



# **FUDMA JOURNAL OF ARTS (FUDJARTS)**

**Volume 2 Special Edition 2018**

**A Publication of the Faculty of Arts,  
Federal University Dutsinma, Katsina State**

## FUDMA JOURNAL OF ARTS (FUDJARTS)

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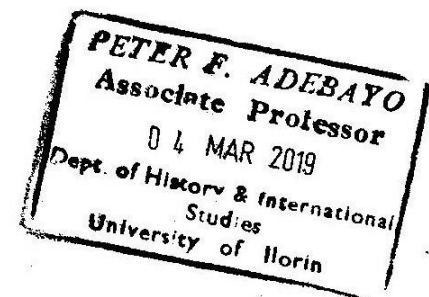
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## BROADBAND IN NIGERIA: PATHWAY TO ECONOMIC DEVELOPMENT

*Peter F. Adebayo, Owoade Adewale A. and Orogbemi, Elias O.*

### Abstract

Does broadband deployment affect economic development? Does limited internet capacity mitigate economic development? Can deployment of broadband fast track Nigeria's economic development? This paper addresses these questions using the historical survey method. Broadband is currently a major factor in the ICT sector and its ability to connect communities at a very high speed is one of many reasons why Nigeria, with an estimated population of 174,507,539 and a land mass of 923,768 square kilometers should engage this vital catalyst to aid the transformation of her economy. The paper traces the role of broadband in global economic development, Nigeria's broadband adoption policies, the problems facing the expansion of Nigeria's broadband capacity, government policies such as the Nigeria National Broadband Plan 2013-2018 and the economic benefits of unlimited broadband capacity in a developing nation like Nigeria. The paper concludes that improvising the distribution of broadband will not only lead to the general incorporation of its citizenry with fast and affordable internet connection but also contribute loftily to economic development in Nigeria.

**Keywords:** Broadband, economic development, Internet, ICT, Nigeria broadband plan.

### Introduction

Broadband can be portrayed as fast and dependable Internet network. It started to show up in some developed nations in the late 1990s, utilising the copper wire as a part of common phone associations as

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digital subscriber line (DSL) or the coaxial link in satellite TV stations (cable modem). In 2001, the main rapid portable systems were dispatched. Today popularised settled broadband systems reach download paces of 1,000 MB/s over fiber optic<sup>1</sup> and versatile broadband 300 Mb/s over a fourth generation (4G) Long Term Evolution (LTE) systems<sup>2</sup>. Before the end of 2014, there were nearly 748 million settled broadband memberships and 2.7 billion portable broadband memberships around the globe<sup>3</sup>. This moderately late development of broadband has effectively fortified much examination of it being a capable universally useful innovation<sup>4</sup>. Broadband has driven across the board changes in Information Technology (IT), empowering administrations, for example, cloud computing and mobile applications. Similarly, it is affecting development crosswise over numerous different divisions, including economic, health, transport and government. The effect of broadband internet on the economy is in this way a subject of growing interest.<sup>5</sup>

Naturally, it appears to be clear that entrance to broadband ought to cause economic development. For instance, access to broadband permits people to instruct themselves (subsequently adding to a country's general human capital stock), offers institutions some assistance with streamlining business methods and cut costs, yields access to new purchasers and merchants in remote markets, empowers new plans of action (consider telemedicine), encourages more effective business sector costs by diminishing data asymmetry, shapes an essential part of a general business environment that is helpful for development, and catalyses the framing of associations between people who ordinarily wouldn't be associated. In like manner, numerous arrangement choices are based around the suspicion of broad band's monetary impact. A few nations as of now have improved broadband infrastructure with a specific end goal to increase economic development. In 2008, for instance, the administration of Brazil worked with five broadband suppliers to construct a broadband system to interface government funded schools in more than 3,000 districts before the end of 2010<sup>6</sup>.

<sup>1</sup> 'Hong Kong Broadband Network,' hkbn.net. Web. 15 Nov. 2015.

<sup>2</sup> 'SingTel First in the World to Offer Commercial 300Mbps 4G Service with Huawei Mobile Broadband Device,' Info.singtel.com.

<sup>3</sup> 'Statistics,' ITU.net. Web. 15 Nov. 2015.

<sup>4</sup> 'Why Broadband,' World Bank. Broadbandtoolkit.org. Web. 15 Nov. 2015.

<sup>5</sup> Oral Interview with A.S. Olalere, I.C.T. Lecturer (21st September, 2015).

<sup>6</sup> 'Telecommunications operators will take broadband to schools,' *Gazeta Mercantil*. Web. 15 Nov. 2015.

