



Wi-Fi Everywhere: A Case of Nigeria

Wari Denyefa Cletus¹, Seiyaboh Zidiegba², Oluwafemi Joseph Shonubi¹

¹Department of Computer Science, School of Applied Sciences/ Federal Polytechnic Ekowe, Nigeria

²Department of Mathematics/Computer Science, Niger Delta University, Bayelsa State, Nigeria

Abstract Wireless technology has changed the lives of people all over the world. Connection can be made from almost anywhere; at home, at work, in libraries, schools, airports, hotels, shopping malls, restaurants and even in some institutions of worship. The purpose of this paper is to highlight some initiatives of companies to deploy this technology. It also discusses how this technology will greatly impact the larger society. Key challenges to successfully roll out these initiatives were also highlighted and discussed. These findings may be useful in the effective deployment of Wi-Fi technology across the country.

Keywords Broadband, LAN technologies, Wi-Fi, Wireless hotspot, ICT

1. Introduction

Wi-Fi is a type of wireless networking protocol that allows devices to communicate without cords or cables. Wi-Fi is technically an industry term that represents a type of wireless local area network (LAN) protocol based on the 802.11 IEEE network standard. It's the most popular means of communicating data wirelessly, within a fixed location, today. "Wi-Fi" is a trademark of the Wi-Fi Alliance, an international association of companies involved with wireless LAN technologies and products [1]. The term Wi-Fi is mostly defined in the tech community as Wireless Fidelity. Hotspot is another term used. It defines an area where Wi-Fi access is available. It can either be through a closed wireless network at home or in public places such as restaurants or airports [2]. For connectivity to be established, a wireless adapter is used to create hotspots - areas in the vicinity of a wireless router that are connected to the network and allow users to access internet services. Once configured, Wi-Fi provides wireless connectivity to your devices by emitting frequencies between 2.4GHz - 5GHz, based on the amount of data on the network. Wireless technology has widely spread lately and one can get connected almost anywhere; at home, at work, in libraries, schools, airports, hotels and even in some restaurants [2]. The different 802.11 networking standards available today enables transmission through different wireless network frequency levels of 2.4 GHz or 5GHz to adapt to the amount of data that is being sent by the user [2]. Getting access to fast and affordable internet connection still poses a challenge in Nigeria [3]. Providing Wi-Fi hotspots across the nooks and crannies of Nigeria will go a long way in the development of the Country's GDP. According to The World Bank, every 10 per cent of broadband penetration a country's GDP grows by 1.28 per cent [4].

This paper is structured as follows. In section 2, the initiatives of government and private companies to deploy Wi-Fi Hotspot across the Country was discussed. The impact of Wi-Fi technology on the society was highlighted in section 3. How using this technology would grow the country's GDP was also discussed in section 4. Section 5 gives factors that can hinder the effective deployment of this technology. The final Section concludes the paper and discusses future work.

2. The Wi-Fi Initiatives – Deployment of Wi-Fi Hotspot

Internet provider Oxygen Broadband provided affordable and reliable broadband through the deployment of Wi-Fi hotspots, when it launched the first metro Wi-Fi hotspot at the Ikeja Computer Village; a popular district for IT-related trade and services in Lagos, Nigeria [3].



There is also Google's Project Link which seeks to build metro fibre and Wi-Fi networks to provide internet services in developing countries - the pilot was launched recently in Uganda [5].

Wifi.com.ng is an ISP Company which builds solar powered base stations that customers get installed in their homes or business. 80% of new customers get a Wifi.com.ng account by calling and then are given a date for installation. Customers pay a setup cost as well as a monthly subscription. Wifi.com.ng is competing with the local Telecommunication Companies which cap the data the customers use, and Wifi.com.ng is the only company that is offering uncapped internet access [6].

Ambitions plans have been initiated on delivering broadband in Africa. In the beginning of 2015, OneWeb shared its plans to bring high-speed Internet and telephony to billions of people around the world, including the unconnected masses in Africa. The idea is to launch and operate a constellation of Low-Earth Orbit (LEO) satellites — a projected fleet of 648 telecom-class micro birds — to deliver low-latency, high-speed Internet access directly to small, self-installable user terminals. In September, Fibersat announced a deal with Arabsat for a hosted payload with numerous Ka-band spot beams blanketing Africa. In October of that same year, Facebook made headlines with the announcement of its plans for broadband in Africa. As part of its Internet.org initiative, Facebook signed a deal with Israeli satellite operator Spacecom to use capacity on the soon-to-be-launched Amos 6 satellite for what Facebook describes as core Internet services, such as healthcare, banking and, of course, Facebook. The capacity will be shared with French satellite operator Eutelsat, which will sell full satellite broadband services in the region [7].

Turkish Airlines has introduced a new telecommunication service that allows free on-board internet services to all passengers regardless of their class on travel from Nigeria to the United States of America. According to the airline, adjustments to its Wi-Fi policy has become necessary in order to further ensure a pleasant travel to the United States [8].

