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STRATEGIES FOR THE PROMOTION OF BROADBAND SERVICES AND INFRASTRUCTURE: A CASE STUDY ON NIGERIA

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BROADBAND COMMISSION FOR DIGITAL DEVELOPMENT

ITU

Strategies for the promotion of broadband services and infrastructure: a case study on Nigeria

September 2012

BROADBAND COMMISSION
FOR DIGITAL DEVELOPMENT

ITU

This report has been prepared for the International Telecommunication Union (ITU) by Mr. Russell Southwood, CEO, Balancing Act - a consultancy and research company focused on telecoms, Internet and broadcast in Africa. It has been developed based on desk research and on Mr. Southwood's experience of the Nigerian market over a ten year period.

We would especially like to thank Dr Eugene Juwah, Executive Vice Chairman/CEO - Nigeria Communications Commission for his invaluable support.

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It is part of a new series of ITU reports on broadband that are available online and free of charge at the Broadband Commission website: www.broadbandcommission.org/and at the ITU Universe of Broadband portal: www.itu.int/broadband.

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Preface

The past twenty years have been an extraordinary time for the development of information and communication technologies (ICTs) – with the 'mobile miracle', we have brought the benefits of ICTs within reach of virtually all the world's people. Through its technical standardization and spectrum management work, ITU has been at the forefront of technological change and is today committed to continue to drive positive change in the ICT sector and beyond. It is now time to make the next step, and to ensure that everyone – wherever they live, and whatever their circumstances – has access to the benefits of broadband. This is not just about delivering connectivity for connectivity's sake, or even about giving people access to the undoubted benefits of social communications. It is about leveraging the power of broadband technologies, and especially mobile technologies, to make the world a better place.

In 2010, ITU, in conjunction with UNESCO, launched the Broadband Commission for Digital Development to boost the importance of broadband on the international policy agenda. The Commission believes that expanding broadband access in every country is key to accelerating progress towards these goals by the target date of 2015. The Commission is co-chaired by President Paul Kagame of Rwanda and Carlos Slim Helú, President of the Carlos Slim Foundation. Some 60 Broadband Commissioners representing governments, industry, academia and international agencies contribute the benefit of their insights and experience to the Commission's work. At the Broadband Leadership Summit held in October 2011 in Geneva, the Broadband Commission recognized broadband as a critical modern infrastructure contributing to economic growth and established four new targets for making broadband policy universal and for boosting affordability and broadband uptake. Innovative new models that promote competition, innovation and market growth are now needed to make the broadband opportunity reachable for all world citizens.

At ITU, the United Nations specialized agency for ICTs and telecommunications, we are committed to playing a leading role in the development of the digital economy through extending the benefits of advances in broadband and embracing the opportunities it unleashes. ITU's three Sectors – Radiocommunication, Standardization and Development – are working together to meet these challenges and our collective success will be a key factor in ensuring the provision of equitable broadband access throughout the world. This series of ITU Broadband Reports represent one tangible contribution towards this commitment.

Dr HamadounI.Touré

Secretary-General, ITU

Foreword

Broadband has become a key priority of the 21st Century, and I believe its transformative power as an enabler for economic and social growth makes it an essential tool for empowering people, creating an environment that nurtures the technological and service innovation, and triggering positive change in business processes as well as in society as a whole. Increased adoption and use of broadband in the next decade and beyond will be driven by the extent to which broadband-supported services and applications are not only made available to, but are also relevant and affordable for consumers. And while the benefits of broadband-enabled future are manifest, the broadband revolution has raised up new issues and challenges.

In light of these developments, ITU has launched a new series of ITU Broadband Reports in 2012. The first reports in the series focus on cutting edge policy, regulatory and economic aspects of broadband. Other related areas and themes will be covered by subsequent reports including market analysis, broadband infrastructure and implementation, and broadband-enabled applications. In addition, a series of case studies will complement the resources already made available by ITU to all its many different types of readers, but especially to ICT regulators and policy-makers.

This new series of reports is important for a number of reasons. First of all, the reports will focus on topical issues of special interest for developed and developing countries alike. Secondly, the various reports build on ITU's recognized expertise in the area augmented by regular feedback from its Membership. Last but not least, this series is important because it provides a meaningful contribution to the work of the Broadband Commission for Digital Development. The findings of the ITU Broadband Reports will trace paths towards the timely achievement of the ambitious but achievable goals set recently by the Commission as well as provide concrete guidelines. As broadband is a field that is growing very fast, we need to constantly build knowledge for our economies and societies to thrive and evolve into the future.

For these reasons, I am proud to inaugurate this first series of the ITU Broadband Reports and look forward to furthering ITU's work on the dynamic and exciting broadband ecosystem.

Brahima Sanou

Director, ITU Telecommunication Development Bureau

1. Introduction

This case study looks at the initiatives taken by the Nigerian Government and the communications regulator to encourage the growth of broadband built-out and use in Nigeria. It looks back at the period between 2006 and 2010 and forward to the likely impact of the latest broadband strategy of the Government.

This country case study is part of a series developed by the ITU and the Broadband Commission for Digital Development. It seeks to highlight the importance of broadband in meeting the Millennium Development Goals (MDGs). Whilst widespread broadband use can contribute to all of the MDGs, in the context of Nigeria it can help to lower levels of poverty (through job creation) and help to meet education and health goals related to the MDGs.

The Broadband Commission for Digital Development aims to assist countries in meeting the Broadband Challenge and Broadband Targets 2015 it adopted in October 2011. The Broadband Targets 2015 consist of a set of four targets for making broadband policy universal and for boosting affordability and broadband uptake:

- Target 1: Making broadband policy universal. By 2015, all countries should have a national broadband plan or strategy or include broadband in their Universal Access/Service Definitions;
- Target 2: Making broadband affordable. By 2015, entry-level broadband services should be made affordable in developing countries through adequate regulation and market forces (for example, amount to less than 5% of average monthly income);
- Target 3: Connecting homes to broadband. By 2015, 40% of households in developing countries should have Internet access;
- Target 4: Getting people online. By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in Least Developed Countries (LDCs).

Nigeria is an interesting developing country case study because its sheer size and diversity makes it challenging, both for policy-makers and service providers. The speed and scale of take-up for mobile phones has been staggering but until recently this has not been matched by Internet take-up. However, mobile broadband has accelerated the number of Internet users and looks set to increase overall levels of penetration in the future. The question is: what can be done in policy terms to spread this type of use more quickly and more widely? There remain significant areas of rural Nigeria where there is little or no broadband Internet access. These twin tasks remain the key challenges for the Nigerian policy-maker engaging with how to use broadband to meet the MDG targets.

