TELE-HEALTH SERVICES IN DEVELOPING COUNTRIES, PROBLEMS AND PROSPECTS: THE NIGERIAN EXPERIENCE.

by

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Tele-Health Services in Developing Countries, Problems and Prospect: The Nigerian Experience

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Abstract

The state of tele-health services in a developing country like Nigeria, has been investigated. The investigation revealed: (1) nascent tele-health services, due mainly to: poor state of telecommunication facilities and services, resulting mainly from: dearth of funds, expertise; and lack of enabling socio-political, economic and regulatory environments (2) that, with these problems solved, tele-health services have bright prospects, viz: (i) in the context of: the New National Health programme, which lays emphasis on primary health care, health education and disease prevention; training medical and health personnel; remote consultation and diagnosis, thus (ii) as a cost-effective health care delivery strategy in the 21st century. (iii) in promoting tourism. Solutions proffered include mainly: provision of adequate rural telecommunication facilities and services; and wide-spread, and cost effective uses of, information technology, particularly networking and communications within the country; and access to the Internet.

1. Introduction

Information technology (IT) in general, and telecommunications in particular, are increasingly playing important roles in virtually every facet of human development. It is the driving force in the current globalisation of economics, trade and tourism, and politics.

It could have equally profound implication and application for health. Many authors including Nakajima have highlighted the potentials for information and telecommunication technologies/services, albeit telematics, to health care delivery, especially for developing countries.

These are reflected in the following quotations:

*The development in modern tele-communication technologies present countries, especially developing ones, with unique opportunity to improve their health care delivery system, hence the health of their populace.*

*Health care is an information-intensive sector and thus can benefit greatly from widespread cost-effective uses of information technology,... Many countries including developing countries, are showing the way.*

The application of telematics to health falls under two main fields of activity: Tele-health and tele-medicine. Antezana has defined tele-health as: "The integration tele-communication system into the practice of protection and promoting health," and tele-medicine as: "the incorporation of tele-communication systems into curative medicine". Basically tele-health is concerned with preventive medicine, and tele-medicine with the clinical aspect of medicine. For the purposes of this work, I would refer to both, collectively, as tele-health services. The paper discusses tele-health services in Nigeria with particular reference to:
the present status, and problems
(2) the prospects as a health care delivery system for the 21st century.

2. **Materials and Methods**

The work was carried out mainly: by the survey sampling - questionnaire - technique; through interviews and discussions with relevant interest groups; and by literature search.

The questions sought to ascertain, amongst others the following: (1) the country's human development indicator (HDI) values (2) number of people with access to various telecommunication/IT facilities (3) Level of awareness and perception of tele-health amongst the people. (4) Factors mitigating against tele-health services, if any, and their ranking. 574 out of 1000 respondents offered answers. Their answers to suggested factors (see appendix 2) could be categorised into three main groups namely: (1) Low technology base – poor state of telecommunication and support facilities, and services (2) Poor funding, lack of expertise, necessary skills, and motivation (3) lack of enabling socio-political, economic and regulatory environments. The other findings are summarised in tables 1 and 2, and appendix 1.

Table 1: Installed Capacity of Telephone lines: National Network by Zones
(Source: Nigerian Telecommunication Ltd. (NITEL), Nigerian Communication Commission (NCC))

<table>
<thead>
<tr>
<th>ZONE</th>
<th>LAG</th>
<th>SW</th>
<th>NW</th>
<th>NE</th>
<th>SE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed capacity (000)</td>
<td>176.0</td>
<td>148.3</td>
<td>131.8</td>
<td>41.0</td>
<td>98.3</td>
<td>595</td>
</tr>
<tr>
<td>Connected lines (000)</td>
<td>130</td>
<td>59</td>
<td>18.6</td>
<td>26.7</td>
<td>61.1</td>
<td>300</td>
</tr>
<tr>
<td>1999 Projection (000)</td>
<td>454.7</td>
<td>324.1</td>
<td>349.2</td>
<td>152.0</td>
<td>252.0</td>
<td>1532</td>
</tr>
<tr>
<td>Recorded waiting list</td>
<td>66.6</td>
<td>24.1</td>
<td>18.6</td>
<td>26.4</td>
<td>64.9</td>
<td>200.6*</td>
</tr>
<tr>
<td>Teledensity/100 people</td>
<td>2.04</td>
<td>.288</td>
<td>.060</td>
<td>.140</td>
<td>.290</td>
<td>.310</td>
</tr>
<tr>
<td>Digital lines (000)</td>
<td>129.48</td>
<td>.288</td>
<td>.060</td>
<td>.140</td>
<td>.290</td>
<td>204.48</td>
</tr>
</tbody>
</table>

