

ICT Infrastructures Available in Nigerian Educational and Research Institutes

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Abstract

The goal of this study was to evaluate the ICT facilities and information systems (databases) available in research institutes in Nigeria. In conducting this research study questionnaires, websites and personal interviews were used. The personal interviews were more fruitful than the questionnaire because of the “non disclosure of government information agreement form” signed by all government employees. Thus the results used for this study came from questionnaires and personal interviews. The regulatory body for tertiary education institutes in Nigeria did not have the requisite information thus only a few educational institutes are included in this study.

A number of challenges were encountered in this study. There was no detailed or current address available for locating the research institutes. Some of the institutes could not be located. The telephone numbers obtained for some of the institutes were non-functional or had changed. The questionnaire sent by email to respondents identified from the previous study bounced back or went unanswered.

Our findings showed that almost all the institutes have ICT facilities such as computing equipment, LAN and Internet provision equipment, but their use is limited. Most of the information systems available are mostly in paper-format, are segmented and are kept by the library and individuals. The computer-to-researcher ratio is very low in most institutes about 1 to 2.

Nigeria is involved in research in all aspects of science and technology, thus it has a large number of research institutes dedicated to these all over the country. The research institutes are supervised by related government ministries such as science and technology, agriculture and rural development, health, industry, power and steel, solid minerals and development and education.

Telecommunications has improved in Nigeria with the introduction of the global system of mobile communication (GSM). The country’s teledensity is about 9 and still growing. The country’s Internet connectivity is provided by the private sector and is available commercially to users through cybercafés.

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Chapter 1

Introduction

The Federal Republic of Nigeria covers an area of 923,768 sq. km on the shores of the Gulf of Guinea. It has Benin on its Western side, Niger on the North, Chad to the north-east and Cameroon to the east and south-east. Nigeria is located on Latitude 10^o N and longitude 8^o E. Its November 1991 census stood at 88,514,501 and has risen above 120 million. It is the most populated country in Africa. Its population is extremely diverse with well over 250 ethnic groups, some numbering fewer than 10,000 people. Ten ethnic groups including Hausa-Fulani, Yoruba, Ibo, Kanuri, Tiv, Edo, Nupe, Ibibio and Ijaw account for nearly 80% of the total population. Most of its population is concentrated in the southern part of the country, as well as in the area of dense settlement around Kano in the north. Between the two areas is a sparsely populated middle belt.

Nigerian Educational and Research Institutes

The Nigerian government supports research into all aspects of science and technology. There are about sixty-five (65) research institutes and more than sixty-three tertiary educational institutions. The list and the mandates of all the institutes is given in appendix B. The educational and research institutes are designated as parastatals that are placed under the supervision of related government ministries.

The Federal Government of Nigeria is the major source of funding for all these educational and research institutes. Grants are awarded by international organizations such as the World Bank, IDRC, UN and USAID targeted at specific projects. Individuals within Nigerian educational and research institutes also receive grants, scholarships and fellowships that can be used for research work, to attend conferences and to obtain additional degrees.

This report has focused on just a few of the educational (universities) and research institutes.

In this report the following research institutes were evaluated:

1. African Regional Centre for Engineering Design and Manufacture (ARCEDEM), Ibadan
2. Raw Materials Research and Development Council (RMRDC), Abuja
3. Federal Institute for Industrial Research (FIIRO), Oshodi
4. National Center for Technology Management (NACETEM), Ile- Ife
5. National Information Technology Development Agency (NITDA), Abuja
6. National Veterinary Research Institute (NVRI), Vom
7. Cocoa Research Institute of Nigeria (CRIN), Ibadan
8. Center for Energy Research and Development(CERDI), Ile-Ife
9. National Horticultural Research Institute (NIHORT), Ibadan
10. National Mathematical Centre (NMC), Abuja
11. Nigerian Institute of Pharmaceutical Research and Development (NIPRD), Abuja.
12. National Office for Technology Acquisition and Promotion (NOTAP), Abuja.
13. Nigerian Building and Road Research Institute (NBRRI), Ota
14. National Space Research and Development Agency (NASRDA), Abuja.
15. Sheda Science and Technology Complex (SHESTCO), Abuja.
16. Project Development Institute (PRODA), Enugu.
17. National Research Institute for Chemical Technology (NARICT), Zaria.
18. Geological Survey of Nigeria (GSN), Abuja.
19. National Universities Commission (NUC), Abuja
20. Centre of Adaptation for Technology (CAT), Awka
21. Bio Resources Development Centre (BRDC), Odi
22. Scientific Equipment Development Institute (SEDI), Enugu
23. Engineering Materials Development Institute (EMDI), Akure
24. Forestry Research Institute of Nigeria (FRIN), Ibadan
25. University of Ibadan (UI), Ibadan
26. University of Lagos (Unilag), Akoka
27. University of Benin (Uniben), Benin
28. Obafemi Awolowo University (OAU), Ile-Ife
29. University of Jos (UJ), Jos
30. Federal University of Technology, Akure (FUTA)

31. Kano University of Science and Technology, Kano

Some organizations were earlier identified to be investigated, but when it was discovered that they were not educational or research institutes of the government we did not investigate them further. The institutes are:

1. National Communications Commission (NCC), Abuja
2. International Institute of Tropical Agriculture (IITA), Ibadan
3. National Data Bank, Lagos
4. National Agency for Food and Drug Administration and Control (NAFDAC), Abuja
5. Standards Organization of Nigeria (SON), Abuja
6. Federal Environmental Protection Agency (FEPA), Abuja
7. National Library, Abuja

The use and practice of Information and Communication Technology in Nigeria is governed by the following Acts and Policies:

1. Information Technology Policy 2002
2. National Science and Technology Policy
3. Communications Act, 2003, and
4. Information Technology Bill 2005 (yet to passed into law)

STUDY METHODOLOGY

The methodology adopted was the use of a questionnaire to assist in the information gathering process; however this method proved inadequate when it led to delays. The questionnaires were caught up in bureaucratic processes and those sent by email to the institutes bounced back. Most of the institutes personnel met preferred to give information informally.

Thus, the information used for this report comes from interviews, websites and the questionnaire.

Chapter 2

ICT Services Available in Educational and Research Institutes

In most of the educational and research institutes visited, the ICT infrastructures had just been put in place. There had been computer systems available for so many years but their use was limited to word processing. The ICT drive in most of the educational and research institutes visited is on Internet service provision. A lot of the institutes have achieved this using government allocation, privately or internationally sourced funds and grants.

All the educational and research institutes visited had computing equipment, such as computer systems, printers and scanners, while the provision of Internet service in most of the institutes is a recent development.