Chapter 1: sets the scene for what follows by describing what the country looks like in terms of its demographic, political and economic context.

Chapter 2: describes how the broadband market has evolved and some of the key barriers to growth.

Chapter 3: looks at the elements that define the starting point for Nigeria's current broadband policy and look back at what was done in policy terms between: 2006-2010.

Chapter 4: seeks to draw out the lessons that might be learned from past and current broadband policy efforts.

Whilst Nigeria's regulator, the Nigeria Communications Commission, is exemplary in terms of the data it produces covering mobile voice, there is significantly less publicly available data on fixed and mobile broadband. What data does exist and is used in this case study needs to be treated with a degree of caution. Figures shown are much more like an "order of magnitude" indication than a more solid indicator. Nevertheless, they are perfectly serviceable in illustrating current and future changes.

2. Demographic, political and economic context

Everything about Nigeria is big: the size of its population, its economy and the scale of the problems it faces. The country covers 923,768 sqkms and is bordered by Benin, Niger, Chad and Cameroon. In climate terms, the country has three distinct zones: arid in the North, tropical in the centre and equatorial in the south. At the last census in 2006, it had 140 million people and it is estimated that in July 2012, there were 170 million Nigerians.

The median age is 17.9 years and 40.9% of the population is under 14 years old. The average literacy rate is 61.3%, with a higher literacy for men (72.1%) than women (50.4%)[1]. 50% of the population is urban and the majority live in the larger cities of Lagos, Kano, Ibadan, Kaduna and Port Harcourt. There is a broad religious split between Christian/animist believers[2] (50%) and Muslim believers[3] (50%). But whilst this is one of the key fault lines in the country, it is worth remembering that there are 250 different ethnic groups and around 500 languages, including the widely used pidgin, a Nigerian variant of English.

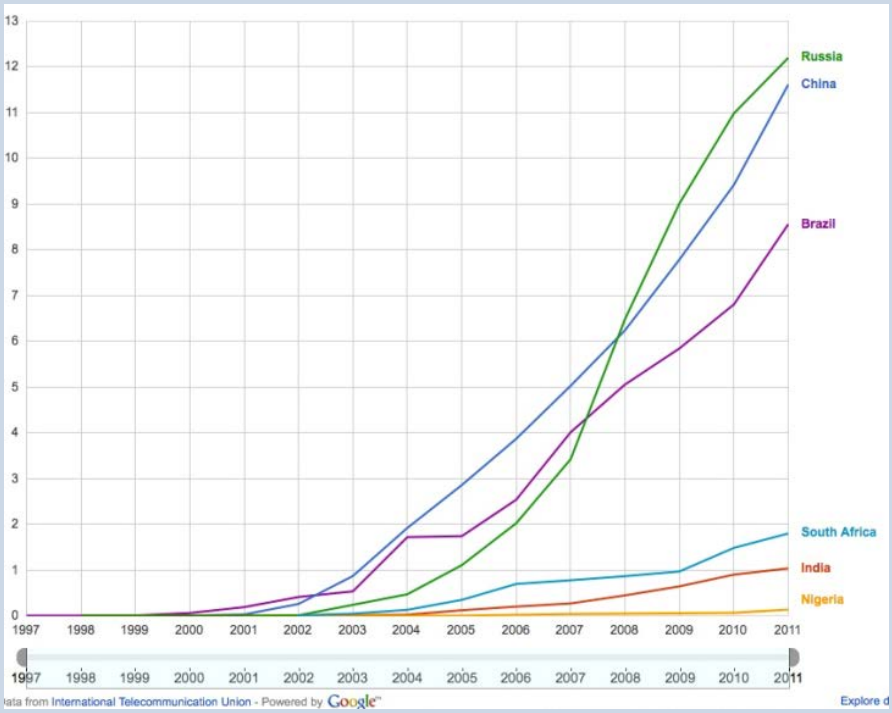
Oil produces 80% of Government revenues and the majority of the country's export earnings. Oil makes Nigeria a very rich country that has a lot of poor people. It also means that the economy is vulnerable to shifts in the international oil price. Recently, the country has started to produce goods like cement and with its population size, it has a sufficient scale of home market to extend this kind of import substitution into other areas.Nigeria is governed with a Federal and State structure that has echoes of its counterpart in the USA. There are 37 states in all but a great deal of economic activity in the country is focused on three cities: Lagos, Abuja (Nigeria's capital) and Port Harcourt (the main cityin the oil-producing region). Outside of South Africa, Nigeria is one of the largest and most complex telecoms and Internet markets in Sub-Saharan Africa.

3. Evolution of the broadband market

Comparisons are always difficult to make but the two charts below use ITU data to compare Nigeria (the orange line in Figure 1 below) with the BRICS countries in terms of broadband subscribers and penetration. Figure 1 shows the comparison of the number of broadband subscribers between 2001 and 2011. Although Brazil has a somewhat larger population, it is clear that it is growing faster in terms of broadband subscriber number than Nigeria. Figure 2 looks at penetration per hundred inhabitants over the same period and it is clear that Nigeria fits in the middle of the range of BRICS results most especially with the rapid increase in Broadband Penetration after the issuance of Unified Licenses, as well as, the 2.1GHz (3G) Spectrum Lincensing.

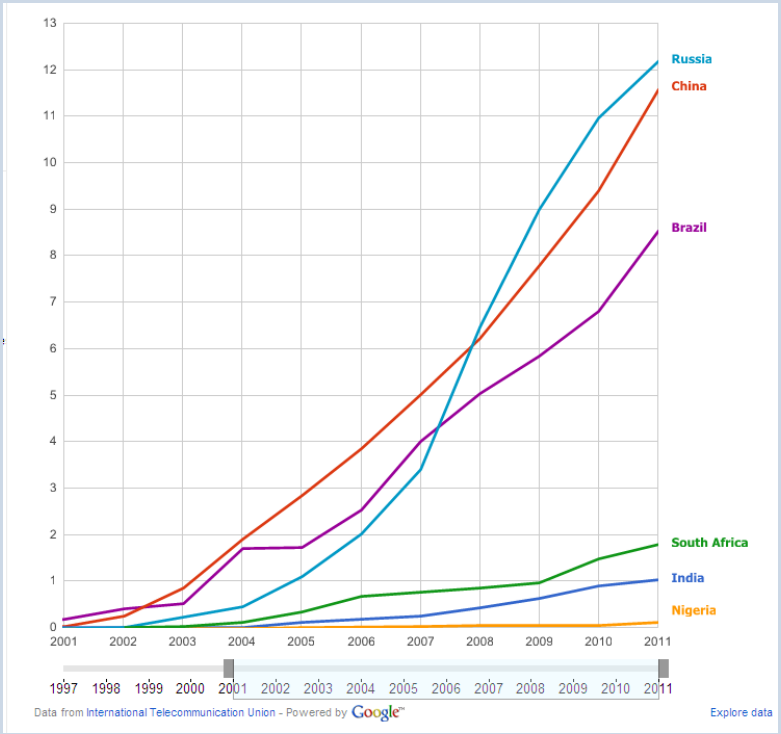
[1] 2010 estimate, CIA Factbook
[2] The biggest groupings being Yoruba from the South West and Igbo from the South East.
[3] CIA Factbook. The biggest ethnic groupings are Hausa and Fulani from the North.

