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Rural ICT Penetration and Indigenous Software Growth in Nigeria – The Way Forward

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ABSTRACT: The Nigerian Communication Commission, NCC [1] indicates that the number of internet users on the country's telecom networks, had increased to 88,284,193 as at May, 2015. BROADBAND Internet is failing to reach majority of those who could benefit most, according to the 2015 International Telecommunications Union (ITU) [2]. This piece of work is motivated by the fact that a little percentage of its rural areas has ICT presence and their possible implications. The objective of this paper therefore is to examine the social, economic and political impact of Rural ICT Penetration and Indigenous Software Growth in Nigeria and the way forward. The result was that though there was obvious lapse in ICT penetration in Nigerian rural communities, remedies abound to arrest the impasse.

KEYWORDS: ICT Penetration, NCC, Internet, Software, Rural Communication, Broadband.

I. INTRODUCTION

It is no longer News that Information Communication Technology (ICT) has filtered into all the fabrics of socioeconomic and political lives of our nation, Nigeria. The country has been operating what may be described as a "Mono Communication Network culture" fathered by a one time giant in the field – Nigerian Telecommunication Limited (NITEL) until the year 2002 when the government of that time led by President Olusegun Obasanjo introduced the Global System of Mobile Communication (GSM) as against the Code Division Multiple Access (CDMA) of now moribund NITEL. The penetration of ICT into Nigerian rural communities then was not much as owning communication gadgets then was only for the affluent and so little penetration was witnessed. However, with the introduction GSM more than fourteen years ago, there was much improvement in the penetration of both ICT technology and software evident in the fact that many rural dwellers can now talk to relatives abroad with ICT facilities using different Application software. Much as our rural settings glory in this improved reach, there are still many rural settings in Nigeria that have not gotten this New life in ICT penetration evident in poor services of ISPs seen in cutting calls, not being able to send messages and poor internet services, among others different from what one sees in urban centers. Some reasons adduced to this included: low Broadband equipment, paucity of funds and poor resource management infrastructures by Service Providers. The question in the mind of every Nigerian is: why does the country still experience low ICT penetration and what is the way forward?

Adeyemi Adepetun [3] reports in The Guardian of Saturday, 16th January that Nigerian Computer Society (NCS) was to renew focus on rural ICT penetration, and indigenous software growth. This view was so apt and came at a time when lots of interests are turned towards rural ICT penetration. Adepetun quoted the current president of Nigerian Computer Society, Prof. Sola Aderounmu as saying that he was not satisfied at Nigeria's over 100% tele-density rate. According to the NCS Boss, the body has marshalled out plans to deepen Information and Communications Technology (ICT) growth in the country, especially in the rural areas adding that with a two year plan (2015 to 2017), NCS, under its new leadership, led by Prof. Sola Aderounmu, would also be focusing on increasing the use of indigenous software in the country.

Aderounmu [4], said that he was going to be more critical about software development in Nigeria adding that the society under him would seriously engage the Federal government to urgently push for comprehensive broadband access all over the country; roll out, implement and monitor local content policy to encourage Ministries, Departments



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and Agencies (MDAs) to patronize indigenous software and hardware. His agenda was aimed at ensuring Nigeria becomes Africa's IT hub. Aderounmu said that the society would also be engaging governments at other levels to establish IT parks through the use of Public Private Partnership mechanism, which will also see that digital centres are established in all the 774 local government areas pointing out that he would also ensure that critical stakeholders collaborate with NCS in pushing the details and implications of the cybercrime Act into the public domain. To achieve all he planned, the new NCS president said the society will employ five strategies which are visiting and meetings; writing; speaking; lobbying and collaborate with agencies (NITDA, CPN, MOCT). Members called for IT development in the country and called on all to make themselves relevant in the push for ICT enabled economy. "Members of the society must ensure that they are relevant in the scheme of things in the country, as far as ICT is concerned. We need to look at where technology is going and contribute significantly to aid the country's growth." He stated.

