ICT, INNOVATION AND COMPETITIVENESS IN NIGERIA

Examining Vision 20:2020 Goals through the Lens of High Growth Sectors and Critical Infrastructure

Context

ICT, Innovation and National Competitiveness

With over 170 million people, Nigeria is Africa’s most populous nation, as well as its third largest economy and the largest by far in West Africa. Despite a history of political and economic turbulence caused by military rule, corruption and mismanagement, Nigeria is expected to have one of the strongest growth rates in the world in the coming decades, driven by booming financial and telecommunications industries, and a large and varied extractive industry. At the same time, however, the majority of Nigerians remain employed in the agricultural sector and economic inequality has been steadily increasing in the past several years. These socioeconomic dynamics are compounded by an expected increase in the cost of living as the high and increasing price of fuel even buffered by costly government subsidies drives up all other costs, including food.

Sectors which yield the largest potential for income or wealth generation over the long term include agriculture, oil and gas, manufacturing, SME / industry, solid minerals and steel, trade and commerce, and culture and tourism. These sectors and infrastructure underpinnings afford the greatest opportunity to positively impact national competitiveness.

Power and electricity are keys to unlocking innovation and ICT development in these sectors. However, more than 15 million households in Nigeria, accounting for over 75 million individuals, live without electricity – the most of any country in Africa. Even those individuals and businesses which are grid-connected remain under-electrified; Nigeria experiences the highest number of blackouts per month of any Sub-Saharan country after Guinea.

Objectives

This primer aims to:

- Provide an overview of the link between ICT, innovation and competitiveness
- Include a set of facts and information to give Forum participants a clear view of the current situation in the focus sectors of education and agriculture
- Outline the potential of ICT to drive innovation in key sectors to increase Nigeria’s competitiveness
- Define key questions for discussion during the Forum

1 Citigroup Wealth Report 2012
4 World Bank Data, 2014
Even with the various sectoral challenges, Nigeria has strong potential for innovation and growth fuelled by its large and growing youth population and its impressive connectivity rates. According to the Nigerian Communications Commission, over 120 million Nigerians are active mobile subscribers – nearly two thirds of its total population – this despite the fact that 60% of Nigerians live below the international poverty line of 1 USD/day.\(^5\)

Globally, technology and innovation are helping to drive national competitiveness, economic growth, and achievement of social development goals. The potential for ICT is huge, even given an increasing “digital divide”. In Nigeria, for example, thirty per cent of Nigeria’s GDP growth in 2012 was attributable to the ICT sector.\(^6\)

Making available ICT that can drive competitiveness calls for access to infrastructure and content, relevance of content and skills and capabilities to use the technology, and affordability of devices and connections to reduce barriers.

Aiming to unlock the potential for growth, Nigeria’s ICT policy calls for public private partnerships to be developed to address the wide set of challenges in the ICT sector. While ICT can help provide an enabling environment for development, similar partnerships will be required in each of the key sectors as well. Creating new types of partnerships that leverage the assets of each sector and individual actors may help achieve cross-cutting ICT and sector goals.

This document lays out the key challenges in the Nigerian education system and in agriculture, presents case studies of successful interventions in Nigeria and across Africa enabled by ICT, and lays out a set of discussion questions on the potential for partnerships to address the key challenges.

According to World Economic Forum’s Global Competitiveness Index, Nigeria must do the following to improve its competitive stance:

- Provide sufficient protection for property rights
- Improve on its security
- Upgrade infrastructure
- Improve health and primary education
- Increase ICT penetration and harness latest technologies for productivity enhancement
- Diversity economy into non-oil sector & increase long-term competitiveness

ICT can help spur global competitiveness. How can Nigeria leverage ICT to drive competitiveness?