The historical backdrop of broadband can be followed to Dartmouth School and research facilities in the Massachusetts Organisation of Innovation (MIT) in 1969 when they updated their entrance alongside the establishments in Canada. Before then, a few government limitations have halfway, kept broadband innovation slowed down, making the web horrendously moderate<sup>7</sup>. To download a low quality motion picture (700MB), it would take 28 hours at full speed, or around three-five days at low speed. Dial-up web was likewise greatly badly arranged on the grounds that it took up full utilisation of the phone. The world was not able to utilise the phone and surf the net in the meantime, constraining them to pick between monstrous impairment and the expense of a second line<sup>8</sup>. It wasn't until 1984 that the two foundations obtained faster Web access we are usual to today. In the years since, broadband innovation has gone from quality to quality by giving web clients speeds without disturbing their phone utilisation. The times of dial-up are a distant memory and gone too is the time when a few major players overwhelm the broadband business sector making it amazingly costly.

All the more as of late, we've seen the ascent of new broadband innovation, for example, 3G versatile broadband and link broadband. The previous gives you a chance to get online on the go at super-quick speeds, while the last has significantly supported association velocities to a UK most extreme of 300Mbps 2012 likewise saw the dispatch of the UK's first-ever 4G system, which guarantees to convey portable broadband associations of the pace and unwavering quality one regularly just get with altered line innovation<sup>9</sup>. Governments and offices around the globe have perceived the significance of broadband to developing nations and web correspondences innovation by and large has been viewed as a vital national foundation<sup>10</sup>.

### Literature on Broadband and Economic Development

Economic development is basic and fundamental to the sustenance and development of any country. A nation is developed when it's ready to give subjective life to her citizenry and one of the real

<sup>7</sup> Mojica, Stephanie. 'The History of Broadband', Brighthub.com. Lamar Stonecypher, 2010. Web. 22 Mar. 2016.

<sup>8</sup> 'Broadband History,' Uswitch.com. n.p. n.d. Web. 22 Mar. 2016.

<sup>9</sup> 'Broadband History,' Uswitch.com. n.p. n.d. Web. 22 Mar. 2016.

<sup>10</sup> Kenney, G. 'The missing link - Information', *Information Technology for Development*, 6 (1995):33-38. Web. 28 Mar. 2016.

components of development is innovation<sup>11</sup>. Economic development is the development of a country's, district's or group's riches for the general wellbeing of its tenants. This additionally includes the formation of occupations and supporting the development of wages<sup>12</sup>. The role of innovation in economic development cannot be underemphasised, innovation holds the way to the present and future development of Nigeria or whatever other nation so far as that is concerned, as is web broadband. Economic development is driven by numerous variables, including products, handle and hierarchical advancements taking into account innovative change and the era and appropriation of thoughts and data. Mechanical change results from little incremental upgrades after some time. Nonetheless, a couple of mechanical upgrades on a very basic level change how and where economic action is sorted out.

The 2009 World Bank Information and Communications for Development report<sup>13</sup> demonstrated that entrance to broadband helps economic development in all nations, however most particularly in developing ones. The study demonstrated that in developing nations, for each 10% increase in broadband penetration, their economies grew by 1.38%. The report, directed in 120 nations somewhere around 1980 and 2006, demonstrated that developed nations' economies grew by 1.21%. The figures affirm that broadband access is key to economic development and significantly more basic to developing nations. Similarly, as development of power and transportation prodded development a long way past the fantasies of their manufacturers, rapid broadband systems empower more prominent productivity and economic development.

The 2010 US National Broadband policy document catches it 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

<sup>11</sup> Lawal, Tolu and Oluwatoyin, Abe. 'National Development in Nigeria: Issues, challenges and prospects.' *Journal of Public Administration and Policy Research*. 3.9 (2011): 237-241. Web. 22 Mar. 2016.

<sup>12</sup> Economic Development (More Information to be added later).

<sup>13</sup> Christine, Wei and Carlo. 'Information and Communications for Development 2009: Extending Reach and Increasing Impact'. *Economic Impacts of Broadband*. World Bank. 3. Print.

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, organise and disseminate knowledge.

