

The Poor State of Broadband in Nigeria: An Impediment to National Development and Globalisation

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Abstract

Harnessing ICT for development requires a strategic framework that takes advantage of various ICT roles which helps integrate the options made possible by technological revolution into the design and implementation of sector development strategies. As such, ICT is not just a sector of the knowledge economy, but a lens through which new possibilities and modalities of comprehensive development can be realised. There has been a competition among many nations nowadays toward the adoption of ICT as a veritable tool for national development and globalization. In spite of the rush towards the adoption of ICT by many African countries, the reports of WEF on NRI released for year 2013 reveals that many African countries are still ranked low. The review made in this paper is to investigate the causes of low rankings characterizing the African countries, Nigeria as a case study. This paper also investigated the present level of broadband ICT infrastructures available in the country and made suggestions on how the rate of broadband penetration could be increased. As a result, People from all walks of life such as youths, professionals, career personnel and host of others would benefit from the wealth embedded in ICT world. In conclusion, the recommendation was made on what to be done for Nigeria to move up some steps in NRI ladder. There are tendencies that when the country fully harness the benefits of ICT available within her that would develop the country economically and tackle the challenges of unemployment which seems to be one of the prevailing problems in Africa and even in some developed countries. Sarcasically in Nigeria, in spite of the satellite own by the country and several cables at the shore of the country, broadband penetration is presently less than 6%

Keywords: WEF (World Economic Forum), NRI (Networked Readiness Index) GDP (Gross Domestic Product), Broadband , ICT Infrastructure, Optical Cables

1. Introduction

Access to advanced information and communication technology (ICT) is a key factor in the economic and social development of Sub-Saharan Africa. Analysis of economic data at the national level shows that investment in ICT results in a higher rate of long-term economic growth [1]. At the level of small businesses, research shows that access to basic ICT services can result in a sustained increase in the incomes of the poor in developing countries [2]. Although limited data make the impact of broadband harder to quantify, emerging evidence suggests that access to more advanced ICT services, such as those that require broadband connectivity for delivery, can also have a positive economic and social impact [3].

However, In spite of Nigeria's growing appetite for data to provide for high speed Internet, e-

commerce, e-learning, e-health, e-business register, e-law, e-policing, e-prescription, e-governance, data ICT, and cloud computing, video and voice services, the level of ICT uptake and broadband penetration in the country is still very low. Validation of this assessment is borne out by our low position on the World Economic Forum (WEF) Networked Readiness Forum for 2013 [4].

In order to reverse the trend, urgent steps must be taken to investigate the reasons for the low rate of ICT uptake and mete out appropriate strategies and tactics to address the situation. The country needs to move up in the ladder of (Networked Readiness Index) NRI especially nowadays that ICT has become the pivot that holds growth and development

1.1 The Global Information Technology Report 2013

The Global Information Technology Report 2013 features the results of the NRI and offer an overview of the state of ICT readiness in the world for the year 2013. The report coverage includes a record number of 144 economies, accounting for over 98 percent of global GDP. [5]

Table 2.1: Leading 20 Countries In GITR And NRI Ranking

Rank	Country/Economy	Score
1	Finland	5.98
2	Singapore	5.96
3	Sweden	5.91
4	Netherlands	5.81
5	Norway	5.66
6	Switzerland	5.66
7	United Kingdom	5.64
8	Denmark	5.58
9	United States	5.57
10	Taiwan/China	5.47
11	Korea Republic	5.46
12	Canada	5.44
13	Germany	5.43
14	Hong Kong SAR	5.40
15	Israel	5.39
16	Luxembourg	5.37
17	Iceland	5.31
18	Australia	5.26
19	Austria	5.26
20	New Zealand	5.25

Table 2.2: Leading African Countries on GITR: WEF NRI Ranking

Rank	Country/Economy	Score
70	South Africa	3.87
80	Egypt	3.78
81	Cape Verde	3.78
88	Rwanda	3.68
89	Morocco	3.64
92	Kenya	3.54
95	Ghana	3.51
96	Botswana	3.50
97	Liberia	3.48
98	Gambia	3.47