Table 1: ICT Services Available in the Institutes visited

	Computers	LAN	Email	Internet	Website	WAN	Database	Intranet
ARCEDEM	Yes	No	No	No	No	No	Administration	No
RMRDC	Yes	Yes	Yes	Yes	Yes	No	ICT Unit	No
FIIRO	Yes	Yes	Yes	Yes	Yes	No	Individual	No
NACETEM	Yes	Yes	Yes	Yes	Yes	No	Administration	Yes
NITDA	Yes	Yes	Yes	Yes	Yes	No	Distributed	No
NVRI	Yes	No	Yes	Yes	Yes	No	Planning Dept.	No
CRIN	Yes	No	No	No	No	No	Individual/Library	No
CERDI	Yes	Yes	Yes	Yes	No	No	Individual	No
NIHORT	Yes	Yes	Yes	Yes	No	No	Individual/Library	No
NILST	Yes	Yes	Yes	Yes	No	No	None yet	No
NASENI	Yes	Yes	Yes	Yes	No	No	Individual	No
SHETSCO	Yes	Yes	Yes	Yes	Yes	No	Individual	No
NMC	Yes	Yes	Yes	Yes	Yes	No	Individual	No
NIPRD	Yes	Yes	Yes	Yes	No	No	Individual	No
FRIN	Yes	Yes	Yes	Yes	Yes	No	Individual/Library	No
NUC	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	No
PRODA	Yes	Yes	Yes	Yes	Yes	No	Individual	No
NARICT	Yes	Yes	Yes	Yes	No	No	Individual	No
NOTAP	Yes	Yes	Yes	Yes	No	No	Individual	No
NASRDA	Yes	Yes	Yes	Yes	No	No	Individual	No
NBBRI	Yes	Yes	Yes	Yes	No	No	Individual	No
EMDI	Yes	Yes	Yes	Yes	No	No	Individual	No
SEDI - E	Yes	Yes	Yes	Yes	Yes	No	Individual	No
CAT	Yes	Yes	Yes	Yes	Yes	No	Individual	No

BRDC	Yes	Yes	Yes	Yes	No	No	Individual	No
GSN	Yes	No	No	No	No	No	Individual	No
UI	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	No
Unilag	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	No
Uniben	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	No
UJ	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	Yes
OAU	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	Yes
FUTA	Yes	Yes	Yes	Yes	Yes	No	Distributed/Standalone	No
KUST	Yes	Yes		Yes	Yes	No	Distributed/Standalone	No

Table 1 above gives details of the ICT facilities available in Nigerian institutes.

Computers: There was a wide range of computing equipment available in the institutes.

Most institutes had a mixture of branded and assembled computer systems. The numbers of laptops in most institutes are very few. The computer-to-researcher ratio is very low, about 2:1 in most of the institutes. This may be due to lack of physical security at the educational and research institute or a low priority of computing facilities on the institute's lists of needs.

It was also discovered that the computing needs of the administrative staff have priority over that of research staff.

The National Universities Commission (NUC) recently carried out (January – March, 2005) an equipment audit, including computing equipment, of all federal universities. Access to this information was to be made available on the commission's website. However, on enquiry the information is yet to be processed

Local Area Network (LAN): Almost all the institutes have a LAN, which is usually wired.

The LAN may be restricted to the resource room, the library or the main building of the institute e.g. NIHORT, NACETEM, FIIRO. The LAN at NIPRD consists of several LANs in different buildings joined together by a wireless link. All the LANs are based on the 10/100 Mbps Ethernet technology.

Electronic mail (E-mail): Most institutes do not have their own email servers, thus they use the free web-based email services. The free web-based email service of Yahoo! is the favorite of most of these institutes. A few institutes, such as NIPRD and RMRDC, have mail servers set up. The sustainability of the email servers made the use of the institute's email services very limited, as personnel still prefer the free web-based email services. Technical ICT personnel and infrastructure such as electricity need to be available before this service can be sustained locally.

Internet Connectivity: About half of the research institutes in Nigeria have Internet access. This was done to facilitate access to information, improve research and teaching, and allow for collaboration. The Internet facilities available consist of a very small aperture terminal (VSAT) equipment (indoor and outdoor), a server, switch and computing systems in a LAN. The Federal Ministry of Science and Technology (FMST) is currently providing Internet facilities in all the research institutes under its supervision. RMRDC is at the forefront of this initiative. A report by the Partnership for Higher Education in Africa provides some information about the Internet connection level in Nigeria.

Website: Not all the institutes have websites, and those who have do not update them regularly. The content presented on most of the websites is not useful to researchers. The websites are usually in the global domain, but with the availability of the Nigerian domain (.ng) it is hoped that most institutes will migrate to this domain. Most of the websites are hosted outside the country for now due to the poor infrastructure in the country. A list of website addresses for some educational and research institutes is given in appendix B.

Telephone: Telecommunications services (fixed or mobile) are available at all the educational and research institutes. Almost all the fixed telephone lines of the institutes were

non-functional as most found the mobile system more convenient and less maintenance intensive. Some institutes which do not have access to fixed telecommunication services e.g. NMC, CRIN are using the mobile lines as official communication lines. The mobile lines are personalized thus making access to other officials in the institute who could assist difficult.

Wide Area Network (WAN): At the moment there is no data network connectivity between any two educational or research institute in Nigeria. The Nigerian Universities Network (NUNet) was proposed as a virtual network for all educational tertiary institutions in Nigeria. The status of this project is unknown.

The Federal Ministry of Science and Technology is currently developing a WAN for institutes involved in science and technology research. The institutes to be linked together include Universities, RMRDC headquarters and liaison offices, research institutes and international research centers. A total of 42 locations have so far been provided with Internet connectivity equipment. The project is being led and sponsored by RMRDC.

Databases: There is no central database in any of the educational and research institutes as administrative and scientific information are kept separately. The information is kept by units such as the accounts unit, personnel unit, library, and individual researchers. All the experimental data obtained during a research work is kept by the researcher who only makes it available to others through publications or when contacted by a researcher in the same area. Most of the information available is still being kept in paper form and the electronic version is difficult to locate on the computer system. Other forms of information storage include CD-ROM, flash disk, ZIP disk, diskettes and the hard disk. Bringing all the information together using ICT will require skilled IT staff and a new attitude to information storage and dissemination.

The Library in most institutes keeps a record of the publications in the mandate area of the institute. It is also the custodian of CD-ROM based information systems e.g. AGORA and CFIS, and acts as the facilitator for Internet access. The Library also receives a regular subscription to the major journal publications in the institute's area of specialization.

RMRDC has a central database of all Nigerian raw materials, processing techniques and publications about them, which it intends to make available via its website. The institute is waiting for its proposed WAN to function so that it can refer researchers searching for further information to the proper RMRDC station where more information will be available.

The National Data Bank, Lagos (www.nigeriandatabank.org) in conjunction with the Federal Office of Statistics (FOS) was proposed as a data bank for researchers on all aspects of the nation i.e. agriculture, economy, science and technology, education, solid minerals, tourism and health. The vision was however unattainable.