As indicated by the Organisation for Economic Collaboration and Development<sup>14</sup> broadband is a GPT that when joined with other data correspondence innovations (ICTs) can on a very basic level change how and where economic movement is composed. This change is affected through a few channels. Direct effects emerge from interests in the framework itself and related ICTs. Indirect effects originate from all parts of economic action influenced by broadband and which drive economic development<sup>15</sup>. A few studies have inspected how firm level profitability is affected by broadband<sup>16</sup>. A key topic of this literature is that broadband empowers the rise of new plans of action, procedures and development. This thus lessens costs, expands profitability and enhances firm productivity. A study by The Allen Consulting Group reports discoveries from an overview of Australian organisations on the cost funds got from utilising broadband internet. The overview results demonstrate that organisations experienced cost investment funds of around 6.3% the utilisation of broadband contrasted with 1.5% from the utilisation of dial up web. The study asserts that the reported normal cost reserve funds would bring about a general profitability addition of around 0.32% for Australian organisations. These discoveries are steady with a later study by the Australian Industry group reported that more than 93% of the organisations studied demonstrated that broadband positively affected their profitability and effectiveness.

A recent report by Grimes, Ren and Stevens<sup>17</sup> utilises a board of 6060 New Zealand firms to decide the effect that contrasting sorts of web access have on firm profitability. The information sourced from two reviews directed by Measurements New Zealand permits the creators to control for a scope of firm attributes including those elements that might decide a company's decision of web access. Two

<sup>14</sup> OECD (2008). 'Broadband and the Economy, Ministerial Background Report'. DSTI/ICCP/IE(2007)3/FINAL, Paris Pp.5-6. Print.

<sup>15</sup> Collins P, Day D, Williams C. 'The economic effects of broadband: An Australian perspective'. *Research Statistics and Technology Branch, Department of Communications, Information Technology and the Arts, Canberra*.

<sup>16</sup> Holt Lynne W. and Jamison Mark A. 'Broadband and Contributions to Economic Growth: Lessons from the U.S. Experience.' *Telecommunications Policy*. 33(10-11), pp. 575-581. 2009. Print.

estimation methodologies are utilised: propensity score matching (PSM) and an instrumental variables (IV) estimator. Results from PSM demonstrate that efficiency ascends by 6.9 to 9.7 percent as a consequence of broadband network. These impacts are reliable crosswise over various sorts of firms with no critical contrasts over an urban versus rustic split or crosswise over high versus low information commercial enterprises. The IV estimation results show considerably higher efficiency sways from broadband appropriation. In particular, that broadband selection builds firm profitability by somewhere around 21% and 25%. Despite the fact that the IV estimation results are fundamentally higher than those got from PSM, the creators support the PSM gauges since they absence of particular information about the right practical determination in connection to an association's work efficiency in respect to its area and in this way have low trust in the IV estimation results.

Notwithstanding those studies that take a gander at the effect of broadband on firm level efficiency, there is a developing assemblage of writing that analyses the relationship in the middle of broadband and macroeconomic level markers, for example, economic development and livelihood utilises an instrumental variable model to assess the impact of broadband base on economic development in a board of 25 OECD nations. The creators presume that the presentation and dispersion of broadband importantly affected Gross domestic product (GDP) development in those nations incorporated into the board. After a nation had presented broadband per capita Gross domestic product was all things considered 2.7% and 3.9% higher than before its presentation, controlling for nation and year settled impacts. Regarding ensuing effects the creators found that a 10% point increment in broadband infiltration raised yearly per-capita development by somewhere around 0.9 and 1.5 rate focuses<sup>18</sup>.

A study by Lehr et.al<sup>19</sup> broke down the effects of broadband infiltration on occupation development, compensation, rents, business development and industry structure at the group (zipcode), industry and state levels. The outcomes show that the broadband take-up

<sup>17</sup> Grimes A, Ren C, Stevens P. 'The need for speed: impacts of internet connectivity on firm productivity'. Motu Economic and Public Policy Research. 2011. Print.

<sup>18</sup> Czernich N, Falck O, Kretschmer T, Woessmann L. 'Broadband Infrastructure and Economic Growth'. *The Economic Journal*. 121(May): 505-532. Print.

<sup>19</sup> Lehr W, Osorio C, Gillet S, Sirbu M. 'Measuring broadband's economic impacts'. Presented at the 33rd research conference on communications, information and internet policy (TPRC). Arlington Virginia, September 23-25, 2005. 2006. Print.

upgrades economic movement with huge consequences for employment development and business development, especially for bigger business and business in IT serious parts. The study found that broadband take-up had no noteworthy effect on wages however that there was a critical relationship between broadband take-up and private property estimations.

Utilising information from 120 developed and developing nations, Qiang and Rossotto<sup>20</sup> used the Barro cross-sectional endogenous development model to break down the effect that broadband has had on long haul economic development rates over the period 1980 to 2006. The outcomes from this exact examination recommend a powerful and observable development profit from broadband access in developed nations. In particular, all else being equivalent, a 10% increment in broadband infiltration in a developed nation would yield a 1.21% expansion in economic development. For developing nations it was found that, all else being equivalent, a 10% expansion in broadband infiltration would yield an increment in economic development of 1.38%.