110	Uganda	3.30
111	Namibia	3.29
113	Nigeria	3.27

1.2 Interpreting the Global Information Technology Report 2013

The Global Information Technology Report 2013 is a project within the framework of the World Economic Forum's Global Competitiveness and Benchmarking Network and the Industry Partnership Programme for Information and Communication Technologies. However, Networked Readiness Index (NRI) 2013 Benchmark ICT Uptake and Support for Growth and Jobs in a Hyperconnected World for the year 2013.

The NRI includes features related to access and usage that cover not only affordable ICT infrastructure but also digital resources, including software and skills. In addition, the NRI includes proxies to assessing some of the economic and social impacts accruing from ICTs. Thus, the Index facilitates the identification of areas where policy intervention—through investment, smart regulation, and/or incentives—could boost the impact of ICTs on development and growth.

The country ranked 113 out of 144 countries surveyed in the Networked Readiness Index (NRI), declining by one rank on the ladder from its position of 112 (out of 142) in the previous year's Report. However, the country inched up by 0.1 points in actual NRI scores to 3.3 points this year from 3.2 points in 2012, when measured on a scale of one (lowest) to seven (highest).

According to the latest World Economic Forum (WEF) report on Global Information Technology Report (GITR) 2013 and published with the theme Growth and jobs in a hyper connected world, it measured the extent to which 144 countries took advantage of ICT and other new technologies to increase their growth and well-being.

Highlight of the report about Nigeria's ICT competitiveness showed that the country has remained in the lowest quartile of countries sampled in the report. This shows the extent to which the country still grapples with the necessary conditions to close the ICT competitiveness gap with most advanced economies.

Notwithstanding this gap, the report noted that the country has improved in seeking the delivery of societal benefits from ICT by initiating a broad-based National Broadband and ICT Plan, which focuses on greater broadband adoption through intensifying the motivators of technology use.

"This is attributed to ICT Skill Development Plan incorporated in Nigeria's National Information Communication Technology (ICT) Policy Draft 2012. This development has led to Nigeria's significant improvement in one of the 10 NRI pillars - Social Impacts - ranking 88 in 2013 from 102 in 2012," the WEF report noted.

The report also acknowledged that Nigeria's market and regulatory framework has been able to support high levels of ICT uptake, adding, however, that the cost of accessing ICT, either via mobile telephony or fixed broadband internet, has remained a constraint towards widespread technology adoption in the country. The GITR 2013 underscored Nigeria's clear divide in ICT usage between individuals and businesses.

While corporate organisations in the country have intensified their efforts to integrate ICT into business processes - improving in that regard to a rank of 68 from 77; the penetration of ICT among individuals has deteriorated to a rank of 111 from 105 in the last one year.

1.3 Why Nigeria is ranked low in year 2013 global information technology report (GITR) WEF and NRI report

The apparent success recorded in the country's ICT sector is as a result of the great success made by the telecommunication industry. The situation in the data communication is highly incomparable. The rates of Internet usage and broadband penetration are both still very low.

Though investigation shows that Nigeria is in number 10 position when considering the countries alongside their respective number of internet users but the number is a low percentage of the population of the country.

Table showing the Top 10 countries with Internet users

Rank	Country	Population of Active Internet users
1.	China	511,963,000
2.	USA	242,614,880
3.	India	119,749,712
4.	Japan	101,376,528
5.	Brazil	88,917,974
6.	Russia	69,837,538
7.	Germany	67,621,622
8.	France	51,962,632
9.	United Kingdom	51,412,657
10.	Nigeria	47,143,356

“With tele-density in the country growing from below 2 per cent in 2001 to about 65 per cent within 10 years, the broadband segment is yet to catch-up. Recent statistics show that there are over 47.1 million internet users in Nigeria, which on the surface appears to be a large number but that figure represents only 29 per cent of the population. In reality, we estimate that actual broadband penetration in Nigeria is in the 10 per cent range, (which) places us in several published studies behind South Africa, Kenya and Ghana in sub Saharan Africa”.