Meanwhile, the NCS has expressed support for the recent charge by President Muhammadu Buhari that Ministries, Departments and Agencies (MDAs) collect biometric data to harmonize the collection and use instead of replicating efforts. According to the society, this directive by Mr. President is not only welcome but an imperative one considering the huge cost implication biometric exercises have caused taxpayers in the past especially in terms of cost of data acquisition, cost of personnel, cost of storage of acquired data and cost of making such data available. As aforementioned, Adeyemi Adepetun[5] noted that Broadband Internet is failing to reach those who could benefit most, according to the 2015 International Telecommunications Union (ITU) State of Broadband Report, while broadband Internet access is reaching near saturation in the world's rich nations, it is not advancing fast in the developing world. For example, African countries have world's lowest broadband penetration, with Nigeria ranked 130th out of the 189 member states of the ITU. Libya, which ranked highest in Africa at the 25th position, is followed by Cape Verde at 59; Tunisia at 67; Egypt at 74; Sudan at 105; Morocco at 106; Cote d'Ivoire at 108; Algeria ranked 112; Uganda is at 120th position; Mauritania occupied the 122nd position; Sierra Leone is at 125 and yours truly— Nigeria at the 130th position. However, Nigeria, whose broadband penetration currently revolves around 10 per cent, is still ahead of countries including Mali; Congo; Burkina Faso; Kenya; Burundi; Liberia; Ethiopia; Malawi, among others.

The report Deloitte [6] revealed that 57% of the world's population remains offline. The situation in the 48 UNdesignated 'Least Developed Countries', which include African nations is particularly critical as explained above, with more than 90% of people without any kind of Internet connectivity. The lowest levels of Internet access are mostly found in sub-Saharan Africa, with Internet available to less that two per cent of the population in Guinea; Somalia; Timor Burundi: Leste and Eriteria. According to the report, Deloitte, ITU ranked the top three countries to include Macao (China); Singapore and Kuwait respectively. African countries including Cameroon; Chad; Equatorial Guinea; Eritrea; Gabon and Guinea-Bissau all ranked at the bottom with a zero or an estimated zero number of active mobile broadband subscriptions per capita. ITU listed the challenges that must quickly be overcome to expand web access to include creating a truly multilingual, multicultural Internet, and making services and devices more affordable. The UN body also noted that cost-effective networks into remote and rural areas are also a key to improving rollout of access Need to Improve ICT Penetration in Rural Settings: Nigeria still lacks some national telecommunications backbone to deliver high speed data to their populations and businesses; these are getting into shape, whether through public or private initiatives. Thus, further investment in national backbone infrastructure is still required to deliver high speed broadband access deeper within each community. Whilst many Nigerian communities have benefited from access to sub-sea cable, only few service providers have adequate infrastructure to deliver this throughout this country to domestic regional hubs. Domestic connectivity is often achieved through strings of micro-wave towers and satellite connectivity, which are sub-optimal to carry large amounts of data without incurring incremental investments.



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Figure 1: A Local ICT Teacher in a Tutorial Session with a Learner – A need for Rural ICT Penetration Source: Susheel Chhabra

Infrastructure sharing initiatives, whether private or public, are acting as market catalysts. They need to remain consistent with wider policy making.

Investments are being made by the private sector operators and by governments in developing voice and data infrastructure, often through fibre sharing. In doing this, national utilities have a key role to play in commercialising existing infrastructure, whether ducts, poles or actual fibre. This has been the case in many geographies in Nigeria. The development of cross-country backbone infrastructure needs to be consistent with wider development initiatives, e.g. access to electricity. If there is a role for public institutions to foster growth in underserved areas and address areas of market failure, then this has to be sorted out.