Note: (a) Telephone Installation charges (US$):
1. NITEL: Analog = 900; Digital = 1,100; (2) PTOs (all digital) = 1,500;
(b) Tarriff (for 3 mins. US$), Intra city (Lagos) = .075; Intercity (Lagos – Abuja) ≥1; Lagos to: An African country = 6.8; N. America and W. Europe = 9.4
(c) Waiting time for installation: NITEL ≥ 6 months; PTOs < a week.
Domestic Satellites: 2: BISNET leased to Banks and Oil companies for VSAT operations; DOMSAT leased to National TV authority, for network news, but there is controversy over payment, thus it is lying under utilised. (d) Cellular Mobile System charges (US$): monthly access = 18.75; Air time (AT) charge: 7 am – 6 pm = .45; 6 pm – 7 am = .23; Cellular to fixed network = air time charge + fixed network charge; International = air time + international charge; Roaming charge = AT + .013.

* Suppressed demand > 4 million lines, and > 200,000 lines for cellular.
Table 2: Number of people with direct access to IT/TELECOM FACILITIES/ SERVICES out of Group population.

<table>
<thead>
<tr>
<th>Group</th>
<th>FACILITIES / SERVICES</th>
<th>Group Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>AC</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>BA</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>BU</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>CS</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>DO</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>LA</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>NU</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>SE</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>OT</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>47</td>
</tr>
<tr>
<td>% of</td>
<td>3.66</td>
<td>8.2</td>
</tr>
<tr>
<td>SAMPLE</td>
<td></td>
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</tr>
</tbody>
</table>

**KEY:**  
AC = Academics; BA = Bankers; BU = Businessmen; CS = Civil servants;  
DO = Doctors; LA = Lawyers; NU = Nurses; SE = Scientists/Engineers;  
OT = Others

Number of people who:  
- a = have telephones at home;  
- b = have telephone at work;  
- c = have some computer skill;  
- d = own their computer;  
- e = have access to computer at work;  
- f = use the telephone > once a week for health matters;  
- g = use the computer > once a week for health matters;  
- h = are satisfied with the telephone services;  
- i = are aware of tele-health services before now;  
- j = approve tele-health services after being explained.

Note:  
(1) Less than: 20% intentionally listen to radio/watch TV for health matters;  
(2) Not even the doctors have the bleep.  
(3) Only the bankers work in network environment.

3. **Results and Present Status**

Effective tele-health services presupposes: the availability, and cost-effective uses, of wide-spread telecommunication services, computer and communication networking, and ideally, access to the Internet; acceptance of the strategy; an organised health sector; and implicitly, at least, a medium HDI.

Reports show that Nigeria is a heavily populated country with: a rural majority (appendix 1), very low HDI value and ranking (0.400, and 137 out of 174, respectively).

And tables 1 and 2 reveal very poor state of telecommunication facilities and services: very low tele-density (<0.4 connected lines per 100 people); practically non-existent rural telecommunications; much-to-be modernised system, (only about 32% of the lines are digital); a very long waiting list (> 4 million); and a relatively exorbitant charges and
tariff, which has been described as the highest in the world\textsuperscript{11}. Table 2 in particular reveals: hitherto very little awareness, and perception of tele-health services; very scanty availability of computers and necessary skills, even among these educated groups. There is no intra-nation connectivity, nor total national connectivity to the Internet\textsuperscript{11}.