A study by Koutroupis<sup>21</sup> utilises a macroeconomic creation capacity with a microeconomic model for broadband venture to gauge how interest in broadband base affected economic development in 22 OECD nations over the period 2002-2007. The outcomes recommend that there is a solid causal connection in the middle of broadband and economic development. The discoveries likewise propose that there are expanding returns to interests in broadband framework and that nations with broadband infiltration rates of more than 30% appreciate higher returns from broadband speculations in respect to those nations with lower broadband usage rates.

Also, a generally referenced econometric study by Crandall, Lehr and Litan<sup>22</sup> gauges the impacts of broadband infiltration on economic yield and occupation, in total and by industry part for 48 Conditions of the United States over the period 2003-2005. The study finds that non-ranch livelihood in a few commercial ventures is absolutely connected with broadband use. All the more particularly, for each 1%

<sup>20</sup> Qiang & Rossotto. 'Economic Impacts of Broadband'. *The World Bank. Information and Communications for Development 2009: Extending Reach and Increasing Impact*. Washington, DC: The World Bank.

<sup>21</sup> Koutroupis (to be added later).

<sup>22</sup> Crandall, R., Lehr, W. and Litan, R., 2007. 'The Effects of Broadband Deployment on Output and Employment, A Cross-sectional Analysis of US Data'. *Issues in Economic Policy*. (6), The Brookings Institute, Washington D.C.



increment in broadband infiltration in a State, work is expanded by 0.2 to 0.3% for every year. At a more disaggregated level the study finds that work in both assembling and administration commercial ventures (particularly back, training and medicinal services) is decidedly identified with broadband infiltration. The literature additionally presumes that State yield of goods and services are likewise absolutely connected with broadband use.

### Broadband and Nigeria

Broadband is to the 21<sup>st</sup> Century Information Age what power was to the Industrial Age. It has a significant transformative impact on how individuals live and function. It empowers the individual user with previously incomprehensible capabilities and worldwide compass. The Web is the world's biggest library and largest repository of data and information; while fast access is basic to completely harnessing the benefits of the Web. Internet and Broadband have been all around recognised as the establishment for transformation to an information-based economy. It is also generally recognised that broadband infrastructure is an empowering influence for economic and social development in the advanced economy. Broadband has the capability of empowering whole new industries and bringing significant efficiencies into training conveyance, medicinal services provision, vitality administration, ensuring open safety, government/resident cooperation, and the general association and dissemination of learning. The most believable statistics on broadband entrance estimate that Nigeria's broadband infiltration is somewhere around 4% and 6%, further underscoring the need for Nigeria to give strategic significance to the advancement of broadband infrastructure.<sup>23</sup>

One very significant step in Nigeria's quest for Broadband concentration is the Nigeria National Broadband Plan, 2013-2018.<sup>24</sup> On the 20th of Sept 2012, former President Goodluck Ebele Jonathan introduced the Presidential Advisory group for a national broadband strategy and guide. The board was led by two esteemed men in the ICT and Telecoms sector, Dr Ernest Ndukwe, and Mr Jim Ovia supported by a cast of 15 center members representing various stakeholder groups in the sector, and an extra set of co-picked members. The Broadband Plan is in respect to an existing National vision, Vision 20:2020 which states that the Government of Nigeria

<sup>23</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.

<sup>24</sup> Oral Interview with Donatus David, Computer Analyst (3rd November, 2015).

intends to become one of the leading twenty (20) economies on the planet by 2020, with a primary development focus of no less than \$900 billion in Gross domestic product and a for a per capita income of no less than \$4000 per annum<sup>25</sup>. As indicated by the Nigeria National Broadband Plan, the principal national ICT approach as of late drafted for presentation to the Federal Executive Council for endorsement contains the proposed broadband policy position of the nation and stresses the significance and centrality of broadband to accomplishing the general goal of ICT as a device for national development. The policy document states:

Although there are some initiatives aimed at deploying broadband in Nigeria, many challenges remain, especially with the deployment of a national fibre optic based network to distribute approximately 10 terabytes of capacity already delivered to landing points in Nigeria. Therefore, there is an urgent need to accelerate the pace of on-going efforts, and also to introduce new initiatives to address this challenge. This is necessary for the actualisation of the developmental goals of Vision 20:2020.<sup>26</sup>

The phone subscriber figure for Nigeria as toward the end of February 2013 was 116,601,637 dynamic lines. The four dynamic GSM operators have around 96% market share while the three dynamic 2G CDMA operators have the rest. 2G mobile scope is at 98% however 3G scope which is mostly found in urban areas is exceptionally constrained at less than 35%. Web infiltration is cited at 33% and Broadband usage is at 6%<sup>27</sup>. Since the 2001 further opening of the web market in Nigeria, essential fiber Optic Spine infrastructure had been brought into all the 36 states and the Federal Capital Territory, most of which has up to this point packed in state capitals and couple of urban centers<sup>28</sup>.