Rural – **Urban divide in ICT/software penetration:** Urban centres are seeing widespread availability and increasingly stronger competition. Data coverage outside major centres remains limited; operators highlight costs as the key limiting expansion factor. Thus data network access and mobile broadband offerings in urban centres is becoming increasingly widespread and competitive. Whilst 2G coverage is increasing slowly rural areas of Nigeria, 3G coverage and above typically remains confined to main urban centres, where the more affluent Smartphone users are currently broadly located.

II. RELATED WORK

The Concept of Broadband: Although ITU is yet to agree on a template of what constitutes broadband, its Commission Deloitte, however defines broadband, as a cluster of concepts, a high-speed Internet access which is always-on and capable of multiple service provision simultaneously." The definition is silent on speed, however not doing so adds conflict to understanding why broadband is not just a concept but a value chain, at least 256kbit per second in either uplink or downlink thereby making a consensus rate for broadband as most of the countries lagging behind could be found in Africa, Asia and South America. Some countries and the citizens have never encountered Internet until Mark Zuckerberg unleashed Facebook on the world's over one billion users for which the world is grateful.

Rural Broadband Initiative – the Benefits: Some of the benefits of the rural ICT broadband penetration initiatives are that it stimulates demand for ICT at the community level, and facilitates the adoption of ICT by the local people for economic and social development.

It will also see that 100% support for this project will have access to cost-effective bandwidth and such increase of ICT presence in rural areas will drive small and medium scale businesses plus employment generation among youths. Provision of both wired and wireless internet at high speed in the rural areas could serve as a catalyst for the uptake of other broadband-dependent projects in those locations such as e-library, e-health, e-government etc. thereby increasing the value chain. The result would off course be a happier society.



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Figure 2: A rural woman making use of ICT facility - The presence of broadband stimulates demand for ICT at the community level. Source: NCC

Deloitte noted that telecommunications growth in Africa has positively impacted incomes across the continent: in Sub-Saharan Africa, mobile revenues reached \$35bn in 2011 representing GDP contribution of approximately 3%. Recent Deloitte and GSMA research states that a 10% increase in mobile penetration in developing economies is likely to increase productivity by 4.2%. Mobile subscriber growth is maturing and could well saturate in the medium term in some markets if rural coverage do not increase.

On rural ICT Penetration, she observed that on the average, mobile subscription penetration has reached 72% across Africa (3Q12) but country penetration rates vary. According to her, Multi-SIM ownership is widespread and actual penetration of individuals could be closer to 40% to 50% in some countries, potentially leaving room for further growth. For instance this is the case in Nigeria where mobile penetration is above 60% but human penetration just above 26% with multi-SIM ownership at 2.4 per user.

III THE EFFECT OF NON-PENETRATION IN NIGERIAN RURAL COMMUNITIES

Adeyemi Adepetun [7] reports that Limited access to broadband Internet (especially in rural economies of Nigeria) is crippling the spread of information and communication technologies (ICTs) in the developing world and widening the already significant digital divide, a report has warned. Besides, the report discovered that this Internet gap deprives developing country businesses of economic development opportunities such as call centres and offshore offices. Indeed, a study of small and medium enterprises (SMEs) around the world found that one of the main reasons they underperform – especially in poorer countries – is that they make too little use of the Internet. For instance, the report discovered that SMEs in Brazil are three times less productive than big firms there, while those in India are 10 times less productive. The report published by the International Trade Centre (ITC), a joint venture of the World Trade Organisation and the United Nations, aimed to find out why.



urce: Internet World Stats - www.internetworldstats.com/stats.htm



Source: Internet World Stats – www.internatworldstats.com

It examined 38 indicators to gauge the national and business environment and firms' capacity to "compete, connect and change". They included such measures as managerial experience, level of training, and existence of bank accounts and audited financial statements. In Indonesia, only 9.4% of small firms were using e-mail, and only 4.2 per cent had their own Web site. In Bangladesh, the figures were 12% and 6% respectively. According to ITC's Chief economist, Marion



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Jansen, "Indonesia is surprising; it's one of the few countries where even large firms underperform in the use of e-mail. "Bangladesh was trying to establish an export position in the IT business, but its small firms were far behind in the use of Web sites and e-mails and appear to ask itself whether it's sustainable to have an export position where the domestic market doesn't seem to be well developed. "As well as a lack of connectivity, many small firms in the poorest countries were held back by their access to finance, and in south Asia and Africa, they scored poorly on international quality certification as well as on low use of e-mail."