Source: World Economic Forum, Dalberg analysis

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5  Subscriber Data January 2014, Nigeria Communication GSMA Intelligence suggests there are about 50 million unique subscribers in Nigeria
6  Dalberg, Impact of the Internet
Africa’s youth account for almost 20 per cent of the population, making Africa the continent with the largest global youth population. This vibrant group has much to offer the continent in terms of innovation, labour, and enthusiasm. However, the majority of youth in Africa are unemployed, underemployed, or inactive contributors to the rising GDP.

Nigeria’s youth population is large, growing, and gaining access to secondary education. Nigeria’s youth between the ages of 15 and 35 make up approximately 64 million people, or 38% of Nigeria’s population. Secondary school enrollment has grown significantly, with enrollment growing at 8.2% per year between 2000 and 2010, compared to population growth of 2.7% per year in the same period. As Nigeria focuses on increasing access to primary education and returning out-of-school youth to school, there should be an increasing pipeline of students seeking access to secondary education.

Part of the education challenge is that the quality of education received in traditional public and private schools does not prepare students for the future, which for the majority does not include university placement. The standards and levels of education have decreased over time, in part as the education system has not adapted to fully incorporate the new learning techniques, or to take into account the changing economic environment. Even with proper certifications in hand, teachers often do not understand the content well enough to teach it to students. Students focus on rote memorization rather than fully engaging on the content. Further, inadequate materials, facilities, resources and low teacher salaries are contributing factors to the poor quality of education. This lack of resources and poor quality of education can lead to lower student and teacher motivation, poor performance on examinations, and limited acquisition of key skills. Beyond the structural and personnel concerns, the curriculum does not train students to meet labour market needs, e.g., soft skills, critical thinking and technical / trade-specific skills.

In order to take advantage of the huge demographic dividend, with a larger working-age population fuelling economic and social growth, the youth population needs to be properly equipped with the education and opportunities to do so. Beyond the socioeconomic rationale for addressing youth education and employment, continued youth unemployment will have a large and lasting impact on the region’s security. For Nigeria to remain competitive in the future, Nigeria’s youth must be prepared to be competitive in the local and global labour market. The students of today may require a new and different skillset, different way of thinking and interacting with information, and a different approach to the education system overall to be competitive tomorrow.

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7 UN Department of Economic and Social Affairs, Regional Overview: Youth in Africa; New York Times, “African’s Daunting Challenge”, 5 May 2011
9 World Bank Development Indicators, 2000-2010
10 World Bank Development Indicators, 2000-2010
Driving long-term impact will require further investment in teacher training and curriculum delivery and partnerships with private sector leaders to provide students with relevant and hands-on training opportunities. Furthermore, in and out of school youth engagement in vocational/technical training may allow a path to employment. Thankfully, ICT can enable solutions in education, even if ICT alone is not the turnkey. To transform the potential of Nigeria’s huge youth population to GDP increases and a reduction in inequality, these solutions are needed sooner than later.

We can learn from a broad set of entrepreneurs and ICT innovation that is already creating solutions along the education “value chain”, including technical/vocational training linked to employment placement, test preparation services, and material development. There is huge potential for education to support innovation, employment and increased productivity and competitiveness in Nigeria. However, a number of opportunities in ICT in education will require power and other infrastructure investments that enable better equipped learning environments, broader access to educational resources, and connection to global pools of information.

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<td>• Mobile payments and enterprise reporting to standardize delivery and lower costs • Distance / e-Learning</td>
<td>• EduTech • Bridge International Academies</td>
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<td>Quality</td>
<td>• Teaching teachers through low-cost, non-data intensive platforms</td>
<td>• Nokia Life+: English Teacher “service ended December 2013...”</td>
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The students of today may require a new and different skillset, different way of thinking and interacting with information, and a different approach to the education system overall to be competitive tomorrow.

