

EVOLUTION OF THE TELECOMMUNICATIONS INDUSTRY

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CONTENTS

- **PREAMBLE**
- **INDUSTRY EVOLUTION**
 - **THE ANALOGUE ERA**
 - **DIGITAL ERA**
- **THE NIGERIAN TELECOMMUNICATION ENVIRONMENT**
 - **HISTORICAL PERSPECTIVE**
 - **INSTITUTIONAL SET-UP**
 - **The Federal Government**
 - **The Ministry of Communications**

CONTENTS – CONTD.

– INSTITUTIONAL SET-UP (Continued)

- **The Nigerian Communications Commission (NCC)**
- **NITEL**
- **Other Licensed Private Telecommunications Operators and Service Providers**

● **LEGAL FRAMEWORK**

● **NATIONAL FACILITIES**

● **INTERNATIONAL AND REGIONAL AFFILIATIONS**

● **CONCLUSION**

PREAMBLE

- **The conveyance of messages by electrical energy, beyond the limits of hearing distances, evolved from mathematical theories and empirical formulae. derived from experiments on basic electricity and magnetism in the 19th century.**
- **The significant inventions of the period 1830 to the end of the century ranged from the Electric bulb to the phonogram, answer phones tape recorder and even the basic analogue computer in its rudimentary form.**

PREAMBLE – CONTD.

- **In the telecommunication sector, telegraphy, telephony, wireless communication, copper conductors and manual exchange; that all form parts of a communication network had all been invented.**
- **The 20th century till date only witnessed the development of appropriate improved technologies for achieving optimum quality of service and adequate quantity of facilities and services, to meet the realities and needs of the age.**

INDUSTRY EVOLUTION.

- The last three decades of the 20th century marked the beginning of the information era, which was promoted by convergence of technology resulting from digitalization.
- In essence, the period before the 1970s with predominantly analogue technology based equipment can be regarded as the analogue era; while 1970 to date is referred to as the digital information age.

INDUSTRY EVOLUTION - CONTD.

- The last three decades of the 20th century marked the beginning of the information era, which was promoted by convergence of technology resulting from digitalization.
- The industry is principally divided to three/four sectors for manufacturing, marketing, operations and logistics of maintenance purposes as follows:
 - Switching
 - Network Access
 - Terminals/Customer Premises Equipment
 - Transmission

THE ANALOGUE ERA

- **Telecommunication networks and services were regarded as a monopoly of sovereign states.**
- **The Executive arm of government responsible for policy also carried out regulatory as well as provision of facilities and services functions.**
- **ITU was the principal international organization charged with responsibility for the following:**
 - **Regulation and planning of worldwide telecommunication.**
 - **Formulation of equipment and system operating standards.**

THE ANALOGUE ERA – CONTD.

- **Coordination and dissemination of information required for the planning and operation of telecommunication services.**
- **Promotion of global telecommunication development**
- **International telecommunication was by correspondent relations between national monopolies on bilateral agreements.**
- **The “Accounting Rate System” prevailed in making international settlement of traffic accounts. The system allowed for high settlement rates flow (import dollars) to some telecommunication operators, especially those in developing countries.**

THE ANALOGUE ERA – CONTD.

- **The traditional monolithic state owned establishments provided many domestic services at greatly subsidised and economically unsustainable pricing levels mainly to support government administrative functions, commerce and meet other social services demands. The primary objective can be summarized as the provision of standard telephone and telegraph public services to the largest possible population.**

THE ANALOGUE ERA – CONTD.

- Policy formulation predominantly dealt with elaborating national policies while uncannily relegating the significance of international policies that go far beyond the scope of national policies.
- Development was based on state/national budgeting procedure and had to compete with other state pressing demands on government resources such as health, education and transportation infrastructure.

THE ANALOGUE ERA – CONTD.

