

NIGERIA

Digital Economy Diagnostic Report



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NIGERIA
Digital Economy
Diagnostic Report

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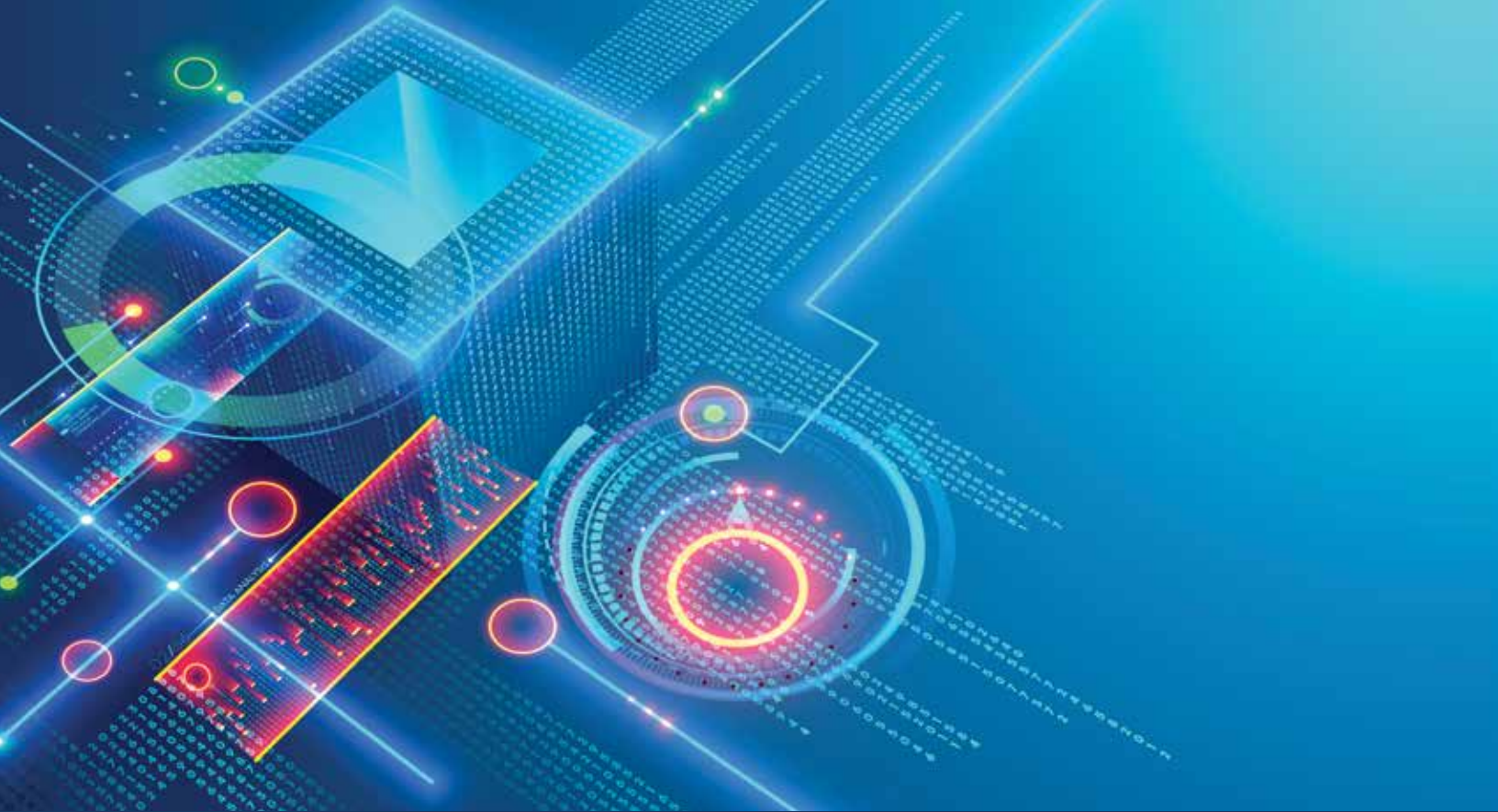
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FOREWORD

Nigeria is uniquely positioned to reap the benefits of the digital economy. Nigeria accounts for 47% of West Africa's population, and half of the country's 200 million people are under the age of 30. Nigeria has the largest mobile market in Sub-Saharan Africa, supported by strong mobile broadband infrastructure and improved international connectivity; yet minimal fixed broadband infrastructure and connectivity in rural areas is leaving a significant number of the most marginalized segments of the population without Internet access.

This Digital Economy for Africa (DE4A) Diagnostic Report highlights the challenges and opportunities of the digital economy for Nigeria. This diagnostic argues that accelerating access to digital technologies spurs innovation, efficiency, and productivity, and as a result brings about choice and opportunities for greater growth and inclusion.

The report shows that many Nigerian citizens and businesses remain excluded from the digital ecosystem as a result of limited access to broadband and nonavailability of adequate devices (mobile devices and computers) to fully utilize the Internet. It also highlights good progress in digital infrastructure, finance, skills, and entrepreneurship, among others. Nigeria's international connectivity ("First mile") is well developed with connectivity to high-speed

Internet via five undersea international links. Similarly, Nigeria is home to several high-growth digital companies that provide hopeful examples of the country's digital potential. Lagos is a mature and active ecosystem with dynamic incubators, venture capital companies, digital start-ups, and private services via digital platforms. And the potential of digital financial services remains untapped despite the large share of unbanked population.

To deliver on the 2030 aspirations of greater access to the digital economy and meet the bold objective of creating 100 million jobs in Nigeria, the country needs to increase investment in infrastructure, create an enabling regulatory environment for the digital economy to grow (e.g., regulatory enablers of DFS), pursue radical reforms that bring about improved skills and a more competitive digital job market, support public-private partnerships to stimulate and sustain demand for the use of digital platforms, and improve the current business climate to boost more investment opportunities.

The World Bank Group stands ready to support Nigeria in pursuing context-specific approaches that will prioritize key interventions in the five foundational elements and advance the digital economy in Nigeria to promote rapid growth, more and better jobs, and more accessible and higher quality public and private services.

Shubham Chaudhuri
Country Director, Nigeria
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ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence	FUTA	Federal University of Technology–Akure
ARPU	Average Revenue Per User	FUTM	Federal University of Technology–Minna
AT	Assistive Technology	FUTO	Federal University of Technology–Owerri
ATBU	Abubakar Tafawa Balewa University	GBB	Galaxy Backbone Limited
ATM	Automated Teller Machine	GDP	Gross Domestic Product
B2C	Business-to-Customer	GDPPC	Gross Domestic Product per Capita
BPO	Business Process Outsourcing	GDPR	General Data Protection Regulation
BPP	Bureau of Public Procurement	GER	Gross Enrollment Rate
BVN	Bank Verification Number	GMIS	Government FMIS
CAM	Companies and Allied Matters	GIIN	Global Impact Investing Network
CAMA	Companies and Allied Matters Act	GIS	Geographic Information Systems
CBN	Central Bank of Nigeria	GNI	Gross National Income
CC	Creative Commons	GNIPC	Gross National Income per Capita
CDD	Customer Due Diligence	GPI	Global Payments Initiative
CNII	Critical National Information Infrastructure	GPRS	General Packet Radio Service
CPF	Consumer Protection Framework	GRID3	Geo-Referenced Infrastructure and Demographic Data for Development
CRC	Community Resource Centers	GSM	Global System for Mobile Communications
CRF	Consolidated Revenue Fund	GSMA	GSM Association
CSR	Corporate Social Responsibility	HNN	Hubs Nigeria Network
DB	Doing Business	HQ	Headquarters
DE4A	Digital Economy For Africa	HSPA	High Speed Packet Access
DFS	Digital Financial Services	HUP	Household Uplifting Program
DNCR	Department of National Civil Registration	i2i	insight2impact
ECOWAS	Economic Community of West African States	IBRD	International Bank for Reconstruction and Development
EDMS	Electronic Document Management System	ICT	Information and Communication Technologies
EFA	Education for All	ICT4D	ICT For Development
ERGP	Economic Recovery and Growth Plan	IDA	International Development Association
EVDO	Evolution Data Optimized	IDI	ICT Development Index
FATF	Financial Action Task Force	IFC	International Finance Corporation
FCT	Federal Capital Territory	ILO	International Labor Organization
FDI	Foreign Direct Investment	IMF	International Monetary Fund
FGN	Federal Government of Nigeria	IP	Intellectual Property
FME	Federal Ministry of Education	IPO	Initial Public Offering
FMF	Federal Ministry of Finance	ISA	Investment and Securities Act
FMI	Federal Ministry of Interior		
FTTH/FTTB	Fiber To The Home/Fiber To The Business		
FTTx	Fiber To The x		

ISP	Internet Service Provider	PENCOM	National Pension Commission
ITAS	Integrated Tax Administration System	POS	Point of Sale
ITC	International Trade Centre	PPP	Public-Private Partnership
ITU	International Telecommunication Union	PSB	Payment Service Bank
IXP	Internet eXchange Point	PSP	Payment Service Provider
IXPN	Internet eXchange Point of Nigeria	QoS	Quality of Service
JSS	Job Success Score	R&D	Research & Development
KYC	Know Your Customer	RAMP	RIA's African Mobile Pricing
LTE	Long Term Evolution	RIA	Research ICT Africa
M&E	Monitoring and Evaluation	RTGS	Real-Time Gross Settlement System
MAUTECH	Modibbo Adama University of Technology Yola	RUBI	Rural Broadband Initiative
MDG	Millennium Development Goal	SANEF	Shared Agent Network Expansion Facilities
MMB	Mavrodi Mundial Moneybox	SDG	Sustainable Development Goal
MMO	Mobile Money Operator	SEB	State Education Board
MNO	Mobile Network Operator	SEZ	Special Economic Zones
MoC	Ministry of Communications	SKC	School Knowledge Centers
MVP	Minimum Viable Product	SME	Small and Medium Enterprises
NBC	National Broadcasting Commission	SOC	Security Operations Centre
NCC	Nigeria Communications Commission	SPV	Special Purpose Vehicle
NCE	National Council on Education	SSA	Sub-Saharan Africa
NCTO	National Cash Transfers Office	SSI	SeedStars Index
NDHS	Nigeria Demographic Health Survey	STEM	Science, Technology, Engineering and Mathematics
NEC	National Economic Council	SUBEB	State Universal Basic Education Boards
NEDS	Nigeria Education Data Survey	SWOT	Strengths Weaknesses Opportunities and Threats
NER	Net Enrollment Rate	TCAG	Technology and Creativity Advisory Group
NFIS	National Financial Inclusion Strategy	TVET	Technical and Vocational Education and Training
NGN	Nigerian Naira	UBEC	Universal Basic Education Commission
ngCERT	national Computer Emergency Response Team	UK	United Kingdom
NIBSS	Nigeria Inter-Bank Settlement System	UMTS	Universal Mobile Telecommunications System
NIMC	National Identity Management Commission	UNCDF	United Nations Capital Development Fund
NIN	National Identification Number	UNCTAD	United Nations Conference on Trade and Development
NINE	Network of Incubators and Innovators in Nigeria	UNDP	United Nations Development Program
NISI	National Internet Safety Initiative	UPU	Universal Postal Union
NIP	NIBSS Instant Payments	US	United States
NIPEP	Nigeria Partnership for Education Project	USD	United States Dollar
NITDA	National Information Technology Development Agency	USPF	Universal Service Provision Fund
NITEL	Nigerian Telecommunications Limited	VC	Venture Capital
NSE	Nigeria Stock Exchange	VSAT	Very Small Aperture Terminal
NUC	National Universities Commission	WAAW	Working to Advance Science and Technology Education for African Women
NY	New York	WACS	West African Cable System
NYSE	New York Stock Exchange	WASSCE	West African Senior Secondary Certificate Examination
OBI	Open Budget Index	WB	World Bank
OECD	Organisation for Economic Co-operation and Development	WBG	World Bank Group
ONSA	Office of the National Security Adviser	WEF	World Economic Forum
OOS	Out Of School	WiMAX	Worldwide Interoperability for Microwave Access X
OTT	Over the Top	WIPO	World Intellectual Property Organization
PE	Private Equity		



EXECUTIVE SUMMARY

With a population of approximately 197 million, Nigeria accounts for about 47% of West Africa's population and has one of the largest populations of youth in the world. Nigeria also has Africa's biggest economy, is the biggest oil exporter, and has the largest natural gas reserves on the continent. Nigeria emerged from a recession in 2017, with a growth rate of 0.8%, driven mainly by the oil sector. Non-agricultural growth, which remained negative up to the third quarter of 2017, strengthened through 2018 with services (primarily Information and Communication Technology, ICT) resuming as the key driver. Economic growth is expected to hover just above 2% in 2019 and over the medium term.

For countries like Nigeria, the Digital Economy offers opportunities, but also brings risks of being left behind. Improved digital connectivity can only achieve the desired transformational impact on economic opportunity and inclusive growth if combined with improvements in digital skills and literacy, the coverage of digital identity schemes, and access to digital payments and other financial services, as well as digital support to start-ups and existing businesses. With such capabilities, the Nigerian economy can harness digital data and new technologies, generate new content, link individuals with markets and government services, and roll out new and sustainable business models.

In 2016, the global digital economy was worth about USD 11.5 trillion, equivalent to 15.5% of the world's overall GDP. The digital economy is expected to reach 25% in less than a decade, quickly outpacing the growth of the overall economy. However, as described below,

Nigeria is currently capturing only a fraction of this growth and needs to strategically invest in the foundational elements of its digital economy to keep pace. The Digital Economy For Africa (DE4A) Initiative forms part of the World Bank Group's support for the African Union's Digital Transformation Initiative for Africa, which wants to see every African individual, business, and government be digitally enabled by 2030.

Broadband is a key enabler to harness the digital economy transformation. In spite of recent growth in fiber installations in Nigeria, national fixed-line infrastructure is still poor, and mobile systems remain the primary means for carrying retail and enterprise data traffic in Nigeria. Furthermore, fixed broadband penetration in Nigeria is very low, with a household penetration rate of 0.04% at the end of 2018, below the African regional average (0.6%), and well below the world average (13.6%). This is due to backbone investment in Nigeria having focused primarily on major urban areas and inter-city routes, and unlike its West African peers such as Ghana and Senegal, Nigeria does not have a national backbone network through which high-speed Internet connectivity can be extended across the entire country. As a result, mobile broadband has become the most common and popular way through which people in Nigeria access the Internet.

Significant bottlenecks inhibit growth of high-speed Internet in Nigeria. These include a complex institutional setup to govern and promote the development of ICT infrastructure and sector development, and a legacy of operators investing in proprietary network deployments, compounded by poor infrastructure qual-

ity. Pushing market bounds further to underserved areas is challenging, given high costs of infrastructure deployment and low revenues, and this has created market failures. High price sensitivity of markets further contributed to lack of innovative service propositions. The affordability of broadband-enabled devices for the bottom of the pyramid is also a major barrier to access in Nigeria, while other demand-side barriers relate to digital illiteracy, lack of local content, and low electrification rates. Therefore, in order for Nigeria to gain the critical number of Internet subscribers needed to build its digital ecosystem and kickstart its digital transformation, innovative solutions and strategic interventions and investments will be required. They will promote the deployment of networks in underserved areas, support the reduction of broadband costs, provide additional complementary public access, and stimulate demand by addressing the digital economy foundations with an ecosystem approach.

Digital platforms are at the core of the digital economy. The benefits of digital platforms stem from their ability to virtually connect people and things, facilitating digital transactions/interactions, including the exchange of information, goods, and services. Despite some progress on the implementation of the goals of both the E-government Master Plan and ICT Road Map, much remains to be done in Nigeria, including institutional coordination, developing a Privacy and Data Protection Act, monitoring the quality of digital services, and fully embracing the Open Government Partnership. The Government of Nigeria has recently launched the Central Portal for Government Services (www.services.gov.ng), created to provide a single point of entry to government information and services, enhancing accountability, and improving the delivery and quality of public services. One of the biggest strengths is Nigeria's e-commerce market, which UNCTAD's business to customer (B2C) report for 2018 ranked as the biggest B2C market, both in terms of revenue and shoppers in Africa. In 2018 the e-commerce spending in Nigeria was estimated at USD 12 billion and was projected to increase to USD 75 billion in revenues by 2025. In overall terms, Nigeria was ranked by UNCTAD as second in Africa below Mauritius in 2018. This digital commerce was provided, among others, by 87 Nigerian platforms, employing 2.9 million people in the country.

The Nigerian economy still stands to benefit from the growth in supply and usage of Digital Financial Services (DFS). DFS providers are better positioned to address the needs of the poor. They also create the 'rails' that enable digital entrepreneurs from other sectors to mar-

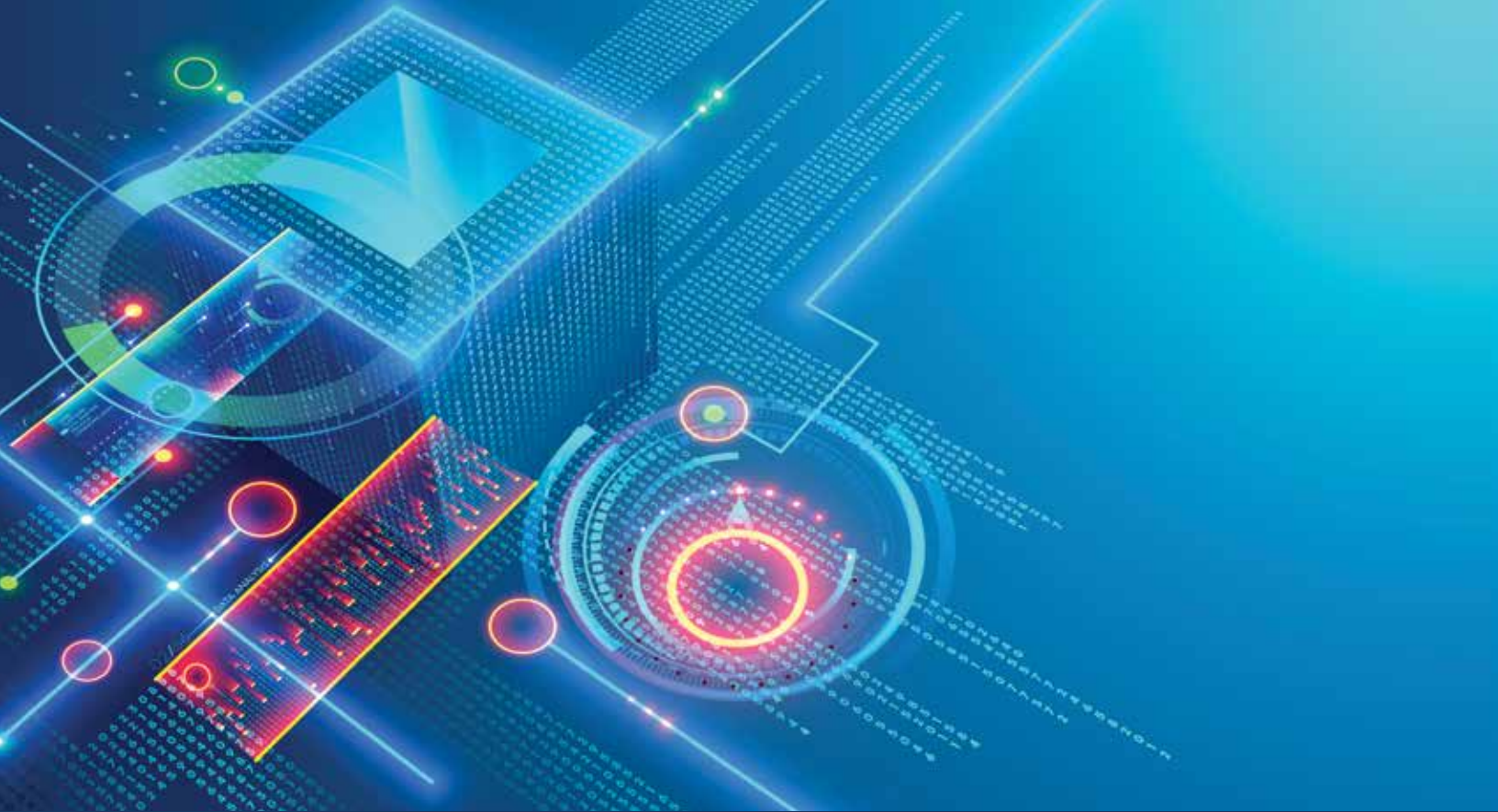
ket their products at scale. Because of the regional and pan-African footprints of Nigerian financial institutions, the country has an opportunity to export its digital financial ventures beyond its borders, diversifying the economy and fostering the regional integration within the ECOWAS. Better DFS can also mean stronger links with the Nigerian diaspora, boosting the inward remittance streams, encouraging investments, and facilitating the exchange of human capital. At the same time, there are also potential threats. Nigerian law enforcement agencies have waged long-standing battles with online and financial fraud, and the country faces an ongoing struggle with terrorism and armed conflict in its northern states. In the absence of adequate regulation and oversight, both issues can be exacerbated by the advent of DFS and the ease of obtaining instant credit and making real-time domestic and international money transfers. Brand new dangers include data leakages and cybercrime, as well as emergence of new monopolies and systems of political patronage.

Given its large, young, and entrepreneurial population, digital entrepreneurship has the potential to become an engine of economic transformation in Nigeria and set the country on a new growth trajectory. Nigeria is home to several high-growth digital companies that provide hopeful examples of the country's digital potential. Lagos is a mature and active ecosystem with dynamic incubators, venture capital companies, and digital start-ups. Digital entrepreneurship ecosystems are also growing in the cities of Abuja and Port Harcourt, with a potential for expansion to other cities. Although urban Small and Medium Enterprises (SMEs) are increasingly using digital platforms for trading, digitalization of firms in traditional industries and rural locations remains limited. Larger firms are more actively using digital technology for basic business purposes, such as communication with customers, but more advanced uses of technology also remain limited. Despite these improvements in the entrepreneurship ecosystem, the growth of digital firms in Nigeria is plagued by a difficult business environment, lack of early-stage financing, limited market opportunities outside of Lagos and Abuja, and as discussed in pillar number five, a lack of digital skills.

Last, but critical, is the wide Digital Literacy gap that excludes the poorest from the benefits of the digital world. Digital skills are a prerequisite for benefiting from any technology across all sectors of the economy, and at all levels of the skills spectrum (from user literacy to producer technical skills). Nigeria's general education standards are low, with the quality offered at all levels

continuously suffering from poor funding and deteriorating teaching capabilities. According to the World Economic Forum Executive Opinion Survey, the quality of Nigeria's education system ranks low in the continent with 2.8 over 7, and below the world average, which stands at 3.8. Furthermore, Nigeria is reported to have one of the lowest shares of government expenditure in education (7%). This rate goes up to more than double in the Sub-Saharan Africa region according to the World Bank. In addition, Nigeria stands out globally in its number of out-of-school children. In 2013, Nigeria had the largest number of out-of-school children of primary age (8.7 million), followed by Pakistan (5.6 million) and India (2.9 million).

Digital technologies are forecast to be a major driver of productivity, with successful economies depending on greater numbers of digitally skilled workers than has previously been the case. In order for Nigerian youth to successfully perform digital work, they must develop digital skills, which exist on a continuum, ranging from basic to intermediate to advanced. With 46% of work activities in Nigeria susceptible to automation, digital skills will qualify youth for jobs in traditional sectors, while also empowering them to thrive in emerging sectors and even launch their own businesses. Ensuring that every person has the appropriate skills for an ever-growing digital and globalized world is essential to promote inclusive labor markets and to engender innovation, productivity, and growth.





1

INTRODUCTION

1.1 COUNTRY AT A GLANCE: NIGERIA¹

A key regional player in West Africa, with a population of approximately 197 million, Nigeria accounts for about 47% of West Africa's population and has one of the largest populations of youth in the world. A federation that consists of 36 autonomous states, Nigeria is a multiethnic and culturally diverse society. With an abundance of resources, it is Africa's biggest oil exporter and also has the largest natural gas reserves on the continent.

Political Context

The country recently held national elections in 2019, for the sixth consecutive time since its return to democracy in 1999. The incumbent president, Muhammadu Buhari, won the election and was sworn in for a second term on May 29, 2019. He has identified fighting corruption, increasing security, tackling unemployment, diversifying the economy, enhancing climate resilience, and boosting the living standards of Nigerians as main policy priorities his government seeks to pursue in his second term which ends in 2023. Because Nigeria's federated structure gives significant autonomy to states cooperation between the federal government and states is necessary to address these policies.

Economic Outlook

Between 2006 and 2016, Nigeria's Gross Domestic Product (GDP) grew at an average rate of 5.7% per year, as volatile oil prices drove growth to a high of 8% in 2006 and to a low of -1.5% in 2016. Nigeria emerged from a recession in 2017, with a growth rate of 0.8%, driven mainly by the oil sector. Growth was higher in 2018 (at 1.9%) and

broad-based; however, it still fell below the population growth rate, government projections, and pre-recession levels. The oil and gas sector reverted to contraction and the non-oil economy was thus the main driver of growth in 2018. While agriculture slowed down significantly due to conflict and weather events, non-oil, nonagricultural growth, which remained negative up to the third quarter of 2017, strengthened through 2018—but remained weak—with services (primarily ICT) resuming as the key



driver. Economic growth is expected to hover just above 2% in 2019 and over the medium term.

Development Challenges

While Nigeria has made some progress in socioeconomic terms in recent years, its human capital development remains weak due to underinvestment; the country ranked 152 out of 157 countries in the World Bank's 2018 Human Capital Index. Furthermore, the country continues to face massive developmental challenges, which include the need to reduce dependency on oil and diversify the economy, address insufficient infrastructure, and build strong and effective institutions, as well as governance issues and public financial management systems. Inequality in terms of income and opportunities has been growing rapidly and has adversely affected poverty reduction. The North-South divide has widened in recent years due to the Boko Haram insurgency and a lack of economic development in the northern part of the country. Large pockets of Nigeria's population still live in poverty, without adequate access to basic services, and they could benefit from more inclusive development policies. The lack of job opportunities is at the core of the high poverty levels, regional inequality, and social and political unrest in the country.

1.2 BACKGROUND ON DIGITAL ECONOMY AND DE4A INITIATIVE

Rapid digital transformation is reshaping our global economy; permeating virtually every sector and aspect of daily life; and changing the way we learn, work, trade, socialize, and access public and private services and information. In 2016, the global digital economy was worth some USD 11.5 trillion, equivalent to 15.5% of the world's overall GDP.² It is expected to reach 25% in less than a decade, quickly outpacing the growth of the overall economy. However, countries like Nigeria are currently capturing only a fraction of this growth and need to strategically invest in the foundational elements of their digital economy to keep pace.

The DE4A Initiative forms part of the World Bank Group's support for the African Union's Digital Transformation Initiative for Africa, which wants to see every African individual, business, and government be digitally enabled by 2030. The Digital Economy for Africa (DE4A) Transformation Initiative is underpinned by five principles:

1. **Comprehensive:** Taking an ecosystem approach that looks at supply and demand and defies a narrow silo approach in defining the digital economy elements and foundations.

2. **Transformative:** Aiming at a very different scale of ambition beyond incremental 'islands' of success.

3. **Inclusive:** Digital Economy for 'everyone, in every place, and at all times,' creating equal access to opportunities and dealing with risks of exclusions.

4. **Homegrown:** Based on Africa's realities and unleashing the African spirit of enterprise to have more homegrown digital content and solutions.

5. **Collaborative:** Dealing with the digital economy requires a different flexible 'mindset', collaborating among countries, sectors, and public and private players.

For a successful and inclusive Digital Economy, African countries would require building key foundational elements of a digital economy (see Figure 1). These foundations, which are synergistic and require the use of public and private sector solutions, are the following:

1. **Digital Infrastructure:** Digital infrastructure provides the way for people, businesses, and governments to get online and link with local and global digital services, thus connecting them to the global digital economy. For a digital economy, good and affordable Internet connectivity is a critical foundation.

2. **Digital Platforms:** Digital platforms offer products and services, accessible through digital channels, such as mobile devices, computers, and Internet, for all aspects of life. Digital platforms enable producers and users to create value by interacting with each other. Governments operate digital platforms to offer citizen-facing government services and share information. Commercial firms also operate digital platforms to offer a growing array of products and services.

3. **Digital Financial Services:** Digital financial services enable individuals and businesses to conduct transactions electronically or online and open a pathway to a range of digital financial services in addition to digital payments, including credit, savings, and insurance. Access to affordable and appropriate digital financial services is critical for the participation of individuals and businesses in the digital economy.

4. **Digital Entrepreneurship:** Digital entrepreneurship and innovation create an ecosystem to bring the digital economy to life with new, growth-oriented ventures and the transformation of existing businesses, which contribute to net employment growth and help enhance competitiveness and productivity of the economy.

5. **Digital Skills:** Economies require a digitally savvy workforce in order to build robust digital economies and competitive markets. Digital skills constitute technology skills, together with business skills for building or running a start-up or enterprise. Greater digital literacy further enhances adoption and use of digital products and services among the larger population.

Corresponding digital transformation targets have been established for all five foundations of the digital economy articulated under DE4A framework (see Figure 2).

FIGURE 1: Key components of the digital economy ecosystem

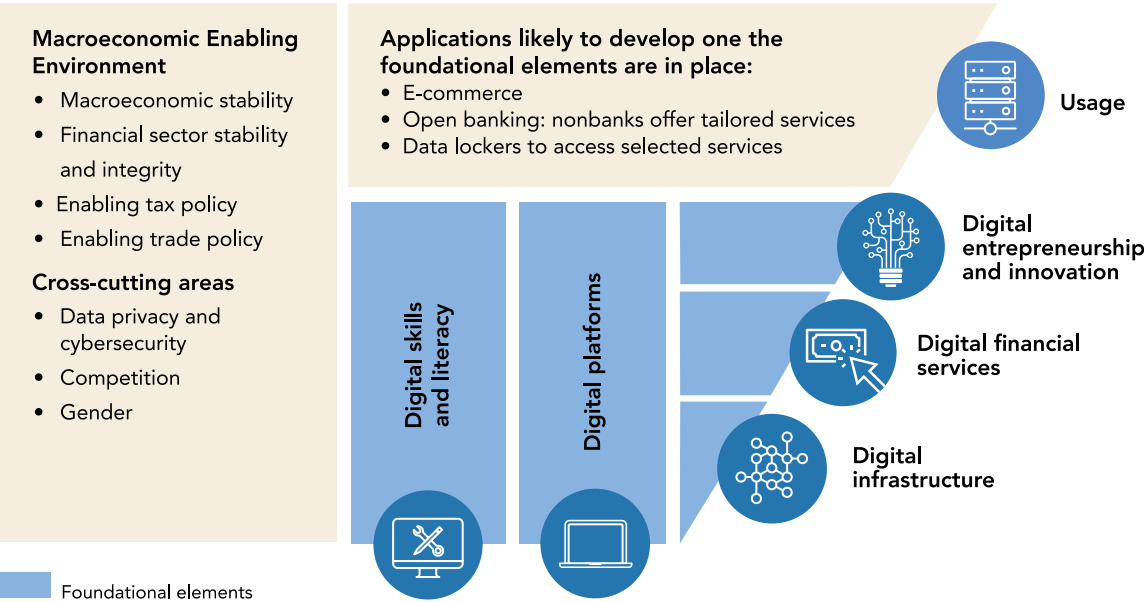
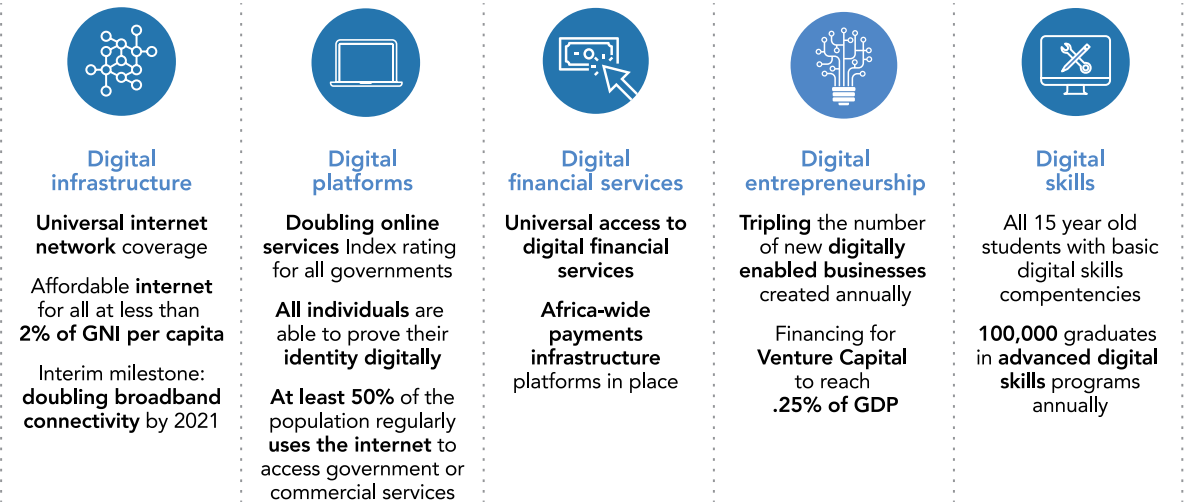


FIGURE 2: Digital Transformation targets across across pillars



1.3 RATIONALE FOR DIGITAL ECONOMY DEVELOPMENT

Digital Economy is defined as the part of economic output derived solely or primarily from digital technologies (ICT) with a business model based on digital goods or services. The digital economy is made up of various components, including a platform economy, a gig economy, an industry 4.0, a digital economy, data analytics, robotics and Artificial Intelligence (AI), machine learning, 3-D printing, and e-commerce among others. (Ernst & Young: Nigeria, 2018).