3. Impact of Wi-Fi Technology in the Society

Free Wi-Fi in townships allows the unemployed to look for jobs online and email CVs. Education is obviously the other major benefit of free Wi-Fi, as kids and older students can study online, download textbooks, and generally access information about the world. How do you learn if your teachers are on strike and you have no internet access? [4]

Public Wi-Fi also provides benefits for the administrators of smart urban spaces. Acquiring data for economic development planning becomes easier, and it has even been used to increase the use of public transportation in some US cities. Free Wi-Fi can also improve marketing, increase customer dwell time, and increase customer spend [9].

To small businesses, surveys have shown that nearly 80 percent of all small businesses consider Wi-Fi to be “important” or “very important” to the success of their companies. While reliable Wi-Fi is important from a business operations perspective, the more important factor is the relevance wireless connectivity has in the lives of a company's customers [10].

But more importantly the impact of Wi-Fi can be felt in these sectors and they include [11]:

I. The healthcare sector

The top three advantages of using Wi-Fi technology:

- Assess management

Since all the valuable equipment in health centers is either on wheels or on mobile therefore, it is sometimes difficult to locate the equipment needed. A simple remedy to such issues is to have a system that knows the whereabouts of all equipment. Therefore, with Wi-Fi, you can get an asset tracking solution and save time after searching for the equipment.

- Monitoring temperature

The proper storage of food, organs, tissues, pharmaceuticals or any other important items at a particular temperature in a hospital is needed for the safety of the patients and maintaining the quality of care. Wi-Fi can easily track the storage temperature that assembles data automatically. With Wi-Fi technology alerts can be sent to different devices, error conditions or reports of temperature.



- Safety of the patients

With Wi-Fi technology, health care centers can actually improve safety and peace of mind of both the patient and the staff. With Wi-Fi the hospitals can keep a track of the patients anywhere within the footprint of the network

II. The commercial sector

Continuous innovation and improvement with Wi-Fi has brought enormous growth in the commercial sector.

- Wi-Fi beneficial to business economy

Wireless technology has cut down the commercial cost this reduction has resulted from internet speed of transaction, the easy access to markets and suppliers, reduction in inventory and effective supply chain management.

- The ability to do jobs via internet

With the ease of access and consistency of satellite's global Wi-Fi technology the barrier of distance of the business-employee relationship is completely demolished. One can now generate productivity by not being physically present in the workplace.

III. Education

- Wi-Fi technology promotes individual learning and research

The Wi-Fi technological tool allows students to learn on their own. As it promotes individual research, it helps students to get into the depth of a specific topic of interests. With this technology, students never get bored while learning. Apart from compulsory subjects, they are also encouraged to play educational games and videos to solve interesting puzzles. For instance, mathematical games enable students to solve mathematical equations. In a nutshell, Wi-Fi technology has improved student's attitude towards learning.

- Wi-Fi makes educational materials accessible and help students with special requirements

The wireless technology has facilitated the growth of online education and has made educational materials easily accessible to the students across the globe. This has helped students to obtain valuable educational materials whenever required. Students find online education flexible which has helped them with different special needs to learn better. For instance, the use of robots or iPads helps students with autism to learn how to spell and talk. Therefore, teachers equip these students with this technology which have educational content.

- Wi-Fi technology has improved reading and writing skills

Online education has improved the way students read and write. Using the internet in the classroom assist students to learn regarding how to write educative writing and how to blog. Since all the computers have word applications which have inbuilt dictionaries, students can learn the meaning of any word and write essays. Some of the interesting English video games also teach them to pronounce and spell specific English terms.

IV. The multifamily sector

Multi-family housing communities have been clamoring for Wi-Fi connectivity for various purposes.

- Wi-Fi technology for official work

Entertainment is not only the sole reason for accessing Wi-Fi connection. More and more residents nowadays are either working from home as a part-time or full time employee or even run their business. With the internet advancement such as Skype they can even conduct meetings with their colleagues or partners and smoothly carry on their work.

- Wi-Fi for multifamily property owners

The property owners or managers find the Wi-Fi access as the most convenient amenities to market their properties. The internet has enhanced the value of their property by ensuring that their building infrastructure is future-proof. It has also enabled the buyers to get the details of any property they intend to buy in the future.

As we see that wireless technology is and will continue to augment the convenience and has certainly improved our quality life.



4. Wi-Fi and Nigeria's Economic Growth

With a population of well over 160million people, the importance of internet access cannot be overemphasized. According to Nigerian Communications Commission (NCC), the number of internet users on Nigeria's telecoms networks has hit 97.21 million, up from the 95.37 million recorded in August [12]

The internet access offers unprecedented for economic growth in the developing countries by providing access to information, connecting people to business everywhere and opening up new markets. The internet can transform the very nature of an economy and support economic development [13].

The result of a World Bank research paper examining the impact of increases in broadband penetration on real GDP per capita growth, indicates that an increase of 1% in broadband penetration leads to a 0.138% increase in real GDP per capita growth [13]. Figure 1.1 illustrates how real GDP per capita increases across regions in the two scenarios. The World Bank also found out that as a result of extending internet access the GDP is also affected positively [13]. Figure 1.2 illustrates the impact on GDP across regions in the two scenarios.