There is a calculable number of submarine landings on the shore of the nation, giving more than 9 Tbit/s of joined capacity. The NCC's Nigeria National Broadband Plan states that:

The infrastructure landscape of Nigeria as at 2012 is estimated to be made up of 25,000 base stations, 116,000 kilometers of microwave and 41,000 kilometers of terrestrial-and-aerial fibre

<sup>25</sup> Ibid.

<sup>26</sup> Ibid

<sup>27</sup> Ibid

<sup>28</sup> Ibid

optic network (excluding metro fibre). Presently 4,000 kilometers of fibre optic network has been deployed on High Voltage transmission lines and several points of presence have been commissioned at various sites in key cities' (Nigeria National broadband Plan).

The Government has introduced a few activities keeping in mind the end goal to address the broadband access and accessibility issue. Federal Government initiated, for example, NTDA (Nigeria Telemedicine Development Alliance), NCC (Nigerian Communications Commission), NBC (National Broadcasting Commission), Galaxy Backbone, NIGCOMSAT (Nigerian Communication Satellite), NIPOST (Nigerian Postal Service) and NUC (National Universities Commission) all of which have carried out various projects in the last years (Nigeria National broadband Plan).

The Nigerian National Broadband Plan 2013-2018 holds that broadband organisation and usability in Nigeria would achieve its top, specifically fivefold increase in web and broadband infiltration figures between the time of 2013 and 2018, fiber infrastructure will be installed in all states capitals, urban cities, certain estates, business districts and rural areas, there will be a transition from 3G networks to 4G/LTE with the accessibility of spectrum. In a nutshell, there will be quick improvement, societal and utility transformation in the wake of overcoming broadband challenges. The most effective method to deliver a five-fold increase in broadband entrance is significant and the Nigeria National Broadband Plan 2013-2018 provided a guide and timelines for accomplishing this. It said that government shall:

- i. Establish policies that see ICT networks and installations as basic national infrastructure that fit the bill for special government assurance.
- ii. Promote transparency of valuing and diminishment of work out costs by empowering an increased level of infrastructure sharing and interconnections and presenting cost caps where necessary or when business sector forces fizzle.
- iii. Take necessary administrative measures to ensure better execution levels in the conveyance of broadband services.
- iv. Facilitate fast rollout of wireless and wire-line infrastructure and give incentives to empower a national 3G wireless scope to no less than 80% of populace by 2018.
- v. Timely release of more spectrums for broadband services.

- vi. Foster alluring investment atmosphere by focused schemes for stimulating demand and giving focused on concessions, charge incentives, grants or support where required.
- vii. Raise advanced proficiency and inclusion by using existing national assets for group access.
- viii. Advocate and demonstrate the benefits of broadband inside of the levels of government and also among the general population.<sup>29</sup>

#### Problem Facing Broadband Operators in Nigeria

In the Nigeria National Broadband Plan, operators in the ICT sector have identified the challenges common to them as:

- a. High costs of right of way and resulting in the high cost of lease and transmission
  - b. Long delays in obtaining permits
  - c. Backhaul capacity constraints
  - d. Multiple and illegal regulation and taxation at Federal, State, and Local Government levels
  - e. Damage to fibre infrastructure during road works
  - f. Lack of reliable, clean public electricity supply
  - g. Lack of major green energy initiatives and support.<sup>30</sup>
- **Right of Way:** Operators have stated that the cost for procurement of Right-Of-Way (ROW) for laying fibre and for procuring sites for base stations has been prohibitively expensive and that the process is time consuming. Indeed available data shows that the cost of obtaining ROW could account for as high as 50% to 70% of the total cost of deploying fibre in various states of the Federation. Lengthy approval times (in some cases up to two years), also contribute greatly to delays and escalation of costs in rollout of broadband networks. Despite the fact that sufficient international bandwidth capacities have been achieved with multiple international cable landings to the shores of the country, excessive upfront charges for rights-of-way for national fibre optic cable rollout initiatives, have hampered efforts to extend these capacities inland to reach all parts of the country.<sup>31</sup>

<sup>29</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.