Figure 1: Comparison of the number of broadband subscribers Nigeria vs. BRICS, 2001-2011



Source: ITU, www.itu.int/icteye

Figure 2: Broadband penetration: Nigeria vs. BRICS, 2001-2011



Source: ITU, www.itu.int/icteye

The most recent Nigerian data from 2011 suggests that the country has an Internet penetration rate of 22.1%, with a broadband penetration rate of 6.1%. User data suggest that the country has 33.5 million Internet users. There is a PC penetration rate of 4.7% and the country builds around 0.5 million PCs (both desktop and laptop) every year[4].

However, there are different estimates of broadband penetration and they vary between 3 - 6% and so Nigeria still has considerable challenges. Also, as will be explored below, what this level of broadband penetration actually means is perhaps not as quite as heartening as the headline figures might suggest.

The biggest positive development has been the rapid increase in mobile Internet use. Again figures vary but an estimate for 2011 was that there were nearly 800,000 broadband subscribers, 74% of which were on mobile networks. Nevertheless both 3.5 and 3.75G are not always particularly fast because of a variety of network issues and as is discussed below prices for retail access remain high. There are future challenges delivering faster broadband speeds on the mobile network.

The analogue-to-digital transition in broadcasting, for which the policy process was started several years ago, is only now beginning to gather speed. According to the AMPS Nigeria survey[5], there were 19.1 million households with television sets. Thus far the estimates for those with digital set-top boxes are between 0.5-0.75 million so there is still a long way to go. So whilst one of the mobile networks has been testing LTE delivery, it will be some while before the most suitable spectrum can be refarmed and allocated for mobile broadband.

The growth of mobile voice in Nigeria has been one of the country's success stories. Starting effectively in 1999 with its first transparent auction of licences, the take-up of mobile phones has reached the point where there were, according to the regulator's figures in June 2012, 102 million active subscribers, a teledensity of 73.12%. In the main, the history of the regulatory regime run by the Nigerian Communications Commission (NCC) has been open, transparent and technology neutral. However, for understandable reasons, both regulation and policy prioritized voice services for the majority of citizens and attracting investment into them, an objective that has clearly been well met.

By the end of 2012, Nigeria will have five international cables[6] and the price of wholesale international bandwidth will have fallen to around US$100 per mbps per month depending on volumes purchased from a price of over US$6,000 per mbps per month in 2004. [7]The cost of international wholesale bandwidth will remain highly competitive and has ceased to be a barrier to cheaper retail broadband prices.

There are five national wholesale fibre networks[8] but only two have anything approaching full national reach. The fibre network of the former incumbent Nitel is largely not in operation. So despite the existence of a competitive national wholesale market, prices for national routes have not come down as quickly as those on the east coast of Africa have done. The NCC commenced studies to established how best to enhance competition in the national optical fibre transmission system.

One of the biggest missing pieces in the broadband jigsaw is the absence of investment in fixed, household broadband coverage. At the local access level, there are few companies offering household

[4] All broadband data in this case study comes from the Nigeria Communication Commission.
[5] All Media and Products Survey (AMPS), Media Planning Services, 2010
[6]SAT3, Glo One, Main One, WACS and ACE.
[7]Internal Balancing Act research.
[8] In order of length of national fibre network: MTN, Glo, Multilinks and Phase3/Dancom.

broadband service outside of Lagos, Abuja and Port Harcourt. Indeed the majority of bandwidth traffic and revenues is focused in a triangle bounded by those three cities. Although local loop unbundling is possible, operators have held back from investing at this level. Also because Nitel has largely ceased to operate, the incumbent telco has not been promoting fixed household broadband as it might be found in other countries. Although several operators have talked about fibre-to-the-home, only a few of the operators have has launched this kind of service.

However, all that might change with the planned merger of its three CDM operators: Starcomms, Multilinks (which has an extensive national fibre network) and Cynacom (formerly MTS). The merged company will be created by Capcom, which intends to invest US$200 million with a view to attracting 2.5 million customers by 2016 at between US$24-32 per month.[9] It would offer triple play packages including voice and TV. In addition, the newly created operator would have sufficient spectrum i.e. combines the assigned frequencies of Starcoms, MTS-1st Wireless and Multilinks in the 1900Mhz range to become a national LTE broadband operator.

The spread of broadband use and the way it is used is in many ways constrained by current pricing structure, something that is true across most of the African continent. Mobile broadband is sold in capacity limited bundles that encourage shorter term use for things like e-mail and web browsing but do not easily accommodate things like video streaming and video calling. In comparison to the selected countries Nigeria's mobile bundle capacity pricing on a monthly per megabyte (MB) of downloaded data basis is at the expensive end of the range for lower capacities and at the cheaper end of the range for higher capacities. Household packages are a relatively recent feature of the Nigerian market and are almost exclusively delivered by fixed wireless technologies. The price comparisons with other competitive markets in Africa show Nigeria falling at the upper end of the price range for fixed household subscriptions.