- **International satellite organizations like INTELSAT & INMARSAT served as bearers for international messages traffic. They were principally inter-governmental cooperatives operating under conventions attested to by appointed signatories of member sovereign nations.**
- **Satellite based telecommunication services were planned and executed on geostationary orbits systems.**
- **Services limited to voice telephony, telegraphy, telex, facsimile, image and low speed data.**

DIGITAL ERA

- **Liberalization of national markets, divestiture, competition and privatization.**
- **Institutional reforms that clearly define and separate policy, regulatory and operational functions.**
- **Emergence of multiple operator environments in national networks. Evolution of other regional and international standards organizations that address telecommunication apart from the ITU. E.g. European Telecommunication Standards Institute – ETSI**
- **Demise of the ITU “Accounting Rate System” for International Traffic Settlements.**

DIGITAL ERA – CONTD.

- **Global Alliances for routing International Telecommunication Services e.g. Global One, Concert and UniSource.**
- **The launch and operation of satellites in constellations below geostationary orbits (LEOs & MEOs) for Global Personal Communication Systems (GMPCS)**
- **Alternative modes of carrying Voice Traffic, e.g. VOIP (Voice Over Internet Protocol)**
- **World Trade Organization's Identification of telecommunication as a tradable commodity.**
- **Provision of customized services to clients specification**

DIGITAL ERA – CONTD.

- **The entry of other utility infrastructure provider to the telecommunication market e.g. NEPA, NNPC, cable Broadcasting Networks, Railways etc.**
- **The advent of Integrated Services Digital Network (ISDN) and**
- **Escalation of wireless services and the relevant increasing need for intensive Spectrum Management in nations. Such services include Wireless in the Local Loop (WILL). First, Second & Third Generation mobile phones and Internet Services Provider's access networks.**

NIGERIAN TELECOMMUNICATION ENVIRONMENT

- **The current concept of a “Global Information Society” emerged from the evolution of telecommunication systems technologies that now make a seamless integration of national information infrastructure practicable, for establishing a Global Information Infrastructure.**
- **Usually in planning the expansion of national networks, the past is always inextricably linked with the present to enhance interoperability and interconnectivity of systems for uninhibited traffic flow. This paper would however only address briefly developments in the country before the last few decades of the 20th century, when, digital systems began to be deployed in the Nigerian network.**

HISTORICAL PERSPECTIVE

- **Under colonial rule, a department of government carried out the provision of facilities for posts and telegraphy/telephone.**
- **In 1851 a post office was established in Lagos and by 1856 Cable and Wireless Company of the UK had commissioned a submarine cable link between Lagos and London.**
- **With the amalgamation of Northern and Southern protectorates of Nigeria in 1914, posts and telecommunication networks were linked to form the basic national network.**

HISTORICAL PERSPECTIVE – CONTD.

- **Nigeria gained political independence in 1960 with less than 100,000 telephone lines. Forty years after, by the year 2000 (and probably till date) Nigeria is yet to attain a one million-telephone lines mark for a population of not less than 120,000,000.**
- **Five national development plans, followed by rolling plans featured after the country's Independence before the establishment of the Nigerian Telecommunications LTD Company (NITEL) in 1985.**

HISTORICAL PERSPECTIVE – CONTD.

- It was however during the third national Development plan period, 1975 to 1980, that significant effort was made to address telecommunication development in the nation. The programme included:
 - Contingency plan exchanges under which new exchanges were to be provided in 45 locations with a total capacity of 162,000 multiple lines, while, 12 other exchanges were to be extended to provide additional 48,000 lines.
 - Phase II. A turnkey projects which provided for the provision of switching equipment and external line plants on turn-key basis in 147 locations. The exercise was to yield 121,000 additional lines.

HISTORICAL PERSPECTIVE – CONTD.

- Mobile exchange program, which involved the provision of 29 units of mobile switching system for additional 11,300 lines.**
- Transmission facilities in the form of line of sight terrestrial microwave radio systems with associated multiplexing equipment were also provided, with adequate diversity, to ensure uninterrupted services. Also, a coaxial cable link between Lagos and Kaduna was planned to serve as alternate transmission path for North-South traffic.**

HISTORICAL PERSPECTIVE – CONTD.