Evidently, the issue of low ranking in the uptake of ICT lies majorly with poor broadband (data) communication in spite of the potential that lies in the broadband infrastructures at the shore of the country which could make us ranked among the best in the sub-Sahara region.

2. What are the ICT Infrastructure Needed for Broadband Communications

2.1 Various Elements of Broadband Connectivity

Broadband is the common term for a very fast connection to the Internet. It allows users to download online entertainment such as video clips and music, listen to digital radio and television, send e-mail faster and speeds up everything they do online.

A broadband service can transmit information at up to 40 times the speed of a dial-up modem connection. As the connection is always on, like water or electricity, users don't need to dial up every time they want to log on. [9]

The provision of broadband connectivity to end users involves several elements. A problem in any of these elements will constrain the delivery of affordable broadband services. In Nigeria, the inadequacy of one element, *domestic backbone networks*, is one of the factors underlying the limited growth of broadband in Nigeria.

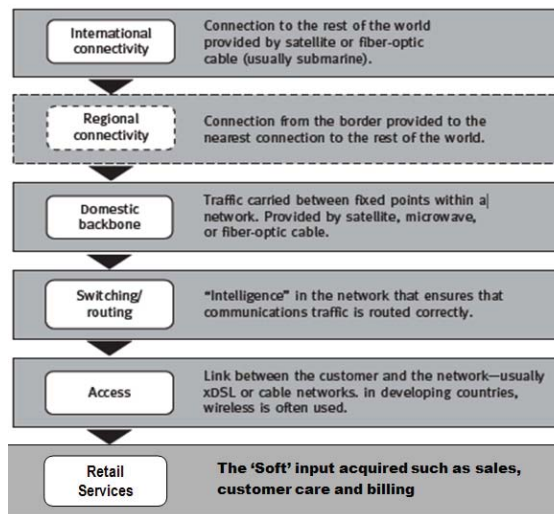


Table1: Broadband Communication Supply Chain

Supplying communications services involves a combination of network elements, processing, and business services. These can be thought of as the “supply chain.” At the top of the chain is the international connectivity that provides the link to the rest of the world. The second level is the domestic and regional backbone networks that carry traffic from the landing point of the international communications infrastructure to other points within the country (in some African countries, regional connectivity is missing). The third level is the “intelligence” contained in the networks. Below this is the access network that links the core network to the customer. Finally, there is a suite of retail services such as customer acquisition, billing, and customer care that allow the business to function. This supply chain is illustrated in Table 1

In practice, there are many variations on the structure of this supply chain. For example, voice services do not rely as heavily on international connectivity as Internet services, and landlocked countries require regional connectivity if they are to access high bandwidth submarine fiber-optic cable networks.

Domestic backbone networks lie at the heart of any communications services supply chain and are an integral component in the provision of broadband connectivity.

One of the first decisions to be made is what kind of connection you want. There are several options for setting up high-speed services, which all come under the broadband umbrella. However, the type of broadband service you need and have access to will be determined by the speed requirements, budget, and the location (city or regional) of your home or office.

2.2 Comparative advantage of fiber optic networks over satellite in building broadband backbones

The two commonly used media of connectivity of a country to the rest of the world and domestic backbone include satellite and fiber optic networks. However, in spite of the popularity of satellite in building national backbone, there are still some shortcomings associated with satellite when the issue involves building a national or international communication backbones.