Two new initiatives are currently underway and their suitability will take time to judge. The first is called National Data Centre for Science and Technology (www.nadcest.gov.ng) which is a project of the FMST in conjunction with FOS. The second is the Nigeria Direct project recently launched by the Ministry of Information and National Orientation. It is web-based and the address is www.nigeria.gov.ng.

However, for all these ICT initiatives to be successful there needs to be a commitment to electronic information preparation, distribution and preservation. That is workers attitude to information should change instead of the previous attitude of "hoarding information means power."

The development of institutional databases will require that the following be considered

- it should be free
- should be web-based for unrestricted access
- should provide full bibliographic reference information

- provide current contact details of researcher
- provide publications and resume of researchers
- should follow international formats used in that area of research e.g. AGORA.

Intranet: An intranet is a network dedicated to the provision of local information for registered users of an establishment or institute. This was only available in two institutes, NACETEM and OAU. An alternative to the intranet, which is file-sharing was not used in almost all the institutes either for lack of knowledge or for security reasons.

Chapter 3

Sources of Information and Communication Technologies in Nigeria

The growth of ICT in Nigeria has been greatly enhanced by the private and financial sectors.

There are over 200 financial institutions (Banks, Insurance, Brokers) in Nigeria who have turned to ICT in order to improve their services and productivity, thereby boosting profit.

There are numerous sales outlets where hardware and software are sold to members of the public. Internet cafes now dot the landscape in all major cities and towns in the country and prices of computing equipment are becoming lower.

The Federal Government of Nigeria has a national policy on Science and Technology. The government has also developed an Information Technology Policy and Communications Act for the country since democratic governance was established on May 29, 1999. These documents have helped to focus the development and use of ICT products and services in the country. NITDA and NCC have been empowered to ensure compliance with these government policies.

The Nigerian Computer Society (NCS), Computer Professionals (Registration Council) of Nigeria (CPN), Nigerian Society of Engineers (NSE), Institute of Software Practitioners Organization of Nigeria (ISPON), Internet Service Providers Association of Nigeria (ISPAN), Ministry of Communications (MOC), National Information Technology Development Agency (NITDA) and National Communications Commission (NCC) are some of the bodies and associations involved in the regulation and provision of ICT services in Nigeria. It should be noted that the private sector has led in the sales and distribution of computing services.

Software Development

The software development sector of the ICT sector is on the rise. Many activities have been targeted towards this emerging sector and it is hoped that in the years to come, Nigeria will be able to export its software abroad.

The Nigerian Computer Society (NCS) and Institute of Software Practitioners Organization of Nigeria (ISPON) hold annual exhibitions where software developers are encouraged to showcase their products and services to the public. Also competitions are held among computer science students in tertiary institutions so as to sustain interest and recruit the new skills.

However, from this study it was observed that the researchers and the institutes all use off-the-shelf software. Microsoft Office is the default application software being used by many computer owners, while customized proprietary payroll application is being used in almost all the educational and research institutes.

Web Applications

The involvement of the financial institutions and the telecommunications sector in ICT in the country has led to the emergence of some activities in web application development. Some of the web applications available are used for mobile phone credit recharge, email alert on the mobile phone and text conversion from mobile phone to email and vice versa. The situation on ground however shows that these services are not being used by subscribers of the telecommunication networks because of the additional cost.

Most educational and research institute website are usually for presentation of information only, because no meaningful transaction can be done online. The development of e-commerce websites has been limited by the cautious nature of the financial sector about allowing electronic transactions on customer's bank accounts. With the introduction of debit cards (MasterCard & Visa) in Nigeria a rise in e-commerce web applications is expected.

The NUC is spearheading a virtual library for the academic institutes. This has been implemented.

Hardware Availability

The country has many companies involved in the sale and manufacture of all types and brands of computing hardware at reasonable prices. Because of the high volume of demand for computing equipment in Nigeria, a number of foreign ICT brand names have partnered with local business organizations in Nigeria to provide installation and after sales services to their customers.

All the established ICT brand names for printers, scanners, monitors, digital cameras, wireless LAN cards, processors to laptops produced by companies such as INTEL, AMD, DELL, HP, SOLARIS, COMPAQ, ACER, TOSHIBA, SONY, CANON, SAMSUNG and LITEON, among others are all available in Nigeria.

Also some local ICT firms, such as Omatek, Unitec and Zinox, have also gone into producing branded and customized computing equipment.

Consulting Services

The consulting aspect of the ICT industry is not fully developed yet or the companies just do their jobs and keep silent. Most of the companies in this field are still new and are yet to make their mark on the industry. A number of existing accounting consulting firms have created ICT units in their firms to provide ICT consultancy when needed. However, the trend in many organizations is to use the in-house expert to decide on their needs and implement.

The implementation can be done internally or outsourced.

Training Opportunities

There are a number of leading training institutions in Nigeria, some of which are franchises from other countries e.g. NIIT and APTECH. They focus on short (3 months) and long-term

(6-12 months) training. Programming languages, operating systems and specialized ICT courses, such as Cisco, Oracle and Microsoft, are taught at these training schools.

A number of educational institutes also provide specialized training on software packages, operating systems and programming languages.

Chapter 4

The Telecommunications Infrastructure

This is a review of the telecommunications services available to the general public in Nigeria.

Our focus in this section is on the telephone services (fixed, mobile, fixed wireless).

At independence in 1960, there were less than 20,000 lines. Early telecommunications development policies were influenced by political, administrative and military policies. Upon independence in 1960, the Department of Post and Telecommunications (P&T) under the Ministry of Communications assumes responsibility for the communication network operation and service provisioning. Between independence in 1960 and 1985, there were 5 national development plans for telecommunications.

The third national development plan of 1975 – 80, targeted significant improvements in capacity and infrastructure in telecommunications. The roll-out target was initially set at one million lines and later revised to 750,000 lines. This target was however grossly unmet.

In 1984/85, telecommunications services became commercialized and the postal and telecommunications functions of the P & T department became separated. The Nigerian telecommunication company (NITEL) was created as a government-owned monopoly operator. Its creation was supported by The Wireless Telegraphy Act of 1961.

As at 1987, the installed telecommunications capacity was 400,000 lines while the connected lines stood at between 205,000 and 250,000 lines. The range of services provided included Fixed Telephone, Telegraph, Telex (and gentex) and Payphone.

There was no remarkable improvement recorded in the performance of NITEL in subsequent years as customers demands were still unmet. The Government therefore embarked on market-oriented reforms, partially liberalizing the Nigerian telecommunications sector via NCC Decree 75 of 1992. Some of these reforms include amongst others:

- Separation of the policy-making body (Ministry of Communication MOC) from industry regulator and network operators / service providers
- Establishment of the communications sector regulator, the NCC, in 1992.
- Licensing of network operators / service providers in 1996

NITEL continued to retain monopoly over voice Telephony in national long distance, international long distance and mobile telephony. The lines concentrated mostly in select urban centres and Nigeria's teledensity ranked better than only those of Afghanistan and Mongolia. Some of the problems identified for the country's low teledensity then were weak infrastructure base, poor quality of service (QoS), low call completion rates and billing inaccuracy.