For countries in Africa, the Digital Economy offers opportunities, but also brings risks of being left behind. Improved digital connectivity can only achieve the desired transformational impact on economic opportunity and inclusive growth if combined with improvements in digital skills and literacy, the coverage of digital identity schemes, and access to digital payments and other financial services, as well as digital support to start-ups and existing businesses. With such capabilities, the African economy can harness digital data and new technologies, generate new content, link individuals with markets and government services, and roll out new and sustainable business models.

Yet in much of the Africa region today, too few citizens have digital IDs or transaction accounts—locking them out of access to critical public services, financial inclusion, and markets. Digital start-ups struggle to attract funding, and ‘traditional’ businesses are only slowly adopting digital technologies and platforms to boost productivity and sales. There is a shortage of workers with the digital skills needed, and limited digital literacy holds back adoption and use of digital products and services. Inadequate policy and regulatory frameworks, including for data protection, cyber security, and competition, also constrain the development of a digital economy in Africa.

Digital economies also introduce new risks—to consumers, creditors, or firms, on personal data and cyber threats, in ways systemic or otherwise—and would require safeguards to mitigate these risks and ensure robust job markets. A key area of concern has been that widespread adoption of automation and other digital technologies can cause significant net job losses. However, in the aggregate, technological change has not led to a significant increase in joblessness, and global employment continues to expand in line with the growth in the labor force (ILO, 2018). Though it may displace jobs, automation using technology causes “creative destruction,” stripping some jobs while creating new ones. To

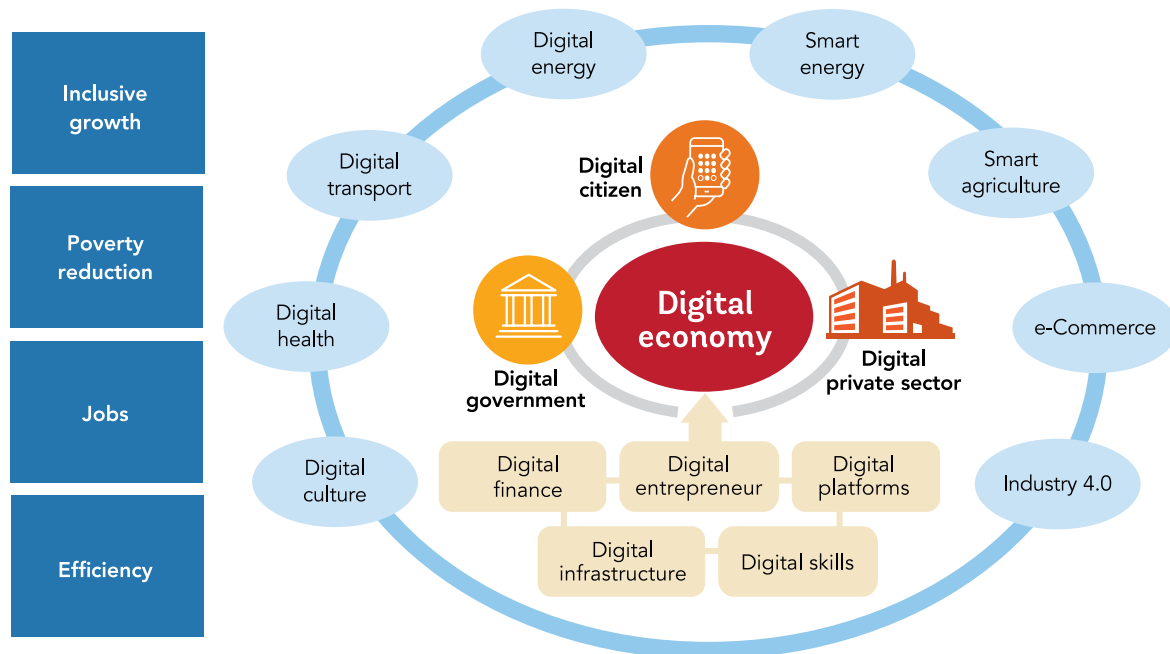
develop safeguards for job markets, developing countries in Africa need to invest in systems and requisite skills early on, including in the digital domain, such that those skills are tied to meaningful jobs. This can help strengthen the country’s competitiveness in the global marketplace.

Additionally, while digital economic development can be critical, the process is neither linear nor a panacea. Effective prioritization and sequencing are required, especially as they deal with the public sector. For example, if public service delivery is a key priority to improve the targeting of the poor, the development of government platforms will need to be prioritized. Key investments and reforms may also need to be prioritized as part of an overall development strategy. Shifting cash into digital accounts for government payments, remittances, Small and Medium Enterprise (SME) payments, and agricultural value-chain payments can enable broad-based participation in the digital economy. Digital financial services can be more accessible for lower-income segments of the population, and for women and agricultural households—population segments often underserved by traditional financial services.

A digital economy has potential to enhance productivity and gains in multiple ways. A digital economy can change the way economies of scale are achieved, particularly with online service delivery, as the incremental cost of offering an additional product or service may become negligible. The digital economy may provide better matching of buyers and sellers in a competitive marketplace. It may address certain concerns with asymmetric information, solving some principal-agent problems where buyers and sellers are separated by intermediaries, or even multiple levels of intermediaries. It may strengthen people’s trust in firms or governments by enabling some decentralized forms of trust (such as with a blockchain) where centralized authorities are not trusted. It may allow products and services to be customized and targeted—enabling better inclusion but also easier ways to exclude some too.

Engagement with some global technology companies on the Digital Transformation program highlights that while there is a willingness for Silicon Valley firms to invest in Sub-Saharan Africa, there are barriers preventing potential investments.³ The opportunity recognized by firms willing to invest in Sub-Saharan Africa, therefore, puts Nigeria in a position to leverage private sector investment in all of the DE4A foundational elements, or targeted investments in specific pillars. However, existing bottlenecks must be addressed in order to create an enabling environment for such investments to benefit Nigeria’s Digital Economy. Some of the investment barriers identified are:

FIGURE 3: Digital economy can bring shared prosperity and reduced poverty



- i. Lack of capacity by government policy makers to understand new technologies;
- ii. Poor regulatory frameworks and government-supported monopolies;
- iii. Bias by governments toward old, existing technologies and hesitancy to adopt new technologies that may dramatically reduce costs or improve impact;
- iv. Data sovereignty and data localization policies that hamper investment in data infrastructure;
- v. Fragmentation within government agencies that also hampers the ability for technology to make an appropriate impact (e.g., sharing data between health education ministries); finance ministry also not supportive;
- vi. Lack of regional integration that hampers ability to get to scale for many business models (e.g., e-commerce, fintech); and
- vii. Lack of digital skills in the population.

In addressing these barriers, it has been indicated that the World Bank Group could establish support for firms and governments in a coordinated effort through the following:

- i. Focus on a regulatory, policy, and appropriate view of taxation, and bring evidence to governments on

the impact of disruptive technologies on key development outcomes (e.g., jobs);

- ii. Bring patient capital (e.g., concessional finance), particularly for new business models—capital markets are often inadequate to finance projects;
- iii. Ensure objectivity in technologies and be open to emerging disruptive technologies (e.g., low earth orbit satellite);
- iv. Bring clarity to the multitude of overlapping initiatives in this space in Africa; and
- v. Focus on large projects that cross companies/projects/regions.

1.4 DIAGNOSTIC METHODOLOGY

An assessment of Nigeria's digital economy has been launched as part of the World Bank Group's DE4A Initiative, which leverages the integrated and foundation-based diagnostic framework to examine the present level of digital economy development across Africa. The assessment, which focuses on Nigeria, maps the current strengths and weaknesses that characterize the national digital economy ecosystem, as well as identifies challenges and opportunities for future growth. The

DE4A diagnostic findings ultimately provide practical and actionable recommendations that inform on priority areas for development, proposing a mix of possible policy reforms and interventions that directly address the needs and support for harnessing the economic and social benefits digital economies bring and the hindrance of mitigating risks.

An in-country fact-finding mission was undertaken in December 2018, by members of the core team, which in addition to the desk research conducted, allowed for broad stakeholder consultation with government, the private sector, and other key stakeholders. This report provides a comprehensive overview of the DE4A five foundational elements in Nigeria.

NOTES

1. Source: <https://www.worldbank.org/en/country/nigeria/overview>
2. Digital Spillover, Measuring the true impact of the digital economy, Huawei and Oxford Economics 2016.
3. The World Bank Group has engaged in discussions with the following global technology companies on the Digital Transformation Initiative program: Google, CSquared, SES, Intelsat, SAP, Rswitch, Amazon, Moringa Schools, Google X, Facebook, Microsoft, Ericsson, Nokia, Orange, Bridge Academies, Inmarsat, Babylon AI, Gebeya, Huawei, Ali Baba, Ant Financial, Paypal, Airbnb, and Uber.



2

DE4A FOUNDATIONAL ELEMENTS

This section provides diagnostic findings on the state of development of the Digital Economy in Nigeria. Following the DE4A Framework, first the Digital Infrastructure pillar findings and recommendations are presented. Second is the Digital Platforms assessment, which is then followed by the third, the status of Digital Financial Services. Then, the Digital Entrepreneurship analysis is described. Finally, the Digital Skills pillar findings and recommendations are discussed.

2.1 DIGITAL INFRASTRUCTURE PILLAR

2.1.1 Importance of Digital Infrastructure Pillar

High-speed Internet (or broadband) has the potential to accelerate Nigeria's socioeconomic development. An extensive body of research confirms the impact of increased investment in broadband on economic growth. World Bank research estimates that a 10% increase in broadband penetration in developing countries is associated with a 1.4% increase in Gross Domestic Product (GDP) (Kim, et al., 2010). Connectivity can shape countries' development path through several interrelated channels:

- i. It can bridge the information gap, alleviating asymmetry problems, and improve communication;
- ii. It is the most cost-effective and fastest means of connecting all citizens—especially those living in remote areas, to markets and services; and
- iii. It increases productivity, lowers transaction costs, and optimizes supply chains (Aker and Blumenstock, 2015).

More generally, broadband is a key enabler to harness the digital economy transformation; therefore, the need to develop broadband infrastructure in Nigeria runs high. Digital economies are creating unprecedented opportunities for countries to unleash new opportunities, create jobs, and transform people's lives. Fast Internet provides a platform for innovation that is used as a key input across sectors and reverberates throughout the entire economy. It potentiates entrepreneurship, with businesses and individuals using fast Internet to create new applications and services in areas such as e-commerce and financial services. It also enables game-changing digital service delivery in sectors critical to inclusive growth, such as education, health, and agriculture. Likewise, it allows the public sector to deliver services to citizens and businesses more effectively and more inclusively. On these accounts, broadband has the potential to transform Nigeria's economy and help the country leapfrog development stages, provided that all sectors of the Nigerian economy put in place effective policies that encourage its use as an essential input for growth.

For the Government of Nigeria, the digital economy is a key priority. In 2015, the Nigeria Communications Commission's (NCC) 8-Point Agenda proposed the transition of Nigeria's economy into a digital economy through investment in digital infrastructure, and more specifically broadband, which represents a key growth driver of the digital economy. The agenda's goals were to facilitate broadband penetration, improve quality of service, optimize usage and benefits of spectrum, and promote Information Communication Technologies (ICTs) innovation and investment opportunities across the country (Nigerian Communication Commission, 2015).

2.1.2 Diagnostic Findings: Current State of Digital Infrastructure Pillar

This section provides diagnostic findings on the state of development of high-speed Internet in Nigeria. First, the scale of Internet services available in the country is reviewed—in terms of access, affordability, and quality of services. Second, sector and market structure are analyzed, through an integrated framework, by looking at all segments of the value chain—*first mile* (international Internet access), *middle mile* (national backbone and intercity network) and *last mile* (local access networks reaching the end user). The analysis is complemented by an examination of the enabling regulatory environment, or *invisible mile*. Last, the report details the key hurdles currently inhibiting growth of high-speed Internet in Nigeria.

Scale of Internet Services Available

ACCESS

In spite of recent growth in fiber installations, national fixed-line infrastructure is still poor, and mobile systems remain the primary means for carrying retail and enterprise data traffic in Nigeria. According to the ITU, in 2018 19.9% of the population used their cell phones to connect to the Internet. Overall Internet usage in Nigeria stands at 27.7%, above the average for Africa (22.1%) (ITU, 2018). Box 1 presents ITU's ranking for Nigeria on a composite index.

Fixed broadband penetration in Nigeria is very low, with a household penetration rate of 0.04% at the end of 2018, below the African regional average (0.6%) and well below the world average (13.6%) (ITU, 2018). Fixed broadband remains a “niche” service used by public institutions and some businesses, as well as a few privileged households. There are therefore important digital divides in fixed broadband, both along gender and urban-rural lines (Gillwald, et al., 2018).

BOX 1

Benchmarking Nigeria's Digital Economy

Nigeria's 2017 ranking at 143rd of 176 countries in the ICT Development Index (IDI) underlined its limited broadband subscriptions. The International Telecommunication's Union's (ITU's) IDI is a composite index combining 11 indicators to monitor and compare developments in information and communication technology (ICT). Measuring the country's ICT readiness, intensity, and impact, the model correlates directly to the enabling environment for a growing Digital Economy. Nigeria's place of 143rd (15th regionally) highlighted its low number of broadband subscriptions (fixed and mobile) and demonstrated the limited usage of the broadband infrastructure and Internet in Nigeria.

Mobile broadband has become the most common and popular way through which people in Nigeria access the Internet. According to ITU, 3G coverage reaches 54% of the population and LTE/WiMAX, 50.8%. These figures are below the regional average for the former (62.7% in Africa), and almost twice for the latter (28.4% in Africa) (ITU, 2018). According to the report “The State of ICT in Nigeria 2018,” there is also an important digital gap regarding mobile broadband, with just over 20% of Nigerians owning a smartphone, 44.84% a feature phone, and 32.16% a basic phone. Furthermore, the gender gap in mobile phone ownership is also significant, with a higher probability of mobile phone ownership among males than females. In addition, the report reveals that males are more likely to own a smartphone than females, while females are more likely to own a feature phone and basic phone (Gillwald, et al., 2018).

AFFORDABILITY AND QUALITY OF SERVICES

Internet data tariffs have significantly decreased due to Nigeria's connection to undersea international links and increased competition in the market. Since 2010, there has been a massive 2,705% increase in the wholesale submarine bandwidth capacity available to Nigerian telecommunications operators, due to the launch of four new undersea cable systems with landing points into Lagos. This additional capacity has the potential to change the landscape of Internet service provisioning and data connectivity in Nigeria through lowered wholesale international bandwidth prices and higher speeds (Gillwald, et al., 2018). According to ITU, the mobile-broadband prepaid handset-based price (500 MB) stood at 1.89% of Gross National Income (GNI) per capita. This situation, i.e., a mobile-broadband price below 2% of GNI, only occurs in five other countries in Africa: Mauritius, the Seychelles, Gabon, Cabo Verde and South Africa (ITU, 2018). Finally, Nigeria ranks 6th out of 49 countries on Research ICT Africa (RIA's) African Mobile Pricing (RAMP) Index, and 10th on the 1GB pre-paid mobile data index. Even though Nigeria compares well in the affordability and price rankings, these rankings need to be weighed against the accompanying broadband objectives of increased penetration and quality of service on which the country fares less favorably. Individual Internet penetration is relatively low in Nigeria, at around 30%. By comparison, South Africa has the highest individual Internet penetration in Sub-Saharan Africa at 53%, despite having considerably higher prices (Gillwald, et al., 2018).

However, access to national fiber-optic networks is still limited and relatively expensive where available. Therefore, while it is true that submarine cables have expanded the capacity of overall international bandwidth, inland locations within the country are yet to experience

any significant lowering of broadband prices. Based on recent RIA surveys in the country, data rates are still high while browsing speeds are slow and unreliable, especially to retail consumers. With very low-income levels among significant segments of the population, it is clear that, even with competitively priced data products, significant numbers of Nigerians cannot afford the devices to come online or to use the Internet in a meaningful way and enhance their well-being (Gillwald, et al., 2018).

Issues with Quality of Service (QoS) persist in Nigeria. Despite the enormous growth and intensive competition among operators, there is still poor quality of service and network congestion. Lack of coverage and quality of services in terms of network quality and download speed often force subscribers to own multiple SIM cards. As a result, according to the report “The State of ICT in Nigeria 2018,” at least half of mobile subscribers own more than one SIM card (Gillwald, et al., 2018).

Sector Structure, Market Structure, and Regulatory Environment

COMPETITIVE ENVIRONMENT

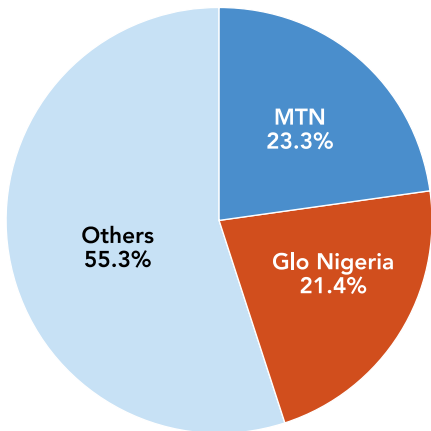
Increased competition in the telecommunications and broadband market, due to continued efforts by the government to liberalize it, has driven growth in the sector (Figure 4 shows the fixed line market share). The establishment of the sector’s independent regulator in 1999, the Nigerian Communications Commission (NCC), ended the monopoly of M-Tel, the mobile subsidiary of fixed-line incumbent, NITEL. The liberalization process was kick-started with the awarding of three GSM spectrum licenses, via an auction, to MTN, CIL (now GLO), and Econet Wireless Nigeria Ltd. The NCC has facilitated market entry over the years through the transparent licensing of various communications services. Several regulatory mechanisms

have also been implemented to create a fair and competitive environment for market players over the last decade and a half. Overall, competition led to a spillover effect on the incumbent operators, who had to lower retail costs, intensify their rollout of cellular services in rural areas, and upgrade their network capacity, leading to greater penetration and improved quality of services. However, the tough conditions in the market have put all operators, even large ones, at risk of having to exit the market (Anon., 2018b).

The demise of the incumbent NITEL means that there is no dominant operator for fixed telephony. Four operators provide fixed telephony (MTN, Glo, ipNX and 21st Century), while two provide fixed wireless telephony (Visafone and Multilinks). Most fixed broadband access is via fixed wireless using WiMAX, plus a growing number of fixed Long-Term Evolution (LTE) operators. Fiber-optic broadband is starting to be deployed in some urban areas. In terms of market share, over 55% of the market is shared among more than 80 operators, with MTN and Glo sharing the remainder. In 2016, MTN successfully bid (the sole auction-goers) for six slots of 2.6 Ghz spectrum bandwidth. The demand for FTTx services is forecast to continue to grow and incentivize investments in metropolitan fiber-optic networks.

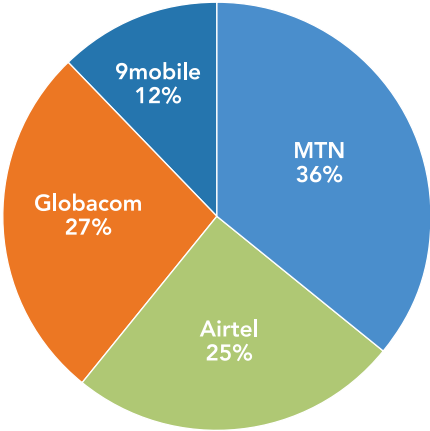
On the other hand, the Nigerian mobile sector benefited from the arrival of a series of submarine fiber-optic high bandwidth cables linking Nigeria to Europe. The deployment of the high bandwidth cables has increased competition in the mobile industry as shown in Figure 5, with operators now focusing on rolling out 4G/LTE technologies. Currently there are four GSM operators: AIRTEL (a subsidiary of the Indian mobile group); MTN (a subsidiary of the South African MTN Group); 9mobile, which was formerly EMTS (a subsidiary of ETISALAT of the

FIGURE 4: Fixed line market share



Source: GlobalData Fixed Communications Forecast.

FIGURE 5: Operator market share by subscribers



Source: NCC, 2017.

United Arab Emirates); and GLOBACOM (owned by a privately held Nigerian group). There are also two operators using CDMA technology, Visafone, and Multilinks, but their market share is negligible. NATCOM acquired the assets of the bankrupt incumbent operator NITEL in 2015, including its mobile licenses, and recently launched under the brand Ntel (ITU, 2018).

In 2015, the mobile subscriber market was heavily dominated by MTN, with a market share of 44% (NCC, 2018). By 2017, MTN's market share had declined from 46% at the start of 2016 to 36%. The biggest gains were made by Globacom, which increased its market share from 20% at the beginning of 2015 to 27% in 2017, followed by Airtel, which increased its market share from 10% to 25% in the same period. The financial challenges faced by 9Mobile led to the operator losing 4% of market share in the same period to become the smallest operator, with only 12% of the subscriber market. Despite this loss in market share, MTN still dominates the market, accruing more than 40% of total revenues. As the market continues to shift, with subscribers moving to cheaper data services, mobile voice revenues have been declining, from a little over USD 4.5 billion at the start of 2016 down to USD 3.2 billion toward the end of 2017 (Anon., 2018b).

Nigeria's market is highly price sensitive, but quality of services has also become a differentiating factor. Innovations and technological changes in the mobile sector continue to change the business environment. The evolution of data communications, more specifically the rise of Over the Top media service (OTT), is expected to have a negative impact on voice service revenue. OTTs, such as WhatsApp and Skype, are cheaper substitutes for voice communications. An exponential growth in demand for these services has significantly reduced voice and SMS revenue. These services have not only lead to a reduction in revenues, but they have also opened opportunities for small operators, especially those who embrace them to be competitive and to gain market shares. This has increased competition in the market, leading to episodic price wars.

In the coming years, both voice and broadband Average Revenue Per User (ARPU) are forecasted to decrease. Voice ARPU will drop from USD 33.09 in 2017 to USD 19.47 by 2022 (the decline in Naira will be less noticeable, decreasing from Nigerian Naira (NGN) 4,516 to NGN 1,986). Broadband ARPU will also decrease, although less severely, from NGN 10,401 to NGN 9,468 over the same time period, with expected investments in international connectivity and fixed broadband network expansion diminishing its decline. By and large, the anticipated increase in fixed broadband revenue is significant (from USD 56 million in 2017 to USD 80 million by year-end 2022), led

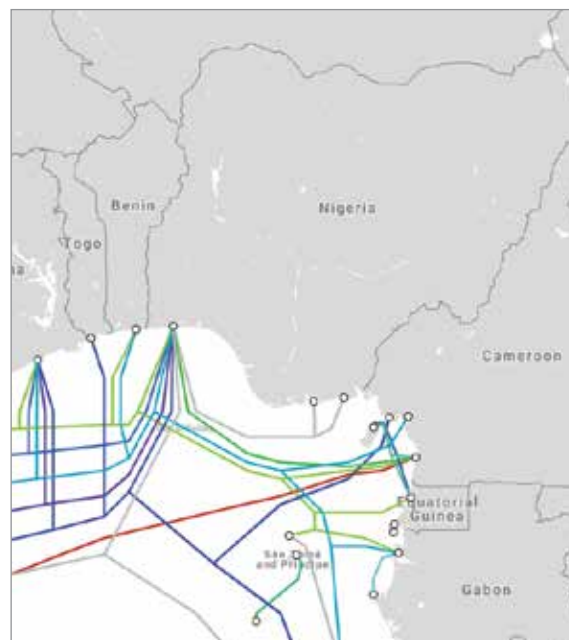
by rising FTTx and fixed wireless adoption. This growth is again based on anticipated investments, in particular, the government's plan to roll out 18,000 km of fiber-optic networks will support fixed broadband revenue growth.

DEPLOYMENT OF BROADBAND INFRASTRUCTURE

This section assesses the digital infrastructure value chain in Nigeria, from the First Mile (international connectivity), through the Middle Mile (the fiber-optic backbones and interurban networks), to the Last Mile (access by the end users) and the Invisible Mile (invisible elements of the chain, such as access to frequencies, and the associated 4G+ services). Digital infrastructure, particularly middle-mile and last-mile, remains underdeveloped, which has limited the spread of broadband.

First mile: Nigeria's international connectivity is well developed. Nigeria is connected to high-speed Internet via five undersea international links: Main One; Glo; West African Cable System (WACS); SAT-3/WASC; and ACE submarine cable system (see Figure 6). The situation was very different in 2010 when only one international link was available, and Nigerian operators were therefore heavily dependent on VSAT systems and nTEL's notorious SAT3 (the de facto monopoly submarine cable system, generally expensive and unreliable) for international bandwidth. Since 2010, MainOne was installed, then Glo-1 in 2011, WACS in 2012, and finally ACE in 2014, with a combined overall capacity of over 9 terabytes.

FIGURE 6: Submarine international links



Source: <https://www.submarinecablemap.com/>

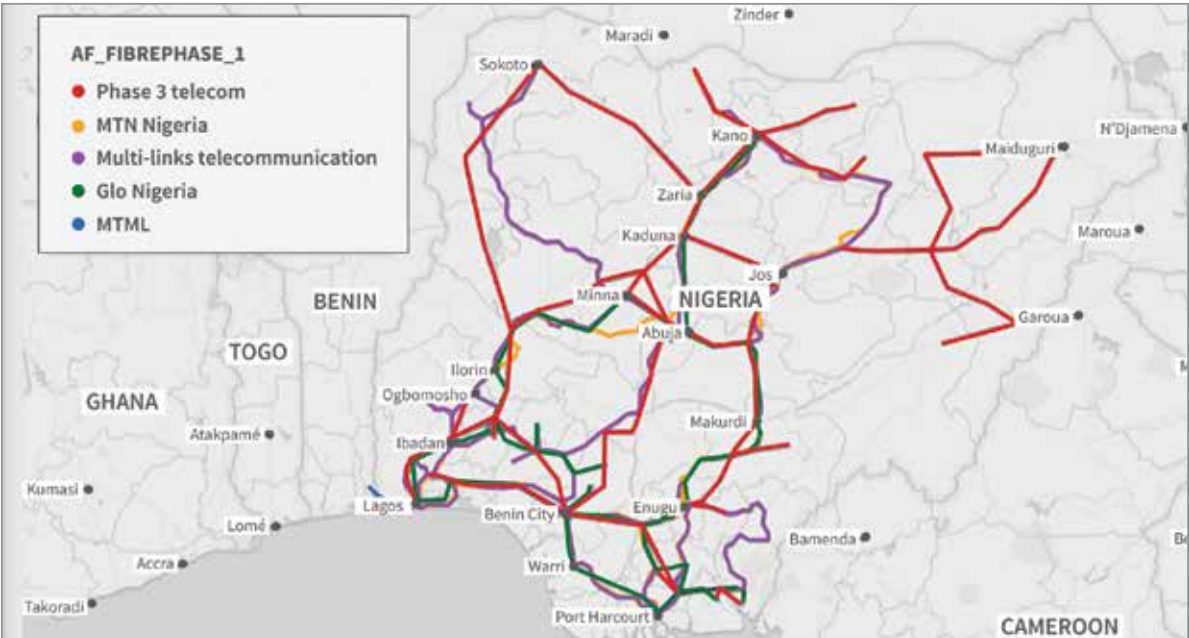
Multiple international links have significantly reduced constraints in terms of international bandwidth usage and prices, and boosted network capacity. The five submarine cables provide adequate redundancy for possible fiber/cable cuts, and total available international bandwidth has been increasing rapidly, reaching a potential capacity of 19.2 terabytes. While Nigeria benefits from the landing and interconnection of many submarine cables, with estimates of over USD 1 billion (NGN 306 billion) worth of investments, outside of Lagos this sizable international connectivity has had little impact on the domestic market. The industry consensus is that the cost of moving traffic inland from any of the submarine cable landing points in Lagos to any location within the country is now higher than the cost of purchasing bandwidth from anywhere outside the country. In this regard, via an arrangement with Cameroun Telecoms, MainOne has recently added a new landing station in Kiribi, Cameroun, to its national network, and the carrier has plans to extend its submarine cable into Escravos (Delta State), Qua Iboe (Akwa Ibom State), Bonny Island (Rivers State), and eventually Port Harcourt (Rivers State) (Gillwald, et al., 2018). Another alternative could be the usage of Internet EXchange Points (IXP), more specifically the Internet eXchange Point of Nigeria (IXPN), which was established in May 2007 as the first IXP in Nigeria. In 2016, IXPN was upgraded to “regional IXP” for West Africa, a major achievement for both the IXP and Nigeria. In bypassing international transit and foreign operators, this infrastructure will improve both the speed and cost efficiency of the

intra-country and intra-regional traffic, reducing barriers to mobile broadband access and usage (Anon., 2019a).

Middle mile: Backbone investment in Nigeria has focused primarily on major urban areas and on inter-city routes. Unlike its West African peers, such as Ghana and Senegal, Nigeria does not have a national backbone network through which high-speed Internet connectivity can be extended across the entire country. Presently, all the operators together contribute about 33,000 km of fiber, and 24,000 towers, significantly fewer than far smaller countries and economies. Figure 7 shows existing fiber deployments in Nigeria. The biggest infrastructure companies with significant network assets are, in descending order, MTN, Glo, IHS, Airtel, 9Mobile, Phase 3, and nTEL (formerly NITEL). In addition, there is a strong imbalance among the main three telephony operators (MTN, Glo-Mobile, and Airtel) in the endowment of national connectivity infrastructure. MTN has a much stronger fiber-optic network than any other operators (in part due to their spectrum acquisition in the 2016 auction), and access to MTN’s network is not sufficiently regulated to ensure open and nondiscriminatory access. This lack of open access is a major obstacle to stimulating competitive broadband development and the sustainability of the business model of the Internet service providers (ISP) that have recently entered the market (Gillwald, et al., 2018).

In 2014, the Federal Government of Nigeria (FGN) launched a vast program to boost broadband cover-

FIGURE 7: Fiber deployments in Nigeria



Source: Song, 2017.

age in all states, to incentivize the development of fiber infrastructure across Nigeria—improving both intra-city and intercity networks. To achieve this, the NCC divided the country into seven regions and awarded seven new InfraCo licenses to different operators between 2014 and 2018 to support an open-access and nondiscriminatory network in layers 1 and 2. The seven InfraCo licenses include: BCN for the North-West; Zinox Technologies for the South-East; Brinks Integrated Solutions for the North-East; MainOne for Lagos; Rae-anna Technologies Limited for South-South; and O’odua Infraco Resource Limited. Due to initiatives like this one, it is expected that the number of fixed voice lines will more than double, from 146,300 in 2017 to 341,700 by 2022, and led by increasing VoIP subscriptions and fixed broadband, lines will grow from 136,800 in 2017 to 377,500 by 2022 (reaching 0.19% of the population). Finally, fiber broadband accounted for 49.2% of total broadband lines in 2017 and will continue to lead the fixed broadband market to 2022 (Anon., 2018a).