Table1: The price comparisons: Nigeria vs. competitive markets in Africa, 2011

Country and Type	Monthlycost	Cost per Mbps/MB	Notes
Ghana			
Householdfixed: 2 Mbps	US$35.74	US$17.87	ADSL
Householdfixed: 20 Mbps	US$172.09	US$8.60	ADSL
Mobile bundle 1.5 GB	US$20.42	US0.136 cents	3G
Mobile bundle: 2.5 GB	US$30.64	US0.122 cents	3G
Kenya			
Fixedhousehold: 10 Mbps	US$116	US$11.60	Fibre-to-the-home
Fixedhousehold: 20 Mbps	US$172.09	US$8.60	Fibre-to-the-home
Mobile bundle: 1 GB	US$9.92	US0.9 cents	EVDO
Mobile bundle: 20 GB	US$110.77	US0.5 cents	EVDO

[9]CAPCOM aims to become Nigeria's biggest retail broadband operator, offering faster fibre connections and triple play, Balancing Act, Issue 618: http://www.balancingact-africa.com/news/en/issue-no-618

Nigeria			
Wireless household: 1 Mbps	US$39.76	US$39.76	WiMAX – 5 GB downloadlimit
Wireless household: Not given	US$73.75	Speed not known	EVDO – 15 GB downloadlimit
Mobile bundle: 1 GB	US$22.08	US2.2 cents	3G & 3G+
Mobile bundle: 5 GB	US$50.49	US0.1 cents	3G & 3G+
South Africa			
Fixedhousehold:1 Mbps	US$35.58	US$35.58	ADSL
Fixedhousehold:4 Mbps	US$50.85	US$12.71	ADSL
Mobile bundle: 1 GB	US$30.65	US3 cents	3G & 3G+
Mobile bundle:10 GB	US$352.03	US0.17 cents	3G & 3G+

Source: Author's research

***Key to the table:** The prices of major operators were chosen in all countries for download speeds and capacities that will handle video streaming. All tariffs are monthly and the third column converts an mbps download tariff into a cost US$ per mbps and a capacity limited tariff into a cost US cents per MB.*

Beyond the challenges of network reach and price, the two most serious problems affecting physical delivery are vandalism and the lack of a reliable power supply. There are frequent cuts to the network and because a number of factors the speed with which these are repaired can often be over 24 hours or more. These cuts happen for a variety of reasons. Construction of various kinds most especially Roadworks means that cables are cut during the process of works. These civil works are not coordinated so a succession of works (power cables, roads, water pipes) takes place creating long periods of disruption. It is also widely believed by operators that some cuts are a form of commercial vandalism designed to damage competitor operators.

However, the most common form of vandalism is criminals digging up the fibre in the expectation that they will uncover copper cable that can be sold. This type of vandalism should reduce as the criminals become aware that the fibre cable laid is worthless. However, more worryingly, some cuts are made because the retrenching and repair of fibre cuts generates work for those in the vicinity of the cut.

There are no publicly available maps for existing locations of the fibre routes themselves and for other utilities like water pipes. The opportunity to lay ducting for fibre operators (that they all can use) alongside major road routes at marginal extra cost exists but is not being taken up. Local government authorities often charge disproportionately high amounts for rights of way and the time needed to obtain them is often lengthy. The NCC in the summer of 2010 proposed to support and promote the policy of laying PVC-pipe along all inter-state, and major metropolitan roads especially new roads so that access to right-of-way is simplified as all operators can simply run their fibre through such a PVC duct infrastructure. To date, not much progress has been made in the PVC Pipe deployment.

Power failures and unreliable "spiky" power with surges causes significant damage and downtime to a range of different telecoms equipment that controls the network at all levels. The need for generators to back-up key network transmission equipment adds to the cost of operating the network.

One report suggests that Nigeria produces only 10% of its daily power requirements[10]. Only 40% of Nigerians are connected to the national grid[11], so the digital divide is also a power supply divide. Up to US$13 billion a year is spent on diesel generators. All this has a direct impact on the cost of supplying broadband services like 3G and LTE: a power cost for mobile towers in Nigeria is nearly five times as much as in India.

The impact of these network cuts are made worse by there not being enough mutual support between operators to address the problem: some companies back each other up when cuts occur but others do not. There are still slowdowns and complete cut-offs where redundancy is an issue. Sometimes operators are competitively antagonistic on the issue of shared redundancy but also because there are trust challenges on some issues like payment and operational effectiveness. All of these physical blockages lead to a lowering of the reliability and up-time on the physical network. For example, one of the city destinations in Nigeria country has only 80% overall up-time despite two different links connecting it to the national network. Increasingly, there are formal Service Level Agreements given by operators but the nature of many of the cuts (most being covered by "force majeure") on the network mean that operators rarely pay the penalties contained in them. The NCC has come up with a new Quality of Services Regulation that requires, among other things, 100% redundancy solution on all major transmission routes. The NCC has only recently taken steps to ensure that optical fibre-transmission operators have in place a disaster recovery arrangement that can accommodate major failures.

So whilst the Internet is becoming something that is much more widely used than it was 5-10 years ago, the actual lived experience of broadband access falls significantly below its full promise.

Considerable progress has been made in some areas (like visa applications, car licenses, e-payment of salaries), less progress has been made in others. Some of the states like Rivers State have e-portals but the Federal Government has no national e-services portal. Also, whilst there has been a debate amongst policy makers and external interested parties about open data, the Federal Government has not yet made the same commitment to Open Data as the Kenyan Government[12] despite the fact that a new Act on freedom of information was only recently signed into law.

But there is a clear appetite for Internet and in particular for broadband services, particularly amongst young Nigerians. The country has seen one of the fastest growth curves on the continent for social networking sites. Figures from mid-2012 illustrate the scale of the phenomenon: Facebook (4.7 m), Eskimi (2.5 m) and 2go (1.8 m)[13]. Even the President has a Facebook site and a Twitter account which he uses to communicate with citizens and there is often an extremely lively debate between the rulers and the ruled.

Nigeria is one of the continent's most content-rich countries and the transition to making this content accessible online has begun. Current successful content sites like Nollywood Love[14] have until now relied largely on diaspora audiences. So whilst its "free-to-view" content has 1-2 million unique viewers globally, its Nigerian unique viewers were a little over 30,000 last year. Nevertheless 60% of its search enquiries

[10] University World News
[11] Large Scale Power and Transport Development Key to Unlocking Nigeria's Potential, Frost and Sullivan Market Insight, 6 June 2012
[12] See: https://opendata.go.ke/
[13] Most recent figure for Nigeria: 5.1 million. Source: https://opendata.go.ke/Other figures: Internal Balancing Act data.
[14] Recently bought by Tiger Global for US$8 million.

come from within Nigeria[15]. In other words, there is a large market waiting to have broadband access that allows them to view local content.