In Nigeria today, the telecommunications industry has experienced exponential growth in the last four years with close to ten (10) million lines connected, as shown in Figure 1 and Table 2. For this, Nigeria has been described as one of the world's fastest growing telecommunications market.

Table 2: Growth in Fixed and Mobile Telephone Lines and Teledensity of Nigeria

SERVICE CATEGORY	Number of Subscribers						
	1999	2000	2001	2002	2003	2004*	Jan. 2005
Fixed							
NITEL	450172	497019	540662	555466	555466	524596	525000*
PTOs	23144	56355	59659	146534	333068	515173	568925*
Sub-Total	473316	553374	600321	702000	888534	1039769	1093925
Mobile	35000	35000	266461	1569050	3149472	8500000	9950000
Total	508316	588374	866782	2271050	4038006	9539769	11043925
Teledensity	0.42	0.49	0.72	1.89	3.36	7.77	9.2

* Values used are estimates

Source: NCC

These achievements can be attributed largely to the goodwill exhibited by the Nigerian government and the enabling and conducive environment with respect to government policy and regulatory regimes.

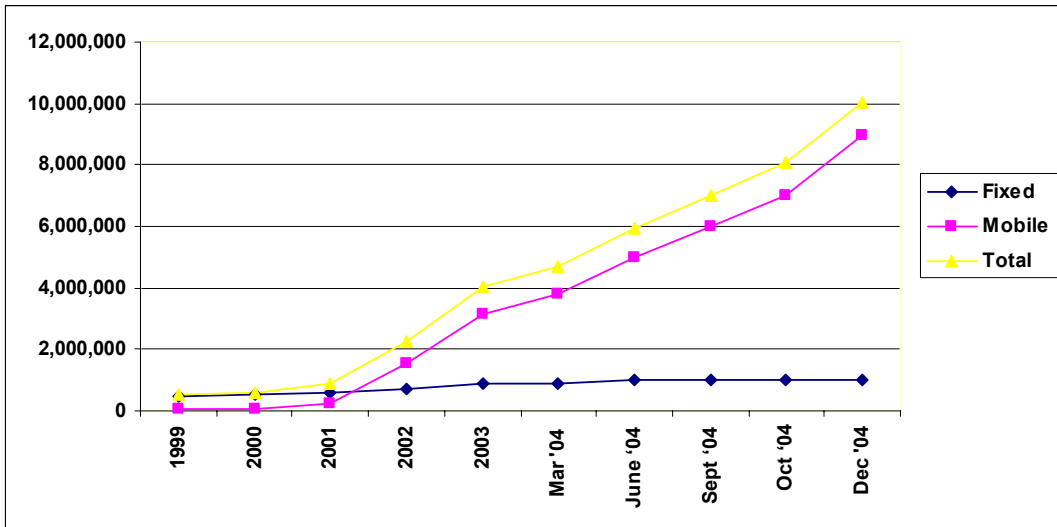


Figure 1: Growth of subscribers in the Nigerian network - Source: NCC

Quoting Mr President, Chief Olusegun Obasanjo, *“We cannot be talking about creating a conducive environment for foreign investments if the performance of our transport, telecommunications and energy sectors remain dismal and epileptic.”* - July 1999. This statement of intent, confirming government’s areas of particular focus, provided the initial driving force behind subsequent activities that has led to the level of development of the industry thus far.

Nigeria's immediate requirement for telecommunications and other ICT facilities was enormous and the required capital and time investment needed to complete a full deployment using wire lines were daunting. Wireless systems therefore offered quicker solutions to providing network access than traditional copper lines and therefore more desirable. Digital Wireless and Mobile Communications Systems have helped Nigeria leapfrog into the global village as an active member. In Table 3, the available communication services and the number of providers is given.

Table 3: Number of Active Operators and Service Providers in Nigeria

SERVICE CATEGORY	Number of Operators & Service Providers						
	1999	2000	2001	2002	2003	2004	2005
National Carriers	1	1	1	2	2	2	2
Mobile (GSM) Telephony	1	1	3	3	4	4	4
Fixed Telephony & Wireless	6	19	19	42	43	44	46
VSAT Networks	27	38	52	77	86	86	95
Internet Services	N/A	N/A	103	194	252	292	337

Source: NCC

The country adopted the use of the Global System of Mobile Communication (GSM) as the best option for the quick deployment of telecommunications services to the Nigerian populace. This has increased the country's teledensity as shown in Table 2.

Table 4: Global System of Mobile Communication

Operator	Identification Prefix	Subscribers as at March 2005	Date of Operation	Network Type	Web address
VMOBILE	0802	1.8million	9/02/2001	GSM900/1800	www.vmobile-nigeria.com
MTN	0803, 0806	4.4million	9/02/2001	GSM900/1800	www.mtnonline.com
MTEL	0804	0.9million	9/02/2001	GSM900/1800	www.mtelnigeria.com
GLOBACOM	0805	2.7million	1/09/2002	GSM900/1800	www.gloworld.com

Source: gsmworld.com, NewAge newspaper, NCC

The table above (Table 4) gives some information about the four GSM providers in the country. The value in each cell of the table is based on reports in Newspapers and on the Internet. One of the operators has two identification prefixes, due to exhaustion of subscriber numbers on the first assigned identification prefix.

The services provided by these GSM operators are available all over the country. The services provided include voicemail, data fax, short message service (SMS), call barring, mobile banking, roaming, and message alerts for news and entertainment. The whole country is yet to be fully covered but each operator is making efforts to provide the best coverage so as to boost the number of subscribers using their network. Three of the GSM operators offer roaming services i.e. ability to use their local mobile phone numbers to receive calls when outside Nigeria, to their subscribers at a fee.

The NCC has grouped communication providers along the line of services they provide and the type of licenses required. The classification is given below and a full list of companies, with their details can be viewed at the NCC website.

Basic Licences

- Community Telephony
- Internet Services
- Prepaid Card Calling Services
- Public Payphone Services
- Sales And Installation
- Voice Mail

Major Licences

- Digital Mobile Licence (GSM)
- Electronic Directory Information Services
- Fixed Wireless Access (FWA)
- Global Mobile Personal Communications by Satellite (GMPCS)
- Internet Exchange
- International Gateway
- Interconnect Exchange
- Metropolitan (Fibre) Cable Network
- National Carrier
- National Long Distance Communications (NLDO)
- Private Network Links:
 - VSAT (Hubs and International)
 - VSAT (Domestic)
 - International Data Access
 - Fixed Telephony
 - Local Exchange Operators

Chapter 5

Internet Connectivity in Nigeria

The provision of Internet services has been the exclusive preserve of the private sector since 1995 when the first license was given to Linkserve Nigeria Ltd. Since then the private sector has led in the area of Internet service provision. The earliest Internet service offered was electronic mail (e-mail) using dial-up. However with the advent of democracy in 1999, Internet service provision blossomed into an enterprising business sector and in the process gave Internet access to many more organizations and individuals.