![School enrolment data for an illustrative Nigerian primary and secondary school cohort](chart.png)

- After six years of primary education, only about 70 of 100 students that were of school age would remain in school
- After a further six years of secondary school, only 18 students of the cohort remain in school

Source: World Bank Development Indicators, 2005-2010
EduTech Software Solutions Limited (EduTech), a member of the Venture Garden Group, offers a range of education technology products. EduTech is working with the Nigerian University Commission to develop an e-learning system, which is currently being piloted at the Center for Distance Learning (CDL) of the Obafemi Awolowo University, Ile-Ife, Osun State. EduTech’s system is designed to relieve the constraints presented by operating the CDL offline.

Studies show that the majority of EduTech’s target market—universities and their students and faculty—considers e-learning to be a good learning option, primarily because of the flexibility and convenience of programmes. The CDL unit, now equipped with two VSATs equipped with 256/512 kbps bandwidth, provides the opportunity to share lectures and educational materials online. Students are provided with customised tablets, VigiTabs, which are loaded with course materials (available both online and offline) and connected to the e-learning portal. Lecture notes and videos are also available for download. The centre is equipped with Teleconferencing technology, allowing lectures to be streamed live at resource centres in Lagos, Abuja, and Port Harcourt.

Survey respondents cited poor internet connection and power supply as barriers to e-learning success. In addition, respondents also feared that certificates from online programs would not be recognised. These barriers and concerns will need to be addressed as the programme scales to the other top universities in Nigeria.

UNESCO and Nokia launched the mobile service, English Teacher, with support from the British Council and National Teachers Institute of Nigeria. The service—available for free—was designed to offer professional development aid to primary school English teachers in Nigeria.

English Teacher leveraged a technology already owned by most teachers—the mobile phone. When teachers signed up for the service, they received daily messages containing educational materials and pedagogical advice. The service, hosted on the Nokia Life+ platform, was expected to help improve the teachers’ delivery methods. The content was developed by the British Council, which has 75 years of experience developing teaching materials for the English language.

In the first two months after the May 2013 launch, 23,000 teachers started using the service. Teachers (or their schools) still paid for data to access the service, although the NokiaXpress browser compressed data by up to 90%. The service did not include a link to performance evaluations or other measures of teacher delivery. The service ended in December 2013.
Bridge International Academies is a chain of low-cost primary schools. Bridge is fully operational in Kenya, with over 80,000 pupils enrolled in over 100 schools. Its operations in Nigeria began recently.

The Bridge Model leverages data, technology, and scale to deliver low cost, high quality education to the target population: people living in poverty. Bridge’s vertically integrated “Academy-in-a-Box” model is touted as a key success factor. The Box contains all the tools, curriculum, instructions, and systems necessary to run each school day-to-day. Prior to launch, Bridge invested in extensive research and development which informed the development of curriculum, training materials, and teaching instructions in the Box.

As Bridge scales, it continues to incorporate data into its operations. Bridge’s administrative activities are centralised and run on the Academy Manager’s smartphone and Teachers’ tablets, interconnected through a customized Enterprise Resource Planning (ERP) system. This centralization eliminates the need to hire multiple administrative personnel per school. At the headquarters level, Bridge uses its data to track student, teacher, and school level performance from academics to financials.

Bridge has already shown early results, with research suggesting that the performance of Bridge’s students is far above the level of students in government-run schools. The key challenges to the company include teacher retention, which has been higher than anticipated, copycats “borrowing” the curriculum / delivery tools, and replicating programme success in other countries.

Beyond the socioeconomic rationale for addressing youth education and employment, continued youth unemployment will have large and lasting impacts on the region’s security.