- Domestic satellite intended for both television and radio broadcasting initially was introduced. Later, the system was modified to accommodate telephony and data transmission between the then 19 state capitals.**
- Today the above projects can be said to form the bulk of analogue systems in the national network that is now being gradually integrated with, or replaced by, the new digital systems as considered appropriate and cost effective.**

INSTITUTIONAL SET-UP

- Up until the establishment of NITEL in 1985, the Ministry of Communications was responsible for planning, project execution, operation and maintenance of telecommunication facilities as well as provision of services. Government also fully owned the Nigerian External Telecommunications LTD that was responsible for international telecommunication.
- Today, with the enactment of Act 75 of 1992, the policy formulating responsibility of the ministry has been separated from both the operating and regulatory activities in the industry.

INSTITUTIONAL SET-UP – CONTD.

- **The telecommunication industry now consists of the following operatives:**
 - **The Federal Government of Nigeria.**
 - **The Ministry of Communication**
 - **The Nigerian Communication Commission**
 - **NITEL the dominant monopoly carrier**
 - **Other Licensed Private Telecommunication Operators and Services Providers.**

INSTITUTIONAL SET-UP – CONTD.

- **The Federal Government is responsible for:**
 - **Giving overall direction for telecommunication development.**
 - **Ensuring Telecommunication Policy is consistent with other National Policies.**
 - **Enacting necessary laws consistent with the National Telecommunication Policy.**

INSTITUTIONAL SET-UP – CONTD.

- **The Ministry of Communications is responsible for broad telecommunication policy, which includes amongst other:**
 - **Proposing policy options and recommending appropriate legislation to government.**
 - **Implementation of Government policy.**
 - **Representing government on international organizations e.g. I.T.U, P.A.T.U, INMARSAT, INTELSAT.**

INSTITUTIONAL SET-UP – CONTD.

- **The Nigerian Communications Commission -**
- **Established by Act 75 of 1992 with the main objectives of:**
 - **Creating a regulatory environment to facilitate the supply of telecommunication facilities and services.**
 - **Facilitate the entry of private entrepreneurs into the telecommunication market.**
 - **Promoting fair competition and efficient market conduct.**

INSTITUTIONAL SET-UP – CONTD.

- **The value added services liberalized by the decree include:**
 - **Installation of terminal or other equipment e.g. telephones, telex, fax**
 - **Provision and operation of public pay phones**
 - **Provision and operation of private network links employing cable, radio communication, satellite, within Nigeria.**
 - **Provision and operation of public mobile communication e.g. Cellular, Paging, Trunking Radio.**

INSTITUTIONAL SET-UP – CONTD.

- Provision and operation of community telephone services e.g. for rural banking, airline reservation, electronic mails network..**
- Provision and operation of value-added network services e.g. for rural areas and estates.**
- Repair and maintenance of telecommunications facilities.**
- Cabling e.g. telephone cables.**

INSTITUTIONAL SET-UP – CONTD.

- **Other functions that became the responsibility of the NCC after the recent Telecommunication Policy of the Obasanjo administration include:**
 - **Assignment and registration of radio spectrum to licensed operators.**
 - **Administration of national numbering plan.**
 - **Establishing mechanisms for promoting universal access to telecommunication services nationwide.**
 - **Enforcing technical standards and protection of consumers from unfair practices by licensees.**

INSTITUTIONAL SET-UP – CONTD.

- **NITEL**

- **the national dominant carrier that still enjoys a monopoly status despite government pronouncement on its privatization and the licensing of a Second National Operator.**

- **NITEL operates its second-generation mobile GSM system under an NCC licence.**

- **Other Private Telecommunication Operators (PTOs)**

- **This licensed group predominantly offers wireless in the local loop services (WILL).**

LEGAL FRAMEWORK

- Wireless Telegraphy Act of 1961 and the Regulations there under of 1969, were the principal instruments for regulating the industry in Nigeria since Independence in 1960.
- The Act was reviewed in 1966, 1968, and 1991 before the enactment of decree 75 of 1992 that established the Nigerian Communications Commission.
- The NCC (amendment) Decree of 1998 and the Wireless Telegraphy (Amendment) Decree of the same year are the principal instruments that now apply in the industry along with the National Telecommunication Policy promulgated by the present administration.