Last mile: In spite of recent growth in fiber installations, national fixed-line infrastructure is still poor, and mobile systems remain the primary means for carrying retail and enterprise data traffic in Nigeria. Fixed broadband, which generates very high construction costs, is in short supply, even within towns (except in Lagos and Abuja), through DSL, cable networks, and FTTH/FTTB. Despite the current influx of fiber-optic operators into the country, which correlates with the potential of the country’s communications market, last-mile infrastructure deployment to end users remains minimal. Therefore, the Internet sector is increasingly depending on wireless access technologies.

On the other hand, mobile operators, who have the advantage of scale and coverage, are the main providers of broadband connections in Nigeria, with networks based on GPRS, EDGE, UMTS, and LTE technologies. Internet solutions and services are also provided by fixed wireless operators, which offer EVDO and HSPA products, and ISPs, which mainly utilize WiMAX and fiber-optic solutions. At the core of access networks is 2G, which covers 87% of the entire Nigerian population. In contrast, according to ITU, 3G is presently only available to 54% of the population. The reliance on older access technologies is at the heart of poor mobile data reliability, which at the moment is quite pronounced throughout the country (GSMA Intelligence, 2014).

Due to regulatory promotion of infrastructure sharing, coupled with the global trend of outsourcing, the majority of base station sites are now under the management or outright ownership of two major tower sharing compa-

nies, IHS Towers (IHS) and American Towers. IHS manages about 15,000 towers and recently secured the Infraco license for the North-Central, while American Towers owns about 5,000 towers. IHS and the MNOs are currently aggressively connecting tower locations to fiber-optic cables to reduce the dependence on microwave back-hauling. This should deepen the national communications infrastructure and may result in improved speeds and a greater range of services (Gillwald, et al., 2018).

INVISIBLE MILE—THE ENABLING ENVIRONMENT

Nigeria has a robust, though complicated, institutional setup to govern and promote development of ICT infrastructure and sector development. Overall responsibility for the ICT sector falls under the Federal Ministry of Communication Technology. The ministry is comprised of three different agencies (Figure 8) (Gillwald, et al., 2018):

- The Nigerian Communications Commission (NCC), the sector regulator, with its mandate guided by the Nigerian Communications Act of 2003. NCC is a fully autonomous body with exclusive powers to license and regulate both private and government-owned operators.
- The National Broadcasting Commission (NBC), established in 1992, with comprehensive powers over all aspects of private broadcasting in Nigeria, including licensing, monitoring, policy formulation/implementation, ethics, and standards. However, unlike the NCC, the NBC is subject to ministerial directives, and any new license can only be issued upon approval by the president on the Minister of Information’s recommendation.
- The National Information Technology Development Agency (NITDA), part of the Federal Ministry of Communication Technology, is responsible for implementing the ICT policy.

While the regulatory regime has improved, Nigeria’s regulatory rankings remain relatively weak when benchmarking with select peer markets. Nigeria ranks 86th in the ICT Regulatory Tracker out of 190 countries, with the lowest score under Cluster 1: Regulatory Authority (ITU, 2017a). The regulator currently faces the difficult task of creating an environment conducive to the significant investments required for the imperative broadband extension presented in the National Development and Broadband Plans under challenging domestic conditions. Until now, broadband rollout has primarily been undertaken by dominant market players, while the regulation of access to broadband networks for service-based competition has not been pursued (Gillwald, et al., 2018). In April 2019, the NCC announced plans to re-farm existing spectrum (repurpose frequency bands that previously allocated for

BOX 2

Government Initiatives Intending to Expand ICT Infrastructure

- The 2012 National Information and Communication Technology (ICT) Policy lays out the sector direction with the main goals of creating a conducive environment for the rapid expansion of ICT networks and providing services that are accessible to all at reasonable costs, and that contribute to the development of the various socioeconomic sectors. Key objectives include (a) to facilitate and support development of a nationwide ICT infrastructure that will support national broadband connectivity and accelerate socioeconomic development; (b) to connect all federal and state networks to a national fiber backbone; and (c) to provide a reliable, accessible, secure, and reasonably priced ICT connectivity to national and international ICT infrastructure (Ministry of Communications Technology, 2012).
 - The National Broadband Policy (2013–2018) recognizes the positive linkages between increased broadband penetration and GDP growth. The plan envisages more than a fivefold increase in Internet and broadband penetration, from 6% in 2013 to 30% in 2018. In addition, metro fiber infrastructure is to be installed in all state capitals and urban cities, while other estates and business districts within major cities would have fiber to the home or premises. At a national level, the intention of government is to facilitate full rollout of wireless 3G networks by operators and transition to 4G/LTE as spectrum becomes available (Ministry of Communications Technology, 2013).
 - Community Resource Centers (CRC), funded by the Universal Service Provision Fund (USPF), aim to extend voice, and ICT training and other e-services to unserved communities on a shared basis and bridge the digital divide in the communities.
- The centers are fully equipped with desktop computers, furniture, telephones, power generators, and bandwidth to provide access to telephone, Internet, ICT, and e-initiatives at semi-urban and rural unserved and underserved areas (Universal Service Provision Fund, 2015a).
- The Rural Broadband Initiative (RUBI), also funded by the Universal Service Provision Fund (USPF), provides subsidies to operators for the deployment of a network to support the establishment of core delivery mechanisms for broadband services in the rural/semi-urban areas of Nigeria. Currently, the pilot wireless mobile broadband hot spots are being constructed across the country. This project provides both wired and wireless Internet at high speeds in the rural areas at wholesale, and at the same time serves as a catalyst for the uptake of other broadband-dependent projects in those locations, such as e-library, e-health, e-government (Universal Service Provision Fund, 2015b).
 - The Smart Nigeria Digital Economy Project is a digital-led strategy initiative of the government to center around the establishment of an ICT ecosystem in Nigeria. This is enabled through significantly expanding broadband coverage, increasing e-government, and establishing ICT clusters, starting in the Special Economic Zones (SEZs). Government will also drive a program to build the skills in this sector, focusing on training ICT engineers in software development, programming, network development, and cybersecurity. The Project's objective is to increase the contribution of ICT and ICT-enabled activities to GDP by an estimated 10% and create 2.5 million new jobs between 2017 and 2020 (Ernst & Young: Nigeria, 2018).

2G mobile services, for new generation mobile technology). Having previously sold six slots of 2.6 Ghz spectrum band to MTN in 2016, there are currently eight remaining slots of spectrum in the 700 MHz band—each valued at USD 16 million—which can be used to expand 4G LTE coverage and increase broadband penetration across the country. There is skepticism, however, whether more spectrum will have a positive impact on the broadband market, mainly due to established operators in Nigeria having limited resources to both bid for spectrum and roll out the ensuing broadband services, as demonstrated in the 2016 spectrum auction where MTN was the only MNO to bid on the spectrum (Anon., 2018a).

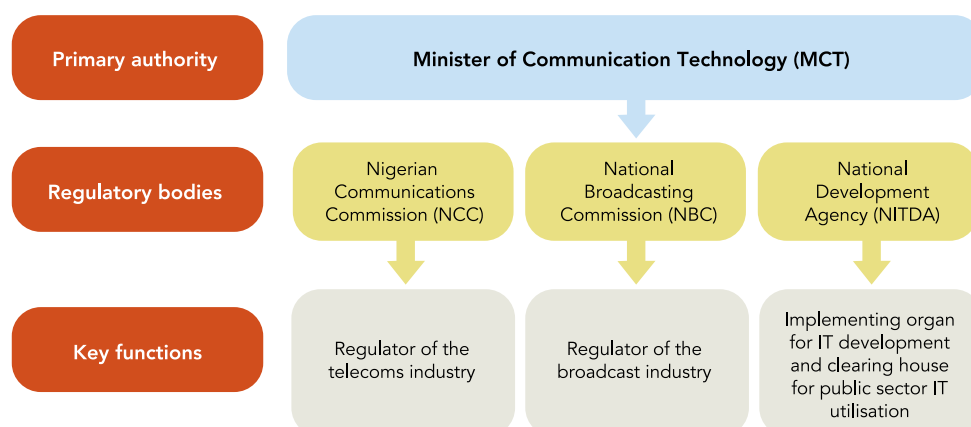
Constraints to High-Speed Internet Development

MARKET FAILURES IN RURAL AREAS

Nigeria is still a long way from achieving widespread use of broadband because of major infrastructure challenges and market failures, particularly in rural areas.

High costs of right-of-way, damage to existing fiber infrastructure as a result of cable theft, road works, and other operations, and the lack of reliable grid electricity supply, coupled with low commercial returns, render services not commercially viable on their own. These costs induce a lack of interest from operators and ISPs in deploying infrastructure in rural areas. Accordingly, network oper-

FIGURE 8: Current framework for ICT regulation in Nigeria



Source: Gillwald, et al., 2018.

BOX 3

Vision 2020

Nigeria's Vision 2020 is a strategic document that identifies the long-term developmental objectives with the aim of achieving accelerated and sustained economic development. Furthermore, Vision 2020 recognizes the importance of ICT skills development and greater diffusion of ICT across subsectors within the economy, including education, finance, farming, trade, manufacturing, services, oil and gas, and the public sector. The strategic initiatives envisioned to drive implementation of policy within the ICT sector include (Government of Nigeria, 2010):

- Providing the appropriate incentives to drive the development of ICT infrastructure and telecommunications services to rural and underserved urban areas;
- Mainstreaming ICT into the education curriculum;
- Encouraging local production of ICT components and subsystems by providing incentives for manufacturers for major ICT projects;
- Facilitating the development of a national multimedia superhighway;
- Establishing a national (spatial) ICT backbone Connectivity and Bandwidth Aggregation Solution;
- Implementing the Nigerian National ICT for Development (ICT4D) strategic action plan to foster a competitive environment with ample opportunities and choices;
- Establishing a national digital library with access points strategically located in both rural and urban areas;
- Promoting e-learning, e-governance, e-business, e-commerce, e-banking, e-management, etc.
- Providing regular and affordable access to Internet resources in all educational and research institutions, with particular focus on basic and post-basic education;
- Establishing appropriate legal and regulatory frameworks to support e-business and ICT-enabled activity—the legal framework will address law enforcement, electronics contracts, consumer protection, intellectual property rights, dispute resolution, privacy, cybercrime and data protection, and other aspects of information security;
- Providing appropriate incentives, including tax benefits and improved infrastructure, with a view to creating an enabling environment that encourages investment, innovation, and exploitation of ICT-enabled services; and
- Mainstreaming ICT policies into the broader development of a knowledge society and ensuring coordination and consistency between ICT policy strategies and national development policies.

BOX 4

Universal Service Provision Fund

The Universal Service Provision Fund (USPF) was established in 2006 to support the rollout of telecommunications infrastructure into rural and underserved areas in Nigeria. The Fund aims to “facilitate the widest possible access to affordable telecommunications services for greater social equity and inclusion for the people of Nigeria” (USPF, 2015c). The USPF consists of several projects aimed at achieving universal access. The programs consist of two broad categories: access and connectivity. The current programs include (Universal Service Provision Fund, 2006):

- **School Knowledge Centres (SKC):** Under this project, 396 public secondary schools have been provided with connectivity, computers, and power backup. Teachers and students are taught how to use ICT as part of the project, as well as one-year technical support, warranty, and remote ICT management. The USPF is also supporting the development and deployment of local content under this program.

- **E-Accessibility Project:** The project provides ICT tools and Assistive Technologies (ATs) to the blind, deaf, dumb, crippled, cognitively impaired, and other categories of people living with disabilities. The project is designed to assist in improving the quality of life of people living with disabilities by:

- Providing support to identified groups in accessing information and communication technologies;
- Improving the overall learning experience of persons living with disabilities by equipping educators with the right hardware and software; and
- Providing ICT and assistive solutions to cover as many areas of disability as possible, including but not limited to sight, hearing, mobility, etc. (USPF, 2015d)

To date the project covers 14 institutions across the country.

ators have focused on the most profitable geographical areas, primarily major urban areas, capital cities, and inter-city routes, to the disadvantage of the majority who live outside those areas. Moreover, decline in revenues for the operators, attributed to pricing pressure induced by competition, while they have not transitioned to generating significant revenues from data as they have in more mature markets, translated into reduced investment and in rollout of infrastructure. These effects have been compounded by the macroeconomic situation that forced operators to slow down or postpone their investment plans for network expansion.

LACK OF NATIONAL BACKBONE INFRASTRUCTURE AND LIMITED INFRASTRUCTURE SHARING

Nigeria’s lack of a national backbone network for the transmission of high-speed data is at the heart of prevalent poor quality of voice and data services. While the InfraCo model sought to address this through the licensing of new players to provide regional backbone infrastructure, the response of industry has been limited. Therefore, in order to fulfill the National Broadband Policy objectives, the regulator needs to develop policies that can lead to a new open access common carrier network, with guaranteed national rights-of-way by attracting new investments.

On the other hand, commercial infrastructure sharing, which is currently being practiced in Nigeria, should be encouraged more in order to reduce the high costs of duplicating networks. However, where this is uncompetitive or the exclusion of other market players, the NCC should investigate the need for mandatory infrastructure sharing (both passive and active) at regulated cost-plus prices. This will lead to the rationalization of unnecessary duplication of infrastructure.

SUBOPTIMAL SPECTRUM MANAGEMENT

Spectrum management appears suboptimal in a number of areas. The regulator needs to review spectrum policy to ensure more optimal coexistence of licensed and unlicensed spectrum. Licensed spectrum is required for the evolution of existing services and needs to be assigned at a competitively determined price to ensure the efficient build-out of capital-intensive networks. Nationally allocated spectrum not in use in remote areas should be available for free or at low-cost use by community-based or not-for-profit micro-networks. Innovative use of unlicensed spectrum can also spur investment and innovation in technologies that can complement licensed networks to expand low-cost, last-mile broadband access. Private sector actors are also concerned by a lack of transparency on spectrum allocation that can create uncertainty around long-term investment horizons for the mobile market.

RIGHTS-OF-WAY

Nigerian fiber operators also spoke about the challenges of obtaining right-of-way and environmental clearances to extend their networks. Various states have different rules, many of them arbitrary and uncertain, and operators have experienced the rules being amended mid-build. They have called for national standardized right-of-ways to be made a federal jurisdictional issue to overcome what is seen as arguably the greatest stumbling block to extension of the national backbone and backhaul networks in Nigeria.

ADDITIONAL BARRIERS TO ACCESS

The costs to acquire a broadband-enabled device, digital illiteracy, lack of local content, and low elec-

trification rates are major barriers to access broadband in Nigeria. An ICT use survey reveals that, of those unconnected, 50% stated that they cannot use Internet because they cannot afford devices to access the Internet, over 25% of them gave 'no electricity' as the reason, while over 20% said 'there is no signal' (mobile coverage) (Gillwald, et al., 2018). There is an urgent need to develop policies and regulations that increase the affordability of smart devices and develop awareness of the Internet, as well as the skills to access and use it, which is critical to reducing digital inequality. Finally, according to USAID's Power Africa program there are 20 million households in Nigeria without any access to power, and 55% of rural areas without electricity (Anon., 2019b).

BOX 5

Edo State Government Initiative Aiming to Expand Broadband Access

Edo Broadband Network (EBN) is a state-wide integrated vendor independent Edo State Government ICT Agency–designed Fibre-Optic HDPE Duct platform infrastructure for various telecom investors willing to invest in running fiber-optic links across the EBN Duct platforms.

Objective

The EBN platform is intended to open the digital potential of Edo residents and provide investment opportunities for tech savvy and local businesses to transform the economy of the state to a digitalized ecosystem for prosperity. We expect to create job growth in economic sectors supported by Innovation Hubs and Edo Skills Development Programs. The Edo ICT Agency projects a 10% growth impact on the state's GDP from fiscal year 2020. EBN will expand broadband services across the state, LGA headquarters, schools, SMEs, and private and government offices. This would provide the following:

- Internet service to streets, schools, and residences;
- Broadband connectivity investment;
- Shared duct among telecom companies; and
- Many more digital opportunities.

Workplan

EBN implementation would be done in four phases as depicted below:

PHASE 1: BENIN METRO CITY.

Implemented by MainOne in partnership with Facebook. EBN Benin Metro is a 450 kilometer four-duct international standard OPEN platform for any service provider to deploy fiber or buy capacity. MainOne has implemented the deployment of street-by-street fiber and now offers E1 (2 mbps/2 mbps) service at under \$90/month. This phase has also connected three Benin City–based LGA HQs.

PHASE 2

Artery road beginning with Benin City to Ekpoma to Auchi and terminating at Okpella town. This phase would connect and execute (replicate the Benin Metro template) in the town of Ekpoma and Auchi. This project would connect 6 LGA HQs.

PHASE 3: LGA (CONNECTING SUB HUBS SUCH AS LOCAL GOVERNMENT HEADQUARTERS)

Phases 1 and 2 would connect 9 LGA HQs with 3 LGA already connected and 6 more by Qtr3 2020. The other 9 LGA are expected to be achieved by end of 2021 as we target the final implementation of phases 1 and 2. All these investments would be driven by the private sector at various levels.

PHASE 4: CONNECTING COMMUNITY/PUBLIC SERVICES

Targets LGA would manage services such as schools, hospitals, and community centers. As an LGA HQ is connected, connectivity to critical services, businesses, and residence via Wi-Fi, fiber, or Point2Point medium is designed.

2.1.3 Digital Infrastructure Recommendations and Next Steps

The findings from the assessment of the current state of Digital Infrastructure in Nigeria aim to identify the factors in the macro and microenvironment that influence the behavior of companies and individuals. Each factor in the macro and microenvironment and its impact help in the identification of the factors in the generic external environment, i.e., Opportunities and Threats; and the factors in the generic internal environment, i.e., the Strengths and Weaknesses, both of which are needed to construct the final SWOT Matrix.

As observed in the SWOT Matrix, despite the challenges and bottlenecks related to digital infrastructure in Nigeria, there are clear strengths and opportunities that indicate the country can achieve much greater digital inclusion in the future. This section details recommendations and next steps based on the SWOT Matrix, which would support Nigeria toward developing digital infrastructure in the country.

IMPROVING INTERNET SERVICE AVAILABILITY AND CONNECTIVITY

R1. Accompany regulatory efforts to encourage infrastructure sharing and open access to critical infrastructure to allow faster deployment and greater rural push in middle and last mile connectivity. Effective infrastructure sharing and open access wholesale would bring broadband to rural areas more quickly by limiting duplication of infrastructure and redirecting resources

to underserved communities. Legal grounds have been established. However, more needs to be done to create the conditions for a dynamic wholesale market, for instance by:

- Consistently monitoring Quality of Service (QoS) metrics and enforcing infrastructure quality standards to solve QoS issues that prevent some operators from using their competitors' networks;
- Enforcing harmonized rights-of-way policies for accessing public infrastructure and taking advantage of future civil works projects for cross-sector infrastructure sharing; and
- Establishing a coordinating agency to mediate between the regulator, operators, ISPs, and infrastructure providers and implement a "dig once" approach to infrastructure development and consolidation. The agency could facilitate consultations to help align interests and achieve buy-in and give guidance on network rationalization and infrastructure sharing enforcement.

R2. Support the reform and operationalization of USPF to accelerate infrastructure development in underserved areas, along the following lines:

- Building USPF's staff capacity on mechanisms and processes to deliver projects, including monitoring and evaluation (M&E), and on new technologies that could be used for infrastructure deployment;
- Raising visibility on the fund, and promoting transparency and accountability through annual reporting on accounts and performance; and

SWOT Matrix

Strengths	Weaknesses
<p>Largest mobile market in SSA</p> <p>Mobile broadband infrastructure (2G in the entire country, 3G only in urban areas, capitals, and main corridors)</p> <p>International connectivity</p> <p>Broadband prices as % of GNI per capita</p> <p>Market competition</p> <p>Cost of devices</p>	<p>Fixed broadband infrastructure and penetration</p> <p>3G mobile broadband coverage in rural areas</p> <p>4G coverage nationwide</p> <p>Lack of a national backbone</p> <p>Only one landing station</p> <p>Quality of service</p> <p>ARPU reductions</p> <p>Spectrum allocation</p>
Opportunities	Threats
<p>NCC 8-Point Agenda</p> <p>InfraCo licenses</p> <p>Infrastructure sharing regulation</p> <p>National ICT Policy</p> <p>National Broadband Policy</p> <p>USPF</p> <p>Vision 2020</p> <p>Very low usage of existing Internet capacity</p>	<p>Digital literacy</p> <p>Use of Internet</p> <p>Electricity access and coverage</p> <p>Gender and economic digital gap</p> <p>Poverty and economic disparities</p> <p>Multiple regulator and supervising agencies</p> <p>Right-of-way costs</p>

- Establishing a ‘Pay or Play’ mechanism, whereby operators can choose if they want to contribute financially to the fund or invest directly in projects themselves and guarantee specific universal access targets in exchange for relief from USPF levies.

R3. Use innovative solutions to mobilize substantial private sector investment and expedite development of broadband infrastructure in underserved areas.

Options to do so include:

- Promoting innovative Public-Private Partnerships (PPP), with competitive awards of subsidies to private operators to support infrastructure development in areas where market forces alone are insufficient to provide adequate broadband coverage. PPPs could be implemented through a joint program, in which WBG’s resources are leveraged alongside USPF’s funds;
- Activating government pre-purchase of international bandwidth, which, if well-advertised, would reduce investment risks for private operators; and
- Considering preferential taxation for providers who agree on specific universal access targets (e.g., reduction of annual telecommunications fees, income tax holidays, lower fees for deployments, tax exemptions on data value added tax, devices, and equipment). This must be done on the basis of a stringent cost benefit analysis.

R4. Optimize spectrum. Market mechanisms to promote more efficient spectrum use include:

- Ensuring liberal spectrum re-farming and/or trading regime for greater flexibility and reduced need for new spectrum auctions. NCC could benefit from technical assistance on this; and
- Promoting greater transparency on spectrum allocation processes to encourage private investment.

R5. Strengthen coordination between the different agencies that govern ICT policy, regulation, and implementation, and consider streamlining the institutional and regulatory framework, by:

- Establishing a technical working group to bring all ministries/agencies involved in the ICT sector together, avoid overlaps, and better coordinate future interventions;
- Providing more clarity on who is regulating the last mile segment of the fixed broadband market and what regulations should govern ISPs’ operations; and
- Considering merging some agencies/regulators (NCC and NBC) to adapt to increasing technological convergence.

STIMULATING DEMAND AND CLOSING THE DIGITAL DIVIDE

R6. Promote affordability of broadband-enabled devices and widen opportunities for individual access.

The government could consider:

- Reducing or eliminating excise duties and other taxes on feature and entry-level smartphones, tablets, or laptops;
- Introducing grants or offering low- or zero-interest loans for their purchase, with a targeted approach to prioritize women and marginalized populations to reduce digital gaps; and
- Providing broadband equipment to educational institutions at cost or via subsidies.

R7. Expand communal broadband access to connect the unconnected.

Citizens in underserved communities mostly do not use broadband because they have no access, cannot afford it, or are not aware of its benefits. Current government initiatives could be further leveraged by:

- Constructing more Community Resource Centers (CRCs). Sustainability should be aimed for, so that facilities and equipment can be maintained, and operational costs covered. The government should explore partnership opportunities with private sector actors that could use these centers to market their activities and enroll customers (e.g., for mobile money);
- Leveraging a Rural Broadband Initiative (RUBI) network, to provide connectivity to underserved communities; and
- Establishing a coordinated policy approach to provide public access. A number of programs providing access points (CRC, RUBI, incubators, etc.) are being implemented by different agencies with different resources and priorities. The government should try to build on synergies to improve program efficiency and generate economies of scale.

R8. Right-of-Way Regulation. The difficulties in obtaining ‘right-of-way’ restrict coverage and are a key factor in service delivery. Regulation must be put in place to compensate landowners for use of property to build digital infrastructure in an environmentally safe manner, reducing equipment vandalism and theft. The state must also enforce the fixed national rates for laying fiber network (NGN 145 per meter) and monitor and penalize states choosing to fix their own pricing in order to roll out the required 120,000 km of fiber network to adequately cover Nigeria (to date only 38,000 km of fiber have been rolled out).

Spurring the adoption and use of broadband networks and services by users will also require government policy and private sector investment to focus on driving demand for broadband services. Specific interventions should be designed to carry out demand-side strategies to stimulate broadband use, e.g., by promoting the use of services that are attractive to potential consumers, such as WhatsApp or social media. Similarly, it is important to educate users about the benefits of broadband and help them develop the user skills needed to use broadband services effectively, especially targeting women and vulnerable households. This will be further elaborated upon in the rest of this paper (see 2.2. Digital Platforms and 2.5 Digital Skills).

2.2 DIGITAL PLATFORMS PILLAR

2.2.1 Importance of Digital Platforms Pillar

Digital platforms can be defined as “multisided marketplaces with business models that enable producers and users to create value together by interacting with each other.”⁴ They enable users to replicate traditional market activities with the help of digital technologies, big data storage, and access to information. The benefits of digital platforms stem from their ability to virtually connect people and things, facilitating digital transactions/interactions, including the exchange of information, goods, and services. Digital platforms leverage economies of scale and network effects to generate efficiency gains, where each additional user creates exponential growth in the benefits offered by the platform in question.

Digital platforms offer products and services accessible through digital media, such as mobile devices, computers, and the Internet for consumers. Digital platforms enable participants to create value by interacting with each other. They can serve people, businesses, and government agencies in all aspects of life, including health care, education, commerce, transportation, and public benefits.

- Governments around the world are implementing the GovTech agenda. This focuses on digital platforms that increase the efficiency and effectiveness of core functions and services; reduces unnecessary duplication of IT systems and registries; combats fraud and corruption by increasing the security and traceability of transactions; improves civic engagement and accountability; and provides improved service delivery to citizens that increases user convenience, provides savings, and greatly improves efficiency.
- For businesses, commercial platforms are an efficient mechanism to exchange goods and services and tap

into underutilized assets and new markets. Efficient public digital platforms can reduce their cost of doing business, as well as facilitate trade and innovation.

2.2.2 Diagnostic Findings: Current State of Digital Platforms Pillar

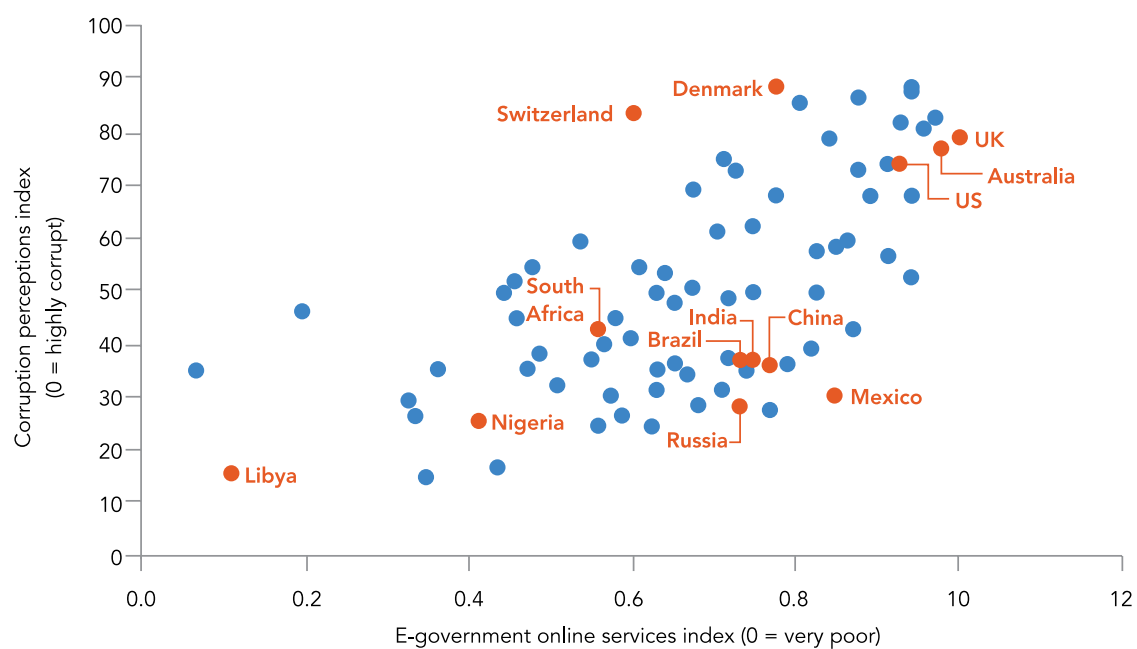
Digital Government Platforms

Implementing GovTech in Nigeria is central to the fight against corruption and for improving the effectiveness of services to citizens. There is a strong co-relation between automation and ease of government online services and the reduction of corruption. The link between government effectiveness and provision of eGovernment services is also well established, as demonstrated in Figure 9 and Figure 10.

At the federal and state levels, a number of new initiatives have been taken to provide digital services. The Government of Nigeria has recently launched the Central Portal for Government Services (www.services.gov.ng), created to reflect ease of doing business initiatives of government ministries, agencies, and departments in line with the federal government executive order. The objectives of the Central Portal for Government Services include creating a single point of entry to government information and services, enhancing accountability to improve the delivery and quality of public services through technology-enabled civic engagement, and transforming public administration efficiency through use of the portal. The Central Portal for Government Services currently offers the following categories of services (Government of Nigeria, 2019): (i) Government to Citizen Services, (ii) Government to Foreigners Services; (iii) Government to Business Services; and (iv) Other e-Government Services. The GovTech agenda in Nigeria can be broadly grouped into five categories:

1. **Government core operations.** These applications are increasing as automation enters government offices. Some of the main back office operations being used are the following:
 - **Financial management systems:** Almost 70% of states in Nigeria have introduced Integrated Financial Management Information Systems. These systems are intended for budget preparation and expenditure management through digital payments. States are using Oracle (Edo and Bayelsa), SAP (Delta and Rivers), MS Dynamics (Kaduna), and a large number of other systems. There is a huge variability at the state levels. This variability is now starting to be introduced at local government levels. These systems have enabled improved cash management and reporting. The federal govern-

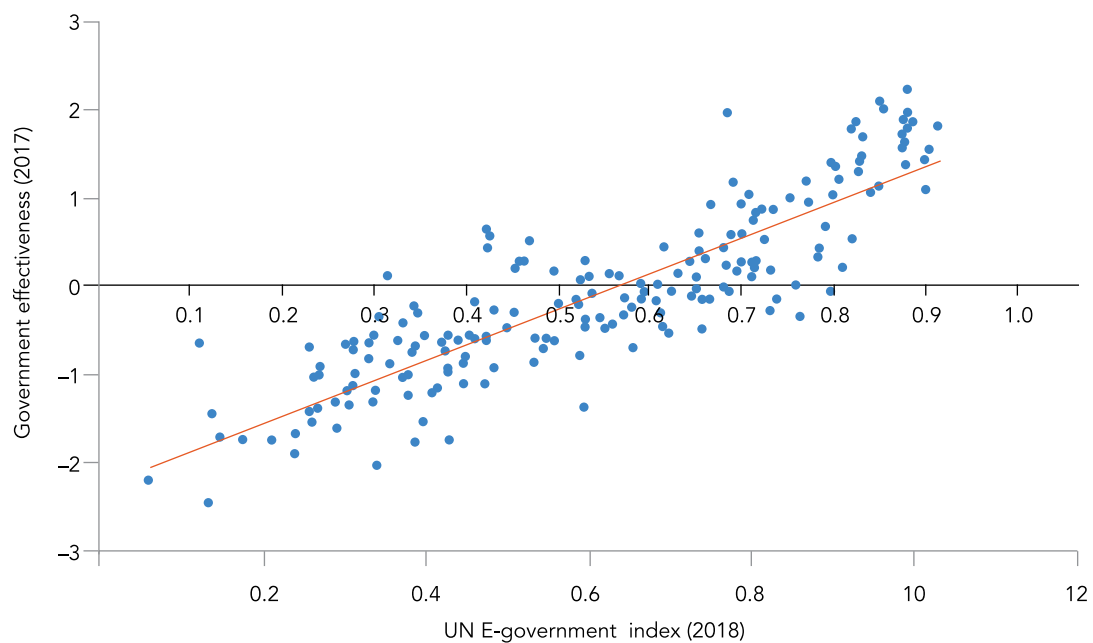
FIGURE 9: E-government services and corruption



Source: GlobalData Fixed Communications Forecast.