One of the most likely reactions one gets when discussing fiber-optic networks in Nigeria is “why not satellite technology?” Satellite communications has been around for a while and has provided telecommunications links between Nigeria and the rest of the world. However, a comparison between fiber optic and satellite technologies reveals that although satellite systems are the most efficient solutions for TV broadcast, for access to remote locations, and essentially, for

wireless access to the local loop and the network backbone, fiber optic networks are more suited for high bandwidth transmission between countries and continents through core networks (or backbones) and submarine links respectively. Fiber optic networks offer very high bandwidth necessary for a country (Nigeria) or African nations to catch up with the new global information technology. For example, fiber cables today can have capacity up to 2 Tbps - an equivalent of millions of simultaneous voice channels per cable. This is far from the reach of any anticipated satellite system, which is less than 1Gbps - lower than our own SAT-3/WASC/SAFE undersea cable system.

Real time transmission and very low bit error rate offered by fiber optic networks are among the advantages of fiber over satellite. Satellite communications add a delay to communications making interactive data transmission difficult and subject the quality of transmission to external factors. A geostationary satellite link has a transmission delay of up to 600 milliseconds compared to 100ms for a combination of fiber and coaxial cable networks.

The open space nature of satellite (and any other wireless) communications makes satellite communication vulnerable to interception and corruption. Although several schemes are available for data encryption for IP over satellite, the high bit error rate may cause failures in the encryption systems. Fiber optic transmission offers undoubtedly the best confidentiality and security of transmission than any other means by its mere nature.

In order to address increasing traffic demand, it is relatively easy to increase the capacity of fiber optic networks during their lifetime by means of wavelength division multiplexing technology. For example, the SAT-3/WASC/SAFE system can be upgraded 12 fold from 10Gbps to 120Gbps. It is impossible to do a similar upgrade on satellite systems.

Perhaps the main disadvantage of satellite communication is their high cost relative to fiber optics communication. In the US, for example, the monthly rate for broadband connectivity through cable is about \$35 for 3Mbps data rate compared to \$200 for 200Kbps by Satellite. While the initial cost of a continental fiber optic network for Africa may appear too high, the long term cost savings over satellite transmission are overwhelming.

Thus due to their high bandwidth, high reliability, high signal quality, long lifetime, better security and low service cost, fiber optic networks are suited for inter and intra continental backbone network infrastructure. On the other hand, satellite systems are more dedicated to video broadcasting and personal communication services such as mobile telephony satellite or to access remote areas.

2.3 Present state of broadband infrastructure in Nigeria

According to experts, any country seeking growth, job and wealth creation must address how it can increase its access to broadband and if governments can improve broadband penetration in the continent most Africans would have increased access to the internet.

Today, people are realizing their life goals due to broadband services with greater access to researches and findings about education, culture and entertainment.

The major Broadband backbone infrastructure in Nigeria includes NigcomSat-1R, WACS, Main-one and Glo 1 fiber optic Cables. SAT-3/WASC (South Africa Trans-Atlantic - West Africa Submarine Cable) which continues from South Africa to Portugal and Spain in Europe with landings at a number of west and southern African countries; Nitel's cable, international submarine fibre-optic cable (Glo-1),

2.4 Broadband infrastructure for building communication backbones that connect Nigeria to the rest of the world

2.4.1 Nigcomsat-1R

NigComSat-1R is a hybrid geostationary satellite located at an orbital position of 42.50 E with a life span of at least 15 years, a total of 40 transponders which will provide optimal and cost effective voice, data, video, internet and application services solutions.

NigComSat-1R is a replacement satellite for NigComSat-1 Satellite. It is a critical ICT backbone infrastructure to drive the National ICT revolution in providing revenue diversification for the Nation and offering cost effective solution and affordable access to meet Nigeria's telecommunications, broadcast, aviation, maritime, defense and security needs.