NATIONAL FACILITIES

- NITEL Existing Infrastructure
 1. Switching. The network is built on four hierarchical structure consisting:
 - Local Exchanges (LE)
 - Primary Centres (PE)
 - Secondary Centres (SE)
 - International Switching Centres.
 - a) Local Exchanges: 233No (56 Digital, 177 Analogue)
 - b) Transit Exchanges:
 - (i) 45 Primary Centres (21 digital and 24 analogue)
 - (ii) 6 Digital Secondary Centres.
 - c) International Switches: 3No– All Digital

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NATIONAL FACILITIES – CONTD.

2. Radio Transmission Systems:

- **Lagos - Ijebu-Ode – Benin – 140mbits in 2+1 configuration**
- **Benin – Abuja – 140mbits in 1+1 configuration**
- **Enugu – Benin Oluku – 140mbits in 3+1 configuration**
- **Enugu – Markurdi - 140mbits in 1+1 configuration**
- **Bauchi – Jos – kaduna - 140mbits in 2+1 configuration**
- **Ibadan – Ijebu-ode - 140mbits in 2+1 configuration**
- **Abeokuta – Ibadan - 140mbits in 2+1 configuration**
- **Kaduna – Kano - 140mbits in 3+1 configuration**
- **Jos – Makurdi - 140mbits in 1+1 configuration**

NATIONAL FACILITIES – CONTD.

2. Radio Transmission Systems:

- Warri – Sapele – Benin - 140mbits in 2+1 configuration
- Ilorin – Osogbo – Ibadan - 140mbits in 2+1 configuration
- Ogbomoso – Oshogbo - 140mbits in 1+1 configuration
- Lagos – Abuja – 155mbits in 3+1 configuration.

3. Optic Fibre Cable System:

- Lagos OPTIC FIBRE CABLE RING NETWORK –
2.5g/565MB/S
- Ikorodu – Lagos – 140MB/S
- Submarine OFC Lagos – Bonny – Port Harcourt –
622mb/s

NATIONAL FACILITIES – CONTD.

- **Aba – Umuahia – Enugu – 622mb/s**
- **Aba – Calabar – 622mb/s**
- **Enugu – Abuja and Lagos – Abuja under construction.**

4. Domestic Satellite System (DOMSAT) Analogue Technology Based:

- **19 DOMSAT stations in 19 state capitals for National Television coverage utilise 1 No. 36MHZ leased INTELSAT TRANSPONDER.**
- **Lagos and Kaduna were upgraded to carry digital messages and used as alternative route for Lagos, Kaduna Telecommunication traffic.**

NATIONAL FACILITIES – CONTD.

5. **BIZNET: Closed user group for oil companies:**
 - **14 Terminals utilise 1 No. 36 MHZ, leased transponder from INTELSAT.**

6. **International (Intelsat Satellites) Earth Stations:**
 - **3No. Digital Earth Stations (Lagos, Enugu, Kaduna)**
 - **2No. analogue Earth Stations (LANLATE AND KUJAMA used as control centers for VSAT within Nigeria).**
 - **Trans West African Microwave link (Benin, Portnovovo, Nigeria, Chad, Cameroon).**
 - **INMARSAT Terminals**

NATIONAL FACILITIES – CONTD.

- SAT3/WASC (South Atlantic Telecommunications Cable/West African Submarine Cable).

7. External Line Plants:

- Combined capacities in the network are over 1,000,000 primary cable pairs with 1,500,000 secondary cable pairs.

8. Telex Network:

- Terminal Exchanges - 16 (2 Digital and 14 Analogue)
- Transit Exchanges - 3Nos.
- Voice Telegraphy Terminals – 21Nos.
- Installed Capacity – 15,000 lines (March 1999)
- Connected Lines – 6843 (March 1999)

NATIONAL FACILITIES – CONTD.

9. Internet:

- **Initial Capacity provided was 5,5000 ports.**
- **Points Of Presence:**
 - **LAGOS – 3000 ports**
 - **Abuja – 1000ports**
 - **Kaduna- 500 ports**
 - **Bauchi – 500ports**
 - **Enugu – 500ports**
- **The POPS are linked by 2MB/S backbone.**

NATIONAL FACILITIES – CONTD.