4. Establishment and implementation of the broadband strategy/policy

4.1. Key players involved in broadband strategy

The key policy document is the draft ICT policy that covers more than broadband alone but makes broadband a central pillar for the delivery of its objectives. The key policy and regulatory players are as follows: the Federal Government's Ministry of Communication Technology (which has spearheaded the draft ICT policy); the regulator, the Nigerian Communications Commission (NCC, which is also responsible for the Universal Service Provision Fund, and the policy implementation); the Government's connectivity provider Galaxy Backbone; the Government's satellite company, Nigcomsat; the National Frequency Management Council (NFMC); the National Broadcasting Commission (NBC); the National Information Technology Development Agency (NITDA); and NIPOST (the national post office service). With the Federal/State structure of Government, the State Governments play a significant role in supporting the ICT policy implementation. For example, Galaxy Backbone works closely with many states (including Benue, Jigawa, Lagos and Niger) on the implementation of broadband networks for Government work and in the case of Anambra State the provision of 100 VSAT receivers for Government use in areas that are without Internet access.

The States have also been part of the *Computers for All Nigerians* and run their own purchase subsidy schemes for civil servants, teachers and students. In addition, Anambra State signed an agreement with Microsoft to localize its software into the local Igbo language[16].

One legacy that has not been resolved is what will happen to the former telecoms incumbent Nitel. It was unsuccessfully privatized before being taken back into state ownership. There was then an unsuccessful auction to sell it and after this failure, the Bureau of Public Enterprises (BPE) took the decision to look for a negotiated sale.

Although according to the BPE, it has been dormant for three years, it has three assets that might at some future stage play some role (in private hands) in achieving a higher broadband penetration rate: its SAT3 undersea cable landing station and international capacity; its spectrum licence; and what remains of its national fibre infrastructure.

With the new policy the role of the different players outlined above may be adjusted in the next phase of broadband policy development, it is indeed likely that there will be the desired major shake-up that will address the challenges of overlap and or conflict in management of scarce resources –the Spectrum. In line with its Vision 20-2020 objective to secure sub-1000MHz spectrum Allocation from ITU to enhance Broadband, Nigeria has recently spearheaded the successful push towards additional spectrum Allocation for Mobile Broadband from ITU-WRC-12 where 694-790MHz as well as 790-862MHz were allocated to it,

[15]http://www.balancingact-africa.com/news/broadcast/issue-no112/top-story/iroko-partners-finds/bc

[16]http://www.balancingact-africa.com/news/en/issue-no-436/computing/nigeria-s-ambara-sta/en

but, unless the overlap and spectrum management conflict between the Broadcast Regulator, the National Broadcasting Commission NBC and the NCC is minimized it would be difficult to maximally harnessed the full benefits of the 700MHz and 800MHz bands that are allocated.

4.2. The legacy policy affecting any broadband strategy (2007-2011)

Normally policy cycles mirror political electoral cycles. However, Nigeria had three Presidents in the 5-year period under discussion[17]. As a result, there has been some understandable disruption of the overall policy processes. The foundations of current ICT policy were laid with the Telecommunications Act of 2003. The Government set out to liberalize the sector and to promote access to facilities and services at reduced cost while increasing penetration. To achieve this second ambition, the Nigerian Telecommunications Act was passed which set up the independent regulator, the Nigerian Communications Commission; the National Frequency Management Council; and the Universal Service Fund.

NITDA was set up in 2001 and set as its ambition "making Nigeria an IT capable country in Africa and a key player in the information society by the year 2005 through using IT as an engine for sustainable development and global competitiveness." It put out a strategic action plan in 2006 that is often described as a national ICT strategy. This was the same year that telecom incumbent Nitel was unsuccessfully privatized.

Both Nigcomsat ltd and Galaxy Backbone ltd were launched by the Government in 2006 as different ways of addressing the bandwidth supply issue. It was also planned that Nigerian Government will eventually privatized the two companies once they are well-established so that they can sustainable run their operations and compete in the market place. Although the SAT3 international fibre cable had started operations in 2001, its monopoly supplier Nitel kept prices high and the bandwidth was not being delivered too many parts of the country. So Nigcomsat ltd was established to "manage and exploit the commercial viability of the Nigerian Communication Satellite for the social economic benefit of the nation".

Galaxy Backbone was launched with a mix of motives: to supply bandwidth and related services to Government; to rationalize "the proliferation of disparate IT networks and assets" across Federal Government into a single, holistic network; and to extend Internet coverage to under-served or un-served areas of the country using satellite. Both organizations were started on the underlying assumption that satellite would provide the main way of delivering the Internet to Government, although Galaxy Backbone was able to use fibre where it was available.

Beyond these initial Government infrastructure projects, most of the focus on Internet access in policy and implementation terms fell on the Ministry and the regulator NCC. In 2006 the Federal Government launched the *Computers for all Nigerians* initiative with the aim of achieving "a PC penetration drive into sections of the Nigerian Community which are currently underserved." In practical terms it sought to deliver 0.5 million PCs, largely through a purchase subsidy scheme for civil servants. In addition, it set out

[17] President OlusegunObesanjo until April 2007; President Umaru Musa Yar'adua until his death in May 2010; and President Goodluck Jonathan as an interim President and then elected President from April 2011.

to work with two ISPs (Suburban and Netcom) to deliver Internet access in Lagos and Abuja.

This scheme, with its emphasis on purchase subsidy, was subsequently taken up by a number of State Governments and extended by some to teachers and students. Six computer brands were eligible, two of which were international (HP and IBM) and four were from local PC assemblers (Zinox, Brian, Omatek and Speedstar). The aim of the latter was to encourage the development of local manufacturing capacity and to generate jobs.

In parallel, the Petroleum Technology Development Fund[18] came out of money generated in the oil industry and had the overall objective of improving education and training for Nigerians who might want to go into the oil industry. It put some of its funding into building and equipping computer centres in both secondary and higher education institutions.

However, the main budget holder for implementing these kinds of Internet access initiatives was the regulator NCC, on the basis of funds it raised from a levy on the mobile industry. It contributes 40% of its Annual Operating Levy to the Universal Service Provision Fund (USPF). Therefore it had responsibility for three main initiatives:

- **The Wire Nigeria Project (WiN):**

This scheme came under the NCC with the objective of ensuring that no place in the country was farther than 30 miles from the backbone infrastructure. Three companies – MTN, and Multilinks– won contracts to deliver the fibre roll-out with a budget of well over N5 billion. Phase3 Telecom later joined the scheme. It was planned that a few hundred kilometres of fibre were to be laid. In August 2012, NCC said that MTN had indicated it no longer wanted to participate in the project[19].

- **State Accelerated Broadband Initiative (SABI)**:

It offered government support and incentives to encourage the private sector to build and run a broadband infrastructure in all state capitals and selected major commercial cities in the country by the end of Q1, 2008. Over N4billion was also budgeted for the project over the years. Both programs have been restructured and fresh implementation started to make appreciable impact.