Note: 2016 data for e-government; 2015 data for corruption perceptions

FIGURE 10: E-government and government effectiveness



Source: World Governance Indicators (2017), UN E-Government Index (2018), World Bank staff calculations.

ment uses the Government FMIS (GFMIS). The Federal Government and 17 States operate the Treasury Single Account (TSA) system that has helped improve cash management and reduce the quantum of idle cash in bank accounts. GFMIS has been deployed across over 90% of federal government agencies, but commitment controls, cash forecasting, debt, and procurement management modules are not fully utilized. According to a system audit conducted by the OAUFG, weaknesses in IT security make GFMIS vulnerable to tampering.

- **Tax:** The Federal Internal Revenue Service introduced the Integrated Tax Administration System (ITAS) that is intended to automate its processes and allow tax returns to be filed online. While ITAS has been deployed, it is not yet used to support collection and audit functions, and it is also not fully utilizing tax debt management functions according to the 2018 IMF report. Many other states have followed the lead taken by the federal government in automating tax systems. Edo State has just introduced a modern tax management system that uses mobile phone technology in order to expand the tax base. A large number of other states have paid private developers to develop stand-alone systems for them, and the results are mixed. Some of them have required outright payment of fees for system developers, while some states are using a revenue sharing arrangement for a specified period of time.
 - **Payroll:** The federal government was the first to introduce an Integrated Pay and Personnel Management system with an aim to eliminate ghost workers and improve efficiency. This system was initiated in 2007, but until 2018 only covered around one third of federal employees. Human resources (HR) and payroll systems have also been introduced in several states based upon customized developments. Rivers State has introduced this at the state-wide level using a bespoke system, while Edo has introduced the HR system in all 28 local governments using an open-source software (Odoo).
- 2. Government services.** These include government services to individuals and to businesses.
- **Registering a business:** The average time to register a business has been reduced by 25% at the federal level. The Corporate Affairs Commission transitioned its processes from manual systems to online. Many other states have followed suit.
 - **Justice sector:** Reforms in this sector are underway in several states. Bauchi, Enugu, Katsina, and Sokoto have made the biggest improvements. In

Enugu, the justice department has ensured that the time taken to enforce contracts has been cut in half.

- **Land management:** Land is the source of a large number of conflicts and corruption in Nigeria and across the world. There are multiple examples across Nigeria how reforms are underway. For example, Kaduna restructured its land registry and created the Kaduna Geographic Information Service where all land records were GIS mapped. All land titles and property maps have been scanned and all records are digital. It also modernized approval processes, which resulted in the most significant improvement recorded in the *Doing Business* rankings since 2008. Other states such as Nassarawa, Edo, and Lagos have established similar modern land management systems.
- **e-Education:** Several states have introduced eMIS systems across the country. The results are mixed. There are also ongoing initiatives in states upgrading the digital skills of their teachers. Rivers State uses the Innovation Hub in Port Harcourt to provide systematic teacher training for skill upgrading in the digital area for teachers on an ongoing basis.
- **e-Health:** There are numerous initiatives in the health sector regarding use of technology for delivery of services. The nationwide polio eradication campaign using household-level satellite data across the country (including in Borno) is the best example.
- **Digital ID:** Nigeria has had a long history of dealing with the challenge of developing a robust ID system. In 1978, the Department of National Civil Registration (DNCR) was set up within the Federal Ministry of Interior (FMI). DNCR was tasked with issuing national identity cards. The program lasted 18 months and was not successful. In 2001, DNCR contracted a private company to issue national identity cards at a cost of USD 236.8 million. The program ran for five years, issued national identity cards to 37.3 million people, and was shelved. In 2007, the government passed the National Identity Management Commission (NIMC) Act and set up NIMC as the government agency responsible for identification in Nigeria. To date, NIMC has generated approximately 31.5 million National Identification Numbers (NINs).
Nigeria currently has a highly fragmented ID landscape—over thirteen federal government agencies and at least three state agencies offer ID services in Nigeria. Many of these capture biometrics and issue ID cards independently without establishing links with other systems, resulting in

duplication and a waste of resources. In 2015 Nigeria registered 70 million voters at a cost of USD 627 million for a one-off biometric, voter registration exercise. Based on an illustrative analysis done in 2015, the FGN is on track to spend USD 4.3 billion on IDs across all such programs in Nigeria, of which USD 1.2 billion has already been spent and USD 3.1 billion is in the pipeline toward the current fragmented approach.

FGN has indicated a strong desire to harmonize existing identification ecosystems. The government has prepared a Strategic Road Map to develop a foundational identification platform, which can be leveraged to improve service delivery. This has been endorsed by the Harmonization Committee at a second Vice Presidential-Level Workshop held on January 31, 2018. The road map was submitted to the Federal Executive Council for final government endorsement in September 2018. The proposed project will support NIMC and other ecosystem partners to implement the vision of the Strategic Road Map. The proposed ecosystem approach will leverage existing capabilities and enrollment facilities of government agencies, partners, and the private sector in Nigeria to rapidly increase coverage of the NIN.

3. Citizen's engagement. Over the last five years, there has been enormous interest in this area. Several states are investing in this area since digital technology provides the vehicle for obtaining citizen feedback directly, without intermediation.

- The best example of this is the “Eyes and Ears” Program in Kaduna State. This is an app that uses citizen feedback to track the implementation of over 3,000 government programs. A Data Center in the Ministry of Budget and Planning also houses a call center, and modern technology is used for transcribing voice into text and producing a one-page dashboard (besides other reports) that is in the public domain and that reports to the governor on the performance of contractors and projects.
- Other programs such as BudgIT perform a somewhat similar function and obtain citizen feedback on other public sector projects across the country.
- The World Bank is using KoboToolbox to digitize Bank-funded operations across the country and then use this information for soliciting citizen feedback on performance. Implementation has been underway for some time. Refresher training is currently underway in Edo, Delta, Rivers, Bayelsa, and Borno states.

4. Public data platform. Nigeria is a leader on the continent in making available high-quality satellite data.

- The GRID3 project (Geo-Referenced Infrastructure and Demographic Data for Development) started in the North-East of Nigeria as part of the polio campaign funded by the Gates Foundation around four years ago. (<http://grid-nigeria.org>) The entire country has been mapped. High resolution satellite data have been cross verified with field data collection. 500,000 points of interest have been identified, including 45,332 schools, 44,109 public water points, 18,539 health facilities, etc. The federal government has made these data available in the public domain (grid-nigeria.org). A number of state governments have started using the data (primarily through their State Bureaus of Statistics) for planning purposes. The leaders in this area are Lagos and Kaduna. The potential use cases are numerous, including in the health, education, agriculture, transport, electricity, urban planning, and other sectors.
- The World Bank has created a Data Visualization Portal (<http://appsolutelydigital.com/Nigeria/>) that contains a wealth of information on Nigeria.

5. Other key issues. Nigeria is a leader on the continent in making available high-quality satellite data.

- **Trained workforce:** The capacity and capability of the civil service workforce is fundamental to the success of all public policy and reform.⁵ In Nigeria, public service initiatives experience poor implementation due to weak digital literacy and ICT skills.⁶ The Nigerian Civil Service is considerably challenged in ICT adoption and skillsets.⁷ The ICT skill base in the country is generally limited in scope and lacks depth because of the absence of a national standard. There have been initiatives since 2003 to shore up the skillsets in the public service sector. The first was by NITDA between 2003 and 2005 when ICDL and ECDL standards were introduced for the training of permanent secretaries as the accounting officers in government ministries. The program was not sustained. Other programs have since come from several agencies, including the Office of the Head of the Civil Service of the Federation. The main problem has been that there is no scoping, tracking, and central coordination of the efforts. For instance, each agency independently decides what ICT training to put its officers through because there is no national ICT skills requirement analysis and clearly defined digital strategy. There have been discussions at the level of the National Council on Communications Technology (the highest policy

making body for ICT in Nigeria) on adopting IC3 as a national standard.

The introduction of an ICT cadre in the civil service sector and creation of an ICT department in most ministries were initiatives to mainstream ICT into the service and scale up the ICT skill database. With the creation of ICT departments came the formation of the Council of Heads of ICT in MDAs. The council is a platform for members' capacity building. It meets bimonthly. However, not all the council members, about 200 in number, are ICT professionals. Trainings do not follow a graduated approach along predetermined areas of need. Moreover, the departments they head, except in the case of the Ministry of Communications with over 160 staff, are sparsely staffed and mostly undertake maintenance of low-level ICT infrastructure. There is a need for government to consider the creation of a special scheme of service for IT professionals if the Gov-Tech agenda is to have a major impact in the public sector. This could really boost morale and commitment and provide an attractive career opportunity for highly skilled IT professionals to join and stay in the public sector.

The Ministry of Communications identifies change management and digital literacy as requirements for the implementation of the new e-government initiative and embarked on the capacity building of public servants in collaboration with the South Korean Government. While this is a good initiative, such capacity building would benefit tremendously from a national strategy, or if it followed an international standard such as the OECD framework on skills for high performing civil service in member countries.⁸

- **Institutional arrangements:** As described in the chapter on Digital Infrastructure, institutional responsibility for digital government in Nigeria at the federal level is dispersed between the Ministry of Communication Technology and regulatory agencies such as NCC, NBC, and NITDA. There are also a large number of other government agencies such as Galaxy Backbone Limited (GBB) responsible for provision of government infrastructure), Nigeria Satellite Limited, Nigeria Identity Management Commission, and others who have responsibility for digital transformation and e-government implementation. Another important actor is National e-Government Strategies, NeGSt, a Special Purpose Vehicle (SPV) created in March 2004 by the federal government through the National Information Technology Development Agency (NITDA) with the mandate to facilitate, drive, and imple-

ment the Nigerian e-Government Programme under a Public-Private Partnership (PPP) model. The PPP model is a tripartite agreement between the federal government, represented by NITDA, strategic and technology partners, and private investors. This fragmentation leads to issues of overlap of responsibilities and effective coordination that has been and remains a challenge. This overlap of responsibilities is partly responsible for the lack of a clear strategy for the way forward. This issue is now starting to be addressed. The government announced in September 2019 its plans to prepare a National Digital Strategy and an Implementation Plan. This effort is to be led by the Ministry of Communication Technology. NITDA will be working closely with the ministry on this task. This provides an excellent opportunity to chart a way forward in this critical sector.

At the state level practices on institutional arrangements vary. One of the most effective models is the one that is being used in Edo State. A stand-alone EDO ICT Agency has been created that reports directly to the office of the governor. It has responsibility for overseeing the implementation of the digital road map and for establishing standards. It also has responsibility for negotiating broadband rollout contracts, which has been done successfully over the last few years. This type of initiative made ICT a core component of the development plan of the state, including its job creation agenda. Staff are working on public sector salaries but are rewarded through skills enhancement training options.

- **Open data:** The Nigeria Open Data Policy presents a great opportunity to increase access and improve accountability. Although the policy is still in the process of being adopted, the draft already contains elements of Open Data principles, including data completeness, timeliness, data propriety, and licensing. It states that government data should be presented in a complete and original or provenance format, "with the highest form of granularity, not in aggregate or modified forms."⁹ It also states that government open data must be nonproprietary and should not require registration, which means that it should not be within the exclusive control of any entity. The draft policy, as a framework, indicates further that for data to be open it should be license free. In other words, it should not be "subject to any copyright, patent, trademark, or trade secret regulation."¹⁰

The policy, when adopted, will not be applicable to corporations at the state government levels,

but would be subject to their adoption because of the structure of the federal system of government. However, the oil and gas sector, being a critical sector and part of the global Extractive Industry Transparency Initiative (EITI), has developed an Open Data policy for the extractive industry. The NEITI Open Data Policy 2016 is therefore part of the EITI initiative.¹¹ A key feature of the policy is that it encourages Nigeria, as an EITI implementing country, to publish EITI data “under an open license, and to make users aware that information can be reused without prior consent.”¹² The pace had been slow but seemed to accelerate in 2019 in a heightened understanding of its economic and data sharing value. The policy is being socialized now as part of the Open Government Partnership initiative, which is under the Ministry of Justice. But the open data component is being implemented by MCT.

The Freedom of Information Act (FOIA) has only been adopted in two states despite a subsisting 2018 Court of Appeal Judgement on its applicability. Also, only Anambra, Kaduna, and Kano have signed up to the Open Government Initiative, which the Open Data policy is a component of.¹³ States need to do a lot more to implement the FOIA and open data.

- **Big data:** There is still a lot of opportunity for growth in data analytics in Nigeria. This is even more so given the existence of a National Strategy for Development of Statistics.¹⁴ Data analytics is not yet mainstreamed into policy and decision making in the public sector of Nigeria. In fact, a seminal attempt by government in that regard was the inauguration, on May 8, 2019, of a National Technical Working Group on Mobile Big Data, whose main terms of reference are to: (i) identify and recommend areas for the application of mobile big data analytics in the public sector; (ii) identify policy and regulation requirements and recommend appropriate solutions for the exploration of mobile big data analytics for national economic diversification; (iii) provide a plan to develop the commercial, infrastructure, and human capital required to position Nigeria as the data science capital of Africa by 2023, (iv) recommend funding options for developing a National Mobile Big Data Analytics Platform; and (v) identify a process for opening new data science-related job opportunities for Nigerian youths.¹⁵ The terms of reference for the Working Group indicate a positive vision for data analytics in government. The challenge will be in its implementation. Given the multiplicity of institutions

with overlapping responsibilities and the multitude of policies and regulations, there is need for a clear vision on how to move the sector forward. The development of the National Digital Strategy provides a good opportunity for articulating the policy framework for use of big data.

- **Interoperability:** Interoperability is a relatively new concept in the public sector in Nigeria, given the independence each agency has regarding ICT procurement and development of its own path for automation. The government’s attempt at creating a shared services platform under the 1gov.net initiative has not been very successful. This is due to the lack of a regulatory requirement and individual and institutional incentive structures. Since no standards have been prescribed regarding ICT procurement, there is no uniformity of systems. GBB, which has responsibility for introducing transversal applications and provision of government infrastructure, does not have regulatory muscle for enforcement and has also been criticized for delivering poor services. Since GBB has to charge for its services at commercial rates, many MDAs are not able to sustain connection to its services beyond basic features. Its data center, which ought to serve as a government cloud, is under-patronized in spite of the data localization policy. Such features like EDMS have also hardly been deployed. It has therefore been impossible to achieve electronic archival of data and data interchange among MDAs.
- **Privacy and data protection:** Nigeria does not have a Privacy and Data Protection Act. This has limited the growth of e-commerce and a data economy. However, a stopgap measure is a Data Protection Regulatory Guidelines by NITDA, which came into effect in 2019. But a Data Protection Bill, modeled after the GDPR and Convention 108 principles has been passed by parliament and is awaiting presidential assent to become law. The bill includes data protection obligations applicable to public and private sector entities that collect and process personal data, individual privacy rights, and a mandatory breach notification framework.
- **Cybersecurity:** The security and integrity of digital data and systems are a significant challenge in Nigeria, where gaps in cybersecurity capacity create significant risks across sectors. Cybercrime threats, such as malware, impersonation, malicious codes, misuse of data, and hacking via easily available tools, are some of the major issues that require protection. The Government of Nigeria estimated the annual cost of cybercrime to be

0.08% of the country's GDP in 2015, costing about NGN 75 billion that year. Organizations have progressively migrated to cloud-based environments for higher level security, and an increasing amount of information has been transferred to cloud platforms. In 2014, the federal government of Nigeria developed the National Cybersecurity Strategy and Policy to lay out the roles of Nigeria's current and future institutions and governance for cybersecurity assurance of national critical information infrastructure assets. They describe a process of phased institution building that is comprehensive yet fragmented, with overlapping roles and responsibilities. For instance, the de jure mandate for the government's root CA is with the National IT Agency, NITDA; however, the de facto role is being played by the National Identification Management Commission, NIMC. Several new agencies, initiatives, departments, units, and working groups are proposed, without clear definition about delineation of mandates; there appear to be overlaps on capacity building (mandated to several MDAs), liaising with the private sector or creating a National Internet Safety Initiative (NISI).

Nigeria has a Cybercrimes and Cybersecurity Act (2015). The Act provides a framework for the prevention, detection and punishment of cybercrimes and the protection of critical national information infrastructure. A legislative review conducted in 2018 with the support of the World Bank found that the combined legislation for cybercrimes and Cybersecurity does not provide for sufficient treatment of cybersecurity and recommended that Nigeria consider maintaining separate laws for each of these areas. It provided additional specific recommendations: for one, that an amended cybersecurity legislation clearly state the penalties for breaches of obligations by Critical National Information Infrastructure (CNII) holders, rather than empowering the respective sectorial regulators—not all of which are yet in place—to define the penalties for cybersecurity breaches in their sector and potentially cause misalignment of penalties across sectors. Second, an amended law should also define the timeline for the reporting of cybersecurity incidents; third, it should contain provisions for requiring cybersecurity service providers and products to be licensed. Fourth, it was recommended that a revised law establish clear powers of ngCERT to prevent and investigate cybersecurity breaches. Lastly, an amended cybersecurity legal framework should set standards for IT security of government information systems and databases. Key agencies are ONSA and Justice.

The government does not have a system for monitoring the use and quality of digital services. A 2018 survey showed that only 2% of citizens use e-government services. Some of the reasons for this include the following: (i) mobile technology (which is a predominant channel for access in Nigeria) is still short on data services, especially in the rural areas, and so many citizens are caught up in the digital divide, as described in the Digital Infrastructure pillar; (ii) awareness of the platforms and range of services is still very low. A large percentage of the population below the poverty line are seemingly oblivious to the potential of the digital economy and participate in it minimally, if at all; (iii) most Nigerians do not have confidence in online services, especially in cases of financial transactions because of cyber-security and weak data and privacy protection policies, as described in the Digital Financial Services pillar; (iv) bandwidth and last mile services to homes have remained a problem for regular and sustained access, as further depicted in the Digital Infrastructure pillar; and (v) quality of service, which has been a vexed issue, discourages serious online presence and access.

PRIVATE SECTOR PLATFORMS

The power of digital technologies is not just in the rolling out of broadband capacity or in the distribution of millions of handsets, but also in the rise of digital platforms. The two key ones are the Android system run by Google and the iOS system operated by Apple. Through their app stores they distribute thousands of new applications which provide services to consumers and also collect data in ways that were unimaginable until recent times. Digital platforms offer services that consumers value, and they drive economic growth.

As per a recent assessment, there are currently around 277 private sector platforms operating in Sub-Saharan Africa (Figure 11).¹⁶ The second largest number in Nigeria (87), which also accounted for the largest share (60%) of the 4.8 million platform workers. Of the 87 platforms in Nigeria, 66 were homegrown (76%), and the remaining were from the U.S. (10%), Europe (6%), the rest of Africa (3%) and other (5%). Figure 11 shows Nigeria's 87 digital platforms recognized as part of the emerging digital platforms in Africa.

Figure 12 gives some statistics regarding the sectors within which these platforms are active in Nigeria as per the latest assessment of 2019.¹⁷

Lagos is the heart of the development of digital developments in Nigeria—especially the development of new digital platforms. Lagos is the only city in Africa that figures in the 2019 Global Start-up Ecosystem

FIGURE 11

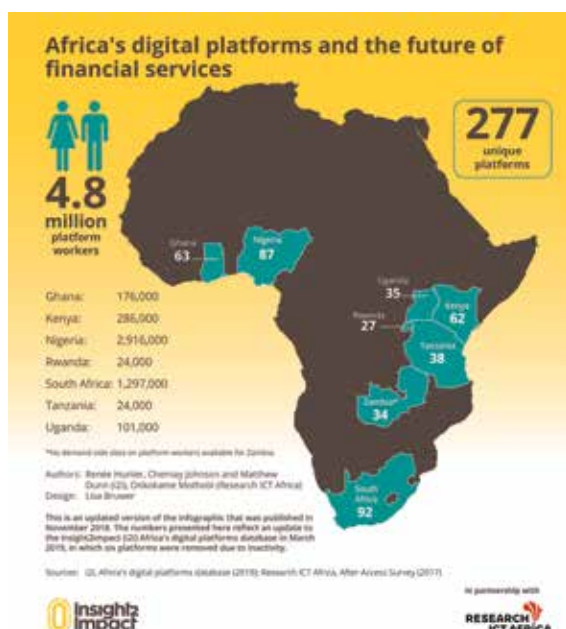
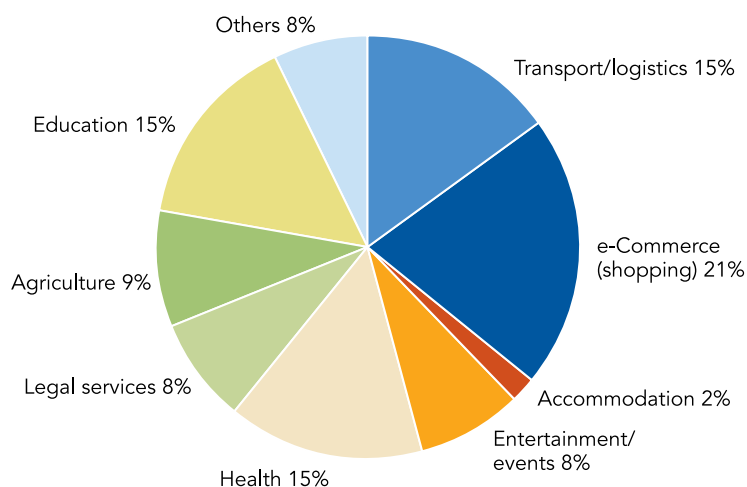


FIGURE 12: Percentage distribution by sector



Source: Insight 2 Africa (2018).

Report as a start-up ecosystem that could challenge the 30 leading global ecosystems led by Silicon Valley.¹⁸ This is extremely creditable considering the fact that Lagos is the youngest of the three thriving digital hubs in Africa. The others are Nairobi and Johannesburg/Cape Town.

Some of the reasons that propel digital growth in Lagos are the following: It has a population of 21 million compressed in the smallest state in Nigeria, the bulk of the working population is below the age of 30, it is the entry point from where Nigeria connects to seven submarine Internet cables that have huge available capacity, it is the commercial capital not just for Nigeria but also for large parts of West Africa, and it accounts for over 25% of the country's GDP. The Lagos ICT Services Cluster has been valued at over \$2 billion with around 400 to 700 active start-ups.¹⁹ Andela, a technology start-up based in Lagos, attracted \$24 million in funding from the Chan Zuckerberg Initiative. Other start-ups have also raised significant amounts of overseas and local capital.

The Lagos Ecosystem has scale due to availability of skilled manpower through the various technology institutes in the country, availability of bandwidth, infrastructure and venture capital as well as sectors and markets that can sustain innovation. Lagos needs to be nurtured and developed as an ICT hub if it is to fulfill its potential as a leading global ecosystem player. There is a need to improve training in the digital skills (as covered in the chapter on digital skills) availability of start-up capital, and a need for an enabling policy environment to facilitate this growth. The basics are in place, but the pace that the business grows at and the

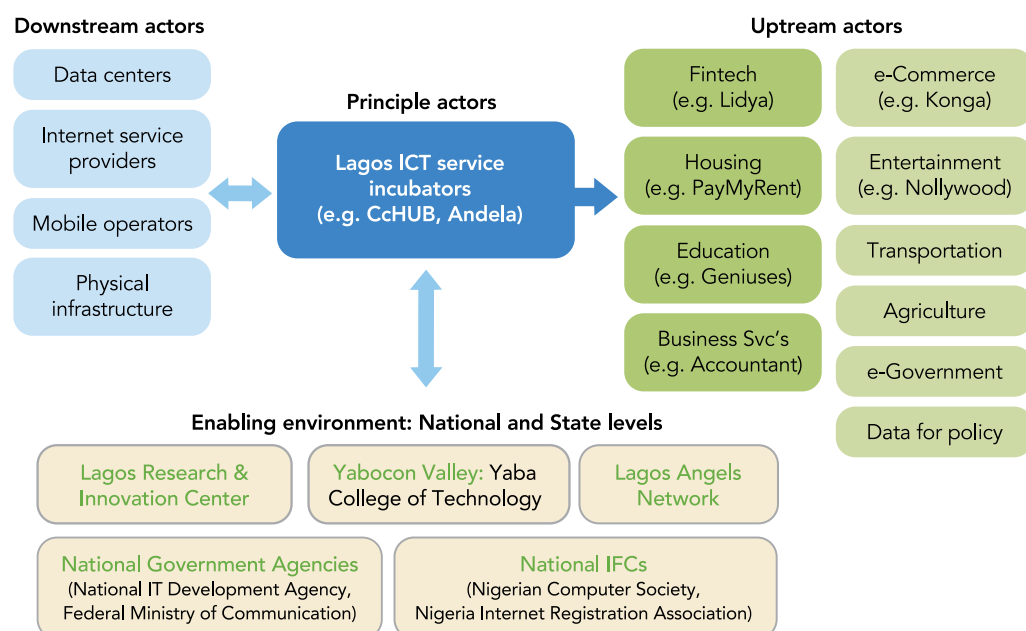
jobs it provides will be determined by proactive action on these two fronts.

Apart from Lagos, there is a thriving digital community in multiple locations across Nigeria. This includes locations such as Abuja, Port Harcourt, Kaduna, Kano, and others. A detailed assessment of opportunities and challenges for developing ICT-led Innovation Hubs was conducted in 2017. This covered the following states: Federal Capital Territory (FCT), Kaduna, Plateau, Adamawa, Cross Rivers, Anambra, Edo, and Lagos.²⁰

Private sector platforms can be classified into either fintech, e-payment channels, social media, or e-commerce, all of which are accessed through digital channels such as smartphones and laptops. Others are platforms for education, agriculture, health, and legal.

- **Fintech:** Out of the 99 million financially eligible adult population in Nigeria, about 36.8% are excluded from the financial system.²¹ The digitization of financial services spearheaded by financial technology companies (fintechs) has the potential to serve a large part of this population. Fintechs have been at the forefront of applying digital tools to provide new and innovative services to customers. Although they appear to be in competition with traditional financial institutions, they provide more of a complementary solution that helps address some of the gaps in financial services in the country. The fintech ecosystem has been growing steadily and has contributed immensely to the development of the Nigerian digital economy. An important contribution has been in the attraction of investments.

FIGURE 13: Lagos ICT Ecosystem



Source: Bola Adetunji et al. "Microeconomics of Competitiveness Final Paper—Lagos ICT Services Cluster," Harvard Business School (2017)

Investment funding for Nigerian start-ups, including fintechs, was more than \$100 million in 2016,²² and increased to \$117 million in 2018.²³ Recent deals have included \$9 million for Flutterwave, \$8 million for Paystack, and \$13 million for Mines.

- **e-Payment platforms:** Nigeria's steady transition into the new realities of the digital economy is also reflected in the increasing adoption of e-payment channels. There has been a sustained growth in transactions carried out across e-payment channels as more people are included in the financial systems and have access to mobile phones and the Internet. Also, the government's willingness to implement digital and cashless policies and guidelines, such as the 2012 cashless policy and the National Payment Systems Vision 2020 (PSV 2020), has been a catalyst for the growth in e-payment transactions. Data shows that overall, e-payment channels (ATM, POS, Mobile, Web, NIP, and E-Bills) have continued recording a positive trend in the value and volume of transactions. In 2018, these channels recorded transactions worth NGN 92 trillion from 1.9 trillion transactions, a 40% increase from the previous year.
- **e-Commerce:** UNCTAD's B2C report for 2018 noted that Nigeria is Africa's biggest B2C market, both in terms of revenue and shoppers.²⁴ In 2018 the e-commerce spending in Nigeria was estimated at \$12 billion and was projected to increase to \$75 billion in revenues by 2025 by McKinsey.²⁵ Not in market size, but in

overall rankings, Nigeria was ranked second in Africa below Mauritius by UNCTAD in 2018 (Table 1).

e-Commerce companies are doing well in this market.

The major e-Commerce retailers have over 1 million customers and receive an average of 300,000 unique visits per day. The market for online payments in Nigeria was valued at NGN 167 billion in 2016. Nigeria's e-commerce sector has attracted foreign investments, with leading players having received multi-million-dollar investments in recent years. This subsector shows tremendous potential for growth and for contributing jobs and tax revenues that would remain in Nigeria. A Nigerian start-up, Jumia, is now part of the NY Stock Exchange and has expanded to 22 countries in Africa. Konga and Yakata are other start-ups that are operating successfully through adopting the standard e-commerce model to be adapted to suit the Nigerian situation. As described in the Digital Financial Services pillar, most shoppers (67%) opt for cash on delivery, and only 23% use credit cards, with another 10% using mobile payments. This is reflective of the low level of trust the population has in making digital payments and the preference for cash transactions.

Nigeria's high ranking is due to the size of its population (191 million), of which 40% have access to accounts, 42% use the Internet, there are 52 secure servers per 1 million people, and its postal reliability score is one of the highest in Africa.²⁶ Another reason could be the current tax regime in the country. A 2017 Federal Execu-

TABLE 1: UNCTAD e-commerce ranking

	Economy	Share of individuals using the internet (2017 or latest)	Share of individuals with an account (15+, 2017 or latest)	Secure internet servers (normalized) (2017)	UPU postal reliability score (2017 or latest)	Index value (2017 data)	Index value change (2016–2017 data)	World Rank
1	Mauritius	55	90	56	66	66.9	–7.2	55
2	Nigeria	42	40	52	85	54.7	5.5	75
3	SouthAfrica	59	69	83	0	52.9	–1.9	77
4	Tunisia	56	37	51	63	51.7	2.1	79
5	Morocco	62	29	54	59	50.9	NA	81
6	Ghana	39	58	45	53	48.8	7.6	85
7	Kenya	39	82	37	27	46.2	3.7	89
8	Uganda	17	59	31	58	41.5	–3.2	99
9	Botswana	47	51	41	26	41.4	0.1	100
10	Cameroon	23	35	25	78	40.3	3.6	101

Source: UNCTAD's B2C Report 2018.

tive Council approval of new sectors in the pioneer status list included technology and e-commerce companies.²⁷ The approval, which listed new sectors for pioneer status incentive, included technology companies in software and e-commerce, which are areas in which platforms fall. The pioneer status is essentially a tax holiday for a maximum of five years. The approval has been widely celebrated in Nigeria as incentive for the growth of the digital economy in general and for e-commerce platforms in particular. This pioneer status represents the import duty waivers granted to companies as incentives, which enables them to make profits within their formative years. The incentives extend to tax credits, capital allowances, investment allowances, and tax exemptions.²⁸ The Nigerian Investment Promotions Council has followed with a publication of the procedures for applying for the pioneer status.

However, a major issue is emerging regarding the application of the Nigerian tax regime on digital platforms. Digital platforms were not originally contemplated by Nigerian tax laws. Although most of the private sector platforms, including e-commerce platforms are taxable, the Nigerian tax regime, which is driven by payer presence and residence, does not provide any guidance or clarity on how they should be taxed. This is largely because most of these platforms have little physical presence to aid tax enforcement. These platforms, such as fintechs, like Paystack and Flutterwave, also operate across continents and in several jurisdictions, making income tax assessment extremely difficult. For instance, Flutterwave enables the processing of any form of payment anywhere in Africa. It has processed over \$2.3 billion in payments across 60 million transactions.²⁹ It accepts 350 currencies

across 30 African countries, charging merchants a small service commission, which it shares with its over 45 banking partners in Africa. It will be almost impossible for the Federal Inland Revenue Services (FIRS) to trace and track the percentage of its income due to its operations in Nigeria. Additionally, the country has yet to take a position on the European Commission's interim proposal on tax on digital services.