Guiding questions:

- What are the key issues in education that block progress towards national and global competitiveness?
- What are the required policy changes to remove obstacles to higher educational achievement and success?
- How should policies take into account new technologies and local innovations?
- How can partnerships led by multinationals, SMEs and other private sector actors drive education sector development? What contributions from local innovators will support education sector reform?
- What is the role of infrastructure investments in providing the required foundation for education sector, e.g., power, telecommunication / broadband, etc.?
- What ICT solutions can improve access, coverage, and quality of education in Nigeria?
Agriculture

Continued growth of Nigeria’s agriculture sector has high potential to further the country’s economic and social development goals. Nigeria’s agricultural commodities drive regional markets and are demanded globally. However, the country is not meeting its work potential—for example, average maize yields reach only 37% of model farm yields. As 70% of the Nigerian population is employed in agriculture, driving agricultural sector development for farmers would have wide-reaching impact on human and social development in the country. Furthermore, as agriculture accounts for 42% of the Nigerian GDP, investments targeting agriculture have the potential to strongly impact the strength of the national economy.

Over the past 20-30 years, while Asia and Latin America have increased global competitiveness as measured by share of global agricultural export value, Africa’s has fallen significantly. Asia and Latin America have increased their global share primarily by increasing land area under cultivation, improving yields, and shifting to higher value crops with targeted government support. Agricultural development in these regions has succeeded in increasing rural farmer incomes and in increasing food security, where there exist appropriate market infrastructure and linkages, and marketing channels. As Nigeria’s population continues to grow rapidly in the coming years, domestic demand for high-value crops is likely to grow with rising incomes and increasing urbanisation rates. However, Nigeria would need to increase its regional competitiveness to avoid continued import dependence and further develop its markets to benefit from this coming trend.

Driving Nigeria’s competitiveness through the agriculture sector will not only help solve food insecurity, but has also create wealth. Agribusiness assets are growing rapidly and already total over 2 billion USD in Africa alone. With the right structuring, there is a huge potential for agriculture to raise the income of value chain actors in addition to driving profits. The Agricultural Transformation Agenda (ATA) of the Federal Ministry of Agriculture and Rural Development highlights this dual-role of agriculture in Nigeria. The ATA outlines the potential of key value chains and regional development hubs, which may serve as investment opportunities leading to both financial returns for investors and poverty alleviation impact for agriculture focused communities.

However, a number of challenges have plagued Nigerian agriculture. Even across these varied challenges - access to finance, access to inputs, appropriateness of farm / business management techniques, volatility of commodity markets, lack of formal land titling, etc. – ICT may be able to help. Improving efficiency through ICT-enabled agriculture solutions may make the sector more attractive globally and to Nigeria’s own youth, i.e., as the wealth creation case is presented more strongly. ICT in agriculture can facilitate access to local and regional markets, connecting suppliers, buyers, and end consumers, and can provide important information to increase market efficiency.

Changing the story on key sectors, e.g., considering the role of market efficiency in competitiveness, may drive wealth creation and reduce food insecurity.

Only four of Nigeria’s 29 most cultivated crops by area harvested (cashew nuts, yams, melon seed, and cassava) are in the top quartile of global yields.

In order to achieve global top quartile, Nigerian yields would need to grow by:

- 6.2x in oil palm
- 3.2x in maize
- 2.9x in rice
- 2.6x in sorghum
- 2.5x in cocoa
- 1.9x in sugarcane

Source: FAO/ITA

11 World Bank, Growing Africa: Unlocking the Potential of Agribusiness, 2013
12 Fund manager websites, fund manager documentation, sector literature and press releases; Dalberg analysis (2009)
Nigeria’s up-and-coming ICT enterprises can support increased efficiencies across the agricultural value chain by addressing market failures. Solutions have already been launched to close gaps in market information, leading to better functioning input markets, and increased farm-level profitability. In addition, as Nigeria moves to re-launch the Abuja Commodities & Securities Exchange, broader scale to-the-minute pricing information should be available closer to production zones. At the distribution level, retailers and consumers are connecting through a variety of ICT solutions, including e-commerce sites and SMS platforms.