2.4.2 SAT-3/WASC (South Africa Trans-Atlantic - West Africa Submarine Cable)

SAT-3/WASC (South Africa Trans-Atlantic - West Africa Submarine Cable) which continues from South Africa to Portugal and Spain in Europe with landings at a number of west and southern African countries. The funding agreement for the project was signed in 1999 and President Wade, one of the founding members of NEPAD, officially launched the networks in Dakar in May 2002. The original capacity was 20 Gbps and is upgradeable to 120Gbps. The submarine cables span a total of 28,000 km and connect the countries of Portugal, Spain (Canary Islands), Senegal, Ghana, Benin, Cote D'Ivoire, Nigeria, Cameroon, Gabon, Angola, South Africa, France (Reunion), Mauritius, India and Malaysia.

2.4.3 Mainone and GLO-1 and WACS (own by MTN) Submarine cables

These submarine cables landed in Nigeria to produce additional capability to the earlier existing ones. With the advent of these cables there is a huge broadband capacity for Nigerians to benefit from.

2.5 Broadband infrastructure for building domestic backbones

In Nigeria, the inadequacy of one element, *domestic backbone networks*, is one of the factors underlying the limited growth of broadband in Nigeria.

Fibre-Optic backbone infrastructure in the Nigeria states and the federal capital territory are not interconnected and are concentrated in the state capitals and a few urban areas. It is recorded that Broadband penetration is low and of about 6% (Omobola Johnson- the Minister of Communication,) while that of Internet penetration is equally low and of about 28% and 33%.

Few states such as Ondo State are having special schemes inaugurated mainly to supervise the connectivity of broadband infrastructure to the interior towns apart from the state capital having interconnection of broadband infrastructure with other parts of the state. The situation is different in most states of the country.

There is no long distance national backbone to carry and distribute the capacities provided by submarine cables to the users in offices, schools, and homes in the hinterland.

3. Successes and Challenges Facing Broadband Communication in Nigeria

3.1 Successes of made in the area of Broadband communication Development in Nigeria

In spite of low penetration in the broadband communications in the country, Nigeria still records some success in the area of the development of broadband communication. Some of the successes are as discussed below:

Several operators have successfully landed submarine cables in Lagos that provide over 9 terabits per second of combined capacity which has enhanced the infrastructure for broadband communication and will help to accommodate the increase in broadband penetration.

The network roll out of number of licenses has also resulted in the installation of a fibre-optic

backbone infrastructure in all Nigeria states and the federal capital territory.

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3.2 Challenges facing broadband communication in Nigeria

Fibre-Optic backbone infrastructure in the Nigeria states and the federal capital territory are not interconnected and are concentrated in the state capitals and a few urban areas. It is recorded that Broadband penetration is low and of about 6% (Omobola Johnson) while that of Internet penetration is equally low and of about 28% and 33%.

National Broadband Plan identifies some of the major challenges faced by operators, such as:

1. High cost of procuring rights of way which ultimately results in high costs for leasing of transmission infrastructures);
2. The incumbent operator, Nigerian Telecommunication Limited (NITEL) has been out of operation for a number of years and all attempts made to privatise NITEL and its subsidiary MTEL, have been unsuccessful.
3. Dearth of investment in fixed household broadband primarily because of the multi-faceted challenges facing operators which prompt the operators to concentrate their household broadband activities on the major cities.
4. Long delay in procuring approval for such rights of the way;
5. Multiple forms of taxation and
6. Regulation;
7. Vandalism; and
8. Distruption caused by roadworks.
9. Generally power supply is a major problem to (operators) doing business in Nigeria

Other reasons for low penetration of broadband include:

10. Incumbent operator NITEL has been out of operation for a number of years.
11. Dearth of investment in fixed household broadband, primarily because of the multi-faceted challenges facing operators. So far some operators have concentrated their household broadband activities on the major cities, such as Abuja, Lagos, and PortHarcourt.

3.3 How to develop broadband infrastructure in nigeria

Ajayi,[7] therefore, says the goal of tremendously increasing Internet/broadband penetration in Nigeria must be given utmost priority in 2013. He advises that the major way to fast-track broadband penetration is to stimulate demand for broadband access by promoting the deployment of applications that are relevant to Nigerian users and will add values to their lives.