In Nigeria now Internet service provision is being offered through various means and methods to users. Some of the technology in use include broadband, DSL, radio, and VSAT. The VSAT option is the major one being implemented by many organizations because of ease of deployment and other advantages over the other methods.

Access to the Internet backbone is deregulated as ISPs are allowed access directly to the Internet backbone through VSATs. Fiber links are being implemented for Internet access by some fixed wireless operators as part of their services to their customers. This service is already available in Lagos, the commercial centre of Nigeria.

The Nigerian Communications Commission (NCC), the regulatory body in Nigeria, has 331 licensed ISP's on its list most of which are not registered with the Internet Service Providers Association of Nigeria (ISPAN). The web address for the organization is www.ispan.org.ng.

A survey of some Internet Service Providers registered with ISPAN reveals the following:

Table 5: ISPs and Services Offered

Name	Web address	Web Email	Internet Access	Web Hosting & Design	Domain Name Registration
Skannet	www.skannet.com	Yes	Yes	Yes	Yes
Linkserve	www.linkserve.net	Yes	Yes	Yes	Yes
Pinet	www.pinet.com.ng	Yes	Yes	Yes	Yes
World Web	www.wwlkad.com	Yes	Yes	Yes	No
Cyberspace	www.cyberspace.net.ng	Yes	Yes	No	No
NigeriaNet	www.nigerianet.com	Yes	Yes	Yes	Yes
NigeriaOnline	www.nigol.net.ng	No	Yes	Yes	Yes
Webonlan	www.webonlan.com	Yes	Yes	Yes	Yes
NOVA	www.nova.net.ng	Yes	Yes	Yes	Yes
GS Telecoms	www.gstelecom.net	No	Yes	No	No
Siotel	www.siotel.net	No	Yes	No	No
Web Access	www.webaccessng.com	Yes	Yes	No	No
SignOnAfrica	www.signonafrika.com	No	Yes	Yes	Yes
Global	www.gxc24.com	Yes	Yes	Yes	No
Cobranet	www.cobranet.com	Yes	No	No	No

The ISPs which have web-based email services are not well patronized by Nigerians, either because of the fee attached to it or the limitations of the email service. This is evident in the email address being used by most Nigerian Internet users. Most ISPs are involved in Domain name registration because the country's top level domain (.ng) is now available.

Table 6: Nigerian ISPs and Technology in Use

Name	Dial-up	DSL/ISDN	VSAT	Radio	Fiber
Skannet	Yes	No	Yes	Yes	No
Linkserve	Yes	No	Yes	Yes	No
DOPC	No	No	Yes	No	No
Pinet	Yes	No	Yes	Yes	No
World Web	Yes	No	Yes	No	No
Cyberspace	Yes	Yes	Yes	Yes	No
NigeriaNet	No	No	Yes	Yes	No
NigeriaOnline	Yes	Yes	Yes	Yes	No
Webonlan	No	No	Yes	Yes	No
NOVA	Yes	Yes	Yes	Yes	No
GS Telecoms	Yes	No	Yes	Yes	Yes
Siotel	Yes	No	Yes	Yes	No
Web Access	No	No	Yes	Yes	No
SignOnAfrica	No	No	Yes	Yes	No
Global	No	No	Yes	Yes	No
Cobranet	No	No	Yes	No	No
NITEL	Yes	No	No	No	Yes

MWEB	Yes	No	Yes	No	No
Starcomms	Yes	No	No	Yes	Yes
Multi Links	Yes	No	No	Yes	Yes
Intercellular	Yes	No	No	Yes	Yes
OduaTel	No	No	Yes	Yes	No
MTS First Wireless	Yes	No	No	Yes	Yes

The results presented in Tables 5 and 6 are based on information available on the websites of the ISPs. Table 5 identifies services provided by some ISPs, while table 6 gives the technology being used by the ISPs to deliver Internet services to their client.

There are more than a million (1,000,000) subscriber customers for Internet access in Nigeria made up of private and corporate organizations. The Internet user community is however close to ten million (10,000,000) people nationwide. This is due to the widespread access available to the Internet through cybercafés and resource centers in educational and research institutes for a small fee. The fee is charged per minute and is available in multiples of 30minutes and an hour. Many cyber cafes offer promotional prices to attract patronage during low usage periods e.g. morning and night.

The use of Internet eXchange Point (IXP) is still limited in the country. There is only one in existence for now at Ibadan between 2 ISPs (www.ib-ix.net), while another is being planned in Lagos to be hosted by NITEL. The purpose of an IXP is to keep local, e.g. Nigerian, traffic local and reduce international bandwidth waste.

Chapter 6

Conclusions and Recommendations

This study has confirmed that a lot of research is being conducted in the country in specialized areas under science and technology, agriculture, health, education and industry.

The research activities and administrative duties generate large quantity of data in the process. The processing and management of the data using ICT is at a very low level in most of the institutions. As a result most of the data is kept separately by units and individuals.

The nation's teledensity has increased as a result of the introduction of global system of mobile communication (GSM). There is no data network connectivity between any educational and research institute in Nigeria, but efforts are being made by the FMST to change this. There is a lack of skilled ICT personnel in most institutes thus leading to low implementation and usage of ICT solutions. The ICT facilities currently available in most institutes are for accessing information on the web and for communication. There is a need to do more with these facilities such as information dissemination, collaboration and demonstration.

However, the following challenges must be solved before ICT is fully utilized in most educational and research institutes:

- The constant supply of electricity at low cost
- Implementation of the LAN to cover all parts of the institute
- Development of intranets to make information (statistics, announcements, minutes of meetings) available locally
- Employment of skilled ICT staff
- ICT Training for all administrative and research staff
- A standard archival method for the vast research findings and experimental data generated by researchers

Since ICT is not the core business area of these educational and research institutes, their ICT needs can be contracted out or an ICT unit formed with just a few skilled staff. New technologies aimed at increasing collaboration, research finding display and presentation, and sharing of data should then be encouraged and deployed in these educational and research institutes. A national network or Internet eXchange Point (IXP) should be developed for institutes in the same broad area of research e.g. agriculture, science, technology, space and veterinary.