5. Key Challenges to Wi-Fi Integration

I. Power Challenge

Lack of consistent and affordable electricity is the single greatest infrastructural challenge in this Country. A key enabling factor to an effective ICT infrastructure is reliable and adequate supply of electricity. This will in turn enable businesses to provide seamless online services through local areas networks, wide area networks and the Internet. The growth of real e-business also cannot take place or be of any significance in an environment with unreliable public power supply [14].

II. High cost

Both e-business and telecoms infrastructure are incomplete without affordable computing facilities. People need to have access to reasonably priced computers for education, recreation, business and other creative activities. They also need low cost Internet and phone service. However, high cost is still a barrier in Nigeria even with price competition [15].

Installing a telephone line in the commercial capital Lagos is normally expected to cost 150,000 naira (approx. US\$1,500) including official and unofficial fees and can involve several months and cumbersome paperwork. Lines are sometimes cut off for no apparent reason and restoring them involves costly delays for business. Independent estimates has put the actual number of lines in use at little more than half of the total switching capacity of 600,000 lines [14].

Computer prices are high because most of the computer hardware in Nigeria is imported [14].

III. Poor Service

Dealing with the telecommunications companies is not the NCC's only challenge. It is also facing the ire of Nigerians over the poor service that these companies are giving them and the high costs of these services. The services of the various carriers have been marred by widespread complaints which include a high rate of dropped calls, poor audio quality, call interference, non-delivery of short message service, SMS, multiple billing systems for SMS, inability to recharge and poor customer care services. NCC alleged that the main contributor to the service deficiency is network capacity constraint as companies were not able to expand fast enough to meet demand [14].

IV. Under-served rural areas

The Nigerian Communications Act 2003 established a Universal Service Provision Fund (USPF) to provide subsidy for service delivery in high cost areas especially the rural and under-served parts of the country. The Board of USPF was inaugurated in July 2006. To ensure that telecommunication services are extended to rural / under-served / un-served areas, the NCC has supported and promoted a number of initiatives through the Fund including [16]:

- Community Communications Center (CCC): provide a public calling center, cybercafé and information and communications technology (ICT) training courses on a shared basis, as well as serve as a platform to wirelessly extend Internet access to surrounding un-served communities.
- Schools, Universities Access Program to Digital Life Style (SUAP2DLS): provide Broadband connectivity to schools and universities and neighboring communities.



- Rural Broadband Internet (RUBI) Access: award subsidies to successful applicants to provide wholesale Internet bandwidth to CCC, Cybercafés, Rural Internet Service Providers (RISE), Institutions, etc.
- Accelerated Mobile Phone Expansion (AMPE) Project: encourage network roll-out in at least five unserved towns/villages in each of the 774 Local Government Areas (LGA) by taking advantage of the ease in deployment of mobile services
- Backbone Transmission Infrastructures: provide voice and data access points in LGA headquarters with backbone connectivity

V. Shortage of experience manpower

Among the factors listed as being responsible for the low quality of service which subscribers are complaining of, the general shortage of experienced manpower in the operating companies pose a challenge [14].

Studies of Nigerian libraries in general and university libraries in particular have consistently reported inadequate levels of ICT literacy as one of the major problems facing technology development in Nigeria. ICT infrastructure development and poor funding have been identified as problems, followed by poor ICT skills among staff [12].

6. Figures

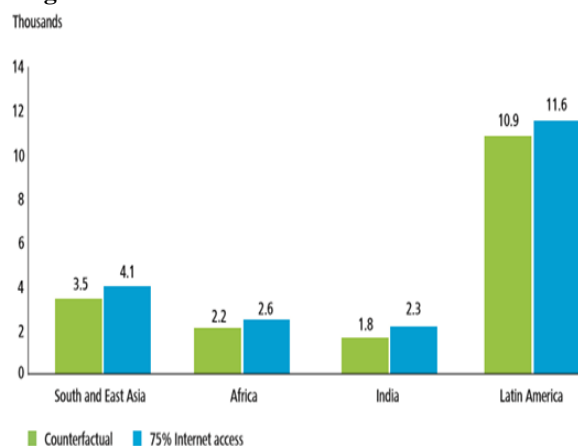


Figure 1.1: Increase in real GDP per capita (2013 \$) in 2018

Source: Deloitte Analysis



Figure 1.2: Real GDP increase (2013 \$tr) in 2018

Source: Deloitte Analysis

7. Conclusion

It is increasingly clear that integration of Wi-Fi in the society is an important factor to the small business owner and the government at large. The merits cut across different sectors of the economy.

It is sad to say that majority of towns and villages still experience inadequate or no access to Wi-Fi.

The success or failure of deployments of Wi-Fi hotspot in all parts of the Country will greatly depend on the availability of constant power supply, affordable ICT facilities and adequate experience manpower to address this need.

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Authors Profile



WARI DENYEFA CLETUS is a lecturer in the department of computer science. Federal Polytechnic Ekowe, Bayelsa State, Nigeria. His research area covers field like computer programming, data structure and analysis and business development.



SEIYABOH ZIDIEGHA is a principal system analyst at the Niger Delta University, Amassoma Bayelsa State. Her research area covers system development and framework development