Taxation of digital platforms therefore is still very much a grey area in Nigeria. The income tax law assumes a physical presence of the taxpayer but this is extremely de-emphasized in digital platforms whose businesses are more tech-driven than location-driven.³⁰ Digital platforms, like e-commerce companies, are indeed emerging markets which, not being adequately captured in the tax laws, provide an explorable opportunity for the government. There is, however, a current debate in Nigeria about whether these platforms should be taxed. Obviously, this emerging market of digital platforms has "succeeded in compounding the existing or traditional tax structure in terms of source of income and residence principle."³¹

However, a 2018 Tax Regulation requires Multinational Enterprises (MNEs) with a total group consolidated revenue of not less than NGN 160 billion, who have either their ultimate parent entity or a constituent entity resident in Nigeria for tax purposes, will now be required to file a country by country report to the Federal Inland Revenue Service.³² The meaning of this is that Nigeria may soon start implementing the taxation of digital transactions³³ and platforms which have hitherto escaped the tax net because of their inherent multi-country presence.

However, this will continue to be an arduous task. Linked to this is the issue of possible taxation of OTT services. OTT applications such as WhatsApp and Messenger have adversely impacted the revenues of mobile providers, and the tax regime governing OTT still needs to be clarified.

NIGERIA'S DATA LOCALIZATION REQUIREMENTS

The Government of Nigeria requires businesses to store all data concerning Nigerian citizens in Nigeria.

Nigeria also requires businesses to host all government data locally unless officially exempted. These requirements discriminate against foreign businesses that distribute their data storage and processing globally, as well as local businesses looking to benefit from hosting opportunities outside Nigeria (Office of the United States, 2018).

2.2.3 Digital Platforms Recommendations and Next Steps

The findings from the assessment of the current state of digital platforms in Nigeria aimed to identify the factors in the macro and microenvironment that influence the behavior of companies and individuals. Each factor in the macro and microenvironment and its impact help in the identification of the factors in the generic external environment, i.e., Opportunities and Threats; and the factors in the generic internal environment, i.e., the Strengths and Weaknesses, both which are needed to construct the final SWOT Matrix.

As observed in the SWOT Matrix, despite the challenges and bottlenecks related to Digital Platforms in Nigeria, there are clear strengths and opportunities that indicate the country can achieve much greater digital inclusion in the future. This section details recommendations and next steps based on the SWOT Matrix, which would support Nigeria toward developing Digital Platforms in the country.

SWOT Matrix

Strengths	Weaknesses
<ul style="list-style-type: none"> – Core government (back-end) systems – Digital services – e-Commerce size in terms of customers and value – Commitment of government to support the ICT agenda 	<ul style="list-style-type: none"> – Digital ID – Government lacks system to monitor quality of service – Data localization requirements – Lack of infrastructure – Quality and cost of mobile service
Opportunities	Threats
<ul style="list-style-type: none"> – National Digital Strategy (under development) – e-Government represents huge growth opportunity for start-ups – Open Data Policy and Action Plan: increased attention to transparency – Central portal for government services 	<ul style="list-style-type: none"> – Institutional structure – Privacy and Data Protection Act – Interoperability – Tax system for start-ups – Constraints affecting ICT hubs in Lagos, Abuja, etc. – OTT impact on revenues of telecom companies

DIGITAL GOVERNMENT PLATFORMS

R1. Improve the legal framework and streamline overlapping responsibilities between the different entities responsible for development and regulation of the ICT sector in Nigeria.

The section on government digital platforms outlined the major gaps that exist in the legal framework regarding digital services. There is a need to improve the legal framework and also to streamline the overlapping institutional arrangements. It is good that the Ministry of Communication has been charged with the responsibility for preparing the National Digital Strategy and Implementation Plan. That should provide the impetus for clarifying institutional arrangements at the federal level. At the state level, there is a need to look at the Edo State ICT Agency model, where a single entity is responsible and accountable for ICT policy, infrastructure, and public sector applications.

R2. Fundamentally reform the incentive structures in place that support the proliferation of multiple government applications that provide limited value for money.

The current institutional arrangements support the development of fragmented solutions in all 36 states and the federal government. There is a need for putting in place a totally different incentive structure that will identify appropriate ICT solutions for the Nigerian context and provide adequate financial incentives to adopt and reward their successful deployment. The SFTAS model is a good one to consider, given the financial incentives put on the table to encourage reforms in the areas of public financial management.

R3. Upgrade the skills of public sector employees to deliver on the GovTech agenda.

Apart from training, there is a need to consider creating a special scheme of service for attracting and retaining highly skilled IT professionals.

R4. Provide special support to Lagos and other ICT hubs across the country that enables them to deliver solutions and create jobs.

Lagos has the potential for development of a major global ICT hub. There is a need to constitute a fully empowered group to address the bottlenecks that are constraining the growth of the “Yabacon Valley,” such as the data localization requirements, etc. A number of other locations are also emerging. Nurturing their growth and providing them with the right incentives to grow is necessary. These incentives could involve the requirement (as in Kenya) that 50 percent of government software procurement is sourced from local software developers.

R5. Clarify the tax regime regarding its applicability to digital platforms.

The tax regime governing ICT is very much a grey area in Nigeria. There are several incentives in place for supporting ICT companies. However, there is a need for clarity, especially regarding start-ups and more mature digital platforms.

2.3 DIGITAL FINANCIAL SERVICES PILLAR

2.3.1 Importance of Digital Financial Services Pillar

The Nigerian economy stands to benefit from the growth in the supply and usage of digital financial services. DFS providers are better positioned to address the needs of the poor. They also create the ‘rails’ enabling digital entrepreneurs from other sectors to market their products at scale. Because of the regional and pan-African footprints of Nigerian financial institutions, the country has an opportunity to export its digital finance ventures beyond its borders, diversifying the economy and fostering the regional integration within the ECOWAS. Better DFS can also mean stronger links with the Nigerian diaspora, boosting the inward remittance streams, encouraging investments, and facilitating the exchange of human capital. At the same time, there are also potential threats. Nigerian law enforcement agencies have waged long-standing battles with online and financial fraud, and the country faces an ongoing struggle with terrorism and armed conflict in its northern states. In the absence of adequate regulation and oversight, both issues can be exacerbated by the advent of DFS and the ease of obtaining instant credit and making real-time domestic and international money transfers. Brand new dangers include data leakages and cyber-crime, as well as emergence of new monopolies and systems of political patronage.

To date, the Nigerian financial sector has not successfully addressed the needs of the country’s poor. The World Bank estimates that in 2018 about 50% of Nigerians lived in extreme poverty—on less than \$1.90 a day—with only 25% of the poorest 40% of adults having an account with a bank or a mobile money provider. At the same time, the need for access to financial services can be even more pressing when living on the poverty line. The opportunity to receive a small remittance in real time or obtain an affordable loan can make the difference between buying enough food or staying hungry, or between keeping kids at school or having them drop out.

Traditional (non-digital) financial products are not well positioned to cater to the marginalized segments of the population. Those most affected by financial exclusion (unbanked Nigerians) tend to live predominantly in rural areas, to be female, and to be younger. The median monthly income of the financially excluded is NGN 15,000 (USD 41.61).³⁴ It is extremely difficult to build a sustainable business model for such a population using conventional banking channels with their high fixed costs. Various studies worldwide suggest that the financial sector is an industry with relatively high consumer acquisition costs (from USD 30–50 in India to even USD 1,500 for some high-income economies).³⁵ Bank branches and ATMs are expensive to set up, especially in rural areas where most unbanked Nigerians live.

DFS create the opportunity to upend that cost structure through leveraging economies of scale and dramatically reducing the marginal costs of providing services. In this way, serving the poor becomes profitable, and financial institutions have incentives to cater to their needs. Replacement of paper banknotes with digital float eliminates much of transport and security costs. Leveraging existing businesses or community institutions as agents reduces setup costs. Relying on digital identification and remote Customer Due Diligence (CDD) means that those processes take up only a fraction of the provider’s staff time. In that way, customers earning USD 40 a month can be served in a way that is affordable to them and profitable to the financial institution.

Without a sustainable DFS ecosystem, other digital businesses in Nigeria will not be able to grow. Benefits of digital channels are not fully captured if financial transactions on online platforms happen offline. For instance, the prevalence of “cash on delivery” payments in African e-commerce has negatively affected bottom lines of online marketplaces.³⁶ Conversely, nonfinancial businesses can boost their sales by bundling credit, lease, or insurance products in a model made popular by the automobile industry. Digital entrepreneurs that can

seamlessly integrate their checkout processes with the purchase of financial services can benefit from the synergies—but only if the DFS sector is mature enough to deliver on such partnerships.

The expansion of alternative delivery channels is imperative for large Nigerian banks if they are to remain internationally competitive. Out of the largest commercial banking conglomerates headquartered in Nigeria, at least four (Zenith Bank, Access Bank, UBA, and GTBank) have large retail banking operations elsewhere in Africa. In many of their foreign markets—from Ghana to Kenya to Zambia—they face increasing competition from local and international DFS providers. Retaining their market shares and their role in pan-African commerce will be increasingly difficult if they do not strengthen their digital portfolios.

Nigerian diaspora abroad can play a part in stimulating the economy—and DFS at home can make it easier. At least 1.2 million Nigerian-born people live abroad, not including migrants' children and grandchildren born in the destination country.³⁷ In 2018, they remitted home USD 24.3 billion, amounting to over 6% of the GDP.³⁸ Nigerians are one of the best-educated diasporas in the United States; they make up about three-fourths of African-origin founders and venture capitalists there.³⁹ But the scarcity of digital money transfer and investment products, as well as limited usage of those already on the market, mean that the full potential of this contribution is not realized. For example, sending money from the UK to Nigeria with the median non-digital remittance service provider costs twice as much as sending it with the median provider where the process is end-to-end digital.⁴⁰

Leveraging DFS may be needed to improve quality of public services and to dramatically reduce the costs of public administration, as well as potential corruption. Paying state and local employees directly into their accounts and with minimal manual intervention may eliminate middlemen and weaken patronage networks. Integrating digital payments with the government procurement and invoicing systems will make audits easier. This is badly needed in Nigeria: the country scores 144th out of 180 economies in the 2018 Corruption Perception Index of Transparency International; the organization's survey found that 43% of Nigerians reported paying a bribe to access public services at least once in the preceding twelve months⁴¹

However, the importance of DFS for Nigeria also lies in potential dangers associated with their use and abuse. The Financial Action Task Force (FATF) has noted several studies of attempted use of formal financial services to finance terrorist activity in the Lake Chad basin.⁴² New

Ponzi schemes are regularly uncovered in Nigeria: “Mavrodi Mundial Moneybox” (MMB) in 2017 defrauded over 3 million Nigerians out of 18 billion naira.⁴³ MMB and subsequent fraud attempts, such as “Loom” or “Growing Circle,” highly depend on new technologies. For example, social media such as Whatsapp group chats reached potential victims and instant payment channels collected funds from them and moved the money beyond the reach of law enforcement.⁴⁴ Growth in DFS not accompanied by higher awareness among consumers and higher capacity of financial intelligence units may therefore ultimately lead to more losses and diminished trust in the financial system.

Digital finance may play a role in achieving the goals of Nigeria's strategic plans. The Economic and Recovery Growth Plan for 2017–2020 envisioned, as one of its “broad objectives,” promoting “digital-led growth.”⁴⁵ To that end, it included a commitment to expand access to finance and strengthen financial inclusion. Sector-specific plans and strategies have been developed under the auspices of the Central Bank of Nigeria (CBN), including the National Financial Inclusion Strategy⁴⁶ and the Payment Systems Vision 2020⁴⁷—soon to be followed by a “Vision 2030.”⁴⁸

2.3.2 Diagnostic Findings: Current State of Digital Financial Services Pillar

Availability of Digital Financial Services

A. MARKET PARTICIPANTS

Traditional financial institutions in Nigeria—commercial, microfinance banks, and nonbank finance companies—have been slow to embrace digital financial products. On the one hand, in 2019 each of the 10 largest commercial banks in Nigeria offers online banking and a smartphone app, with some of the smaller institutions following their footsteps. The medium-sized Wema Bank also recently launched ALAT, a digital-only bank-within-a-bank. On the other hand, online and mobile apps developed by banks are, in most cases, very basic in their functionality. They allow users to check their balances, download transaction history, pay bills, and make on-us credit transfers; sometimes they also include domestic interbank credit transfer functionality. In summary, these are basic features considered standard for digital banking throughout the 2000s. However, none of the apps offer budgeting tools, transaction analytics, or integration with social media profiles or messaging apps. Similarly, they do not build on possibilities offered by card tokenization. Online banking in Ecobank, the sixth largest bank in the country, is limited to bill payment services. Islamic banking (or noninterest banking, as it is known in Nigeria) has not developed widely used digital channels.

Commercial banks in Nigeria are mostly of domestic origin; just three out of twenty (Stanbic, Citibank, and Standard Chartered) are subsidiaries of foreign banking groups. At the same time, several Nigerian-headquartered banks, such as UBA, are active on other African markets through foreign branches or subsidiary companies. The banking sector is highly profitable (return on equity, according to the Economist Intelligence Unit, averaged 23.5% in Q4 2017). All banks issue cards, and most offer acquiring services. However, the payments acceptance market, including merchant and bill payment services, is gradually becoming dominated by third-party aggregators and other nonbanks, ranging from switch operators such as Interswitch to fintechs such as Flutterwave.

In contrast with other countries of the region Mobile Network Operators (MNOs) were absent from the mobile money market, as the regulations of the Central Bank of Nigeria (CBN) prohibit telecommunication companies from applying for such a license. Instead, mobile money services can be provided by banks or banked consortia, as well as non-banks that are not MNOs or their subsidiaries. While the central bank issued over thirty licenses, a single provider, Paga, in 2017 accounted for over half of all mobile money transactions by volume and by value. However, MNOs are likely to enter and disrupt the financial services market following the enactment of the Payment Service Banks (PSB) Guidelines, which will permit the launch of PSBs by MNO subsidiaries.

While being the largest economy in Africa by itself makes Nigeria well positioned to create a vibrant fintech sector, most companies branding themselves as fintech offer only e-commerce payments, digital sav-

ing, and lending. Few create new value by innovative uses of data and integrating financial services with other digital products (social media, ridesharing, “sharing economy”), although the space is fast evolving and more complex use cases are being gradually introduced. In addition to that, hardly any start-ups have expanded beyond the Lagos metropolitan area.

Payment services and lending have so far been the most successful fintech use cases, measured both by the number of ventures and by their uptake among consumers. At the same time, the relative lack of granular demand-side data makes a deepened market analysis more challenging. In his “Guide to the Payments and Fintech Landscape in Nigeria,” Segun Adeyemi identifies 14 categories of ventures operating in the fintech and DFS ecosystems, comprising of over 40 payments businesses and 25 lenders, and trailed by 12 savings and investment platforms. Figure 14 shows key fintech categories and lists some of the major players in these markets. On the other hand, full-service digital banking, digital stockbroking platforms, crypto-asset platforms, and digital remittance services are markets with no more than three entrants. There are no purely digital insurers; at most, Nigerians can use online comparators to shop for offers of different brick-and-mortar insurance providers.⁴⁹

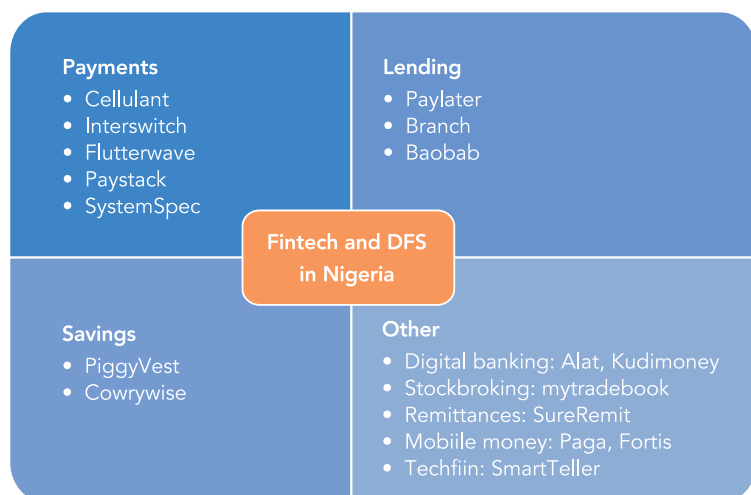
B. ACCOUNT OWNERSHIP

Financial inclusion in the country has effectively stalled, with repercussions for the development of digital financial services. According to EFINA, in 2018 only 39.7% of adults had a bank account, compared to 38.3% in 2016; the growth did not exceed the margin of error.⁵⁰ Only 15.5% reported making at least one digital payment in the past year. Additionally, the gender gap is very high: account ownership among men (51%) is almost twice as high as among women (27%).

Account penetration rates among formal businesses are relatively high—but most small businesses have not been formalized. According to the 2014 World Bank Enterprise Surveys, 70.4% of surveyed firms had a checking or savings account with a bank. However, 98.5% of surveyed enterprises (all of them employing at least five people) were formally registered and licensed. On the other hand, according to a 2016 household survey, only 1.8% of nonfarm enterprises operating in the whole of Nigeria were registered. Most informal enterprises cannot open bank or mobile money accounts, and thus most Nigerian businesses remain without access to formal financial services.

Whereas in other African markets inclusion of the unbanked would mostly be driven by mobile money

FIGURE 14: Composition of the DFS industry in Nigeria: main markets and examples of companies operating on them.



Source: Adeyemi (2018).

providers or other nonbanks, this has not been the case for Nigeria, where—according to the same research—only 1.7% of respondents had a registered mobile wallet. Out of the 10 largest economies of Sub-Saharan Africa, only Ethiopia—where e-money issuance or mobile money was effectively not permitted⁵¹—scores worse on mobile money account ownership (see Table 2). While elsewhere in Africa mobile money drove gains in financial inclusion, Nigerian mobile money providers have so far reached only customers that are already banked (EFInA reports that 90% of mobile money customers already had an account with a commercial bank).

Fewer people own accounts in Nigeria than in other African economies with similar or lower income levels. This trend becomes even more salient after excluding higher income outliers, such as Botswana or South Africa. On the other hand, it remains close to the pan-African trendline with respect to the relationship between financial access and the access to mobile telephony or the Internet. Nonetheless, there are a number of outliers, such as Tanzania or Uganda, where account ownership is high, even though mobile subscriptions or Internet access remained at average or low levels (see Figures 15–17).

There are significant regional differences in account ownership between northern and southern states of Nigeria. If only the 17 states belonging to southern geopolitical zones (South-West, South-South, and South-East) were considered, financial inclusion indicators would reach or surpass the levels recorded by many leading economies of Eastern and Southern Africa—with account ownership exceeding 60%. On the other hand, the rates of formal financial inclusion in the North-West and North-East hover around 30%.

Reaching excluded populations in the northern states could be more challenging without reliance on DFS, which is still at a nascent stage, both related to needed infrastructure and services. As discussed before, financial services are provided predominantly by commercial banks, which lack substantial field presence outside the urban centers of Kano and Kaduna. Literacy levels in the North are lower by about 30 percentage points than in the South, residents are less likely to own a mobile phone or have access to the Internet, and there are fewer non-agricultural enterprises; religious considerations may require noninterest banking—the supply of which is currently limited.

C. PAYMENT SERVICES

Usage of digital payments is relatively low. Just about 30% of adult Nigerians have made or received a digital payment in the past year according to the 2017 Global Findex data. More worryingly, Nigeria is the only large economy of Sub-Saharan Africa where the proportion of the population making or receiving digital payments fell between 2014 and 2017. It also scores second worst in the share of adults using mobile phones or the Internet to access an account, as well as in the share of adults that have sent or received domestic remittances using a mobile phone (Table 3). This is confirmed by available supply-side data: an average adult in Nigeria made 0.4 mobile payments per year—more than a hundred times fewer than in Ghana, Kenya, or Uganda (Table 4).

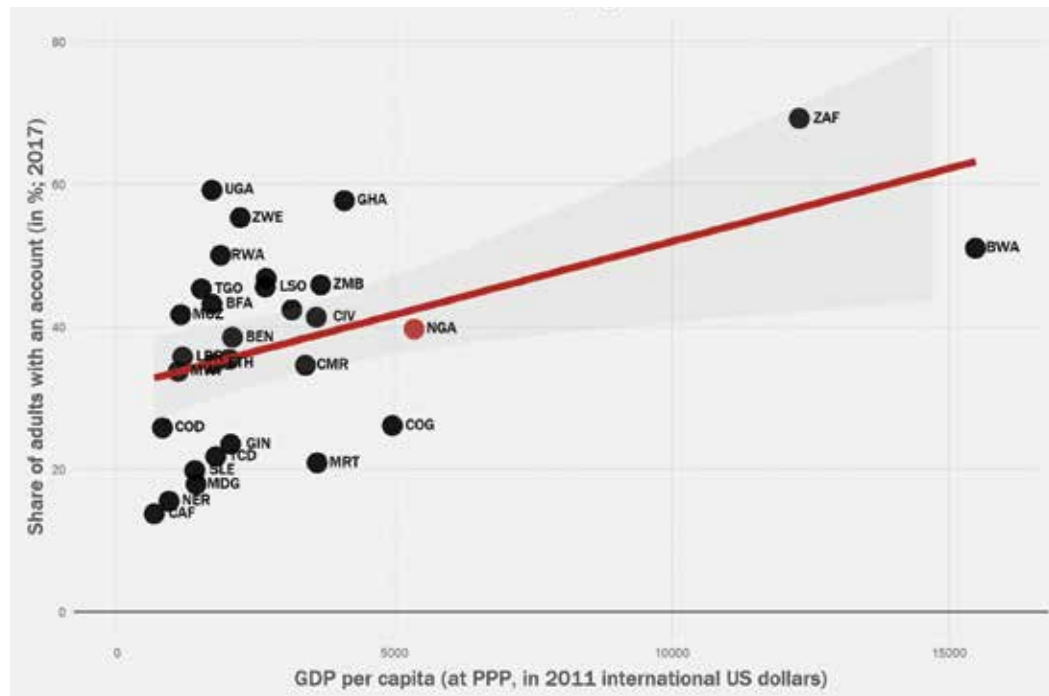
Data on the use of different payment instruments demonstrate the success of the national faster payment scheme (NIBSS Instant Payments—NIP). Launched in 2011, NIP was one of the first retail instant payment systems worldwide, and in 2018 accounted for 31.8% of electronic payments by volume—and 58% by

TABLE 2: Account ownership in Nigeria and eight largest economies of Sub-Saharan Africa based on the 2017 Global Findex data

	Account ownership (2017)	Mobile money account (2017)	Gender gap in account ownership
Nigeria	40% (–4 p.p.)	6% (+4 p.p.)	24 p.p. (+4 p.p.)
Kenya	82% (+7)	73 (+15)	8 (0)
South Africa	69% (–1)	19 (+4)	–2 (–2)
Uganda	59% (+15)	51 (+16)	13 (–3)
Ghana	58% (+17)	39 (+26)	8 (0)
Tanzania	47% (+7)	39 (+7)	9 (–2)
Côte d'Ivoire	41% (+7)	34 (+10)	11 (1)
Ethiopia	35% (+13)	0 (+4)	12 (2)
Cameroon	35% (+23)	15 (+13)	9 (5)

Note: Numbers in parentheses indicate change since 2014. Data unavailable for Sudan and Angola.

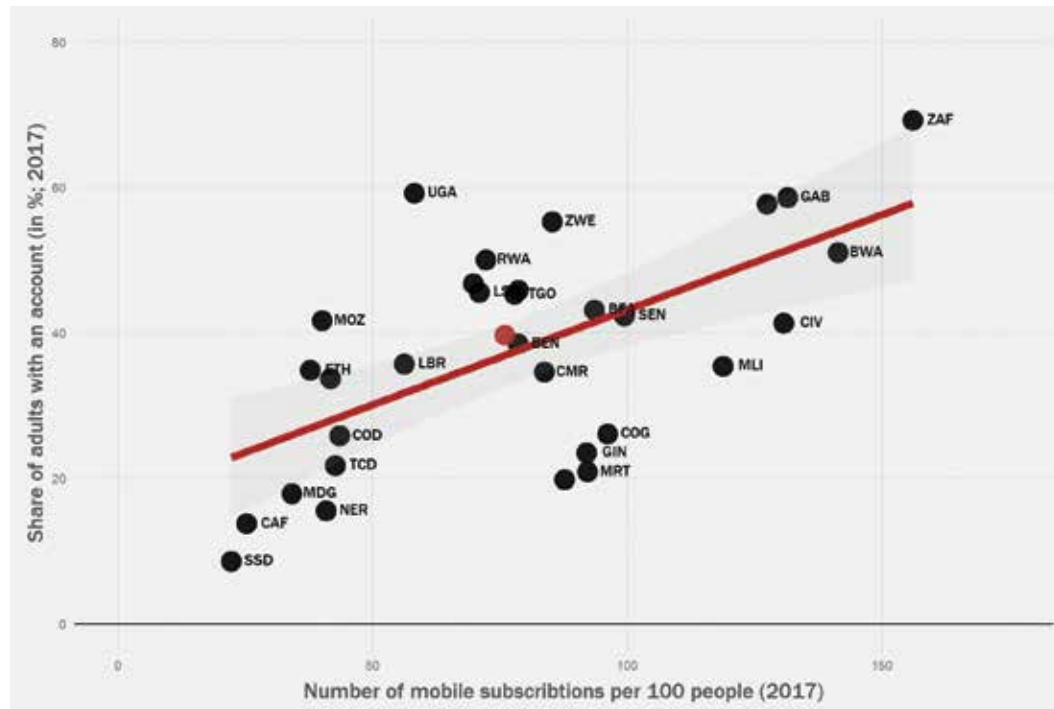
FIGURE 15: Relationship between GDP per capita and financial inclusion



Source: Global Findex and World Development Indicators database.

Note: Each point represents a Sub-Saharan Africa economy; Nigeria is marked with a dark red point.

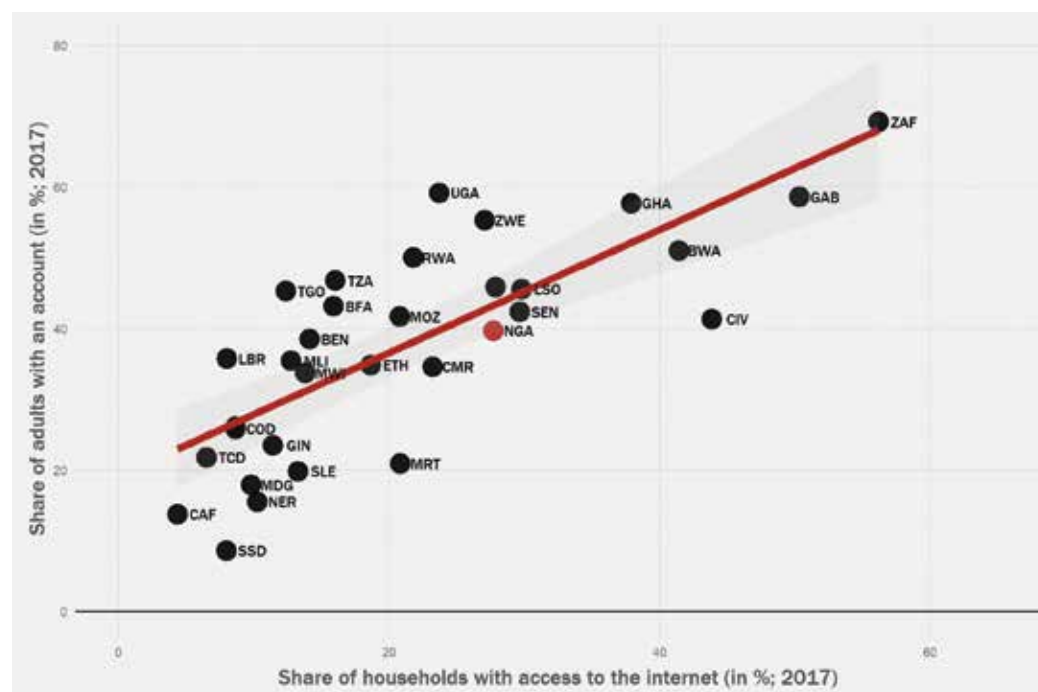
FIGURE 16: Relationship between mobile subscriptions and financial inclusion



Source: Global Findex and World Development Indicators database.

Note: Each point represents a Sub-Saharan Africa economy; Nigeria is marked with a dark red point.

FIGURE 17: Relationship between internet access and financial inclusion



Source: Global Findex and World Development Indicators database.

Note: Each point represents a Sub-Saharan Africa economy; Nigeria is marked with a dark red point.

TABLE 3: Usage of digital financial services in Nigeria and the eight largest economies of Sub-Saharan Africa based on the 2017 Global Findex Data.

	Made or received digital payments in the past year (2017)	Used a mobile phone or the Internet to access an account (2017)	Sent or received domestic remittances through a mobile phone (2015)
Nigeria	30% (-7 p.p.)	8%	7% (+4)
Kenya	79% (+10)	72%	63% (-1)
South Africa	60% (+1)	21%	19% (+7)
Uganda	55% (+15)	47%	47% (+3)
Ghana	49% (+24)	35%	43% (+26)
Tanzania	43% (+8)	37%	41% (+5)
Côte d'Ivoire	38% (+8)	33%	38% (+11)
Ethiopia	12% (+7)	0%	0% (0)
Cameroon	29% (+21)	16%	20% (+19)

Note: The percentage refers to the share of all adults (aged 15 and higher) who have used the service. Numbers in parentheses indicate change since 2014. Data unavailable for Sudan and Angola.

TABLE 4: Number of mobile payments per adult per year in Nigeria and the five largest economies of Sub-Saharan Africa.

	Mobile money payments per adult (2017)
Nigeria	0.4
Sudan	0.4
Kenya	52.2
Ghana	55.4
Côte d'Ivoire	29.6
Uganda	48.5

Source: IMF Financial Access Survey. Data unavailable for South Africa, Tanzania, Ethiopia, Cameroon, and Angola.

value—in Nigeria. Its usage continues to grow rapidly: between 2017 and 2018, the volume and value of payments grew, respectively, by 79% and 43%. On the other hand, the significance of paper-based instruments, such as checks, is steadily decreasing.

While the introduction of NIP and its adoption by all commercial banks has led to digitization of higher value payments, small payments are still made in cash, which drives the frequent use of ATMs.

Although the share of bank account and debit card holders has remained virtually at a constant level, the number of ATM withdrawals rose slightly between 2017 and 2018, with the average withdrawal value decreasing to NGN 7,400 (USD 20.50). Alternative channels for small-value payments have failed so far. For example, the number of transactions with M-CASH—an interoperable scheme facilitating the use of mobile money wallets for point-of-sale (POS) transactions—has not exceeded 0.08% of the POS transaction volume with credit and debit cards.

D. CREDIT AND SAVINGS

Access to and usage of credit and saving products remains lower than access to and usage of accounts and payment services. According to the 2017 Global Findex data, only 5% of Nigerians borrowed from a financial institution or used a credit card, and 28% borrowed from family and friends; only 21% saved at a financial institution. While fintech start-ups have pioneered digital origination, disbursement, and repayment of personal consumer loans, other types of lending depend on brick-and-mortar access points. Lending for microenterprises and SMEs is particularly underdeveloped: only 0.6% of households managing a nonfarm enterprise reported using bank loans for start-up financing; 33% of firms identified access to finance as a major constraint. Only 3.4% of investments and 3.9% of working capital were

reported to be financed by bank loans. Over 30% of newly originated credit is captured by the oil and gas industry, while only 3.6% supports the ICT sector.