The following are expected to happen in the deployment and use of ICT facilities in educational and research institutes across the country in years to come:

- all research institutes to have Internet connection
- use of other Internet services apart from web access and email
- the development of WANs or IXPs for related educational and research institutes
- the recruitment of skilled ICT personnel or outsourcing of ICT jobs
- increased use of assembled computer systems and locally manufactured computer systems
- the existence of a common gateway for all Internet traffic in the country
- the increased use of the Nigerian top level domain name (.ng)
- use of local Internet services e.g. email and hosting, as infrastructures become available, cheap and easy to manage.
- Establishment of web portals to access research databases in most institutes either free or on a pay-per-access basis

The benefits to the educational and research institutes if ICT infrastructures are well developed include:

- collaborative research,
- reduced duplication of research work,
- availability of data for research,
- distributed database of research data will be available, and
- increased researcher recognition and contribution to research efforts.

Data Sources

1. National Communications Commission, www.ncc.gov.ng
2. National Universities Commission, www.nuc.edu.ng
3. GSM World, www.gsmworld.com
4. Nigeria Direct Project, www.nigeria.gov.ng
5. Internet Service Providers Association of Nigeria, www.ispan.org.ng
6. Federal Ministry of Science and Technology, www.fmst.gov.ng
7. National Data Centre for Science and Technology, www.nadcest.gov.ng
8. Raw Materials Research and Development Council (RMRDC), Abuja
9. NewAge Newspaper
10. National Virtual Library of Nigeria, www.nigerianvirtuallibrary.com
11. The Partnership for Higher Education in Africa (2005) “ICT and Internet in Partnership Countries” available at <http://www.foundation-partnership.org/pubs/bandwidth/index.php>
- 12.
13. Research Institutes in Nigeria,
available at <http://www.fmst.gov.ng/docs/MandatesResearchInstFedEstab2004.pdf>
14. Universities in Nigeria
available at <http://www.nuc.edu.ng/Universities/Universities.htm>
15. IT Policy available at <http://www.nitda.gov.ng/docs/policy/ngitpolicy.pdf>
16. Communications Act 2003
available at <http://www.ncc.gov.ng/regulatorFramework/NigerianCommunicationsAct2003.pdf>
17. Okon, E. E. (2005) “Research and Technological Development in Nigeria” available at http://les.man.ac.uk/PREST/SCOPE/documents/National_Report_Nigeria.pdf
18. National Science and Technology Policy
available at <http://www.fmst.gov.ng/docs/NatPolicyOnSandT.pdf>

APPENDIX

A

Authorship

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Oluwaseyitanfunmi OSUNADE is a doctoral student and teaching assistant in the Department of Computer Science, University of Ibadan, Ibadan, Nigeria. He is working on the evaluation of Java-based mobile agents. He had his bachelor's degree in Computer Engineering at the Obafemi Awolowo University, Ile-Ife in 1995 and his master's degree in Computer Science from the same institution in 2000. He also has a MBA, and Microsoft and Cisco industry certifications. Mr. O. Osunade is a member of the Nigerian Computer Society and Nigerian Society of Engineers.

B

List of Educational and Research Institutes in Nigeria

S/No.	PARASTATALS	MANDATES	WEBSITE
A) FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY			
1.	Federal Institute of Industrial Research (FIIRO), Oshodi, Lagos.	Research and development into food processing, agro-allied, textiles, pulp and paper, design and fabrication of prototypes, micro-electronic and information services.	www.fiiro.gov.ng
2.	National Office for Technology Acquisition and Promotion (NOTAP), Abuja.	To encourage a more effective process for the identification and selection of foreign technology as well as vet, register and monitor contract agreements for the acquisition of foreign technologies by Nigeria Local Patents registration.	
3.	Raw Materials Research and Development Council (RMRDC), Abuja.	Promote, support and expedite industrial development and self-reliance through optimal utilization of local raw materials as inputs for the nations' industries.	www.rmrdc.org
4.	Nigerian Building and Road Research Institute (NBRRI), Ota	Research into the use of local materials and methods in road and building construction.	
5.	National Space Research and Development Agency (NASRDA), Abuja.	Pursue the development and application of space science and technology by developing indigenous capabilities for research and development to boost socio-economic potential of the nation.	
6.	Sheda Science and Technology Complex (SHESTCO), Abuja.	To embark on research and development of advanced nuclear facilities for Nigeria as well as establish advanced research laboratories.	www.shestco.org
7.	National Agency for Science and Engineering Infrastructure (NASENI), Abuja.	To embark on the development of science and engineering material complexes for the production of basic tools and science and engineering materials.	
8.	National Information	To ensure the implementation	www.nitda.gov.ng

	Technology Development Agency (NITDA), Abuja.	of the National Information Technology (IT) Policy and to coordinate and regulate the information technology sector.	
9.	National Center for Genetic Resources and Biotechnology (NACGRAB), Ibadan	To undertake developmental research, data gathering and dissemination of technological information on matters relating to genetic resources utilization, genetic engineering and biotechnology.	
10.	Regional Programme for Technology Management (REPTM), Lagos	To embark on research and development of management of science and technology resources in the West African Sub-Region.	
11.	National Center for Technology Management (NACETEM), Ile-Ife.	To train and carry out research in technology management and developing high-level manpower in science and technology policy formulation.	
12.	Nigerian Institute for Trypanosomiasis Research (NITR), Kaduna.	Research into Trypanosomiasis and onchoerciasis generally, especially the pathology, immunology and methods of treatment of the diseases.	www.nitrnigeria.org
13.	Federal College of Chemical and Leather Technology (CHELTECH), Zaria.	To train middle-level manpower in all aspects of chemical and leather technology.	
14.	Nigerian Natural Medicine Development Agency (NNMDA). Lagos.	Initiate policy and improve the knowledge on the practice and potential of natural medicine with a view to fully developing and integrating it into the National Health care delivery system.	
15.	Project Development Institute (PRODA), Enugu.	Research into engineering, design and fabrication, ceramic products, electrical and electronic products and energy including coal and scientific equipment.	
16.	National Research Institute for Chemical Technology (NARICT), Zaria.	Carry out research and development work into processes for the conversion of solid minerals, petroleum and agricultural raw materials into useful industrial chemicals,	