- **Universal Service Provision:**

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 supported and promoted a number of initiatives through the Fund including:

  - ✓ ***Community Communications Center (CCC):***

This initiative was designed to 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

[18] See: http://www.ptdf.gov.ng/

[19] See: http://www.technologytimesng.com/news/2012/08/ncc-reviews-sabi-win-subsidy-deals-as-uspf-plans-10000km-fibre-link-across-nigeria/

wirelessly extend Internet access to surrounding un-served communities.

- ✓ ***Schools, Universities Access Program to Digital Life Style:***

The programme was designed to provide broadband connectivity to schools and universities and neighboring communities. USPF says that its Schools Access Project has been rolled out to 766 government schools representing 41% achievement of 1,858 schools targeted under its School Access Project (SAP) aimed at providing public schools with ICT hardware and funding subscriptions for broadband internet for at least one year.

In addition, USPF also said TiAP has been rolled out to 193 tertiary institutions across the country targeting 374 tertiary institutions under the Tertiary Institution Access Project (TiAP) to provide tertiary institutions with ICT hardware and funding subscription for broadband internet for at least one year.

Meanwhile the Fund's e-Library project has been deployed to 74 libraries across the country under the project to provide internet connections to public libraries and institutions in underserved/ un-served areas across the country, USPF says. USPF says that SAP has been rolled out to 766 government schools representing 41% achievement of 1,858 schools targeted under its School Access Project (SAP) aimed at providing public schools with ICT hardware and funding subscriptions for broadband internet for at least one year.

- ✓ ***Rural Broadband Internet (RUBI) Access***:

This awarded subsidies to successful applicants to provide wholesale Internet bandwidth to CCC, Cybercafés, Rural Internet Service Providers (RISE), Institutions, etc.

USPF says that it has implemented its Rural Broadband Initiative (RUBI) in 18 Local Government Areas (LGAs) to facilitate easier access to high speed internet. According to the Fund, the RUBI project facilitating the roll-out of broadband services to un-served and underserved areas was targeted to provide 109 RUBI initiatives across senatorial zones in the country under its 2007-2011 plans. USPF says it has subsidized a total of 224 CCCs across the six zones of Nigeria achieving 77% of their set targets of building 291 CCCs across the six geo-politcial zones across the country.

- ✓ ***Accelerated Mobile Phone Expansion (AMPE) Project***:

This was designed to encourage network roll-out in at least five un-served towns/villages in each of the 774 Local Government Areas (LGA) by taking advantage of the ease in deployment of mobile services.The USPF has awarded subsidies for 74 Base Transceiver Stations (BTS) while 62 of these have been implemented and 12 are in progress representing 12% of set targets of 490 BTS under the Accelerated Mobile Phone Expansion- Base Transceiver Station (AMPE-BTS) project aimed at subsidizing the construction of BTS in underserved and un-served communities, within the same time frame, the Fund says. Information on the operators that have deployed services and the extent of coverages was yet to be published by the Fund.

On the other hand, USPF says it has subsidized the establishment of 104 CIPs representing 69% of the planned targets of 150 CIPs under its Accelerated Mobile Phone Expansion – Co-location Infrastructure Project (AMPE-CIP) aimed at encouraging/ subsidizing the construction of shared telecoms infrastructure for co-location of telecoms operators.

- ***Backbone Transmission Infrastructures:***

This was designed like the NCC WIN project to provide voice and data access points in LGA headquarters with fibre-based backbone connectivity.

The USPF said it has recently concluded the process for the BTRAIN Pilot Project that will achieve the initial deployment of 500km of fibre out of the 1,000km of fibre backbone infrastructure under its Backbone Infrastructure Project (BTRAIN) aimed at providing subsidy to accelerate the build-out of backbone transmission infrastructure to all local government areas in Nigeria.

All of the USPF's initiatives have now been reviewed and it has issued a new strategy which is reviewed in section 3.4 that follows. A great deal of the initiatives above was aimed at opening up Internet access rather than specifically broadband Internet access. One of the key obstacles to achieving broadband before 2010 was the absence of a competitively priced international wholesale bandwidth. This changed with the arrival of a second international cable in July 2010.

4.3. The starting point for the new broadband policy

Developing a national broadband strategy remains challenging because many of the issues addressed in the previous period have not gone away:

- The principal focus of policy and regulation since the start of effective mobile roll-out in 1999 has been voice services, coverage and quality. It is only more recently that the Internet and broadband in particular have become a policy focus and growing demand has signaled that Nigerians want these kinds of services.
- The largest universal service initiative (for GSM voice) was allocated US$200 million for coverage in rural areas in 2006. However, no progress has been made to date on this plan. Other universal service plans are in place for wider data coverage but have also made relatively slow progress.
- There are issues around pricing, redundancy and access at national network level. These are acting as a barrier to faster broadband take-up and preventing the widespread national fibre networks being used to their fullest potential.
- Despite the NCC pilot initiative in 2010, there has been a lack of investment in fixed household access at the local level and whilst there has been more investment in corporate and government access, there are still many shortcoming in terms of price, access and coverage.
- Despite the availability of plentiful national and international wholesale capacity, pricing regimes seem to be predicated on the assumption that broadband capacity needs to be rationed. Outside of the country's middle class, Nigerians have a low level of purchasing power, particularly in the rural areas. Policy needs to address pricing to achieve maximum take-up.
- There are key issues around spectrum allocation for LTE roll-out and the speed of the digital transition in broadcasting. The proposed plans from Capcom to re-plan its network from CDMA to LTE offer one route to overcoming this problem but still leaves the issue of a level playing field for other operators. With the recent Allocation of 800MHz and 700MHz to Nigeria at WRC-12, the Country has a very good opportunity channelize the two bands and licensed them, in such way that

will enable it to actualized its dream of wireless Broadband deployment.

- Vandalism of existing networks has the effect of decreasing levels of up-time on the network. It is hard to convince people to become regular broadband users if there are still long periods of outages for whatever reasons.
- Although Government has said that progress is being made, the power supply, which is both unreliable and "spiky", plays a similar negative role to vandalism in undermining up-time for users.

4.4. Nigeria's new broadband policy

The chart below – taken from a presentation by Communication Technology Minister Omobola Johnson – lays out how the Ministry sees the role of the key players involved during the next period of broadband policy.