Figure 4: Internet VISAT - A facility for Rural ICT Penetration Source: Hayzee Networks Communications; Email: <u>fidelity@globalnettv.net.ng</u>

The report noted that SMEs account for nearly 70 per cent of employment. They employ disproportionate numbers of women and young people and at lower wages than their larger rivals, so improving their productivity is seen as a route to economic development. According to the study, Latin America emerged as the most entrepreneurial region, with more than 10 per cent of young people starting up their own businesses in many countries, but weak national business environments hampered their ambitions. ITC Executive Director, Arancha Gonzalez, said the study – which will be published yearly – was intended as practical tool for governments and companies to improve their performance. While large enterprises and national economies have reaped major benefits from this technological revolution, individual consumers and small, upstart entrepreneurs need to be among the greatest beneficiaries from the Internet's empowering influence. "If Internet were a sector, it would have a greater weight in GDP than agriculture or utilities", it observed.

ICT Penetration and Digital Opportunity: Bankole Orimisan [8] noted that the clear division between traditional and digital media is fading away according to PwC's Entertainment and media outlook: 2015 – 2019 report, which also predicts unprecedented growth of the entertainment and media industries in Nigeria, Kenya and South Africa repetitively. The report forecasts that South Africa's entertainment and media industry is expected to grow from R112.7 billion in 2014 to R176.3 billion in 2019, largely fuelled by digital spend and at a compound annual growth rate of (CAGR) 94 per cent. Internet access in South Africa for one will rise rapidly from R32.5 billion in 2014 to R76.2 billion in 2019 according to the report, making it the largest contributor to South Africa's total entertainment and media revenues. Nigeria's entertainment and media market grew by 19.3 per cent in 2014 to reach \$4 billion. By 2019, the market will be more than twice as big, with estimated total revenue of \$8.1 billion. As in South Africa, the Internet will be the key driver of growth for Nigeria. Television, comprising revenue from TV advertising and subscriptions, is the other main driver. "Consumers are choosing offerings that combine an outstanding and personalised user experience with an intuitive interface and easy access. This includes shared physical experiences like cinema and live concerts, which appear reenergised by digital and social media," Myburgh continues.



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Figure 5: A computer System with different Applications (Programs) – a gadget for Rural ICT Penetration Source – Internet.

As in South Africa and Nigeria, the Internet in Kenya is expected to be the largest driver of growth, followed by television and radio. TV advertising will overtake radio in 2016, and Internet advertising will see the fastest growth rate at a CAGR of 16.8 per cent. Traditional mediums such as TV, radio and newspapers will continue to be the first choice for most Kenyan advertisers in the foreseeable future. "Affordable Internet access will continue to digitally disrupt the market in novel and innovative ways. The ongoing spread of services to mobile networks, novel devices and emerging markets will change how media and entertainment are served, consumed and monetized in multiple ways. Affordable Internet access will also inhibit the revenue growth of various sectors as consumers use it to access free, ad-funded and lower-priced subscription-based versions of new and existing services." said Myburgh. media The report also details growth of Kenya's entertainment and media industry which was valued at \$1.8 billion in 2014, up 13.3 per cent from 2013, when it stood at \$1.6 billion. The Kenyan market is expected to surpass the \$3 billion mark in 2019 to reach \$3.3 billion. "Today's media companies need to do three things to succeed: innovate around the product and user experience; develop seamless consumer relationships across distribution channels; and put mobile at the centre of the consumer's experience." Myburgh stressed. ICT Penetration and National GDP Growth: Adedayo Akinwale [9] reports that The National Information Technology Development Agency (NITDA) has said that given the rate of Information Communication Technology (ICT) development in Nigeria, by the year 2020, ICT will contribute 20% to the nation's Gross Domestic Product (GDP). Its Director General, Mr. Peter Jack [10] stated this in Abuja at the Africa Information Technology Exhibition and Strategic Conference the theme; "Africa and Emerging ICT Opportunities." with According to him, the ICT sector is demonstrating dynamic growth in Africa and Afritex was aimed at bringing together stakeholders from Africa and around the world to showcase latest technologies and innovations as well as discuss best practices in ICT world as it impacts on Africa economy. Jack said: "I'm saying by the year 2020, the contribution of ICT to the GDP would have doubled from 10% to 20%, and by that time we are sure that the emphasis oil will be grossly reduced. on ICT Penetration and Indigenous Software Growth In Nigeria: The rapid uptake of rural ICT and software growth in Nigerian has been mainly driven by:

- ✤ Mobile services being a core life enabler to all user segments
- Favourable macroeconomic factors flowing to higher consumption
- licensing opportunities and improved regulatory environment
- Further growth in subscriber levels is likely to be driven by:
- (1) Lower call prices and overall cost of ownership of handsets to gain access to lower income segments;

(2) Better network coverage in rural areas and operating models adapted to serving such remote connectivity needs; and(3) Mobile data connectivity (as well as M2M), which has already proved very successful in a number of communities and towns.

Mobile markets are slowly moving towards lower revenue growth levels.



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Figure 6: African Subscriber Growth and Penetration. Source: WCIS, ITU, GSMA and Deloitte analysis

IV. CHALLENGES OF RURAL BROADBAND PENETRATION IN NIGERIA

According to ITU Secretary General, Hamadoun Toure [11],"Broadband uptake is accelerating, but it is unacceptable that 90 percent of people in the world's 48 Least Developed Countries remain totally unconnected. With Broadband Internet now universally recognized as a vital tool for social and economic development, we need to make connectively a key development priority."

Nigeria lags far behind in the global Fixed Broadband index, some say, six percent, others score even far less. 60 percent of the world is said to be without Internet, according to the UN-backed Broadband Commission for Digital Development (annual report). The Commission envisages a 25 percent increase in Internet users this year. This is where Nigeria is locked in.

The world has witnessed Internet progression, from analogue to digital, and the digital milestones; 2G, 3G, 4G and now, much touted 5G (Dolloite in IMT 2020). It does become important to understand broadband, and what speed passes for broadband. It is true that the world had seen generational developments in Internet evolutions, from a little snail speed to fast speed Internet connectivity. But, it is also true that there had been serious challenges in taking Internet to major parts and hinterlands of the world. Thus, as the world evolves to next generations of Internet, the conflicts of supply and demand will continue to take the centre stage of the question of penetration.

Challenges in Increasing Subscriber Base: Dolloite noted the as mobile operators continue to add subscribers to their network, they typically reach out to other segments and often either poorer subscribers or multi-SIM owners. In some occasions, incremental subscribers often spend much less than more affluent early adopters of mobile services. Again, reaching to specific niche segments or to remote areas, where competition may be less strong can be costly, diluting margins. Also identifying the appropriate execution path is challenging. In most cases, there is only a small divide between what is eligible for partnerships and what is more relevant for Ministries and Agencies (M&A), often a result of the availability of opportunities





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Figure 7: Large African Markets in ICT – a key to Telecom Growth Source: Deloitte analysis, Tele-geography, ITU Data, IMF

The Leadership conundrum: And governments everywhere must pick up the battle from here, as ITU had continuously demanded. Governments must lead the crusade for urban-rural Internet integration from the front, not the rear. In times like this, good speeches are not enough. Speeches must, and should be matched with set goals of action.