		petrochemicals and polymers.	
17.	Energy Commission of Nigeria (ECN), Abuja.	To conduct research and to develop energy facilities for Nigeria, for ensuring adequate supply of energy at affordable cost and to enhance at affordable our national security.	
18.	Nigerian Institute of Science Laboratory Technology (NISLT), Ibadan.	To advance science laboratory technology profession in Nigeria.	
19.	Technology Incubation Programme Nationwide.	Designed to nurture new start-up businesses that engage in science and technology based activities through the establishment of technology business incubation (TBI) centers.	
20.	National Biotechnology Development Agency (NABDA), Abuja.	To empower the nation to become self-reliant in the development and application of biotechnology-based products and services.	
B) FEDERAL MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT			
21.	Cocoa Research Institute of Nigeria, Ibadan	Research into cocoa, kola, cashew, coffee and tea.	
22.	Forestry Research Institute of Nigeria (FRIN), Ibadan	Research into natural forests, plantations, woods products and wild life.	www.frin.gov.ng
23.	Rubber Research Institute of Nigeria (RRIN), Benin	Research into natural rubber and its by-products	
24.	National Root Crops Research Institute (NRCRI), Umudike.	- Research into yams, cassava, cocoyams, irish potatoes, sweet potatoes and ginger. - Farming systems Research and Extension covering the South East Agricultural zone.	
25.	National Cereal Research Institute, (NCRI), Bida	Research into rice, soya-beans, beniseed and sugarcane	
26.	National Institute for Fresh Water Fisheries Research, New Bussa	Research into fresh water fisheries and other aquatic resources in rivers, natural and man-made lakes	
27.	National Horticultural Research Institute (NIHORT), Ibadan	Research into fruits, vegetables, their processing and preservation; development	

		of indigenous ornamentals	
28.	Nigerian Stored Products Research Institute, Ilorin	Research into storage and preservation systems for agricultural produce	
29.	Lake Chad Research Institute, Maiduguri	Research into variety improvement of wheat and barley, improvement of farming systems and all agricultural crops in Borno and Adamawa States	
30.	Nigerian Institute for Oceanography and Marine Research (NIOMR), Lagos	Research into the geo-physical phenomena of the Nigerian ocean bed and the contiguous land mass research on marine and brackish water fisheries and oceanography	
31.	Nigerian Institute for Oil Palm Research, Benin City	Research into oil palm, coconut, raffia palm and ornamental palms and dates	
32.	National Veterinary Research Institute (NVRI), Vom	Research into livestock diseases and their control including the production of vaccines and sera	www.nvrinigeria.org
33.	Institute of Agricultural Research and Training, Obafemi Awolowo University, Ibadan	Conducts research and training in tropical agricultural crops and animals.	www.iart-ng.org
34.	Federal Soil Conservation School, Owerri	Train and produce manpower in tropical soils as well as its conservation, flood and erosion management and control.	
35.	Federal College of Animal Health and Production Technology, Ibadan	The college is mandated to conduct research and training into animal production, husbandry, health, in order to improve animal protein sufficiency in Nigeria.	
36.	Institute for Agricultural Research and Extension Services, ABU – Zaria	The institute is mandated to conduct research and training in the production and management of mandate crops like sorghum, maize, groundnut, cotton, etc that are commonly grown in the savannah region of Nigeria.	
37.	National Animal	The main mandate is to	

	Production Research Institute, Zaria	research into the production and management of tropical livestock like goat, sheep, camel, horse and cattle.	
38.	Federal College of Wildlife Management, New Bussa, Niger State	Training and research into domestication and management of tropical wildlife.	
39.	Federal College of Forestry, Ibadan	Training in forest resources, parks and ranges.	
40.	Federal College of Animal Production Technology, Jos	Training of Nigerians in the technology of animal and livestock production and management	
41.	Federal College of Fisheries and Marine Technology (FCFM), Lagos	Training of Nigerians in the field of marine technology and management and oceanography, fishing and fisheries production.	
42.	Federal College of Agriculture, Akure	Training of manpower development in the field of agriculture and farm management.	
43.	Federal College of Agriculture, Umudike	Training of manpower development in the field of agriculture and farm management.	
44.	Federal College of Veterinary, Medical Laboratory and Technology	Training and research into domestic animal life, health and management.	
45.	Federal Soil Conservation School, Kuru, Jos	Train and produce manpower in tropical soil as well as its conservation, flood and erosion management and control.	
46.	National Centre for Agricultural Mechanization (NCAM), Ilorin	To train and produce technical manpower in areas of agricultural mechanization.	
47.	Rural Agricultural and Industrial Development Scheme (RAIDS), Ibadan	A scheme with a mandate of converting agricultural produce to a raw material of a rural industry. Developing rural area, creating wealth and creating job for a teeming population.	
48.	Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), Kaduna	Financing and supporting Agricultural schemes, financing and supporting co-operative societies,	

		financing of rural development project.	
49.	Agricultural Rural Management Training Institute (ARMTI), Ilorin	Training of agricultural extension workers, research in agricultural management.	
C) FEDERAL MINISTRY OF HEALTH			
50.	Nigerian Institute of Medical Research (NIMR), Lagos.	Medical Research into communicable diseases, e.g. malaria, human parasites, etc. nutritional defect problems, genetic and non-communicable diseases, public health, etc.	
51.	Nigerian Institute of Pharmaceutical Research and Development (NIPRD), Abuja.	Research into medical plants, herbs and drugs development and formulary.	
D) FEDERAL MINISTRY OF INDUSTRY			
52.	SMEDAN, Abuja.	To harness the prospect of viable Small and Medium Industry (SMIs) sub-sector as the vehicle for rural industrialization and poverty eradication. To coordinate and support the development of SMEs in Nigeria.	
53.	Bank of Industry, Abuja.	To assist in resuscitating ailing industries and promoting new ones to cover all the geopolitical zones in the country.	
54.	National Automotive Council, Abuja.	To rehabilitate, expend, sustain and encourage the development and the automobile sub-sector in Nigeria. To promote the development and increased usage of local components parts by putting in place appropriate tariff structure in favour of local production.	
55.	National Sugar Development Council, Abuja.	To accelerate the growth and development of the local Sugar Industry industry in order to achieve at least 70% self-sufficiency by the year 2010 & thereby drastically reduce sugar	

		importation as well as conserve foreign exchange.	
56.	African Regional Centre for Design and Engineering Manufacture (ARCEDEM), Ibadan.	To promote engineering design in African. To develop and train engineering personnel particularly in Engineering Design and Manufacturing processes.	
E) FEDERAL MINISTRY OF POWER AND STEEL			
57.	Metallurgical Training Centre, Onitsha	To train of Engineering personnel on processes of material sciences (metallic and non-metallic materials).	
58.	National Metallurgical Research and Development Centre, Jos.	Undertaking Competitive Research & Development of various aspects of Material Behavior.	
59.	National Steel Raw Materials Exploration Agency, Kaduna	Development of Raw Material base of the steel plants.	
F) FEDERAL MINISTRY OF SOLID MINERALS DEVELOPMENT			
60.	Nigeria Mining Cooperation, Jos.	To coordinate mining activities nationwide. To promote and encourage cooperation between Nigeria and the external community in mining activities.	
61.	Nigeria Coal Cooperation, Enugu..	To research, develop and produce coal for both local use and exportation.	
62.	Bitumen Project, Akure.	To coordinate, research, promote and develop the bitumen industry.	
63.	Geological Survey of Nigeria(GSN), Kaduna.	To coordinate mining activities nationwide. To promote and encourage cooperation between Nigeria and the external community in mining activities.	
G) FEDERAL MINISTRY OF EDUCATION			
64.	National Educational Research and Development Council (NERDC), Abuja	To develop and monitor curricula for primary and secondary schools.	
65.	National Mathematical Centre, Abuja.	To promote the teaching of mathematics in primary and	www.nmcng.org www.comsats.org.pk/nmc

		secondary schools and provide the tools in pure and applied sciences.	
66.	All Tertiary Educational Institutions.	To provide training and carry out pure and applied research.	