While ICT solutions can support increased market efficiencies, the “farmerpreneurs” and SME owners using these solutions will need access to the knowledge, skills, and infrastructure to leverage the technology. Beyond the importance of agriculture to Nigeria’s competitiveness today, with increasing urbanisation the rural farm areas of today will provide the urban entrepreneurs of tomorrow. Developing the businesses of farmerpreneurs and other rural entrepreneurs may support employment and future competitiveness. Increasing power and infrastructural investment to rural areas will contribute to the creation of an enabling environment for entrepreneurs.

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Share of world agricultural exports, 1961-2011

Source: FAOSTAT
The electronic wallet system e-wallet was deployed by Nigeria’s Federal Ministry of Agriculture and Rural Development as part of the Growth Enhancement Support Scheme (GESS).

In 2013, an estimated 4.2 million farmers received subsidized farm inputs via the support scheme. With the e-wallet, these farmers can receive e-vouchers for subsidised agricultural inputs on their mobile phones. Prior to the introduction of the new system, farmers were systematically cheated of the government provided subsidy on fertiliser. Farmers now procure seeds and fertiliser directly from agro-dealers after paying any necessary top-up fees. The e-wallet technology is provided by Cellulant Nigeria.

The scheme has been criticized given some challenges with supply of inputs, delayed delivery to redemption centres and database management, for example, registration challenges or data inaccuracies. Notwithstanding these challenges, innovative ICT solutions of this sort can be applied to solving other value chain problems in agriculture.

MoBiashara is a mobile e-commerce platform that supports transactions via SMS. It was developed by SlimTrader, a US based e-commerce firm. In Nigeria, the platform is used to buy and sell agricultural inputs and produce. Manufacturers, distributors and retailers upload their inventory to the platform, and potential buyers can use SMS to perform searches and use local payment solutions to make purchases.

MoBiashara brings the convenience and ability to compare prices central to online shopping to people with limited or no internet access. Beyond access the platform’s inventory system can save transport and time costs incurred in acquiring agricultural products. For example, farmers might save time and money on trips to buy inputs, only traveling when they are available. Beyond potential cost savings, quality is assured when purchasing on the platform, as it hosts only genuine products. For instance, Notore, a Nigerian fertiliser and agro allied company, has used the platform to enable farmers to purchase fertilizer directly from its accredited retailers.

The limited awareness and adoption of payment solutions poses a potential challenge to the successful operation and scale of any e-commerce platform in Nigeria.
iCow provides agricultural information via SMS and the internet, with an aim to enhance farmers’ productivity in Kenya. The initiative is supported by USAID, The Indigo Trust and infonet-biodivision.

iCow provides constant monitoring. iCow’s Mashauri Farmer provides tips on cows (and chickens), monitors throughout their lifecycle and shares veterinary doctor locations. iCow provides information on livestock, gestation calendars and immunization and health, diet and nutrition services. With over 40,000 users in Kenya, iCow aims to help milk farmers achieve the 15 litres of daily milk production required to cross the poverty line. Some of these farmers have recorded a 100% increase in milk production after signing up for iCow’s services. SMSs cost 3 KES (0.04 USD) each and the services are available in English and Kiswahili.

Studies have shown that internet-powered agricultural services such as iCow face challenges scaling up and this largely due to a shortage of technical skills.

Guiding questions:

• What are the key issues in agriculture that block progress towards national and global competitiveness?

• What are the growth opportunities within agriculture, which will position Nigeria for longer-term regional and international competitiveness?

• What are the required enabling policies needed to remove obstacles to increased agricultural productivity and returns? How should these policies take into account new technologies and local innovations?

• How can partnerships led by multinationals, SMEs and other private actors drive agricultural sector development? What contributions from local innovators will support agriculture sector reform?

• What is the role of infrastructure investments in providing a foundation for agriculture sector, e.g., power, telecommunication, market infrastructure, etc.?

• What ICT solutions can improve access to information and assets in agriculture?

• What approaches will promote increased participation of youth in the agriculture sector? How can public private partnerships achieve this goal?

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