9. Private Telecommunication Operators Licences:

S/NO	CATEGORY	NO OF LICENCES OFFERED	NO OF LICENCES ISSUED
1.	Private Network links Employing Satellite	131	88
2.	Private Network links Employing Radio	42	35
3.	Public Mobile Communication (Paging)	49	29
4.	Installation of terminal or other equipment	1235	555
5.	Internet	454	302
6.	Public Payphone Services	111	82
7.	Cabling Services	27	21
8.	Digital Mobile Communications	3	3

NATIONAL FACILITIES – CONTD.

9. Private Telecommunication Operators Licences – Contd.:

S/NO	CATEGORY	NO OF LICENCES OFFERED	NO OF LICENCES ISSUED
9.	Community Telephone Services	53	3288
10.	Voice Mail services	48	31
11.	Tele – Centre /Cybercafe	500	201
12.	Prepaid Card Calling Services	108	45
13.	Trunked and Non – Trunked Radio	6	5
14.	Non – Commercial private Network links	49	6
	Total	2,816	1,435

INTERNATIONAL AND REGIONAL AFFILIATIONS

- **International Telecommunication Union (ITU)**
- **African Telecommunication Union (ATU)**
- **International Telecommunication Satellite Organization (INTELSAT)**
- **International Maritime Satellite Organization (INMARSAT)**
- **Regional African Satellite Communication (RASCOM)**
- **West African Telecommunication Regulatory Authority (WATRA)**

INTERNATIONAL AND REGIONAL AFFILIATIONS – CONTD.

- **West African Telecommunication Regulatory Authority (WATRA) was formed on September 22, 2000 with the following objectives:**
 - **To establish cooperation among states towards rapid and sustainable telecommunications Development in the sub-region**
 - **To promote the development of telecommunication in West Africa**
 - **Drive liberalization, competition and privatization initiatives**
 - **Coordinate regional position on telecom issues**

INTERNATIONAL AND REGIONAL AFFILIATIONS – CONTD.

- Formulate regulatory and technical issues
 - Formulate regulatory and technical plans for the region
 - Encourage adoption of uniform technical and quality standards
 - Promote fair interconnectivity practices
 - Promote harmonization of telecommunication policies within the region.
- WATRA Current Status:
 - Draft constitution prepared for deliberations
 - WATRA website established

INTERNATIONAL AND REGIONAL AFFILIATIONS – CONTD.

- WATRA secretariat moved from NCC to ECOWAS secretariat
- NCC appointed chairperson to the ECOWAS Technical Group for the facilitation of the adoption of the WATRA charter.
- Proposed consultative meeting of ministers and Heads of Regulatory Agencies scheduled for May 30 – June 1, in Mali.
- WATRA's actualization is supported by regional and international organizations such as ECOWAS, ATU, WORLD BANK, USAID, AFRICAN CONNECTION AND ITU.

CONCLUSION

- **Nearly twenty years ago, the International Telecommunication Union adopted a resolution that led to the establishment of the renowned Independence Commission for worldwide telecommunication development.**
- **The principal objective was to curtail and bridge the continuously widening gap in telecommunication development between the industrialized and non-industrialized nations of the world.**
- **The result was the “Missing Link” report submitted in January 1985.**

CONCLUSION - CONTD.

- The target set in the “Missing Link” was that by the early part of the 21st century “virtually the whole of [human kind should be brought] within easy reach of a telephone and of all the benefits this can bring”.
- Today we talk of the “digital divide” and are still encumbered with the same problems that beset us during the analogue era, which eventually led to the Lord Maitland’s Commission.
- The world has witnessed great changes in the telecommunication environment, which now tend to culminate in the realization of a Global Information Society.

CONCLUSION - CONTD.

- Nigeria, in line with world trends, is pursuing policies aimed at modernization and rapid expansion of networks and services to enhance economic and social development
- Whither Nigeria by the end of this decade would be determined by the “short term fixes” applied in solving existing, pressing, network problems and their long-term consequences.
- In the final analysis, a national network is an integrated unit and should be approached and seen as such.

Thank you.

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