Figure 3: The role of the key players involved in broadband policy

NCC	ICT industry regulation
NITDA	IT industry support and development
NIPOST	Postal service delivery and access infrastructure
Galaxy Backbone	ICT infrastructure provision for Federal Government and its agencies
NIGCOMSAT	Commercialisation of Government's satellite resources
USPF NITDF	Managed fund to incentivise universal access
NFMC	Prudent and co-ordinated allocation of frequency resources
Ministry of Communication Technology	Policy formulation Policy impact assessment Supervision and oversight of all MDA ICT related projects and initiatives

Source: Ministry of Communication Technology of Nigeria.

There are two key policy components to the country's broadband strategy: the National ICT Strategy (drafted under the Ministerial Committee on ICT Policy Harmonization) and the Universal Service Provision Fund Strategic Management Plan (2013-2017). At the time of writing, both were out for consultation with stakeholders. These policies fit into the national *Vision 20:2020* which has as one of its objectives "the development of a vibrant ICT sector" and this driving other sectors including local content through entertainment (Nollywood films, in particular) and media. This is reflected in the draft National ICT Plan which envisages Nigeria becoming a knowledge-based economy.

4.4.1 National ICT Strategy

The National ICT Strategy noted that: "The reality of convergence has not yet been reflected in Nigeria where the institutions that regulate and/or develop the ICT sector still function as distinct actors in the industry, without much co-ordination…the lack of industry convergence…has resulted in fragmentation and inefficiency in the management of resources in the sector." Therefore on a structural level, the National ICT Strategy[20] proposes a converged regulator covering telecommunications, IT, broadcasting and postal, one whose roles would be to promote universal access to ICT services.

The National ICT Strategy has thirteen policy objectives and the ones with a direct bearing on broadband are listed below (with their original numbering):

- To promote widespread access to high quality advanced communications technologies and services, in particular the Internet.
- To divest NIPOST of its regulatory function and transform into a commercial provider of postal and integrated data communications services (author's underlining)
- To encourage the development of Broadband services that will enable Nigerians to enjoy the benefits of globalization and convergence.

In order to achieve these policy objectives, it focuses its attention on four key ICT infrastructure objectives:

- national ICT backbone and Broadband infrastructure;
- infrastructure that will foster digital literacy and Internet usage;
- affordable Universal Access to ICT; and
- national physical infrastructure (including power).

The Strategy asserts that 70% of Nigerians live in rural areas and do not therefore have access to ICT services and that some living in urban areas are un-served or underserved. It says that the following need to be considered to address these problems: the development of a national fibre optic backbone infrastructure that ensures high bandwidth availability, universal access, encouragement for private operators to roll out the infrastructure and use of existing government structure (like NIPOST) as platforms for extending ICT to rural communities.

Under the component on Research, Development and Innovation, the Strategy focuses on developing local content on the web clearly as a way of driving use of broadband. The strategies include: implementing an ICT local content policy; digitizing existing film and music content; making this digitized content available online. It also contains a focus on encouraging an outsourcing industry in Nigeria, one part of which would to provide tax relief or pioneer status over a specified period.

It also re-emphasises the need for "a nationwide ICT infrastructure that will support national broadband connectivity and accelerate socio economic development." To achieve, the following elements are highlighted; giving ICT infrastructure the status of critical national infrastructure; connecting State and Federal Government networks with optical fibre; and accelerating the existing power sector reforms.

[20] http://www.commtech.gov.ng/downloads.html

The Government has already begun to discuss Public-Private Partnerships to look at creating metronetfibre in larger cities. It is envisaged the following States might be involved initially: Ondo State, Ekiti State, Lagos State and Abia State. These partnerships might involve the State Government, a private sector investor and the World Bank's financing arm, the IFC. The Government has no desire to control or manage these PPPs, seeing the role of running them to be left in the hands of the private sector. Most importantly, they don't want to create de facto monopolies where the private operator gives better terms to favored operators. It also wants to support with financing if possible the USPF's roll-out in the regional clusters it has identified. As Lagos and some of the states identified may not fit into the definition of unserved or relatively underserved areas of the country it is likely that the relevant state government will contribute significantly into the partnership arrangements.

In terms of vandalism, the Ministry has engaged lawyers to look at drafting a Critical National Infrastructure Bill that would make vandalism a criminal act. But obviously getting a law on the statute book will take time. In the meantime, there is a discussion being held with the Attorney General about using a President Executive Security directive to address the issue. This would identify equipment covered by the directive and the police would be mandated to take action. In terms of clearing obstacles for those wanting to build infrastructure, The Government will address issues raised by the Ministry of the Environment. On rights of way in particular, it will seek to secure an agreed 90 day maximum turnaround for applications.

The Government's role will be to: review broadband penetration targets and determine further action; use demand and supply-side initiatives; and provide special incentives to operators to increase their investment in this infrastructure.

To feed the supply side of the process, it is envisaged that there will be 15-20 additional e-delivery processes, particularly in Health, Agriculture and Trade and Investment. Ultimately it would like to see 45 e-transaction processes per Ministry. Tax registration and payment is in the pipeline for financial year 2013/2014. In Higher Education, it will seek to extend the NREN network to all 30 Universities and medical colleges and envisages this being funded by the World Bank.

The targets laid out under the Strategy are summarized in the table below, which shows the target of doubling broadband penetration by 2015:

Table 2: Plan targets for 2015 shown against 2010 baseline: a comparison

Item	2010	2015
Contribution of ICT to GDP	3.5%	5%
Internet users	33.5 million	70 million
Internet penetration	22.1%	34%
Broadband penetration	6.1%	12%
PC penetration	4.7%	12%
Local PC assembly	<500,000	1 million
Jobs	n/a	1.3 million

Source: Presentation by Minister Omobola Johnson, Ministry of Communication Technology of Nigeria.

The financing of the strategy will be through "Government, the private sector, as well as international organizations." The attraction of new investment will be addressed through: tax and import duty reliefs; pioneer status to qualified investors; and simplifying the process of obtaining approvals and permits. The Plan envisages that the transition to digital broadcasting will "provide a clear roadmap for harvesting the 'digital dividend" spectrum and ensure competitive allocation."

For Universal Service access, the Plan envisages the following strategic levers: extending the definition of universal access to include digital literacy and nationwide broadband presence; subsidy to foster infrastructure deployment; using existing infrastructure (Post Offices, schools, libraries) to extend access; the promotion of e-serves for all population groups but particularly in remote and underserved areas; and the promotion of Public-Private Partnership on infrastructure roll-out. These are covered in more detail in the following section on the Universal Service Provision Fund's Strategic Plan.