E. INSURANCE

Insurance in Nigeria is rarely offered through digital channels. A limited number of comparator websites aggregate offers from various traditional insurance providers, but their usage is most likely limited. Fewer than 1% of all households in Nigeria have signed up for any form of insurance products, of which auto insurance is the most common.

F. FINANCIAL ACCESS POINTS

Nigeria remains at par with other large African economies with respect to the number of traditional financial access points, such as bank branches, ATMs, and POS terminals—but lags in agent banking and mobile money agents which will be more effective in facilitating financial inclusion in remote areas. As measured by the number of agents per 100,000 adults, the saturation on the Nigerian market is almost 50 times lower than in Kenya and over 100 times lower than in Ghana (Table 5). It is also concerning that the number of agents per capita actually decreased between 2016 and 2017.

Access points, however, are not spread evenly across the country. The north-south split, described earlier in relation to account ownership, is even more salient with respect to the location of bank branches, ATMs, or mobile money agents. As seen in the map (Figure 18), financial institutions are widely present across the southern states. In the north, however, only the Federal Capital Territory (FCT) of Abuja and the cities of Kaduna and Kano have managed to sustain a sizeable presence of banks and ATMs. Beyond the questions of economics and culture (e.g., the need for interest-free banking among some Muslim Nigerians), the scarcity of access points can also be explained by the fragile situation in the North-East—the same map shows that financial institutions are unlikely to open branches and agents in areas that have to cope with an increased threat of terrorism and violence. While the map in Figure 18 did not capture the more recent data, the recent increase in ransom kidnappings recorded in the North-West zone discourages business and providers from operating in those areas.

Enabling Environment for Digital Financial Services

There are several strengths that Nigeria can build on to advance its DFS market. It can capitalize on the size of its economy, or leverage Lagos as a fintech hub and the network effects it generates. Nigeria's financial sector also benefits from the earlier investments in payment systems and the financial markets infrastructures, as well

TABLE 5: Number of access points per 100,000 adults in the largest Sub-Saharan African economies where data are available. The numbers in parentheses indicate change relative to the previous year.

Country	Agents per 100,000 adults (2017)	ATMs per 100,000 adults (2017)	POS terminals per 100,000 adults (2017)
Nigeria	11 (–21%)	16	198 (+36%)
Ghana	1098 (+39%)	12	—
Uganda	713 (+16%)	4	—
Kenya	576 (–1%)	10	147 (+27%)
Sudan	35 (+42%)	5	—
South Africa	—	68	—
Angola	—	—	589 (+25%)
Tanzania	—	—	13 (+11%)

Source: IMF Financial Access Survey and central banks' data.

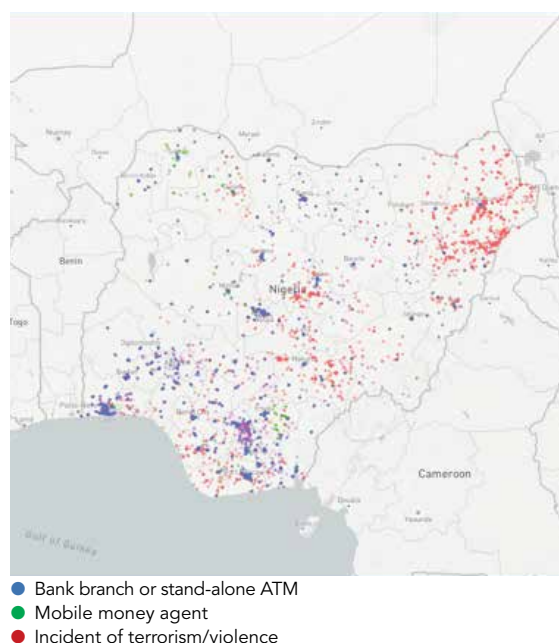
as the electronic Know-Your-Customer (e-KYC) systems based on the Bank Verification Number (BVN).

Nigeria is the largest economy in Sub-Saharan Africa, largely owing to its fast-growing population. This has several implications for the DFS market. First, it creates the necessary economies of scale that can sustain many low-margin DFS business models (e.g., low-value payment services). Second, it makes it more viable to design and market financial products addressing niche markets, as reaching even 1–2% of Nigerians will effectively mean capturing millions of users. Demographic growth has created a very young society, with millions of young adults entering the economy as “digital natives” and expecting digital delivery of various services, including DHS.

The large size of the existing fintech hub in Lagos can create beneficial network effects. Abundance of fintech companies and jobs can attract new talent and create new synergies across the ecosystem. It is also beneficial that Lagos—aside from its DFS role—is one of the main commercial centers of Africa. Thanks to that, the growing fintech sector can attract alumni of large corporations from other sectors, who contribute their experience, knowledge, and contact networks. Geographic proximity facilitates exchange of information between different industries and formation of joint ventures. At the same time, even Lagos faces a deficit of digital skills that may put constraints on the growth of the sector. There is a shortage of software engineers with mobile development experience, data analysts, and a wide range of retail finance talent.

With the CBN as the main regulator of the financial market in Nigeria, there is generally no ambiguity about the remit of each regulatory institution. Capital markets and exchanges are regulated by the Securities and Exchange

FIGURE 18: Map of financial access points (2014) and terrorist incidents (2014–2017) in the country



Source: Bill & Melinda Gates Foundation's Financial Services for the Poor Maps (access points); University of Maryland (terrorism incidents).

Commission (SEC), but the law clearly delineates responsibilities of each of the institutions. In the past, issues related to the regulation of mobile money providers were seen as an area of a regulatory overlap between the CBN and the Nigeria Communications Commission. However, a memorandum of understanding between the CBN and the NCC has significantly improved coordination between the two and removed ambiguities as to the chief role of the central bank as a regulatory and licensing authority for mobile money operators. Notwithstanding that, coordination between different departments within the central bank may pose a greater challenge.

Nigeria has managed to develop a comprehensive and interoperable infrastructure for processing of high-value and retail payments, which are accessible to banks and nonbanks. After challenges with exclusivity agreements among switching providers in the 2000s and the early 2010s, the CBN enforced interoperability between financial providers through a connection to a single central infrastructure. Consequently, as of 2019, practically all ATMs, POS terminals, and mobile money agents are interoperable. The Nigerian Inter-Bank Settlement System (NIBSS), owned by a consortium of the CBN and commercial banks, is the operator of most of the retail systems, which include the automated clearinghouse for credit transfers and direct debits, a domestic card and mobile money switch, and an instant payment service. In addition to that, the country is home to several private switches and a domestic card scheme (Verve), managed by a subsidiary of Interswitch. In general, membership in systems is available to both banks and nonbanks, although only commercial banks can hold settlement accounts with the CBN and directly participate in its Real-Time Gross Settlement System (RTGS).

Extensive homegrown payments infrastructures allowed the vast majority of payments to be processed in domestic currency and decoupled the issue of payment digitization from discussions on exchange management and capital controls. Recently, Mastercard Nigeria followed the domestic scheme of Verve in deciding to invoice its participant banks for transaction fees and other charges in domestic currency (NGN). As a result, smaller banks can be more confident that the boost in electronic payments will not result in depletion of their forex reserves.

The Bank Verification Number (BVN) system, comprising a biometric-enabled ID database and the e-KYC infrastructure, has lowered onboarding costs for fintech companies and thus contributes to more robust competition in the financial services market. Each Nigerian with a bank account is registered in the BVN database and can use the BVN number to open a new account with another bank, open an online wallet, or apply for a loan. Verification with the BVN is instantaneous and can happen remotely—online or through mobile devices. Application Programming Interfaces (APIs) allowing for BVN integration have been provided by NIBSS, the organization managing the system, to fintechs and banks across the country. As a result, it is used for onboarding by virtually all fintech start-ups and other nontraditional DFS providers. Unfortunately, the database effectively includes only banked Nigerians who have completed their initial BVN registration at commercial bank branches. It is of no help, however, to the

unbanked—their lack of BVN has resulted in most fintechs and other DFS providers avoiding targeting them as potential customers. In addition to that, the BVN structure itself may be creating adverse incentives: banks may not be willing to make significant investment in registrations, knowing that the newly registered users may use their KYC profile to move business to competitors.

Mobile phone ownership is sufficient to support rapid expansion of financial access through digital technologies. Mobile phones are owned by 67% of unbanked men in Nigeria and 53% of unbanked women. Nearly 1 in 10 unbanked adults work in the private sector and receive wages in cash, and 77% of them own a mobile phone.

Decentralization of the government may also contribute to an enabling environment for DFS. The complex relationship between the federal government and states at times creates coordination challenges and makes it more difficult to implement nationwide policies. But the high degree of decentralization can also be an opportunity, as it allows more capable states to introduce relevant reforms without the need to wait for worse performers. Streamlining of public financial management in Kaduna state can be an example—decisions of the state government led to digitization of the majority of government-to-person and person-to-government payments, creating an impulse for further development of digital financial services in the region.

Constraints to Digital Financial Services Development

A. MARKET DEVELOPMENT

Provision of digital financial services in Nigeria is dominated by commercial banks, which limits their accessibility to a broader range of consumers. Commercial banks' traditional customer base is salaried personnel of large enterprises, civil servants, or owners of formal businesses. While there are no regulatory constraints preventing others from accessing banks, various factors ranging from branch locations to the lack of appropriate banking products result in persistence of financial exclusion.

Nonbank DFS providers so far have not successfully targeted unbanked customers. Fintechs position themselves as complementary to commercial banks rather than as their substitutes. For most digital savings, lending, and payment products, a bank account is a requirement. As described before, this is mainly caused by the fact that only bank account owners have the BVN, which can be used by DFS providers for e-KYC. This demonstrates the adverse effect of the lack of a robust identity management system in Nigeria on financial inclusion; existence of a reliable National ID framework would have prevented the emergence of the BVN in the first place,

and thus limited the exclusionary consequences of its limited coverage.

DFS products for businesses—particularly SMEs—remain an untapped niche. While multiple providers offer digital financial services for larger corporations, Nigerian markets lack digital SME lending, investment, or payment products. M-CASH—a scheme and an initiative to boost acceptance of mobile payments among small merchants—has not yet been successful, despite growth in the number of transactions. One of the most prominent reasons for this is the high rate of informality among microenterprises and the self-employed. In the absence of formal registration and licensing, such companies are not eligible to open an account with a bank or a mobile money provider and thus lack the gateway for accessing other financial services.

B. POLICY AND REGULATION

To review policy reform toward financial inclusion, the National Financial Inclusion Strategy (NFIS) adopted in 2012 has recently been refreshed, but issues related to insufficient focus, lack of coordination, and unrealistic targets remain. The first NFIS was finalized by the central bank in 2012, but the fact that a large number of its targets were missed necessitated updating the document and publishing its new version in 2018. The new strategy builds around five priority areas:

- Create a conducive environment for the expansion of DFS;
- Enable the rapid growth of agent networks with nationwide reach;
- Harmonize KYC requirements to increase access to financial services;
- Create an environment conducive to serving the most excluded; and
- Drive adoption of cashless payments.

However, it still lacks adequate prioritization, retaining the old strategy's "two overall targets, 15 product/channel/enabler targets, 22 key performance indicators, and 70 strategic recommendations." It is also too prescriptive, as it requires specific shares of each type of access points, rather than leaving the decisions on specific products and channels to market participants. Even though the document itself acknowledges that stakeholder consultations indicated that "regulations and policies, such as fixed fees for certain transactions, limit the range and variation of business models that can be deployed," the strategy itself does not commit to changes in regulations fostering a more market-driven approach.

While the strategy assumed a collaborative approach and devised roles for various stakeholders, the lack of coordination between stakeholders hampered the implementation efforts. For example, only in late 2018 did the CBN sign key memoranda of understanding with the Nigerian Communications Commission and the NIBSS. The coordination issues directly stem from the absence of a coordinating mechanism. CBN's Financial Inclusion Secretariat lacks sufficient convening power and support from high-level political champions that could prevent fragmentation of efforts across different stakeholders. The document envisions that regular reporting to the National Economic Council (NEC)—chaired by the vice president—will ensure high levels of political support, but acknowledges that so far, the issue had not been prominently present on the NEC agenda. It also considers that the strategy's expectation of a financial inclusion breakthrough before 2020 may be unrealistic.

The legal framework for DFS providers is very complex and still lacks several important elements. As various incarnations of the Payment Systems Management Bill have since 2009 been awaiting their adoption by the parliament, the legal basis for digital payments in the country has been the Central Bank of Nigeria Act, accompanied

TABLE 6: NFIS targets and their status as of 2018, or the most recent year for which data is available

	Status as of 2018	NFIS 2020 target
Share of adult Nigerians using digital payments	16%	70%
Share of adult Nigerians owning a savings account	38%	60%
Share of adult Nigerians using a credit product	8.3%	40%
Share of adult Nigerians with an insurance product	3% (2016)	40%
Deposit money bank branches per 100,000 adults	5.5 (2016)	7.6
ATMs per 100,000 adults	16.32 (2017)	203
POS terminals per 100,000 adults	198	850
Agents per 100,000 adults	10.50 (2017)	476

Source: EFINA, CBN.

by various elements of secondary legislation.⁵² Confusion abounds with respect to different types of licenses that providers of digital financial services could adopt:

- Some register as mobile money operators or payment service providers;
- Others leverage state or national microfinance bank licenses; and
- Online lenders can render their services based on a CBN finance company license or a state-regulated money lender license.

More recently, an exposure draft by the central bank proposed streamlining the fragmented landscape of payment service providers' licenses, consolidating them into three general license types, each corresponding to the provider size. However, the proposed structure would also significantly increase the capital requirements for Payment Service Providers (PSP), which has been resisted by the market. Separately, the regulator has hinted that issuance of general "fintech licenses" may be contemplated, but this has not yet been developed into any formal regulations. Notwithstanding those developments, the basic problem remains: new license types keep getting introduced on top of old ones with little coordination and alignment across different departments of the CBN and other regulators. As a result, the licensing framework for DFS providers is opaque, creates possibilities for limiting competition and regulatory arbitrage, and makes effective oversight more difficult.

The small size of the DFS market indicates that the capacity of the CBN to effectively supervise it has not yet been under strain. However, if the growth accelerates, relevant departments may lack sufficient numbers of highly qualified staff that understand the technology and business models behind new entrants to the market. At this point, neither the central bank nor market participants have implemented any technical solutions (regtech, supotech) to streamline regulatory compliance, supervision, and oversight.

C. MARKET ENTRY

Mobile network operators were, until recently, not eligible at all to provide financial services. This changed with the adoption of CBN *Guidelines for Licensing and Regulation of Payment Service Banks in Nigeria* which, if implemented, can be a game changer for financial inclusion. A Payment Service Bank (PSB) license is the new type of license, permitting the operation of a "narrow bank"—an institution that can accept deposits but cannot lend. Unlike Mobile Money Operators (MMOs), PSBs could be operated as subsidiaries of telecommunication

companies. Overall this is a good start, but consideration should be given to review of the guidelines—once CBN has started to implement them—to ensure they create an enabling environment as the PSB license may remain restrictive in the following ways:

- Mobile network operators are not permitted to use their own branding when operating PSBs;
- CBN will require a network of physical agents/branches to be operated, making it impossible to run a digital-only business; and
- It is also required that PSBs have field presence in "underserved" areas to be defined by the regulator; the opaqueness of the term may make it more challenging to develop feasible business plans.

The only other license type—in addition to the PSB license—that permits nonbanks to issue electronic money is the mobile money operator license. Other forms of e-money, such as prepaid cards, can only be issued by banks. The CBN guidelines require that the e-money float be stored in a nominee account with a commercial bank and opened in the name of the customers of the provider, thus making it bankruptcy-remote. The funds in the nominee account must not be used for purposes other than redeeming e-money and executing fund transfers. E-money issuers are not allowed to earn interest on that account, nor are they allowed to pay interest on the balances of their wallet holders.

The CBN and NIBSS (operators of interbank payment and settlement systems) announced in 2018 the launch of a regulatory sandbox, but the project has not been yet effective. More recently, a similar initiative has been considered by the SEC. The aims of the project, its legal and regulatory framework, and other modalities have not been clarified. However, launching a sandbox without streamlining the rest of the regulatory framework may merely increase the market opaqueness and add to participants' confusion.

D. DELIVERY CHANNEL AND PRODUCT INNOVATION

Agent-based models have so far not succeeded in increasing the number of access points. This is directly related to mobile money's failure to gain popularity among the unbanked. Uniquely for Sub-Saharan Africa, the number of agents per 100,000 adults in 2016 (20) only barely exceeded the number of ATMs (17.5). Because of that, the CBN, NIBSS, and financial industry have launched the Shared Agent Network Expansion Facilities (SANEF) program, aiming at developing a network of 500,000 white-label banking or mobile money agents by 2020. However, achieving this will not be likely without leveraging the

retail networks of MNOs and strengthening business models for agents. The CBN has been very prescriptive in imposing caps on the pricing of agent services, which in some instances may effectively require agents to offer them below cost. At the same time, regulations forbid exclusivity arrangements and make the principal entity liable for actions and omissions of its agents.

“Tiered” Consumer Due Diligence (CDD)/Know-Your-Customer (KYC) regulations have not succeeded in boosting inclusion. Most Nigerians—and nearly all unbanked citizens—have not been enrolled in any of the two biometric ID databases: the NIBSS’s Bank Verification Number (BVN) or the National ID database managed by the National Identity Management Commission (NIMC). Tiered KYC regulations allowed financial institutions to open accounts for customers who are not enrolled in either database and present only rudimentary ID documentations; however, most DFS providers have not effectively relaxed their internal requirements. In the view of the providers, the presence of digital ID among their prospective customers is necessary to keep enrollment costs low and shield them from money laundering and terrorism financing risks.

Upcoming changes in the national ID infrastructure can result in long-term significant improvements but may result in short-term challenges for DFS providers. The government has initiated the data migration from NIBSS’s BVN to NIMC’s database and permitted the use of third-party providers to conduct National ID enrollment. In addition to that, the National ID registration will be decoupled from the issuance of the plastic ID card, with citizens instead provided with an electronic-only credential. Those measures are expected to dramatically increase the National ID coverage rates, which will in turn allow DFS providers to easily onboard the unbanked population. Using the National Identification Number (NIN) for e-KYC is one good practice architecture that could be implemented in Nigeria. It could also be possible to build an e-KYC service around a sectoral ID such as BVN, if that sectoral ID was suitably linked to the NIN. If the government decides to switch from KYC based on the BVN to the one based on the National ID, changes in the IT systems used by banks and other financial institutions will be necessary. This will require clear communication by NIMC with respect to technical specifications of relevant APIs, conditions of database access, and arrangements for data exchange and integration testing.

While digital onboarding of individual customers has received plenty of attention, this has not been the case for businesses. To access any formal financial ser-

vices, businesses must be formally registered. However, the economy of Nigeria is still largely informal, with formal business accounting for barely over 30% of the GDP and heavily concentrated in Lagos. Even in the case of formally registered businesses, e-KYC and digital onboarding is rarely practiced.

Digitization of government payment efforts have to date not succeeded in boosting the digital finance ecosystem, and they need to be intensified. The government payments landscape in Nigeria is complex, involving disbursements and collections by various agencies at the federal, state, and local levels. Nonetheless, several digitization projects have been completed. For example, nearly all salaries of the employees of the federal government and federal parastatals are paid into bank accounts. All federal taxes can also be paid electronically. Migration to electronic payments has also been attempted with respect to social protection programs. For example, the Household Uplifting Program (HUP) managed by the National Cash Transfers Office (NCTO) assumes that all recipients of the program’s allowances are provided with a mobile money wallet, to which the benefit amount is transferred. However, because of very low rates of electronic payment acceptance by shops, schools, landlords, or other service providers—and because of the scarcity of reliable cash-out points—program beneficiaries very rarely make use of those wallets and normally withdraw the entire allowance in cash at the first possible opportunity. There are also still many other government payments that have not yet been digitalized, including cash transfer programs, such as the National Social Safety Nets Project (NASSP), which have great potential to advance financial inclusion.

Strict regulations on pricing may render providing agent services unprofitable and ultimately lead to financial exclusion of remote areas. CBN has been imposing strict and highly granular limits on prices of various banking services, which limits discretion of individual institutions.⁵³ It is not clear whether the ceilings imposed by the central bank have been justified by demonstrated market failures, nor has the methodology for calculating such limits been publicly disclosed. However, in the specific case of agent banking, the imposition of free-of-charge cash-outs and the NGN 100 limit on cash-in charges seem to make agent banking in remote areas unprofitable, given the cost of liquidity and security challenges. The media have been reporting that a number of shops and other businesses—instead of entering into agent banking agreements—have been involved in providing unregulated debit/credit card cash back (providing cash to customers while registering the withdrawal as a POS purchase).⁵⁴

E. MANAGING RISKS OF DIGITAL FINANCE

Nigerians are aware of the criticality of cybersecurity, but efforts of different stakeholders need better coordination and communication. A cybersecurity framework and guidelines for bank and payment service providers have been issued by the CBN and became effective January 1, 2019. It mandates compliance with local and international standards, audit requirements, regular penetration testing, and reporting of cybersecurity incidents to the regulator. The Cybercrime (prohibition, prevention, etc.) Act has been in effect since 2015, giving law enforcement necessary legal tools and investigative powers to prevent and prosecute digital crimes. However, the coordination across different stakeholders is still limited: for instance, there is no financial sector-specific CERT, while the national CERT (ngCERT) does not have a single financial sector focal point.

The Consumer Protection Framework (CPF) has been put in place, but it lacks accompanying legal acts and regulations. The document includes chapters on the overall legal and supervisory framework, disclosure and transparency, fair treatment and business conduct, data protection and privacy, and alternative dispute resolution mechanisms, as well as the commitment to strengthening consumer education and boosting financial literacy. However, this has not been accompanied by enactment of specific and legally binding regulations covering issues such as disclosure, dispute resolution, or fair treatment. Moreover, the CBN's Financial Consumer Protection Department, responsible for supervising all CBN-regulated financial institutions with respect to financial protection, lacks sufficient capacity, resources, and enforcement powers to effectively uphold the standards committed to in the framework. Even though the CPF includes data protection as a "key principle" and the right to privacy is explicitly stated in the country's constitution, to date there has been no comprehensive data protection legislation, and no uniform approach has been adopted for consent requirements for collection and processing of digital data.

F. FINANCIAL INFRASTRUCTURE: RETAIL PAYMENTS INFRASTRUCTURE

While an interoperable retail payments infrastructure has been put in place, some doubts persist with respect to its robustness and reliability. For example, NIBSS estimates that on any given day, 10–15% of POS card transactions fail. Although the majority of such cases seem to be happening because of fund unavailability, at least a third of them occur due to network errors and other system issues. Failures may be more frequent during peak times—for example, on Christmas Eve in 2018, 25% of all card transactions were reported to fail. Reasons for this lack of reliability vary, although

they tend to involve the endpoints (acquired and issuer banks) rather than the networks themselves. Regardless, they diminish confidence in electronic payments, especially when transaction errors lead to incorrect debiting of funds, forcing card users to start cumbersome dispute procedures. Temporary measures, such as the increase of the transaction timeout threshold from 15 seconds to 45 seconds, have been recently undertaken by NIBSS—but better networking infrastructure and better policing of switch participants will be needed to regain users' trust.

The infrastructure for cross-border payments is much less developed. In many cases, obtaining or converting foreign currency at one of the official rates requires the completion of multiple paper forms. The Swift Global Payments Initiative (GPI) has not been widely implemented by Nigerian banks, even though some of their parent companies were at the forefront of global adoption. As a result, digital disruption has not significantly affected the international remittance market, which remains dominated by informality.

G. FINANCIAL INFRASTRUCTURE: CREDIT INFRASTRUCTURE

While the country has been developing its credit infrastructure, expansion in alternative scoring methods may be needed to reach excluded populations. The country has three credit bureaus, together working under the umbrella of the Credit Bureau Association of Nigeria. The bureaus process positive and negative reporting and offer scoring services. Microfinance banks and other finance companies (mortgage banks, finance companies, and development finance institutions) are presently their largest users, with 594 of them submitting data to and using the services of credit bureaus as of December 2018. They also account for 7.9 million of the 15.0 million customers reported in the credit bureau database at the time, with the numbers growing. Many of the digital lenders use alternative data to supplement information received from credit bureaus, but further work will be needed to develop reliable stand-alone scoring models for financially excluded Nigerians.

Despite the launch of a collateral registry, movable collateral loans still represent a small share of enterprise lending. The online searchable registry was established through the cooperation of the CBN and IFC in 2016. Over 2018, movable collateral was used to support SME loans with the total value of NGN 1.2 trillion. While it attests to a remarkable growth, more than doubling in comparison with the previous year, movable collateral loans still represent a small share of total enterprise lending in the country. Though 611 financial institutions—commercial and microfinance banks, finance companies, and Development Finance Institutions—were registered, only 75

registered transactions collateralized with movable assets totaling NGN 1,579 billion. Moreover, a large part of those registrations comprises legacy transactions and wholesale lending done by the Development Bank of Nigeria.

2.3.3 Digital Financial Services Recommendations and Next Steps

The findings from the assessment of the current state of Digital Financial Services in Nigeria aimed to identify the factors in the macro and microenvironment that influence the behavior of companies and individuals. Each factor in the macro and microenvironment and its impact help in the identification of the factors in the generic external environment, i.e., Opportunities and Threats; and the factors in the generic internal environment, i.e., the Strengths and Weaknesses, both of which are needed to construct the final SWOT Matrix.

Many of the main barriers to the development of digital financial services lie beyond the scope of the financial sector and the remit of financial regulators. Issues dealt with elsewhere in this paper—the low quality and accessibility of broadband and 3G/4G connections, gaps in the national ID coverage or the missing IT talent—are all affecting the potential of financial services providers. However, the government and the CBN still have the opportunity to boost the growth of the industry by committing to specific actions.

Building the Infrastructure for Digital Financial Services

R1. NIBSS and NIMC should expediently complete the integration between the NIN system and the BVN database. Until the NIN/BVN coverage of the country is complete, e-KYC processes for lower KYC tiers could leverage alternative ways of establishing and confirming identity, which could range from low-cost biometrics (e.g., voice analysis) to social network analysis and certification by trusted third parties. If the government decides to use the NIN for e-KYC services, NIMC should start providing technical information to banks and other DFS providers on the technical aspects of using NIN for consumer onboarding, so that the industry is ready for the eventual migration from systems relying on the BVN.

R2. NIBSS and CBN should strengthen enforcement of service standards to reduce the incidence of transaction failures. Performance indicators with respect to the share of failed transactions, time required for dispute resolution, and system availability should be developed and communicated to financial institutions and the public. Failure to observe them should result in sanctions, beginning with public censure and, if necessary, including suspension of the switch membership. The CBN, NIBSS, and industry associations should also cooperate in building capacity of commercial banks in the area of IT and network infrastructure and encourage outsourcing if the in-house resources of financial institutions are insufficient to meet the operational reliability and security standards.

SWOT Matrix

Strengths	Weaknesses
<ul style="list-style-type: none"> – No ambiguity about the remit of each regulatory institution – Comprehensive and interoperable infrastructure for processing of high-value and retail payments – South DFS coverage – NIP – Credit Bureau 	<ul style="list-style-type: none"> – Account ownership – DFS usage – Credit and savings – Insurance – e-Bill payments – North and rural DFS coverage – Robustness and reliability of payments infrastructure – Unduly restrictive requirements with respect to payment service banks – Consumer protection – Lack of coordination and communication in the area of cybersecurity – Low DFS supervisory capacity – Low levels of digital financial literacy
Opportunities	Threats
<ul style="list-style-type: none"> – CDD/KYC – SANEF – Growing fintech sector – Government payments – Cross border payments – Collateral registry 	<ul style="list-style-type: none"> – Lack of high-level NFIS champion and prioritization of few high-impact actions – Complex DFS licensing regime – Strict regulations on pricing of agent services – Slow integration between NIN system and BVN database

R3. Credit bureaus should continue developing products and services addressing the needs of digital lenders. Integrating fintechs and other nonbank financial institutions that still do not participate in credit reporting will further boost the credit bureau coverage numbers and contribute to delivery of affordable credit. Exploring the use of alternative scoring methods should specifically target the largest excluded populations, such as the self-employed in the service sector and subsistence farmers.

R4. The adoption of the new regime for movable asset lending⁵⁵ should be enhanced through capacity and awareness building. CBN should require that financial institutions take part in specialized training, equipping them with the skills for developing asset-based lending, collateral valuation, and realization. Development of secondary market and deployment of online platforms that support effective factoring and value chain financing for SMEs should be also be promoted.

R5. CBN should encourage development of infrastructure for streamlined processing of foreign currency transactions and international payments. This should focus on the two basic pillars:

- First, Nigeria should actively participate in efforts to develop international payment systems for high-value and retail payments, both at the Pan-African level and within the West African Monetary Institute and ECOWAS member countries.
- Second, consistent and risk-based policies should be developed with respect to granting remittance service providers access to domestic payment and clearing systems, particularly to NIP.

Reforming the Policy and Regulatory Environment

R6. The CBN and state licensing authorities should reduce the number of different license types for DFS providers and the overlap between them. The regulator should identify license types that cover similar activity types (such as the PSB and mobile money operator licenses) and consider removing such duplications. The CBN may reconsider the requirement for banks and other financial institutions to operate brick-and-mortar branches and be open to businesses that operate in a fully digital mode. On the other hand, if the central bank does insist that commercial banks, payment service banks, and microfinance banks must maintain physical branches, it could consider a separate license for digital-only establishments, akin to Hong Kong's "digital banking licenses." Given that DFS' business models would often span the remit of multiple departments of the central bank, it could also be beneficial to create a "single window"—a single point of contact

that all market participants could approach for licensing queries and for receiving timely answers.

R7. Regulations on agent networks should be revised by removing barriers related to pricing structure in order to incentivize investments in access points in financially excluded communities. To that end, the CBN may want to consider liberalizing the pricing of agent services and other banking charges. While pricing caps may provide an important financial consumer protection measure, they have not worked in Nigeria—according to a 2017 EFINA survey, over 40% of agents charged customers extra fees beyond those prescribed by the regulation. The regulator should also examine whether the prohibition of engaging in agent business imposed on nongovernmental organizations (NGOs), religious organizations, and bureau de change could be reconsidered. Finally, further research is needed on the impacts of the forced cash-in/cash-out interoperability between mobile money agents. While as a principle interoperability is to be welcomed, it is possible that the current interchange structure creates adverse incentives limiting access points expansion.

R8. The CBN should implement the guidelines for licensing and regulation of Payment Service Banks (PSBs) by expediting the review of applications for PSB licenses and making the final decision on this process by the end of 2019. As the implementation progresses, consideration should be given to amending the guidelines to revise restrictive provisions, such as the prohibition of MNOs using their brand for their subsidiary PSBs and other restrictions on mobile operators leveraging synergies between their core business and their financial services. Without the opportunity to leverage the MNO brand and distribution network, it is unlikely that PSBs will be able to create sustainable business models that would bring financial services to excluded populations.

R9. The CBN should ensure that its DFS supervisory capacity is commensurate with the growth of the market. It should therefore regularly review and update its oversight frameworks and secure funding and staff time for training of its officers, as well as collaborate with peer institutions and international standard setting bodies on conducting study visits, staff exchanges, and information sharing programs. It should also strengthen collaboration within the institution, so that the knowledge and experience of departments such as Information Technology or International Operations could be shared with supervisors and overseers.

R10. The CBN should conduct further research to monitor and evaluate the implementation of tiered KYC by

market participants. Anecdotal evidence from the field suggests that many institutions, despite the existence of appropriate regulations, do not serve customers without the BVN and proper documentation. A field study could help estimate the scale of the problem and the reasons behind the low take-up of low-tier accounts. At the same time, the CBN should ensure that the threshold amounts for each tier are periodically revised and, at the minimum, adjusted for inflation.

R11. Account opening for merchants and other small businesses should be made easier. Low-risk small businesses should have the opportunity to accept digital payments and open digital accounts without the need for a burdensome check and collection of extensive documentation. The federal government and state governments could consider the possibility of outsourcing registration of informal businesses to banks, finance companies, or mobile money agents. If opportune, the government may consider additional fiscal incentives for boosting digital payments acceptance.