Under some parastatals sub-research units exists. Some of them are listed below:

Energy Commission of Nigeria (ECN)

1. Usman Danfodio Energy Research Center, Sokoto;
2. Centre for Research and Development; A.B.U, Zaria;
3. Centre for Energy Research and Development; O.A.U., Ile-Ife;
4. Centre for Energy Training, U.N.N., Nsukka.

National Agency for Science and Engineering Infrastructure (NASENI)

5. Centre for Adaptation and Technology, C.A.T., Akwa;
6. Hydraulic Equipment Development Institute, Kano;
7. Engineering Materials Development Institute, EMDI, Akure;
8. Scientific Equipment Development Institute, SEDI-M, Minna;
9. Scientific Equipment Development Institute, SEDI-E, Enugu;
10. National Engineering Development Centre, NEDDEC, Nnewi.

National Space Research and Development Agency (NASRDA)

11. Centre for Satellite Technology Development, Abuja;
12. Centre for Geodesy and Geodynamics, Toro, Bauchi State;
13. Centre for Space Science, Nsukka;
14. Centre for Space Transport and Propulsion, Lagos;
15. National Centre for Remote Sensing, Jos;
16. Centre for Basic Space and Technology Education, Ile-Ife.

National Biotechnology Development Agency (NABDA)

17. North-West Zonal Biotechnology Centre, A.B.U., Zaria;
18. South-West Zonal Biotechnology Centre, University of Ibadan;
19. North-Central Zonal Biotechnology Centre, University of Jos;
20. North-East Zonal Biotechnology Centre, University of Maiduguri;
21. South-East Zonal Biotechnology Centre, U.N.N.;
22. South-South Zonal Biotechnology Centre, University of Port-Harcourt.

Technology Incubation Centres (TIC)

- | | |
|------------------|-------------|
| 1. Agege, Lagos; | 4. Calabar; |
| 2. Aba; | 5. Minna; |
| 3. Kano; | 6. Nnewi; |

- | | |
|------------------|-----------------|
| 7. Birnin Kebbi; | 12. Uyo |
| 8. Benin | 13. Akure |
| 9. Bauchi | 14. Sokoto; and |
| 10. Maiduguri | 15. Gusau |
| 11. Warri | |

S/N	Universities	Website Address
Federal Universities		
1.	University of Ibadan, Ibadan, Oyo State.	www.ui.edu.ng
2.	University of Nigeria, Nsukka, Enugu State.	www.unn.edu.ng
3.	University of Lagos, Akoka, Lagos State	www.unilag.edu.ng www.unilag.edu
4.	Ahmadu Bello University, Zaria.	www.abu.edu.ng www.widernet.org/nigeriaconsult/abu.htm
5.	Obafemi Awolowo University, Ile-Ife	www.oauife.edu.ng
6.	University of Benin, Benin	www.uniben.edu.ng www.uniben.edu
7.	Bayero University Kano	www.buk.edu.ng www.kanoonline.com/buk/default.htm
8.	University of Calabar	www.unical.edu.ng
9.	University of Jos, Jos	www.unijos.edu.ng www.uiowa.edu/intlinet/unijos/unijos.htm
10.	University of Ilorin, Ilorin	www.unilorin.edu.ng
11.	University of Maiduguri, Maiduguri	www.unimaid.edu.ng
12.	Usman Dan Fodio University, Sokoto	www.udusok.edu.ng
13.	University of Port-Harcourt, Port-Harcourt	www.uniport.edu.ng
14.	University of Abuja, Abuja.	www.uniabuja.edu.ng www.widernet.org/nigeriaconsult/uniabj.htm
15.	Nnamdi Azikiwe University, Awka.	www.nauni.edu.ng www.unizikonline.net
16.	University of Uyo, Uyo.	www.uniuyo.edu.ng
17.	Abubakar Tafawa Balewa University, Bauchi	www.atbu.edu.ng www.atbunet.org
18.	Federal University of Technology, Owerri	www.futo.edu.ng
19.	Federal University of Technology, Akure	www.futa.edu.ng
20.	Federal University of Technology, Minna	www.futm.edu.ng
21.	Federal University of	www.futy.edu.ng

	Technology, Yola	
22.	Nigerian Defence Academy, Kaduna	www.nda.edu.ng
23.	Federal University of Agriculture, Abeokuta	www.fuaab.edu.ng
24.	Federal University of Agriculture, Umudike	www.fuau.edu.ng
25.	Federal University of Agriculture, Makurdi	www.fuam.edu.ng
26.	National Open University (NOUN), Lagos	
STATE UNIVERSITIES		
27.	Rivers State University of Science and Technology, Port Harcourt.	www.rsust.edu.ng
28.	Imo State University, Owerri.	
29.	Olabisi Onabanjo University Ago-Iwoye	
30.	Abia State University Uturu.	
31.	Kogi State University, Lokoja.(Formerly Prince Audu University)	
32.	Niger Delta University, Bayelsa State	
33.	University of Ado-Ekiti, Ado- Ekiti	
34.	Enugu State University, Enugu.	
35.	Ambrose Alli University, Ekpoma	
36.	Ladoke Akintola University, Ogbomosho	
37.	Lagos State University, Ojoo	
38.	Kano State University of Technology	www.kust.edu.ng
39.	Adamawa State University	
40.	Nasarawa State University, Keffi	
41.	Delta State University, Abraka	
42.	Benue State University	
43.	Adekunle Ajasin University, Akungba	
44.	Ebonyi State University	
45.	Anambra State University	
46.	Kaduna State University	
47.	Cross River University of Technology	

PRIVATE UNIVERSITIES		
48.	Igbinedion University, Okada	
49.	Babcock University, Ilishan-Remo	www.tagnet.org/babcock
50.	Madonna University, Okija	
51.	Bowen University, Iwo	
52.	Covenant University, Ota	
53.	Pan-African University, Lagos	
54.	Benson Idahosa University, Benin City.	
55.	ABTI University, Yola.	
56.	Ajayi Crowther University, Oyo	
57.	Caritas University, Enugu	
58.	Bingham University, New Karu	
59.	Katsina University, Katsina	
60.	Al-Hikmah University, Ilorin	
61.	Cetep City University, Lagos	
62.	Redemers University, Ede	
63.	Lead City University, Ibadan	www.lcu.edu.ng

Source: NUC (2005)