Incentivize the quick and effective rollout of new infrastructure and services by all players in the industry; provide universal access to broadband services to the same extent as basic telephony services; provide industry players with requisite spectrum and other resources; and ensure requisite protection for existing infrastructure.

Stanley Jegede, Chief Executive Officer, Phase 3 Telecoms has called on the Federal Government to invest in a national backbone infrastructure that will carry and distribute data capacity from the shores of the country to the hinterland. Jegede made the statement in Lagos recently, insisting that a fully established national backbone infrastructure would boost capacity distribution of broadband and deepen internet penetration in the country.

He noted that Nigeria has a lot of broadband capacities from MainOne, Glo 1, and MTN's West African Cable System (WACS) at the shores of the country, but without a long distance national backbone to carry and distribute the capacities to users in offices, schools, and homes in the hinterland, our dream of accelerated broadband penetration would be grossly hindered.

There is a serious need for government to subsidize the creation of a national broadband backbone network, this subsidy which is very similar to subsidy in America, Australia, and in the UK, will work towards effectively building critical infrastructure required to create a platform where costs associated in delivering the services to the consumers at the right price is determinable." Jegede said.

3.4 Benefits derivable from broadband communication

Mrs. Opeke (CEO of Main One Cable Company) maintained that "when broadband is readily available, behaviour patterns will change because we will rely on such to obtain services and get tasks required in our daily existence as students or workers or business people done. [12]

The 2009, World Bank Information and Communications for Development report showed that access to broadband boosts economic growth in all countries, but most especially in developing ones. The study showed that in developing countries, for every ten-percentage points of broadband penetration, their economies grew by 1.38 per cent. The report, conducted in 120 countries between 1980 and 2006, showed that developed countries' economies grew by 1.21 per cent. The figures confirm that broadband access is key for economic growth and even more vital in developing countries. Many Africans are seizing the opportunity that it offers to move their economies forward.

In the same way that the construction of electricity grids and transport links spurred innovation far beyond the dreams of their builders, high-speed broadband networks stimulate greater efficiency and the advancement of businesses.

The 2010 U.S. National Broadband policy document captures it even better when it states: "Broadband is the great infrastructure challenge of the early 21st century. Like electricity a century ago, broadband is a foundation for economic growth, job creation, global competitiveness and a better way of life. It is enabling entire new industries and unlocking vast new possibilities for existing ones. It is changing how we educate children, deliver health care, manage energy, ensure public safety, engage government, and access, organize and disseminate knowledge."

It is a known fact that one of the key requirements for any successful business is the ability to communicate effectively and efficiently especially in this digital age. Anything that can speed up the rate at which communication takes place improves radically the output from any business endeavour and enhances the efficiency with which business processes are carried out. This is the whole new vista of opportunity that broadband technology offers us.

Broadband gives you a high-speed, 'always-on' connection to the Internet, which is typically at least 10 times faster than regular Internet connections. Besides being fast, it is highly cost-effective and provides consistency and reliability. It can save you time when using email and the web, thereby helping your staff to become more productive. In addition, it allows you to build online links with customers and suppliers, as well as with off-site and remote workers.

The term 'broadband' is used to describe any high-speed connection to the Internet with speeds starting from at least 1mbps.

4. Conclusion

In the review work, the reasons for the low ranking in WEF NRI for 2013 was discussed with the major reason being the poor development of broadband communication industry in Nigeria. Based on this discovery, the level of broadband infrastructure in the country was also investigated.

However, it was also discovered that Nigeria has enough fibre optic cable at her shore to provide us with the capacity needed for the Nigerians but due to lack of domestic connectivity, many Nigerians are not benefitting from this wealth of Broadband communication capability.

Not that alone the ways of developing broadband communication was also discussed. Finally, what the country stand to benefit by improving on the broadband communication was also

discussed.

By implementing the suggestions given in this paper, I am very optimistic that Nigeria will soon be singing a new song of great innovation.

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