<sup>30</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.

<sup>31</sup> Ibid.

- **Multiple Regulators:** While the Nigerian Communications Commission, NCC is identified under Nigerian Communications Act as the regulator for telecommunications and therefore broadband, there are other agencies at different tiers of government whose regulatory oversights are incidental to public ICT/Broadband infrastructure. These include Federal, States and Local Government MDAs on Environment, Aviation, Town Planning and Consumer Protection. All these agencies in carrying out their statutory functions individually occasionally try to enforce special rules for the deployment of broadband infrastructure leading to multiple approval processes being required and conflicting standards being imposed. Operators being required to get permits from several regulatory bodies can be unduly onerous, costly and time consuming. Industry regulators and regulation shall be assessed and streamlined.<sup>32</sup>
- **Multiple Taxes:** It has been suggested that revenue generation has in many cases been the primary purpose of some public authorities in getting involved in exercising regulatory interest in the telecommunications industry; thus making telecommunication companies prime targets for revenue generation and imposition of all kinds of taxes and levies on telecommunications infrastructure build. Some make deliberate unsubstantiated claims about supposed health hazards of telecommunications infrastructure only to demand taxes and levies without proffering any remedial or palliative measures for their claims.<sup>33</sup>
- **Illegal Taxation:** Illegal taxation happens when some public authorities and even private individuals demand payments, taxes or levies that are not backed by any law and resort to threatening and oftentimes vandalising infrastructure in order to compel operators to make payments.<sup>34</sup>
- **Discriminatory and High Taxes:** This is where the taxes are legal and backed by law and where special taxes and levy rates are demanded from operators in great disparity to what is demanded from other companies not in the telecoms and ICT sector, thus amounting to discriminatory taxes. These taxes shall be assessed and streamlined.<sup>35</sup>

<sup>32</sup> Ibid.<sup>33</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.<sup>34</sup> Ibid.<sup>35</sup> Ibid.

- **Security of Infrastructure:** Vandalism, bombing and outright economic sabotage of telecom infrastructure has become a frequent occurrence in the Nigerian ICT sector. Some operators have reported more than 70 cuts on their respective nationwide fiber networks on a monthly basis. This is generally caused by theft, willful damage, or accidental disruption due to road construction or expansion. Often, the phenomenon is accompanied by widespread service downtime and economic losses due to unearned revenues not only by the telecom operators, but also by the vast community of Nigerian business people who use these networks to conduct their businesses. One operator has reported it spends about USD90 million annually to repair fiber network cuts. Security of outdoor telecommunications infrastructure and safety of technical field staff have become part of the avoidable burdens that have befallen telecom operators in the country. Such phenomenon is among the factors hampering the deployment and operations of broadband networks around the country. Certain ICT and Telecoms Infrastructure are critical to the National Interest and shall be protected.<sup>36</sup>
- **Spectrum Allocation:** The challenges of spectrum allocation and assignment in the country have been identified as follows:<sup>37</sup>
  - **Underutilisation and Non-utilisation of Spectrum:** Not all the companies assigned frequency spectrums have rolled out services. Even where services are rolled out, there have been cases where capacity, coverage, and the resulting subscriber base had fallen far behind the anticipated performance due to underutilisation of spectrum. While the first scenario calls for greater enforcement of the use-it or lose-it provisions in our law, the second scenario might be mitigated by a regime that permits spectrum trading (selling, leasing and sharing).
  - **Insufficiency of Assigned Spectrum:** The spectrum size assigned for certain frequency allocations have not been optimal to support a robust rollout of full broadband networks. For instance, in the case of 2.3GHz allocation where slots of 20MHz spectrum currently allocated in that frequency will be deemed sufficient ordinarily. However, it has been determined that, given the prevailing

<sup>36</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.<sup>37</sup> Ibid.



infrastructure challenges in the country, 30 MHz spectrum slots would have permitted the deployment of more robust broadband networks on that frequency.