4.4.2Universal Service Provision Fund

Generally speaking, national broadband strategies can seek to do three things: extend infrastructure as quickly as possible to what operators call "addressable markets"; through so doing hope to create a larger "critical mass" that will allow lower pricing; and lastly, to connect those whose ability to pay for broadband is weaker. The latter is undoubtedly the most challenging part of any broadband strategy.

After reviewing its activities, the Universal Service Provision Fund (USPF) has published for consultation, its Strategic Plan for the period 2013-2017. In reviewing its 2007-2011 Strategic Plan and its implementation, the USPF identified the following weaknesses: too many projects and plans for an organization that had just been set up; projects were defined with a "one size fits all approach" which did not always address the specific needs of beneficiaries; programmes were not reviewed regularly to check against current realities; and there were no plans to increase internal capacity[21].

There were three key threats that meant it was much harder to implement projects than had been envisaged: low levels of literacy meant those who were the services were aimed at did not often see their benefits; poor electricity supply meant it was more expensive for operators to provide services; high bandwidth costs deterred use; and finally there was insufficient local content to attract people to use the services.

From this analysis, the USPF has made a number of changes to how it seeks to implement its strategy. It will adopt a holistic approach in selecting projects and look at overall ICT gaps in regional clusters and seek projects that respond to these gaps. In order to improve buy-in for projects it will engage with a wider group of stakeholders (relevant government entities, operators and service providers, Non-Governmental Organizations, Community Based Organizations etc) through representation on a newly created Advisory Council. It will use a Net Present Value approach to define rather more carefully the maximum allowable subsidy. It will allow a "grace period" in which it subsidises operating costs as operators build up a customer base. It will carry out regular monitoring and evaluation of projects.

[21] Draft Strategic Management Plan 2013-2017, Universal Service Provision Fund, August 2012

For its forthcoming strategic period 2013-2017, USPF has adjusted its priorities to reflect these lessons learnt and to fit more closely with the National ICT Plan. On this basis, it has the following objectives:

- The extension of the national fibre optic backbone from major cities/towns where they are currently existent to surrounding Local Government Areas to enable affordable and sustainable access to data services.
- Continued support for the development of community centres where rural dwellers can benefit from the lower prices associated with shared data services.
- Exploring opportunities to implement programmes targeted at creating awareness of the benefits of Internet usage and training end users of the Internet in un-served and underserved areas.
- Supporting the development of local content and applications (i.e. m-health, m-learning, m-banking, m-government applications) which stimulate demand for Internet services and provide sustained socio-economic benefits for recipients of these services.

The objectives will be pursued within a framework of guiding principles and it is worth highlighting some of these that have not already been covered in this paper:

- Funding of infrastructure comes with the condition that operators will share that infrastructure at reasonable prices;
- The social inclusion principle will mean that USPF projects will also be targeted at "vulnerable groups and disadvantaged interests" (*"the elderly, physically challenged, women and children…").*
- USPF will encourage private sector investment in un-served and underserved areas and encourage competition between operators in these areas.
- USPF will give priority to programmes that are likely to be self-sustaining and do not require subsidy on a continuous basis.
- Their programmes will look to stimulate productive use of ICTs for economic, social and cultural development.

Within this framework of objectives and principles, the USPF has set itself some very specific targets. It will aim to connect about 200 communities, about 2000 public schools (representing 10% of the total number of public schools as at 2011) and collaborate with other stakeholders (for example, NUC, World Bank Step B) to connect all tertiary institutions to internet via supply of computers and bandwidth in the country by 2017.

The Fund's new strategy aims to increase in telephone and Internet penetration as well as coverage of 90% of Nigeria's inhabited land mass with telecommunications services by 2017. It will support the development of at least two local content applications on an annual basis starting from 2013.

5. Lessons learned

A great deal has been achieved through past policy efforts but the sheer scale of the task is still enormous. With the perfect vision provided by hindsight, the following lessons might be learnt in terms of broadband policy formulation and its subsequent implementation:

1. Because of the long lead-times in Government, past policy tended to follow events rather than lead them. For example, the two of main Government vehicles for addressing bandwidth issues were focused on satellite. Whilst satellite still has its place in reaching more remote areas, fibre will clearly deliver more Internet access than was initially imagined. Also, the Government and the regulator were relatively slow in addressing the blockage to cheaper Internet caused by the high wholesale prices charged by its own telecoms operator Nitel.

2. As the analysis in the current National ICT Plan makes clear, there were a number of different policy initiatives with no clear central thread that bound them all together around common objectives. The new ICT strategy has attempted to address this issue but as the saying goes, the proof of the pudding is in the eating. A successful broadband strategy has not only to weave together the many different contributions from Government and its agencies but to create a positive set of relationships with the private sector, civil society and NGOs. The danger is to imagine that Government or one part of Government alone can bring about a successful strategy. This is particularly true for a key factor like electricity power supply without which any broadband supply is likely to be considerably more expensive.

3. As the analysis in the latest strategic plan for USPF makes clear, a plan does not often survive what it describes as "current realities." Any plan needs to be revisited regularly (perhaps on an annual basis) to spot whether shortcomings are developing and whether circumstances have changed since the plan was written. Governments the world over find it easier to make announcements of their plans than to implement them. Only an enormous amount of determination and political will can ensure effective implementation. Government needs to spot emerging problems – like vandalism – and be quick to help rather than waiting to see what happens.

4. There are "chicken-and-egg" problems with supply and demand. Without compelling content and services, people will not use broadband. But without broadband being available, they will not have that opportunity. Policy-makers – even in a country as content-rich as Nigeria – have in the past tended to focus on the technical issues around supply rather than the thinking about what content and uses might inspire demand. However, the new draft strategy has a clear focus on local content. Government is important as an "anchor tenant" for broadband and can help create demand through its services and by supplying affordable broadband in schools and universities. But its services alone will not create the critical mass of users needed to help operators lower the retail price of broadband.

5. In broad terms, there are two different types of universal access areas: market gap, and those

where citizens are simply unable to afford any version of services. Universal service initiatives have been used to address both. The precise combination of capital and operating subsidy will vary enormously. However, without addressing both it will be hard to have practical evidence on which future funding might be based.

6. A successful strategy is one that allows an honest measure to be made at a later point as to whether it was effective or not. With some notable exceptions, most African regulators have focused on tracking voice subscriber numbers, penetration and associated data. The result in Nigeria is that the majority of data for broadband is not solidly anchored. Going forward, the regulator needs to be able make available publicly regular, updated subscriber numbers for the Internet, broken down into fixed and mobile access. Occasional consumer surveys on Internet use would greatly help supplement these headline figures.

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