In Nigeria, the good news is that the Nigerian Communications Commission, NCC, under its current CEO, Engr. Eugene Juwah, had been so determined and focused in the efforts to alter the face of the nation, from an analogue to a digital nation. Between 2013 and 2014, there had been Spectrum sales in the 3.5GHz, 2.3GHz and expectedly soon, in the 2.6GHz bands. And because it is not just safe and enough to sell Spectrum Frequencies, the all-important question of last mile delivery of Internet to homes, offices and to the hinterland, led to the planned licensing of Infrastructure Companies, acronym 'InfraCos.'

Nigeria, a country of over 170 million populations, is a huge country by any stretch, but it is also a very rural country in demographic spread. Thus, a rural broadband investment by private investors is not a first line attraction. In a vast country with weak income base, poor electricity and public infrastructure, mass illiteracy, and mass unemployment, these are fundamental challenges than they are sources of investor's opportunities.

In the final analysis, government must take a leading role through financial incentives and tax holidays as a last mile imperative, otherwise the prospect is very dim that any investor would approach a bank to secure a loan to roll out a data network, knowing that the pay-back day cannot be guaranteed, especially in an unstable economy like Nigeria with very high lending rates, and poor public infrastructure.

Deloitte, envisaged four potential scenarios:

- 1. Winner takes all as the markets consolidate quicker than most operators can respond;
- 2. Turf wars continue as new and existing operators battle it out for the profitable market and are joined by banks trying to protect their core business against mobile payments;
- 3. New entrants come into the market from adjacent sectors with greater added value than the traditional carriers foreign media and even advertising groups are viewing telcos as a ready-made channel to market; and
- 4. Owning the hearts, minds, and wallets of consumers is the end goal. Will telcos, who have laid the foundation for connectivity and access, be the winners; or will it be global technology groups, the banks, media, advertisers or retailer giants?

There surely remain impediments to growth – road, rail infrastructure and power can be scarce, political instability and corruption are still widespread, regional integration is progressing only slowly but all these elements are improving and making long-lasting impacts, which is not just on the industry incumbents, but on all players in their respective value chains (hardware, software, services and people provisioning) as they reposition their offerings to keep in step with an unchartered end-state.



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Figure 8: A Conundrum Of Differentiation Options Source: Cisco Analysis 2012, Deloitte analysis

V. RECOMMENDATIONS

The work recommends as follows:

- Since analysis suggests there is considerable potential for SMEs to catch up and that the Internet being a 1. change agent in the way people work, socialize, create and share information, and organize the flow of people, ideas, and things around the globe, considerable effort should be made by government and groups toward the establishment of policies and programmes that will drive ICT penetration in Nigerian rural settings.
- 2. Since ICT business requires much investment, entrepreneurs should jettison: "I can do it alone attitude" and put their resources together to make meaningful impact in the sector.
- 3. Efforts should be geared by ISPs towards international connection through cables and satellite facilities with a view to having enough resource for rural ICT growth in Nigeria.
- Nigeria still lacks some national telecommunications backbone to deliver high speed data to their populations 4. and businesses; these are getting into shape, whether through public or private initiatives. Thus, further investment in national backbone infrastructure is still required to deliver high speed broadband access deeper within each community.

VI.CONCLUSION

This work has broadly examined the incidence of poor ICT penetration in Nigerian rural settings and concludes that this development has caused the country losses in economic growth, political development and capacity building in human capital. In this time when University lectures are delivered through internet services to the remotest rural dweller in Western Countries, their counterparts in Nigerian rural communities are ignorant of what internet services are all about. They travel to urban centres in search of the same opportunities. Some have lost their lives in the process. Again, the loss in economic terms of the resource the rural communities would have gotten through SMEs in ICT business to improve their lives are immense thereby contributing to poverty in these communities. Information and communication Technology (ICT) is one of the key drivers in global economic growth and has facilitated transactions between information providers and information seekers. There is therefore the need to make sure that it reaches everywhere in this country.

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