- Lack of Guard Bands: The lack of guard bands between adjacent frequencies assigned to operators have been reported as the cause of harmful interference to networks requiring the need for spectrum restructuring in some bands to accommodate guard bands.
- Conflicting and Overlapping Spectrum Licensing Regime Existing between the NBC and NCC: There have been cases where spectrum issued by NBC have been deployed to offer telecoms or internet access services, signaling the need to formalise spectrum convergence regulation in Nigeria to remove such grey areas.
- High cost of spectrum licenses: The high cost of spectrum licenses in the country contributes to high sunk cost and challenges associated with accessing spectrum for the rollout of high-speed networks. In some cases, the current high licence fees for spectrums have eroded the resources for rolling out their networks.
- **Investment and Funding:** Nigeria has enjoyed considerable investment over the years in the telecoms industry amounting to an estimated \$22billion. However, funding has not been flowing to areas where operators do not regard as commercially viable such as rural areas and remote sparsely populated locations. The Universal Service Provision Fund has been involved in initiatives to help bridge the funding gap for extending services to rural and underserved areas. Telecoms infrastructure is capital intensive and it is also true to say that even the level of investment so far would have achieved more in terms of subscriber base and national spread if operators had shared infrastructure at various levels. Instead, infrastructure is unnecessarily duplicated. While the bigger companies seem to enjoy better access to funding, most small ISPs and small telecom companies have been finding it difficult to access funding for new rollout programs. With local bank loan interest rates at double digit levels that are deemed unsustainable, the industry will benefit from a vibrant Venture Capital base that could help significantly in funding good business opportunities in Broadband services provision<sup>38</sup>.

In summary the relative difficulty in accessing long term low interest funding for the purpose of building or extending broadband

<sup>38</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.

infrastructure is limiting the pace of rollout of such infrastructure to only those areas where operators are convinced of significant financial return. The implications are clearly visible in the limited broadband infrastructure all over the country resulting in the slow adoption of broadband based services, and consequently stunted growth in demand for these very same broadband services. The use of broadband is its very own demand stimulus as users get more access to it and find that they are able to do even more. Without focused funding and dedicated public and private partnerships to address this limitation of funding and rollout options, growth in broadband demand and adoption will always remain stunted. The Federal Government will set up a funding roundtable with all local and international stakeholders to devise innovative and in some cases new ways of making broadband and investment in the enabling networks for broadband a viable option for investors and funding institutions alike.<sup>39</sup>

#### Broadband as a Pathway to Nigeria's Economic Development

Globally, technology has contributed to several developments, from societal developments, wealth creation to growth and transformation. The Industrial Revolution in the 19<sup>th</sup> Century contributed greatly to the development of the United Kingdom and France. Also the United States of America rose from an agrarian economy in the 19<sup>th</sup> Century to an industrial superpower in the 20<sup>th</sup> Century. Taiwan and Korea are leading countries in silicon microelectronics while the information technology market has been dominated by China and India. An analysis of these economies shows that their transformation was propelled by their huge investment in technology among other factors.<sup>40</sup>

According to the World Bank, every 10 percentage point increase in broadband penetration of a country results to an increase in economic growth of 1.38 percentage points.<sup>41</sup> A 10 percent rise in the broadband market in Latin America and the Caribbean increased the GDP to 3.2 percent and boosted productivity to 2.6 percent.<sup>42</sup> With increase in deployment of broadband services, Nigerian economy will

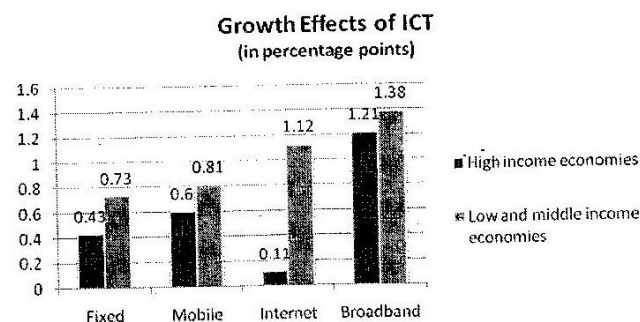
<sup>39</sup> Nigeria National Broadband Plan 2013-2018, Nigeria Communication Commission.

<sup>40</sup> Emmanuel O. Egbogah, P.Eng. OON: The Role of Science and Technology in Development: *The Miracle of Malaysia and the Future for Nigeria*, Petroleum Technology Development Journal (ISSN 1595-9104) An International Journal, January 2012 - Vol. 41 'Why Broadband'. World Bank. Broadbandrookit.org. Web. 15 Nov. 2015.

<sup>42</sup> Inter-American Development Bank (IDB) Technical Note: # IDB-TN- 471, Socio-Economic Impact of Broadband in Latin American and Caribbean Countries, November 2012, <http://www.iadb.org/>



experience a rapid development that has the potential to eradicate unemployment, increase productivity and aid innovation as well as creativity. The Nigeria National Broad Plan (2013-2018) pinpoints the benefits of broadband to Nigeria's economy, through its effects on several industries and sectors like entertainment, agriculture, commerce, security and energy.