Clearly, it is seen that tele-health services, if anything is nascent in Nigeria. There is only the use of radio and TV to disseminate, mainly, health information. Even then people are concerned about what is broadcast. This strategy could be unattractive because of cost – TV time at effective peak viewing costs about US$ 625/30 seconds. There is the controversy of who picks the bills, the electronic media house, the government(s) and /or non – governmental organisations. Health information and education as of now are mainly disseminated through socio-cultural and religious organisations. This method though reliable is not timely, and is limited in penetration.

4. Problems and Solutions

4.1 Problems

From the above discussions the problems identified are:

(1) Lack of enabling socio-political, economic and regulatory environments. Amaeshi\textsuperscript{12} and others\textsuperscript{11,13} have made similar observations. This discourages private investors\textsuperscript{11,13}, creates disillusion and apathy among the work force, and causes emmigration of the much needed expertise and skills.

(2) Lack of will on part of Government even to implement its own policies; and lack of accountability, as have been observed by other authors\textsuperscript{14,15}.

(3) Low technology and resource base, especially in the: telecommunication sector, including low tele-density and low penetration, inefficient service\textsuperscript{9,11,15}; and education and health sectors\textsuperscript{9,16}. According to reports\textsuperscript{10}, the Communication Minister, Maj. Gen. P. Aziza, at the recently concluded Africa Telecom 98, in Johannesburg S. Africa, has underlined the dearth of funds and facilities, when he stated that Nigeria needs an average of US$ 6b to bring its telecommunication facilities and services to set national target. This is against an annual national budget of about US$ 2.5b for 1998.

(4) Poor maintenance culture, and waste due to arson and sabotage.

(5) Ethical and legal problems: there is the fear of abuse of medical records confidentiality when the records are transmitted over tele-communication systems.

4.2 Solutions

The following solutions are suggested:

(1) Enthronement of the enabling environments and the principle of accountability, to attract private sector participation and international collaboration in developing the relevant sectors mainly the telecommunication sector.

(2) Embellishing the resource bases through proper funding and training. The funding can be improved by introducing some form of social insurance/tax.

(3) Establishment of effective rural tele-communication services, possibly by: providing multipurpose community tele-centres (MCT), and the use of wireless local loops. Rural tele-communications can be funded in part by the Brazilian model\textsuperscript{17}, whereby some of the revenue generated from urban operations is used in funding rural
tele-communications.

(4) Adopting modern, open system technologies.

(5) Implementation of intra-nation communication, and computer connectivity, and subsequent total connectivity to the Internet.

(6) Establishment of a hierarchical (primary<->secondary<->tertiary) health care system.

4.2.1. Steps being taken: Some of these suggestions are being put in place, viz, (a) A hierarchical: primary, secondary and tertiary health programme, with bases at community/Local Government, state and national levels respectively. (b) A National Health Information system. (c) A National Health Insurance scheme is being discussed. (d) Computer education/literacy is being emphasised. Unfortunately it is yet to be part of medical school curriculum. (e) Nigerian Universities Network (NUNET) is being established with the assistance of the International Centre for Theoretical Physics (ICTP), Trieste, Italy. (f) The tele-communication, and electricity sectors are to be privatized as stated in the 1998 budget. (g) An independent tele-communication regulatory body, the Nigerian communication commission (NCC) has been setup. (h) 5 private telephone operators (PTOs), and 13 Internet service providers have been licensed. (i) An independent - second network operator (SNO) will be appointed before the end of the year as promised by the Hon. Minister for communications. (j) Measures are being taken to connect Nigeria fully to the Internet by end of 1998.

5 Benefits and Prospects

The benefits for tele-health services, especially for developing countries, have been reported by several authors. They include (1) Disease prevention: through health education - aetiology of diseases, symptoms and signs and what to do - and health information. (2) Improved epidemiological surveillance. (3) Reduced cost of training medical personnel and health workers. (4) Remote consultation and diagnosis. (5) Fast and reliable means of medical information exchange between physicians.

