducive to the rapid adoption of ICTs.
- This great responsibility is vested on the ICT arm of NEPAD – the e-Africa commission.
- The e-Africa Commission will be responsible for developing policies and strategies and projects at the continental level as well as managing the structured development of the ICT sector in the context of NEPAD.

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Joining the Rest of the World

WSIS

- The WSIS process, which began about 2 years ago, had the 1st phase successfully cocluded in Geneva, Switzerland from 10-12 Dec. 2003. It involved a lot of preparatory meetings at both the national, regional and international levels.

- The most significant event to have happened to the global Information Society was the WSIS in the sense that all stakeholders came together to address how to solve the problem of digital imbalance i.e. digital divide between countries in the North and those of the South, between the richest and the poorest nations, between the haves and the have not; and even within citizens of the same nationalities.

- In Africa, the Bamako bureau came up with a declaration on African position. The 10 priority areas for Africa were formulated and fine tuned in Tunis for all Africa to gain advantage of the WSIS in order to leap from to the newly emerging information society.

- WSIS has brought the awareness to all African heads of government on the fact that they should definitely have a re-think and really focus on ICT development and deployment as the driving force for their economy.

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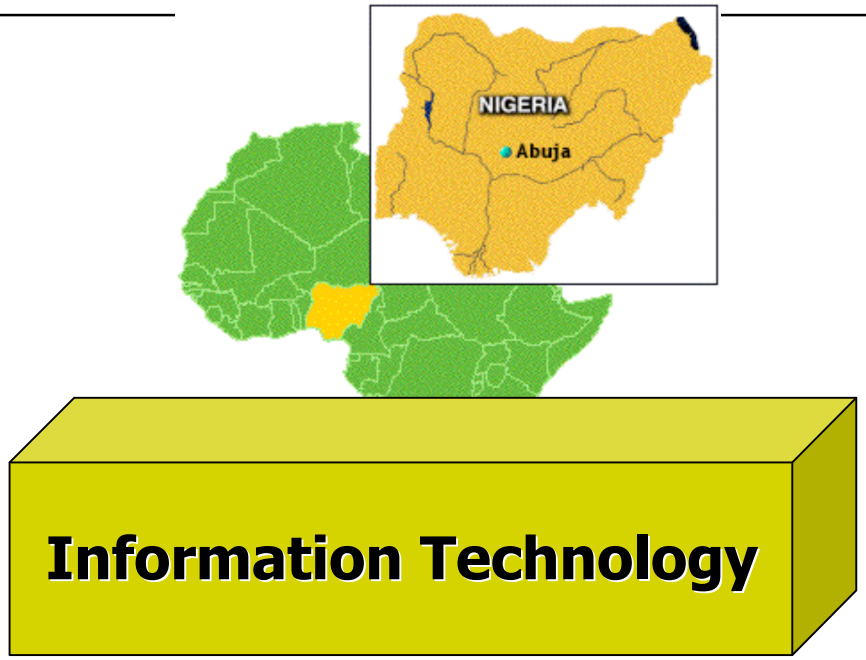
Some special events ICT targeted at ICT development



Training

- In accordance with the National IT Policy, NITDA has played strategic roles in fostering the development of IT human resources in Nigeria.
    1. NITDA has hosted many consultative forums with Stakeholders in Information Technology especially in the public sector to enlighten these decision makers on the need for IT based economic development.
    2. Been involved in a series of training programmes aimed at IT education to the youth, IT professionals and the public service stakeholders.
- Partnership with CISCO to roll-out local academies especially in the Institutions of Higher Learning for training of Networking Professionals.
    - The training has been quite successful at the NITDA headquarters in Abuja.
- Partnership with UNDP in the TICAD Initiative. The agency just concluded a training programme for 50 public servants and will soon train Legislatures in the Senate and National Assembly in the 2nd phase of the project.

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NITDA Projects
Mobile Internet Units - MIUs

- NITDA has constructed six Mobile Internet Units (MIU) to carry out ICT education and Internet awareness to the rural communities in the six geopolitical zones of the country.]
- The MIUs were commissioned by Mr. President in 2003.
- These units are buses with computer systems, printers, scanners, digital cameras, servers and other communication infrastructures like the VSAT terminals.
- They are designed to double as mobile Telecentres and Internet centres.

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NITDA Projects

Public Service Information Network – PSNET

- The project is being implemented in phases. Phase one has already commenced with the set up of the *Presidential Network*, which connects the Presidency, Vice-President's office, SGF, Ministers, Chief Economic Adviser, etc. This phase will also link up Federal Ministries in the Federal Capital Territory (FCT) Abuja.
- The Phase two of the project has also commenced. In this phase, various states are provided with intranets with central nodes at the various state capitals. Broadband Wireless Access, VSATs and optical fibre technologies provide the backbone for these networks.
- The Phase three will provide the infrastructure at the Local government level.
- Upon completion of these, the network at the three levels of government will be integrated and this will provide the infrastructure to implement the e-government project.
- Nine states are already part of the PSNET.

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Other Developments In The IT Sector

- In recent times there has been local assembly of branded computers and accessories by Nigerian companies, among which are Zinox Technologies Ltd. Other indigenous vendors like Omatek and Unitec and Beta have also launched their own brands of locally assembled computer systems.
- This is a good development that is certain to make it easier and cheaper for Nigerians to own their own computer systems. The slogan is that parents should spend their money to buy computer rather than purchasing expensive stereo systems or other expensive entertainment systems.
- This is a good development that is certain to make it easier for Nigerians to own their own computer systems.

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:
  - The National Virtual Library Project.
  - Education Management Information System (EMIS) Programme.
  - The National Open University of Nigeria and Distance Learning Programmes.
  - Computer in Schools Initiative.
  - Nigerian Universities Network
  - National Teachers Institute Teacher Training Programme by Distance Learning
- The core goals of these efforts is to improve the efficiency and quality of the educational delivery system at all levels using context-relevant ICTs.

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NITDA e-Government Strategy

- Work has already commenced to allow for a citizen-centred government through the e-government project. The Italian government is working with NITDA to deploy an e-government solution to Nigeria.
- A major e-government programme involves a consortium of private companies and 6 banks.
- The goal is to move the various ministries and agencies to the position where they no longer see themselves as separate and distinct entities but as one Government. One that collaborates, shares information, and leverages on the collective knowledge to provide the public with integrated services – conveniently, seamlessly, continuously, speedily, efficiently and effectively.

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Nigeria eGovernment model

- Covers a wide range of application areas including but not limited to
  - **eAdministration (citizen-centred admin, planning)**
  - **eStatistics (strengthening of FOS and other relevant government bodies)**
  - **eAccounting, budgeting and management**
  - **eEnterprise (National Data Bank)**
  - **ePopulation (Citizen registry)**
  - **eHealthcare delivery**
  - **Geographic Information System (e.g. Federal Survey Dept.)**
  - **eResources (Land and minerals registry, territory managments)**
  - **eTaxation and revenue management (On-line taxation)**

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Nigeria eGovernment model (contd.)

- eJudiciary (Court proceedings database)
- eLegislation (National Assembly online)
- eEducation (GUS, eLearning, Institutions)
- eCustom
- eMilitary
- National Information Infrastructure Backbone (NIIB) - Public Service network provides the connectivity of the eGovernment

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Thank you.

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