R12. The Financial Consumer Protection Framework should be accompanied by relevant binding regulations. These should cover all issues covered by the framework, such as transparency in pricing and advertising or dispute resolution. In addition to that, relevant data protection legislation should be introduced.

Engaging Key Stakeholders

R13. Once the FGN makes the critical decision to digitize all government payments, CBN should use its convening powers to facilitate digitizing government payments at state and local levels. As a first step, the CBN should consider developing a toolkit for state and local treasuries, outlining the steps that need to be taken to successfully develop electronic payments and collection systems, based on the examples of states such as Lagos or Kaduna. Further, the CBN should develop a streamlined offer of treasury services to state governments and advise on model agreement with private sector gateways for government collections

R14. Establish an effective NFIS refresh coordination and implementation structure led by a high-level political champion and prioritize high-impact actions. Support of high-level political champions may be necessary to give requisite convening power to CBN's financial inclusion secretariat to ensure coordination across relevant agencies and all layers of the government—it is therefore important that the NEC commits to placing financial inclusion on its regular agenda. If possible, the strategy itself could be further revised to prioritize a more

limited number of high-impact actions. At the same time, reporting of financial inclusion indicators should be more frequent (at least quarterly or, ideally, monthly).

R15. Financial institutions, the CBN, government agencies, and civil society should collaborate on fostering financial literacy and capability. Financial literacy activities should focus on groups that are disproportionately affected by financial exclusion, as well as on recipients of government transfers, young people, and families sending or receiving international remittances. Targeted digital financial literacy campaigns can help people in better understanding, selecting, and making use of DFS that fit their needs, and help increase trust in these services.

R16. Academia, government agencies, civil society, and development partners should collaborate to advance digital skills in the economy. Most of the financial service providers have limited in-house skills, particularly in data analytics. Secondment programs, training bootcamps, or conversion courses, developed in partnership with or with support from development partners and/or global universities, would help bridge the skills gap and make the labor market less dependent on expertise brought in from abroad. Nigerian universities may support tech entrepreneurs through building incubators or organizing innovation hackathons, which may have spillover potential for growing local entrepreneurship in Nigeria.

2.4 DIGITAL ENTREPRENEURSHIP PILLAR

2.4.1 Importance of Digital Entrepreneurship Pillar

Digital entrepreneurship can be defined as the creation of new ventures and the transformation of existing business through digital technologies. Digital entrepreneurs include: (i) new (digital start-ups) and mature (digital scale-ups) firms that have digital technologies at the core of their business model, i.e., they develop/ transform the digital technology to deliver new/ improved products/ services to their customers; and (ii) digitally enabled businesses which utilize digital technologies (e.g., social, mobile, analytics, and cloud solutions) to improve business operations, sharpen business intelligence, and engage with customers and stakeholders through new (digital) channels.

Given its large, young, and entrepreneurial population, digital entrepreneurship has the potential to become an engine of economic transformation in Nigeria and set the country on a new growth trajec-

tory. Digital entrepreneurship represents an important opportunity for the large number of youths entering the labor force. According to the Nigerian Communications Commission, both mobile penetration (49% unique subscribers) and Internet penetrations (32%) are increasing rapidly, which could propel the creation of technology-based start-ups and improve productivity and competitiveness of existing firms.

Digital entrepreneurship is a government priority, as outlined in the Economic Recovery and Growth Plan 2017–2020 (ERGP). The plan recognizes the need for a digital-led strategy to make the Nigerian economy more competitive in the 21st century global economy. To support the development of the digital economy as highlighted in the ERGP, the government also adopted the Nigeria ICT Road Map 2017–2020 and the Nigeria ICT Innovation and Entrepreneurship Vision (NIIIEV) released in 2018. NIIIEV sets up three ambitious goals to be achieved by 2025: (i) 95% of the population to access broadband Internet; (ii) reach 75% digital literacy rates; and (iii) ICT to contribute 25% of GDP.

2.4.2 Diagnostic Findings: Current State of Digital Entrepreneurship Pillar

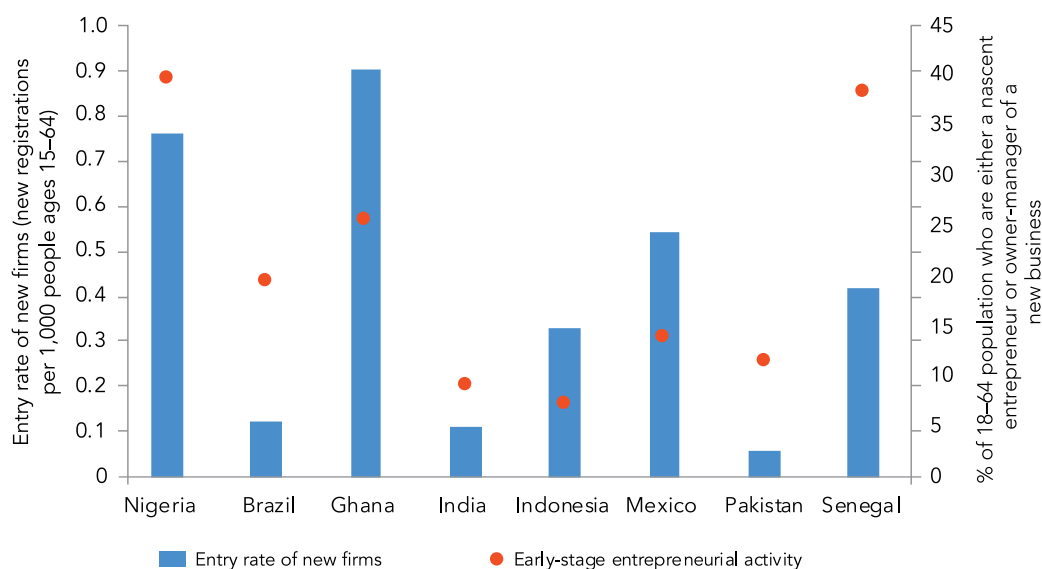
The digital entrepreneurship ecosystem, as part of the overall entrepreneurship ecosystem in Nigeria, is characterized by a vibrant population of entrepreneurs. Nigeria scores high in the entry rate of new firms

measured in terms of new registrations per 1,000 people. While South Africa tops the charts, Nigeria is comparable to other regional leaders like Ghana and Kenya, and outpaces global peers such as India, Indonesia, Mexico, and Pakistan (Figure 19). Additionally, more people in Nigeria state that they are either a nascent entrepreneur or an owner-manager of a new business than in comparator countries.

Despite its entrepreneurial potential, Nigeria remains a minor player in the global digital economy in terms of exports of digital goods and services. The Information and Communication Technology (ICT)⁵⁶ sector expanded in the last decade: its contribution to Gross Domestic Products (GDP) doubled in 2010–2017 (Figure 20) and accounted for 12.2% of the GDP in 2018. In 2018, the sector contributed 9.65% to GDP growth. However, in 2017, only 5% of Nigeria’s exports were in the ICT sector (Figure 21).

Nigeria is home to several high-growing digital companies that provide hopeful examples of its digital potential. The Nigerian digital entrepreneurship ecosystem has blossomed after the domestic company MainOne installed a 7,000 km fiberoptic cable from Portugal to Nigeria in 2010. Affordable access to high-speed Internet boosted creation of successful digital businesses, especially in marketplace applications and e-commerce. Other industries like software development, online outsourcing, and business processing outsourcing are still latent, pri-

FIGURE 19: Scale of entrepreneurial activity (2012–2017)



Note: South African data were excluded from the chart due to its high new firm entry rate of 10.22 per 1,000, which was an outlier, combined with its relatively low entrepreneurial activity rate of 10.96% of the population.

FIGURE 20: ICT contribution to GDP in Nigeria (2010–2017)

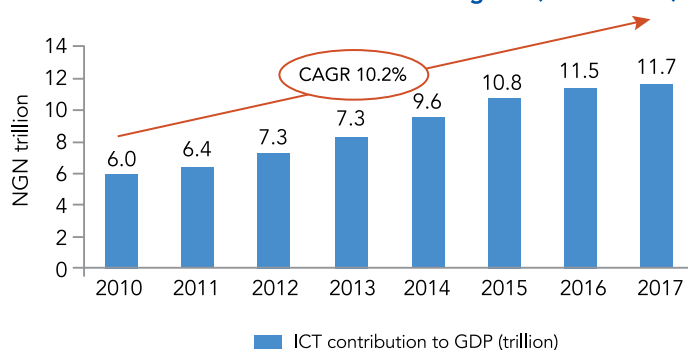
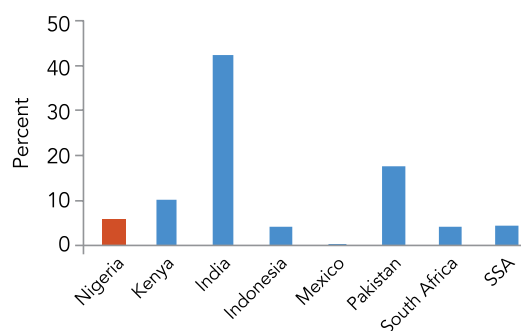


FIGURE 21: ICT as a % of service exports, 2017



marily due to the lack of reliable connectivity and power, and advanced ICT labor skills. However, there is no Nigerian company on the 2018 Forbes Top 100 Digital Companies list, compared with fourteen in China, four in India, and one in South Africa.

The digital industry is concentrated in Lagos and Abuja, marking an important geographic and sectoral divide in the use of digital technologies. Lagos is a mature and active ecosystem with dynamic incubators, venture capital companies, and digital start-ups. Digital entrepreneurship ecosystems are also growing in Abuja and Port Harcourt, with a potential for expansion to other cities.

Nigerian digital firms are in the lower value-added segments of the digital value chain. According to the Ernst & Young analysis of the digital value chains in Nigeria, the top ten largest Nigerian software developers in the software development industry are responsible for only 0.32% of the local market (Ernst & Young: Nigeria, 2018). In the ICT infrastructure and tech support outsourcing industry, the top 10 players are multinational subsidiaries, including Microsoft and Huawei.

The profit margins in the digital industry are comparable to the average profit margins of other sectors in Nigeria but are significantly lower than global industry trends. The profit margins of 7–10% are healthy, but low compared to global digital leaders: the software sector gross profit margins in 2018 were 74.36% on average with a return on investment of 30.6% (CSI_Markets, 2019). The lower profit margins are due to the difficult business environment, lower productivity, and skills and higher input costs (e.g., price of equipment, energy, and cost of capital) (Ernst & Young: Nigeria, 2018).

There are examples of successful digital companies in service industries. An increasing number of digital start-ups operate in services, including health and education. For example, Andela is a digital start-up that builds skills

of software developers. It has recently completed its USD 100 million Series D funding round, reaching the total funding of USD 180 million. Hitch is a company that supplies free digital educational material matched to state curricula and can be used offline. Digital health start-ups in Nigeria include online health insurance subscription plans (Avon HMO), telemedicine (Kangpe and Mobidoc), medical devices (MDaaS), blood center services (Lifebank), clinical reference information and e-learning (Medenhanz), medication supply (Medsaf and Drugstoc), and aviation emergency ambulances such as Flying Doctors Nigeria (Dr. Hempel Digital Health Network, 2018). Digital start-ups also operate job matching platforms in Nigeria, such as Jobberman. Virtual freelancing, or e-lancing, is less common in Nigeria than other regional competitors like South Africa and Kenya.

Use of digital technologies by traditional firms, however, remains limited. Although urban SMEs are increasingly using digital platforms for trading, digitalization of firms in traditional industries and rural locations is low. For example, a recent survey of smallholder farmers in Nigeria found that 77% of mobile phone users use basic phones without Internet capability, 88% of them have never used the Internet as source of professional information, and 49% never use cell phones and SMS services for business purposes (Anderson, et al., 2017). Reasons for the low digital usage include low levels of digital literacy, limited Internet access, and high costs. Larger firms are more actively using digital technology for basic business purposes, like communication with customers, but more advanced uses of technology remain limited. Fewer Nigerian firms (13.8%) spend on Research & Development (R&D) compared to firms from Ghana and Kenya, the Sub-Saharan African average (17.4%), and all countries (15.6%) that participated in the enterprise survey (Figure 22). Among digital industries, only software developers have significant expenditure in R&D amounting to 23.4% (Ernst & Young: Nigeria, 2018).

Low penetration of digital technologies is symptomatic of the overall lack of innovation capacity among Nigerian firms. Nigeria's innovation capacity scores lower than most comparable economies according to the 2018 Global Innovation Index (Figure 23). Barriers to digital innovation include shortage of qualified developers and engineers, limited access to modern technology and equipment (e.g., most VR equipment retailers do not ship to Nigeria), and limited collaboration with public research and education institutions.

Constraints and Opportunities for Digital Entrepreneurship and Innovation

Notwithstanding its current shortcomings, the dynamism of the Nigerian digital entrepreneurship ecosystem presents opportunities for development. Digital entrepreneurs and investors are attracted by market opportunities in Nigeria, the vibrant entrepreneurial scene and talent, improvements in telecommunications, and government-led reforms. However, growth of digital firms is plagued by a difficult business environment, lack of early-stage financing, limited market opportunities outside of Lagos and Abuja, and a lack of digital skills. The infrastructure and support system are rapidly expanding, but they are concentrated in the big cities, are driven by donors and diaspora efforts, and lack coordination mechanisms that would allow firms to build a pipeline of digital ventures across all growth stages.

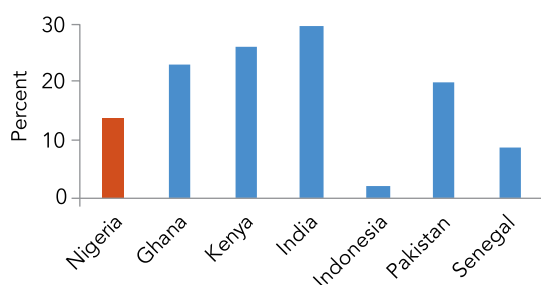
A. REGULATIONS, POLICIES, AND INSTITUTIONS

The cost and complexity of doing business in Nigeria is a significant impediment for the development of digital entrepreneurship. The latest *Doing Business* report ranks Nigeria 146 out of 190 economies, the worst comparator in the group of countries with similar endowments and levels of economic development. Digital entrepreneurs are particularly constrained by the infrastructure challenges (e.g., lack of electricity), the multilayered and cumbersome tax system, and complexity of the public procurement processes.

Policies for stimulating investment in the digital industry are outdated and ineffective. The lack of data on digital industries poses challenges for the formulation and implementation of targeted policies. Improvements in credit infrastructure, including a recent law on secured transactions, a new collateral registry, and active credit bureaus have not translated into better access to finance for digital entrepreneurs. Like tax incentives, it is not widely utilized (e.g., credit info reporting and sharing) and therefore does not translate into better access to finance. Additionally, the assets of digital start-ups are often intangible and cannot be used as collateral as is required by most commercial credit institutions. Investors, including Venture Capital firms (VCs), cite the lack of transparency and stability in the legal framework in Nigeria as a barrier to operations. The country lacks legislation establishing clear dispute resolution mechanisms and an effective insolvency regime that would limit exposure of investors to significant liabilities.

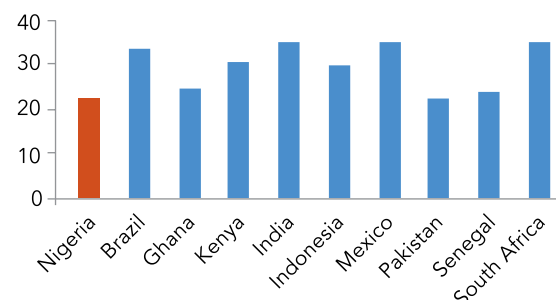
Existing policy incentives are underutilized by digital entrepreneurs because of complex and burdensome requirements, confusing application processes, and a lack of transparency. Even in cases where there have been legislative reforms, there is a lag in utilization, such as the case for credit reporting and secured transactions. Available incentives such as the Venture Capital Incentives Act, the Pioneer Status for tax holidays to eligible companies, and other SME support programs offered to entrepreneurs across all sectors by MDAs are all underutilized. The Venture Capital Incentives Act of 2004 is not considered relevant by the targeted Venture Capitalists as it is structured quite contrary to the fund structure that VC's operate under. The Pioneer Status Incentives issued by the Nigerian Investment Promotion Commission (NIPC), which grants three to five years of tax holidays to eligible companies, remains underutilized by digital entrepreneurs due to the high capital requirements and burdensome application process, and a lack of transpar-

FIGURE 22: Percent of firms that invest in R&D, latest available year (2013 to 2016)



Source: (World Bank, 2017)

FIGURE 23: Innovation Capacity—Global Innovation Index 2018 score



Source: (Global Innovation Index, 2018)

ency in the selection process. There are several other SME support programs offered to entrepreneurs by the government, most notably Central Bank of Nigeria's NGN 220 billion (about USD 721 million using the official rate) Micro, Small and Medium Enterprises Development Fund (MSMEDF), which was launched on August 15, 2013.⁵⁷ In addition to the lack of transparency in implementation, the MSMEDF's artificial interest rate, which is significantly below market rates, is distortive, unsustainable, and of questionable effectiveness.

The legislative framework does not match the needs of digital industries, but recent legal reforms demonstrate a government commitment to improve the situation.

Absence of effective regulations for prevention, detection, and punishment of cybercrimes is a deterrent for digital start-ups and investors. The recent Nigerian Data Protection Regulation, passed in January 2019, is a step toward improving data compliance. However, implementation is constrained by several factors: this subsidiary regulation is secondary to any acts of parliament; the function of the supervisory authority for data protection is unassigned; and the enforcement of fines in case of noncompliance is problematic (Salami, 2019). The Intellectual Property (IP) protection policy is outdated, and the Cybercrimes Prevention Act is not effectively implemented. The Companies and Allied Matters (Repeal and Re-enactment) Bill 2018 (CAM Bill) which was passed by the National Assembly in 2019 was a step in the right direction but unfortunately was not assented to by the presidency. The CAM Bill introduced new forms of entities including Limited Liability Partnerships, which will create structures for private equity and venture capital funds and includes company rescue provisions to create an effective insolvency regime.

There is a lack of clarity regarding the legitimacy of new investment vehicles such as crowdfunding in Nigeria.

Current legislation prohibits private limited liability companies, which is the most common form for digital start-ups, from: (i) "inviting the public to subscribe for any shares or debentures of the company or deposit money to it"; and (ii) having more than 50 shareholders (CAM Act). In addition, the Investment and Securities Act (ISA) bars all invitations to the public to acquire or dispose of any securities of a corporate entity or to deposit money with any corporate entity for a fixed period or payable at call, whether bearing interest or not, unless the body corporate concerned is a public company. Therefore, only public companies in Nigeria may offer their shares to the public.

The institutional structure for implementing the digital economy agenda faces capacity and coordination challenges. In 2001, the Ministry of Communications

established the National Information Technology Development Agency (NITDA) to create a framework for IT practices, activities, and systems. To improve growth of tech start-ups and the environment for digital innovation and entrepreneurship, NITDA created the Office for ICT Innovation and Entrepreneurship (OIIE). The Ministry of Industry, Trade and Investment is also an important player as it oversees the development of SMEs, promotion of exports and foreign direct investment, and the expansion of trade. To address the lack of inter-ministerial coordination and policy coherence, the presidency created the Technology and Creativity Advisory Group (TCAG) under the Industrial Policy and Competitiveness Advisory Council. The TCAG brings together 28 digital entrepreneurs, 13 leaders in the creative industry (music and film), and 14 government agencies to promote public-private dialogue and facilitate the resolution of regulatory and systemic barriers to the digital and entertainment sectors of Nigeria. However, for the moment the TCAG has limited administrative capacity and resources to be effective.

B. ECOSYSTEM SUPPORT AND INFRASTRUCTURE

The infrastructure and support ecosystem for digital entrepreneurs is growing across the country; however, they face significant constraints that hinder their effectiveness.

There are over 100 digital hubs (incubators, co-working spaces, and accelerators) across the country, and the numbers are on the rise. Nigeria has also attracted several multinational companies including Google, Microsoft, and Facebook, which have set up their own incubators/accelerator programs.

Most existing digital hubs are operated by the private sector and provide valuable co-working spaces to start-ups, but they operate in isolation, have limited funding, and fail to establish market linkages.

Most hubs lack sustainable business models, have difficulties recruiting qualified staff and experienced mentors, have no M&E systems, and consequently no evidence of results of their activities. Digital entrepreneurs need several rounds of support to qualify for private investments, which is an additional burden on hubs and accelerators, most of which do not have their own sources of funding. The lack of coordination between the various ecosystem actors limits their effectiveness, and few digital entrepreneurs are satisfied with the level and quality of services. Linkages to academia are limited, with only a handful of university-based hubs.

Several gender-focused networks and support structures have emerged to help women navigate the world of digital entrepreneurship in Nigeria.

In-country consultations confirmed the findings in a recent report on women entrepreneurship that highlighted the impor-

tance of social, cultural, and legal constraints (World Bank, 2019c). Notable new initiatives that help to tackle those challenges include innovation hubs (e.g., She Leads Africa), women-focused acceleration programs by mainstream hubs (e.g., Venture Garden Group's Greenhouse Lab and Impact Hub), and networking events (e.g., African Women in Technology Conference and Tech Women Lagos).

Large domestic corporations and multinationals are increasingly supporting digital entrepreneurship developments in Nigeria. Financial institutions are the predominant customer base for leading digital start-ups, and they offer increasing support to digital ecosystems alongside the telecoms and multinationals. For example, Union Bank works closely with local incubators and partnered with Co-Creation Hub (CC Hub) to establish the Campus Innovation Challenge. Access bank has set up its own incubator. Google and Facebook have established accelerator programs.

However, the linkages that emerge in the ecosystem need to be further strengthened. The two recent players, Network of Incubators and Innovators in Nigeria (NINE) and Hubs Nigeria Network (HNN), connect over 75 hubs, and support knowledge sharing and standard setting. Afrilabs, an Africa-wide network, is based in Nigeria, engages extensively with the Nigerian ecosystem, and is a member of the TCAG. Nevertheless, the ecosystem is still not well connected and has several communications and coordination gaps.

C. ACCESS TO FINANCE

Access to finance remains one of the key challenges for entrepreneurs, and it is even more acute for digital entrepreneurs. There is a lack of understanding of the digital sector among local financial institutions and private investors, adding to the general gap of financial products for local entrepreneurs. Given the intangible nature of digital entrepreneurship, most businesses do not qualify for lines of credit.

There is a dearth of early-stage investors in Nigeria. According to IFC, the aggregate nominal amount of start-up investments as a percentage of GDP remains lowest in Sub-Saharan Africa at 0.06% compared to 0.93% in India, 0.32% in China, and 2.53% in the U.S. Angel networks and venture capital funds are in the nascent stages: they finance only 3% of start-ups in Nigeria. The main player is the Lagos Angel Network (LAN), incorporated in 2014, which is composed of 40 active investors. There are also other angel networks, including the Abuja Angel Network and the South-South Angel Network.

However, international investors are increasingly interested in Nigerian digital entrepreneurs. Due to the lack of early stage investors in Nigeria, the most promising start-ups apply for funding from international programs like YCombinator, 500 Startups, and Techstars. Thirteen out of the 28 African start-ups admitted to YCombinator have been Nigerian, and the majority raised USD 150,000–USD 1.2 million in funding.

Growth-stage digital start-ups have increased financing opportunities. Once a start-up is able to develop and execute a scalable business model (reach the growth stage) its financing options increase. Due to the constraints at the early stage very few firms in Nigeria reach the growth stage. However, the few companies that reach the growth stage have access to financing opportunities from Venture Capital and Private Equity firms. In 2018, Nigeria attracted the highest number and amount of Africa's digital investment deals. The African Tech Start-ups Funding Report shows Nigeria emerged as the premier investment destination on the continent in 2018; with 58 start-ups raising a total of USD 95 million (Disrupt Africa, 2018).

Venture Capital and Private Equity (VC/PE) firms in Nigeria are mainly internationally financed. According to the most recent Global Competitiveness Index, it is more difficult to access Venture Capital in Nigeria than in other countries. Venture capital and private equity firms in Nigeria receive minimal investment from domestic institutional investors such as pension funds and insurance companies. Even though the National Pension Commission (PENCOM) has issued regulations to allow investments in private equity funds,⁵⁸ the pension funds in Nigeria remain extremely conservative with only an estimated 0.36% invested in VC/PE. Most VC/PE funds are financed by foreign investors, including IFC, which has a pipeline of about 900 digital start-ups across SSA with Nigerian start-ups making up 27% (245 companies) of these. The lack of domestic investment in VC/PE has resulted in most growth stage digital entrepreneurs being registered outside Nigeria, which limits the extent to which Nigeria benefits from these companies.

There are limited options for private equity investors in Nigeria to exit their investments. The value of Nigeria's traded stock is just 1% of GDP compared to the global average of 69% and the Sub-Saharan Africa average of 28%. On the supply side there is a dearth of IPOs due to a combination of weak governance of pipeline companies and regulatory bottlenecks. On the demand side, there is low participation of domestic institutional investors.

D. MARKETS

Nigeria is Africa's largest market for digital products and services, but its growth is constrained. Despite its protracted economic recession, Nigeria remains Africa's largest ICT market with 82% of the continent's telecoms subscribers and 29% of Internet usage. However, overall digital literacy rates remain low, especially among women, and low-income and rural populations. Micro-entrepreneurs and local SMEs are also missing out on digital dividends.

Nigeria's e-commerce market is the largest in Africa, but the sector struggled in recent years. The e-commerce market in Nigeria is estimated at USD 13 billion (Jumia, 2019) with big homegrown players like Jumia and Konga. For further growth, e-commerce firms will need to overcome severe challenges, most importantly the lack of infrastructure across the country that hinders logistics and the lack of trust by Nigerians in e-commerce that will require significant efforts at consumer awareness building.

The Nigerian software market is estimated at USD 10 billion annually due to broadband expansion. It is currently dominated by products from Asia and Europe, with some imports from the United States, but the market segment for high-quality products remains largely unsaturated. Nigerian software producers are mostly small and young companies that lack products and expertise to capture market opportunities. However, fintech companies are increasingly gaining ground. There are examples across all firm growth stages: start-ups Paga, Flutterwave, and Paystack along with older firms like Interswitch and SystemSpecs. Some Nigerian software developers have expanded outside the country. For example, Flutterwave has offices in Kenya, Ghana, and Uganda.

The largest current demand is from large corporates based in Nigeria, but they source globally. In Nigeria, financial institutions and telecoms have a high rate of technology utilization, growing needs for digital products and services, and the capacity to pay. However, there is significant competitive pressure and high entry costs for digital entrepreneurs to acquire and scale up a corporate customer base in Nigeria, especially for younger start-ups.

Digitization of services offers the opportunity for expanding the local business-to-business (B2B) and business-to-customer (B2C) markets. Increased penetration of digital payments can expand the opportunity for digital solutions for local SMEs, including traditional industries and individual customers. Mobile Internet platforms helped SMEs and micro-entrepreneurs expand their customer base with no need of a storefront presence. In

agriculture, mobile technology allows farmers to link to a wider pool of customers and obtain information about prices in distant markets. Digital technology can also facilitate low-income farmers' integration into value chains for high-quality products for advanced country markets.

Another growth opportunity is created by the expansion of e-government. The Nigerian government is increasingly using the Internet to provide better information and services to its citizens. For example, there have been extensive efforts to automate business registration, and most of it can now be done online. Digitalization of public services is also creating new opportunities for entrepreneurs. For example, the e-voucher system has been introduced in Nigeria for distributing subsidies for seeds, fertilizer, and other farm inputs and may eliminate intermediaries, reduce corruption and leakages, and enhance efficiency. This may open the market for digital platforms and other ventures that integrate digital technology in their service and delivery systems. The increasing pressure on public authorities to extend the reach of basic services to the marginal communities and regions, and to be more responsive, accountable, and transparent, creates more demand for public agencies to hire digitally skilled employees and partner with digitally enabled businesses for delivering services. However, e-services are inaccessible for many communities that have limited access to the Internet.

In the long term, the future of Nigerian digital businesses will rely on their ability to conquer international markets. The Pan-African market is the most plausible internationalization strategy for Nigerian digital entrepreneurs to attain a sizable scale and diversified risk that would entice both domestic and international investors. Workers and online outsourcing firms in Nigeria report that very little of their work is driven by local or regional demand. In most cases, outsourcing firms, such as Andela and software development industries in Nigeria, are driven by clients in the developed world (Kuek, et al., 2015).

With the right mix of strategies and supporting framework in place, Nigeria's digital entrepreneurship ecosystems can rapidly accelerate overall opportunities within the digital ecosystem. This is exemplified by the case of Kaduna State, in Northern Nigeria (Box 6).

2.4.3 Digital Entrepreneurship Recommendations and Next Steps

The findings from the assessment of the current state of Digital Entrepreneurship in Nigeria aimed to identify the factors in the macro and microenvironment that influence the behavior of companies and individuals.

Each factor in the macro and microenvironment and its impact helps in the identification of the factors in the generic external environment, i.e., Opportunities and Threats; and the factors in the generic internal environment, i.e., the Strengths and Weaknesses, both of which are needed to construct the final SWOT Matrix.

Based on the analytic findings of this report, several priority policy issues are proposed to address key constraints to digital entrepreneurship in the short and medium terms. These recommendations are grouped around the key ecosystem constraints and opportunities described above. Because digital entrepreneurship is a relatively new agenda in Nigeria and consistent data on various aspects of the ecosystem is not available, several

recommendations require a more detailed review of the existing policy instruments and additional evidence-based analysis.

Improve the policy environment for Digital Entrepreneurship

R1. Reform the Policy Environment to Encourage Digital Entrepreneurship

Nigeria's legal and regulatory framework must be assessed and structured to create the business-enabling environment that can support the development of a digital economy. Enactment of the CAM bill will be an important step to improve the business environment for entrepreneurs and to provide greater clarity for investment funds. Once enacted, it will be important to develop regula-

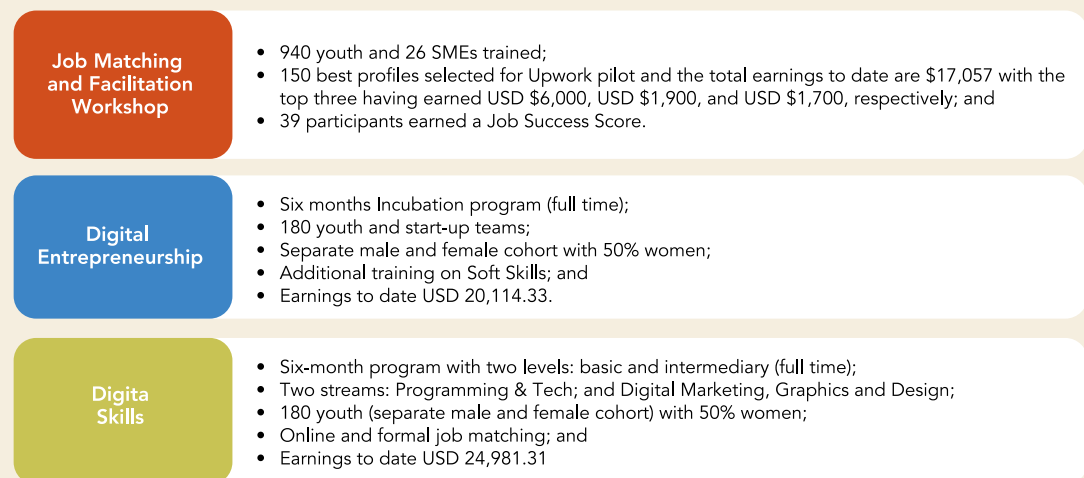
BOX 6

Kaduna State Government Initiative Aiming to Support Digital Entrepreneurship and Digital Skills

The Kaduna State Government launched the 'Click-On Kaduna' program in partnership with the World Bank Group and the Rockefeller Foundation. 'Click-On Kaduna' is empowering disadvantaged youth and women between the ages of 18 and 40 in fragile and conflict zones by training them to leverage employment opportunities in the digital economy. The program is using digital technologies to drive innovation, digital skills, and job creation, and break the cycle of unemployment, and fragility and violent conflict in Kaduna State.