**Figure 4: Growth Effects of ICT**

Source: Nigerian National Broadband Plan, 2013 – 2018

Fifteen (15) years ago, distance learning is a scheduled programme available for a small group of people with facilities that include a satellite video at a very high price. Today, with the broadband initiative, it is possible for students to enroll in distance learning programmes and take lectures in the absence of an enclosed facility, without any schedule at an affordable cost.

With an improved broadband service in Nigeria, students will be able to access information that will improve upon their learning process.<sup>43</sup> They can be directed to websites, stream videos and connect at online learning communities. Students can benefit from Open courseware like that of the Massachusetts Institute of Technology (MIT), Khan Academy (for secondary school students) and National Open University among many others. Also, there is no doubt that an increased effort in the distribution of broadband services will increase the percentage of adult literacy in Nigeria.<sup>44</sup> Education is the foundation of development. Accessible, affordable and reliable broadband service will have enormous impact on the quality and depth of education in Nigeria.

<sup>43</sup> Oral Interview with Ahmed Ibrahim, Broadband Consumer (1st November, 2015).

<sup>44</sup> Oral Interview with Adebisi Funmilayo, Broadband Consumer (1st November, 2015).

In the health sector, broadband services provide an array of opportunities. With a reliable broadband service, doctors can communicate with patients on issues like result of test, reminder of appointment, request to take actions or drug prescriptions. It will also assist doctors in writing prescriptions on behalf of patients, a pharmacist can also use a reliable internet access to communicate with a patient on the contra-indications of a prescription.<sup>28</sup> Advanced diagnostics, tele-therapy, telemedicine and online support groups for patients are among the benefits of broadband in healthcare services.

Insecurity is a major challenge facing Nigeria today. This ranges from terrorism to crime operations. An availability of broadband services will therefore help surveillance systems like CCTV to monitor citizens' activities in streets, homes and work places. Also, an availability of high speed network will give prior information of natural disasters such as Typhoons, Tsunamis, hurricanes, floods and earthquakes.

Dr Eugene Juwah, the Executive Vice-Chairman of the Nigerian Communications Commission (NCC) has revealed that the largest use and demand of broadband service comes from music, movies, videos, TV Shows and Radio Content downloads. Broadband service has therefore contributed in no small amount to National Development through entertainment. This will in turn, increase the revenue derived from entertainment, promote emerging artists and help in media advertising.

Nigerian farmers with access to affordable broadband services can also get information on weather, learn about farming management practices, have access to pricing options, monitor greenhouse temperature, and sell crops online among many others.

Broadband internet will also contribute to E-Commerce, with the growing amount on online consumers. A proper distribution of broadband service will undoubtedly boost and enhance online businesses in Nigeria, bring retails closer to consumers, as well as increase competition among small and large scale businesses.<sup>45</sup>

E-government also has the potential to bridge the gap between the government and the people. In Nigeria where geographical complexities have reduced government service to the people, an adoption of e-government, a system that can work effectively with broadband access will among many other things, bring government services closer to the people, increase transparency and accountability as well as involve the citizens in the decision making process.

<sup>45</sup> Oral Interview with Femi Omoniyi, Computer Scientist (19th September, 2015).

### Conclusion

Broadband is a noteworthy innovative improvement, giving users quick access to new opportunities, applications, and substance. A great part of the exploration on the relationship between broadband and its economic effects has been as subjective contentions. Formal observational studies have concentrated on developed nations, and firm-and group level studies in those nations affirm the high potential financial additions from broadband – including higher efficiency, lower costs, new monetary opportunities, employment, development, and expanded exchange and fares.

Whether this awesome potential to add to development and intensity is acknowledged will rely on whether governments comprehend the opportunity and guarantee that strong conditions are set up through administrative and arrangement changes and additionally key speculations and open private associations. Understanding the advantages of broadband additionally requires advancement of new contents, administrations, and applications, and in addition expanded human ability to adjust the innovation in financial exercises. Broadband plainly merits a focal part in national development procedures.

In a final analysis, the availability of a reliable, accessible and affordable internet broadband will not only end the problems of slow internet connection, high price of available broadband services and bandwidth incapacity, but will also boost the economy, increase the standard of living, provide employment, promote productivity, boost agriculture, promote entertainment, improve healthcare services, enable civic engagement, provide security, contribute to literacy, better environmental management and bring the government closer to the people. Furthermore, if the Nigerian government can ensure proper deployment of broadband services and formulate policies that encourage participations, broadband connectivity (new communication technologies, applications and services enabled by high-bandwidth networks) will be a major catalyst in achieving the nation's vision 2020.



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