Thus tele-health service has great prospects in Nigeria, especially: (1) as a strategy for implementing the New National Health Programme (NNHP), by improving primary health care (PHC), the bedrock of the NNHP, through: (a) Health education - and disease prevention. Prevalent causes of death are preventable/communicable diseases that can be prevented through effective health education, the type that can be offered by tele-health services; (b) Improved epidemiological surveillance; (c) Improved quality medicine to remote areas by remote consultation and diagnosis, thus as a strategy for health for all. (2) In facilitating the development of national health databank, and medical expert system, thus improving medical (continuing) education, thus the quality of general practice and family medicine. (3) In promoting international travel and tourism: the traveller can receive necessary medical attention from the appropriate physician by remote consultation, thus reassuring the traveller of adequate health care services.
Summary and Conclusions

The state of tele-health services in Nigeria were discussed with emphasis on present status, problems, and prospects. Possible solutions to the problems have been proffered.

Investigations reveal that despite the obvious potential benefits, and some positive steps being taken, tele-health service is still at nascent stage, due mainly to:

(1) the poor state of the tele-communication industry
(2) dearth of material, and appropriate human resources
(3) lack of enabling environments to attract private sector and foreign participation in developing the relevant sectors – telecommunication industry.

Fears concerning patients' medical record confidentiality have been expressed, and the issue of who picks the bills has been discussed. Solutions to the problems have been proffered. They include: (1) Provision of the enabling political, economic, ethical and regulatory environments by the relevant authorities, to encourage private sector and international collaboration in funding and developing telecommunications. (2) Adequate and appropriate human resources development. (3) Adequate provision of appropriate technology and services, especially rural telecommunication services.

In conclusion, I would state that: With the right mix of technologies and resources, and the enabling environments, tele-health services have bright prospects in Nigeria, especially in the area of primary health care and preventive medicine, thus in the implementation of the NNHP. And, as: technology advances and gets standardised, computer softwares become more and more user-friendly, the country's relevant technology base and acquisition of essential skills increase; expert systems, and appropriate communication and computer networking are implemented, tele-medicine would also be a reality. In effect Tele-health services will be a cost-effective strategy for health-for-all in the 21st century in Nigeria, and indeed any developing country.

Acknowledgement

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Appendix 1: Some Relevant Facts about Nigeria: Geography, Demography and Social Indicators.

Land area = 923,454sqkm; Population=100m; Population : growth = 3.5%; distribution: 65% rural, 35% urban; Official language = English; Government: Military dictatorship; 3 tiers of Government, Local (764), State(36) and Federal (1 Federal territory). Capital: Political = Abuja, Commercial = Lagos GNP/capita =US$290; Real GDP/capita PPP$ =1540; Adult literacy(%) = 54.1; HDI Value =.400 HDI rank = 137/174; Gross enrolment at all levels of education % of 6- 20 year = 37;
Mortality rates: (a) Infant/1000 live births = 87, (b) Maternal/100000 = 1500; Military expenditure as % of combined education and health = 33%. Prevalent causes of death = diarrhoea, diseases, malaria, TB, AIDS; Average spending (% of total budget) from 1990 – 97: Education = 5.78; Health = 2.7.

Health establishment (hospitals): General = 897; Maternity = 3,349; Infectious diseases = 48; Orthopedic = 3; Psychiatric = 16; Teaching = 16; Others = 9,674, Total = 14003.


Appendix 2: List of suggested factors (to respondents) mitigating against the development of telecommunications, thus tele-health services in Nigeria.

Respondents were requested to: Kindly rank the following factors in the order (in respondent’s opinion) they mitigate against the development of telecommunications services in general, and tele-health services in particular, starting with the most responsible factor.

(1) Over all low technology base = □; (2) Lack of financial resources/poor funding = □; (3) Poor state of telecommunication infrastructure = □; (4) Poor support facilities e.g. electricity, gas, etc = □; (5) Lack of democracy = □; (6) Insufficient deregulation of the economy, especially the telecommunication sector = □; (7) Vandalism and arson = □; (8) Poor regulatory and legal framework = □; (9) Corrupt practices = □; (10) Lack of expertise/skill = □; (11) Despondent Work force = □; (12) Poor State of Education and Low adult literacy = □; (13) Foreign conspiracy = □; (14) Too much deregulation of the economy = □; (15) Lack of rural telecommunications = □.

References

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