The Kaduna State Development Plan (KSDP) 2016–2020 considers ICT-related industries as areas with significant potential for driving regional economic growth and job creation. The ICT sector offers new opportunities for youth in Nigeria as Nigerian youth enter the virtual economy and earn an income by performing paid tasks in a growing global marketplace. Connecting Nigeria's unemployed and underemployed youth to the digital economy is especially critical in Kaduna State, where many young people have limited access to gainful employment opportunities in the local market.

FIGURE 24



tions to support the CAM Bill and other relevant recently passed legislation, such as the Secured Transactions Act, to ensure effective implementation. Additionally, there should be a review of legislation impacting digital entrepreneurs, including: (i) the IP policy and legislative framework; (ii) the Cybercrimes Prevention Act; (iii) the VC Incentives Act; and (iv) the tax incentive system akin to the Pioneer Tax, to ensure the regulatory environment is conducive and not an impediment to the growth of digital entrepreneurship.

R2. Conduct an assessment of existing SME support mechanisms

An evaluation of SME support programs in Nigeria, such as a Public Expenditure Review (PER), should be conducted to identify key areas of improvements given the limited fiscal space available. There are established methodologies for Public Expenditure Reviews (Correa, 2014) that could be applied in the Nigeria context. It will also be important to assess the distortive effect of the various interventions and explore alternative support mechanisms that will instead crowd in private investment. An independent review will allow for an arms-length assessment of the quality of public spending and should result in the development of an integrated set of actionable measures that combines institutional reforms with changes in the policy mix and catalytic investments.

R3. Strengthen the institutional structure to support digital entrepreneurship

It is essential for Nigeria to ensure consistency and coordination across the government in support of digital entrepreneurship. The TCAG could be structured to ensure effective overall coordination across the

government and long-term strategy setting for digital entrepreneurship. Good practice experiences (such as the Science and Technology Policy Council of Finland or the Irish Council on Science, Technology and Innovation) show that coordination mechanisms with a high degree of influence on society and policy making consist of several key characteristics: they are made up of influential business leaders and government representatives, they develop comprehensive strategies, and they disseminate these strategies through a small but stable secretariat. TCAG already has the right membership, and so there needs to be a focus on establishing a dedicated secretariat that will support the development and implementation of an action plan. Engaging with best practice councils in other countries could also benefit the newly created TCAG to prioritize its activities, ensure sound and effective private sector consultation, establish partnerships and coalitions, and be effective in providing independent advice on the digital entrepreneurship agenda.

R4. Update the legal framework for private equity investment and allow for the introduction of innovative financing mechanisms

This could include revising current laws and regulations relevant to access private equity finance, such as the Venture Capital Incentives act, and ensuring they effectively incentivize and remove impediments to investment with properly calibrated consumer and investor protection rules in place. One potential option would be to introduce a regulatory sandbox for innovative financing mechanisms, such as crowdfunding, which would allow the government to study effects and risks of proposed legislative changes in a controlled environment before implementing any changes nationwide.

SWOT Matrix

Strengths	Weaknesses
<ul style="list-style-type: none"> – Vibrant ecosystem in Lagos and Abuja – Expanding digital ecosystem networks – Private sector-led digital hubs – VC for growth-stage start-ups – Diaspora networks – Expansion of e-governance and public procurement 	<ul style="list-style-type: none"> – Lack of coordination among players – Weak ecosystem outside the cities – Inadequate legislation for innovative financing and digital start-ups – Burdensome and unclear tax policy – Lack of digital skills – Lack of early stage investors – Uneven Internet/mobile penetration
Opportunities	Threats
<ul style="list-style-type: none"> – Government championship of digital agenda – Platform for public-private dialogue (TCAG) – Proposed Companies & Allied Matters Bill – International investments in digital start-ups – Entrepreneurial culture and young labor force 	<ul style="list-style-type: none"> – Tightening international competition for digital investments – Weak business climate – Brain drain – Weak IP protection and cybercrimes – Low digitalization of traditional industries limiting the B2B markets

Support efforts to strengthen the pipeline of digital entrepreneurs

R5. Collect data on digital entrepreneurs and technology-enabled firms, and conduct a technology adoption survey to systematically assess the firm-level barriers to adoption of digital technologies

This assessment will provide a basis for need-based development of government policies and programs, and evidence for consultations with ecosystem stakeholders. This information will be a public good that allows digital entrepreneurs to better understand needs and constraints of their potential clients in internal markets and develop customized products for different client segments. It can also inform the design of programs of innovation hubs and other ecosystem enablers.

R6. Conduct a review of innovation hubs and other programs that target digital entrepreneurs in Nigeria and develop a Monitoring and Evaluation framework (M&E) for innovation hubs in partnership with the private sector

Performance data will promote competition among hubs and improve resource utilization. It will also help identify good practices and scale up the most impactful models. The government can support existing incubator networks and other stakeholders in developing an M&E framework for innovation hubs in the country. This information will be critical to assure effective design and implementation of new university-based incubators that the government is planning to set up across the six geopolitical zones.

R7. Foster collaboration between ecosystem players including digital entrepreneurs, innovation hubs, academia, big corporates, investors, and the government

The government could play an important role in facilitating the digital entrepreneurship ecosystem by providing open data and statistics, platforms for public-private dialogue, and incentives for collaboration. However, successful implementation of these initiatives will depend on ownership and participation of the private sector. The first step in that direction in Nigeria could be in helping the digital industry to self-organize by supporting the capacity of digital industry associations, providing forums for industry dialogue, showcasing success stories of digital ventures, and providing awards to digital entrepreneurs to increase their visibility

Encourage private sector solutions for funding digital entrepreneurs

R8. Incentivize institutional investors to invest in public and private equity markets

Institutional funds such as pension funds are the most important source of capital for venture capital, private

equity, and public equity markets globally, and Nigeria should not be an exception. In addition, there is overwhelming evidence that diversification of institutional investment (both in terms of sectors and geography) is important to protect portfolios across economic cycles. PENCOM should review successful international experiences to identify potential options for creating domestic investment opportunities for pension funds, allowing them to diversify their portfolio and deliver required long-term returns, including through public and private equity investments.

R9. Explore avenues to de-risk and scale up early-stage funding for digital entrepreneurs

The government could play a catalytic role for early stage investments in digital ventures by helping to de-risk the market. There are a range of options available based on international experiences, including mezzanine financing, guarantees, and fund-of-funds that invest alongside seed- and early-stage investors that mitigate the exit risks to investors in a shallow Nigerian secondary market. Whatever solution is employed will need to be implemented in a transparent manner, with the private sector in the lead role, to eliminate the potential for market distortions prevalent in existing solutions.

Strengthening markets for digital products and services

R10. Support mechanisms to facilitate provision of services to large corporations by start-ups with innovative products/services

To promote the linkages with large buyers, the government should help to address the following key challenges of Nigerian digital startups: (i) the information gap, by providing matchmaking services between start-ups and large corporate and incentivizing contracting of local firms; (ii) the firm capabilities gap, through upgrading programs that improve management and employee skills, quality control, and technology; and (iii) the challenge of informality by lowering the administrative barriers to formalization. These initiatives will help to connect large corporates and multinationals in Nigeria with innovative start-ups locally.

R11. Support adoption of digital technologies in strategic industries

Based on the results of the technology adoption survey and in collaboration with the private sector (e.g., investors, lead firms), the government should launch targeted programs for digital technology adoption in industries like agriculture and agribusiness that can have a transformational impact on productivity and livelihoods, as well as expand digital markets. Based on lessons of experiences from other SSA countries, programs such as the e-voucher

program for smallholder farmers may provide a platform for collaboration between the government and digital businesses and activate new markets for digital services (World Bank, 2019). Other sectors may also benefit from similar initiatives.

R12. Improve collaboration with digital entrepreneurs in provision of public services through transparent public contracting, digitalization of public services, and ICT up-skilling of public workers

The government should expand contracting of public services through SMEs and actively pursue opportunities to increase the reach and accessibility of public services through digital solutions. These solutions should rely on a range of digital technologies that are accessible to the poor (e.g., basic mobile phones). There are proven digital solutions that use mobile and other information technology to improve access and quality of services, such as Internet kiosks for payments and smartphones for medical information for health professionals (World Bank, 2017). The government should also launch joint ICT up-skilling programs for government agencies and local entrepreneurs to improve collaboration and trust and reduce rigidities in procurement of the necessary ICT services

2.5 DIGITAL SKILLS PILLAR

2.5.1 Importance of Digital Skills Pillar

Digital technologies are forecast to be a major driver of productivity, with successful economies depending on greater numbers of digitally skilled workers than has previously been the case. As an example, the creation of a digital single market in Europe is expected to add €415 billion in annual GDP to the EU (Institute for Public Policy Research, 2018), requiring a new set of skills for workers. It is estimated that roles requiring digital skills will grow up to 12% by 2024. As firms' production and employment needs continue to change rapidly, the labor supply needs to be able to rapidly adjust to meet demand (World Bank Group, 2018).

In order for workers to successfully perform digital work, they must develop digital skills. With 46% of work activities in Nigeria susceptible to automation (World Economic Forum, 2017a), digital skills will qualify workers for jobs in traditional sectors, while also empowering them to thrive in emerging sectors and even launch their own businesses. As the nature of work continues to change, digital skills will become increasingly important for workers to engage in new forms of work, such as virtual freelancing, and participate in the gig economy and online job marketplaces (World Bank Group, 2018).

It is unpredictable, however, what jobs will emerge, disappear, or change in the future due to digital technologies. Therefore, Nigeria's education sector needs to be flexible to respond not only to new jobs in ICT professions, e-commerce, and online-service provision, but also for changes in traditional industrial and artisan jobs. For example, digital devices or mobile money will likely affect the work of technicians, lower end service providers, mechanics, and retailers, etc., who will need basic to advanced digital skills in order to be able to compete in the digital economy. Consumers, on the other hand, will also need to acquire digital skills in order to shop, pay, work, communicate, or study. In relation to studying, technology-based teaching and learning, such as the bridge academy in Lagos and Edo, will bring in increased demand for personalized and self-learning using online resources/mobile learning labs. All of these changes will pose considerable demands on the existing skills development system in Nigeria.

Digital skills exist on a continuum, ranging in level from basic to intermediate to advanced. According to the World Bank Digital Jobs for Youth report, these skills refer to a combination of behaviors, expertise, know-how, work habits, character traits, dispositions, and critical understandings that enable youth to actively participate in and contribute to the digital economy (World Bank Group, 2018). According to the European Commission, three main types of digital skillsets are needed in contemporary society (Institute for Public Policy Research, 2018):

- 1. Basic digital skills:** Skills that enable people to play an active role in the digital society as 'digitally literate' and empowered individuals. This includes the skills to use every day digital applications (including e-commerce and e-government), carry out basic Internet searches, and be safe online.
- 2. Digital skills for the general labor force (intermediate skills):** In addition to basic skills, these skills are needed in most digitally enabled workplaces. This subset includes new skills for established workers in sectors that are adopting digital avenues, and skills for seeking work in the digital economy. These general skills enable people in a vast range of roles to use the applications created by ICT specialists, without themselves having specialist expertise.
- 3. Digital skills for ICT professionals (advanced skills):** Advanced digital skills for ICT experts and leaders across all industry sectors. These include skills linked to developing new technologies, products, and services.

Finally, regardless of sector or occupation, new work formats will offer individuals and entrepreneurs new

opportunities. One example of these new work formats is online platform work, which is on the rise globally, including in Sub-Saharan Africa. The region currently has 56 e-ridesharing services, most of them homegrown apps launched over the last three years. In Africa, online talent platforms have the potential to create significant benefits by moving people from informal to formal jobs, and by increasing workforce participation and hours worked of those formerly underemployed or inactive. By 2025, this could result in 1.9 million jobs and USD 20 billion additional GDP in Nigeria (World Economic Forum, 2017a).

2.5.2 Diagnostic Findings: Current State of Digital Skills Pillar

Policy Framework

This section assesses the education policy framework in Nigeria, including the institutional structure, government programs, and education strategies.

A. INSTITUTIONAL STRUCTURE

Education is a shared responsibility of the three tiers of government in Nigeria (federal, state, and local) and suffers from insufficient interagency and intergovernmental coordination. The Nigerian education system can be described as a 1-6-3-3-4 system. First, in basic education there are one pre-primary year, six years of primary, and three years of junior secondary education. Then, the next three years are senior secondary education, followed by four years of tertiary education (World Bank, 2017a). In order to access and qualify to university, all students must take the West African Senior Secondary Certificate Examination (WASSCE) and must get at least five credits including English and Mathematics relevant to his/her major course (HALI Access Network, 2018). UBEC and SUBEBs manages basic education, including junior secondary, while the state ministries of education oversee senior secondary. State governments own state universities and the federal government owns and manages Federal Unity Colleges and all federal universities.

B. VISION 2020

Nigeria's Vision 2020 is a strategic document that identifies the long-term developmental objectives with the aim of achieving accelerated and sustained economic development in Nigeria. Furthermore, Vision 2020 recognizes the importance of ICT skills development and greater diffusion of ICT across subsectors within the economy, including education, finance, farming, trade, manufacturing, services, oil and gas, and the public sector. In line with this objective, Vision 2020 will (National Planning Commission, 2009):

- Promote development of local capacity to meet the needs of the ICT sector in order to develop an industrialized economy;
- Encourage research and development within the ICT sector;
- Promote private sector-led ICT investment, entrepreneurship, innovation, and local capacity development; and
- Government will facilitate and be a catalyst of ICT sector initiatives.

The strategic initiatives envisioned to drive implementation of policy within the ICT sector linked to digital skills include (Government of Nigeria, 2010):

- Mainstreaming ICT into the education curriculum;
- Encouraging local production of ICT components and subsystems by providing incentives for manufacturers for major ICT projects;
- Establishing a national digital library with access points strategically located in both rural and urban areas;
- Promoting e-learning, e-governance, e-business, e-commerce, and e-banking; and
- Providing regular and affordable access to Internet resources in all educational and research institutions, with particular focus on basic and post-basic education.

Education Sector

This section assesses the state of educational levels and access to education in Nigeria. As described below, Nigeria has made great strides in expanding access to education, though gains have been reversed in recent years. Regional disparities exist mostly in the north and rural areas. The conflict crisis contributes significantly to North-East disparities. The gender gap is reversing most significantly in the North-West region among the pupils in basic education. A recent study by the World Bank showed the gap between girls and boys who never attended school is small (about 1 percent). The educational system, which should provide the basic and foundation literacy and numeracy skills required to be effective in the digital age, does not produce the kinds of candidates who can hit the ground running. Nigeria's general education standards are low, with the quality offered at all levels continuously suffering from poor funding and deteriorating teaching capabilities. Traditional educational emphasis on theoretical components and insufficient promotion of practical applications of using new technology are obstacles to overcome. Universities are often themselves under-skilled, under-equipped and under-funded to innovate the curriculum or recruit and up-skill teaching person-

nel that can capably train digitally literate graduates. The following broad issues persist:

Availability of trainable pool of labor

- Only 2–4% of total secondary and tertiary-level graduates are employable with a minimum of training interventions (6–9 months training); and
- A large part of the tertiary graduate trainable pool available (18–20%) requires training interventions for 1–4 years.

Quality of trainable pool at primary, secondary, and tertiary levels

- There is a lack of proficiency in English language communication;
- Math and Sciences are not well developed for many primary, higher secondary, and tertiary graduates;
- There is a lack of self-motivation and self-learning initiatives, problem-solving skills, and process-based learning (discipline) in a large portion of tertiary graduates; and
- There is a need to nurture and support a sense of creativity, innovation, and learning from failure among the talent pool.

Inadequate ICT training opportunities for teacher (trainer) programs at all levels of education

- More teachers require regular training in teaching new digital technologies;
- There is a lack of qualified trainers in ICT at primary and secondary schools;
- There is a lack of hard and soft infrastructure in schools and colleges to enable teacher training; and
- Train the Trainers programs are available, however are often not implemented due to lack of coordination between key stakeholders.

Initiatives to overcome these challenges include, for instance, the Basic Digital Education Initiative (BDEI) organized by Tech4Dev and Microsoft, which are expected to train 500,000 young Nigerians. Yet, high poverty and illiteracy rates, the urban-rural divide, disadvantages in opportunities faced by women and girls, and low human development investments are factors hindering the closing of digital skills gaps.

A. EDUCATION LEVELS

As described in other pillars, Nigeria's education standards are low, with the quality offered at all levels continuously suffering from poor funding and deteriorating

teaching capabilities. According to the World Economic Forum Executive Opinion Survey, the quality of Nigeria's education system ranks low in the continent with 2.8 out of 7, and below the world average, which stands at 3.8 (World Economic Forum, 2017a). Furthermore, Nigeria is reported to have one of the lowest shares of government expenditure in education (7%). This rate goes up to more than double in the Sub-Saharan Africa region according to the World Bank. In addition, the International Labor Organization (ILO) estimates that 21.4% of youth in Nigeria are not in education, employment, or training (World Bank Group, 2019).

Despite Nigeria's commitment to free, compulsory, and universal basic education under the Universal Basic Education Act of 2004, basic education continues to suffer from low and inequitable access. Based on the 2015 Nigeria Education Data Survey (NEDS), the Nigeria Gross Enrollment Rate (GER) in primary education is 87% (compared to 100% for Sub-Saharan Africa), and while the rate for junior secondary education (65%) is above the average for SSA, it remains well below the universal average.

Nigeria's primary school gross enrollment rates computed using the household survey data were 72% and 74% in 2010 and 2015, respectively. These GERs are significantly below UNESCO's 2016 estimate of 85%. Nigeria ranks among the bottom 20% of countries in SSA whose average is 97%. The basic education GER (meaning for the first nine years of school) was 75% in 2015. The Net Enrollment Rate (NER) for basic education improved marginally in 2010–2015, increasing from 69% to 72%. International comparison of primary school NERs shows that Nigeria's rate of 68% is well below the SSA regional average of 78%.

This inequitable access to education observed in Nigeria will lead to increased inequality in digital skills, and subsequently low access to new jobs in the digital economy.

The quality of basic education, measured in terms of student learning outcomes, is also low in Nigeria. A recently released report by the National Bureau of Statistics shows a decrease in students' performance in 2018 relative to 2017. The percent of candidates, 47.21, who sat for the exams in 2018 passed with 5 credits including English Language and Mathematics compared to 53.97% in the previous year. Of the candidates that passed in 2018, 50.47% were female while 49.53% were male. Furthermore, regional data shows the South-East (66.25%) is the best performing region while the North-East (19.96%) had the poorest performance among candidates.

These foundational skills gaps underscoring basic math and/or literacy will pose challenges in improving digital literacy in Nigeria, and thus limit the opportunities offered in the digital economy (World Bank, 2017a). Furthermore, Nigeria lags Ghana, Kenya, and Senegal in the quality of its Math and Science education. While it is not surprising that Ghana and Kenya are rated higher than Nigeria, Senegal's rating indicates a potential to overtake Nigeria in digital skills in the future (World Economic Forum, 2016). Nonetheless, there is still a huge opportunity for Nigeria to devise and apply workable strategies for advancing overall digital skills and benefit from the digital ecosystem.

While access to education has stagnated at the primary level, it has expanded substantially at the secondary and tertiary levels. Secondary gross enrollment more than doubled from 24% in 1990 to 56% in 2013, the highest in the time series. Since then, it decreased to 42% in 2016, in line with SSA average that same year, and far from the universal average. Tertiary gross enrollment, on the other hand, increased more than twofold from 4% in 1990 to 10.2% in 2011, with the latest available data setting Nigerian tertiary enrollment above the average for SSA (8% also in 2011). The rapid expansion of enrollment in secondary and tertiary education could place additional pressure on the share of resources available for the pre-primary and primary subsectors (World Bank Group, 2019).

B. REGIONAL DISPARITIES

Enrollment rates in the south and in urban areas are much higher than in the north or in rural areas. The primary school NER in the southern geopolitical zones ranges from 81–87%, with the South-East zone having

the highest rate. Whereas in the northern zones, the rates range from 55 to 69%. Despite an increase in NER, the north and south are not converging. Similarly, the NER for primary education in urban and rural areas showed a large gap: 82% and 62%, respectively, in 2015. This represents an improvement since 2010, though mostly in urban areas (World Bank, 2015).

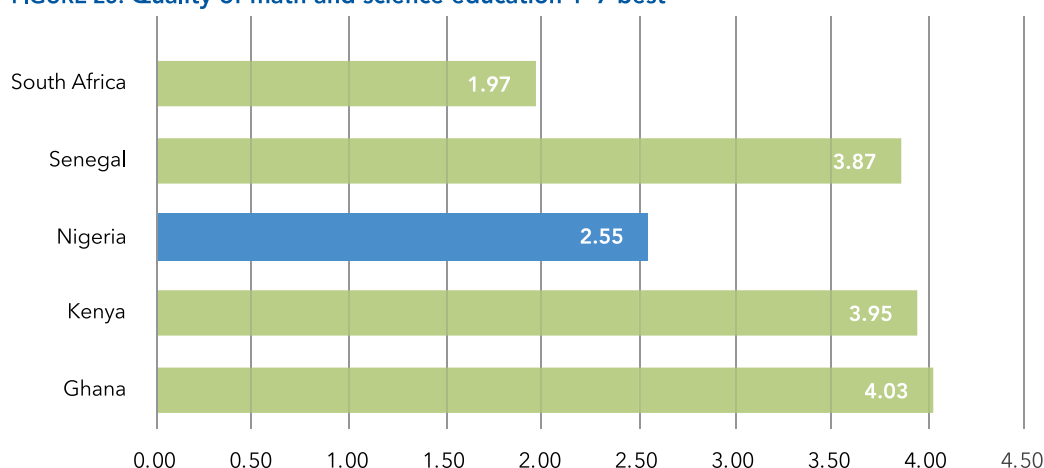
The gender gap in school enrollment appears to be minor. The difference between female and male enrollment rates, both net and gross, are consistently around or below 1 percentage point. Girls' GER in secondary education increased from 60% to 63% in 2010–2015, effectively closing the gender gap. However, at the senior secondary level in 2015, a gender gap remains, but in favor of girls: 42% versus 38% for girls and boys, respectively.

Access to digital skills learning can indeed decrease regional gaps between the north and south by providing access to underserved areas in both regions of Nigeria, particularly regions where access to schools and physical education infrastructure are limited. Furthermore, in the northern region where existing cultural barriers prevent women and girls from access to most kinds of formal education, digital skills programs can be applied in a manner that includes more females to tackle existing gender disparities in accessing digital skills training and development.

C. DIGITAL SKILLS DEVELOPMENT

Nigeria has over 500 tertiary and secondary institutions offering skills development and/or Technical and Vocational Education and Training (TVET) programs, some of which also offer digital skills for employment.

FIGURE 25: Quality of math and science education 1–7 best



Source: WEF—Global Information Technology Report (2016)

These include Abu Bakar Tafawa Balewa University (ATBU), Bauchi, Federal University of Technology Akure (FUTA), Federal University of Technology Minna (FUTM), Federal University of Technology Owerri (FUTO), and Modibbo Adamu University of Technology Yola (MAUTECH). The TVET programs offered at these universities are Electrical and Electronics, Automobile and Mechanical Productions, Agriculture and Business Education, and Building and Woodwork (Ismail & Sale Mohammed, 2015). An increasing number of Nigerian universities have skilled lecturers with requisite facilities to build the digital skills of their undergraduates and postgraduates. Funding to support innovation in the digital space in most universities is still a major challenge for addressing existing skills gaps.

D. DIGITAL EDUCATION AND TRAINING PROGRAMS

In recognition of the need to create a digitally enabled workforce, several firms are increasingly offering a variety of education and training programs at global and regional scales. Some of the dominant education and training programs in Nigeria are offered through private sector-led interventions by Andela and Google, while the government has also established implementation of digital skills programs as a component of a national digital economy project.

The Smart Nigeria Digital Economy Project

The Smart Nigeria Digital Economy Project is a digital-led strategy initiative of the government which centers around the establishment of an ICT ecosystem in Nigeria. This is enabled through significantly expanding broadband coverage, increasing e-government, and establishing ICT clusters, starting in the Special Economic Zones (SEZs). Government will also drive a program to build the skills in this sector that are focused on training ICT engineers in software development, programming, network development, and cybersecurity. The project's objective is to increase the contribution of ICT and ICT-enabled activities to GDP by an estimated 10% and create 2.5 million new jobs between 2017 and 2020 (Ernst & Young: Nigeria, 2018).

Google Digital Skills for Africa Program

Google's Digital Skills for Africa program was initially launched with the stated aim of training 1 million young people in the region between April 2016 and March 2017. This was achieved within 10 months, with over half of those trained being residents of Nigeria. The online program has trained people in 29 countries, and the face-to-face program is offered in 11 countries. In July 2017, a new target was announced—to train 10 million people by 2022. To date, more than 2 million learners have taken part. The objectives of this are to create a 'level playing field' of digital skills and opportunities, and to drive socio-

economic change through entrepreneurship. In Nigeria, the program had a specific aim of training unemployed young people, thus enhancing their employability for a global digital labor market. The country's population is expanding, and if the economy is to sufficiently provide jobs, it must diversify beyond commodities and into technology. However, this will not be practical unless digital skills levels rise substantially. The program is also linked to Nigeria's commitment to the United Nation's Sustainable Development Goals (SDGs) for 2030 (Institute for Public Policy Research, 2018), specifically the following SDGs (Gillwald, et al., 2018):

- **ICT SDG Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.**
 - Target 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs, and entrepreneurship.
- **ICT SDG Goal 5: Achieve gender equality and empower all women and girls.**
 - Target 5b: Enhance the use of enabling technology, in particular information and communications technology, to promote women's empowerment.

Andela

Technology has also facilitated the creation of jobs through working online or joining the so-called gig economy. Andela, a U.S. company that specializes in training software developers, has built its business model on the digitization of Africa. Andela has trained 20,000 software programmers across Africa using free online learning tools. Once qualified, programmers work with Andela directly or join other Andela clients across the world. The company aim is to train 100,000 African software developers by 2024. 90% of its workers are in Lagos, Nigeria, with other sites in Nairobi, Kenya, and Kampala, Uganda (World Bank, 2019d).

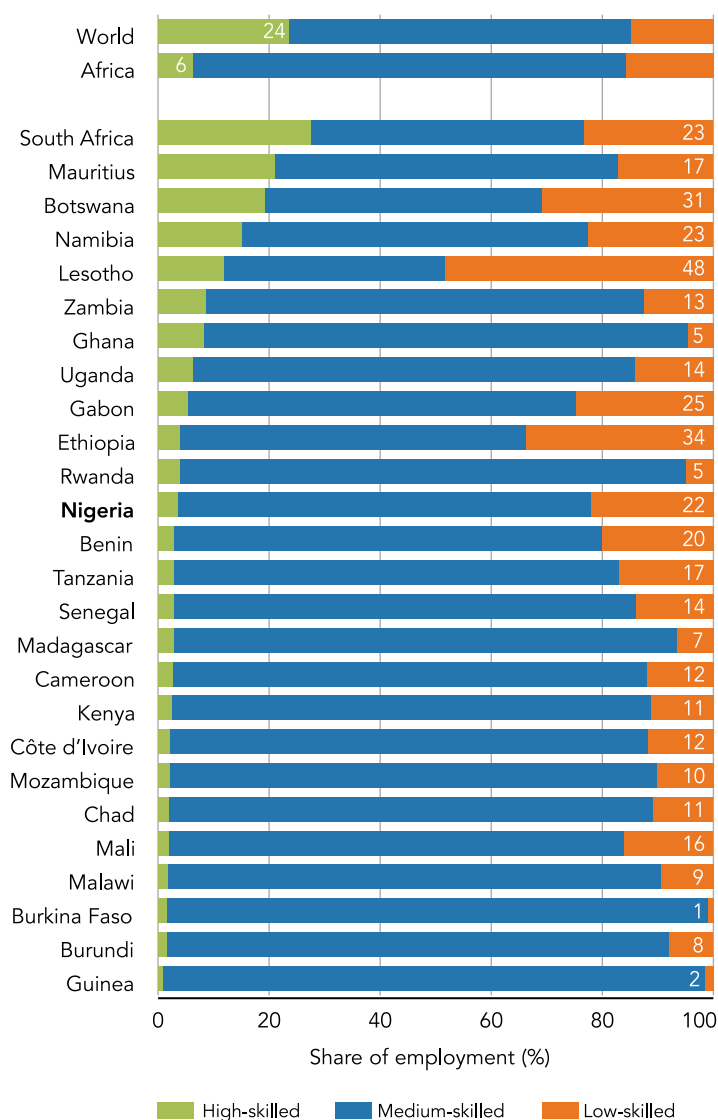
The Labor Market

This section assesses the state of digital skills in Nigeria's labor force, including a description of Nigeria's presence in the virtual economy.

A. LABOR FORCE

Out of a total population of 190 million, the Nigerian labor force is estimated to be in the region of 59 million, with a literacy rate of 51%. Furthermore, the World Bank's Nigeria Jobs Report of 2015 found that the Nigerian economy needs to create 40–50 million jobs between 2010 and 2030. These numbers translate into over 2 million additional jobs per year. These jobs will need to be

FIGURE 26: Africa's employment distribution by skill level required



Source: World Economic Forum, 2017a.

created in urban and rural areas, and predominantly in nontraditional sectors, such as Information Communications Technologies (ICT) (World Bank Group, 2019).

Labor force participation in the Sub-Saharan region is high and characterized by the generally strong economic participation of women. However, significant gender gaps in workforce participation remain in countries such as Mauritius, Mali, Côte d'Ivoire and Nigeria. Furthermore, Nigeria maintains large proportions of workers in lower-skilled jobs, and high formal sector unemployment rates, which increased from 11.92 to 15.99 million in 2017, with the youth reported to be the most affected at 33%. These high unemployment and underemployment rates

are also affecting secondary school and university graduates (World Economic Forum, 2017a).

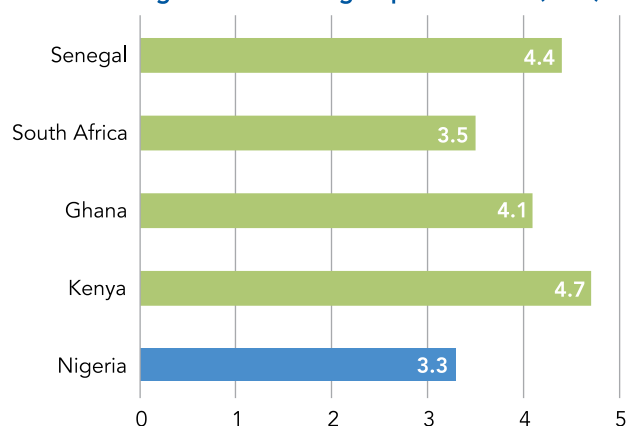
In addition, Nigeria is far from making optimal use of its human capital potential and is underprepared for the impending disruption to jobs and skills brought about by the Fourth Industrial Revolution. This underpreparation is portrayed by the 2017 ITU ICT Development Index and the World Economic Forum Index, where Nigeria ranked 143rd out of 176 and 15th in the region, respectively. In the 2017 ITU ICT Development Index, Nigeria obtained 3.53 points in the IDI Skills Sub-Index, although the lowest score was for the IDI Use-Sub-Index with 1.58 points (ITU, 2017b). Furthermore, the World Economic Forum's Human Capital Index, which measures the extent to which countries and economies optimize their human capital through education and skills development and its deployment throughout the life-course, ranked Nigeria 114th out of 130 countries, with a score of 51.06. The same Human Capital Report revealed that Sub-Saharan Africa, on average, currently only captures 55% of its full human capital potential, compared to a global average of 65%, ranging from 67 to 63% in Mauritius, Ghana, and South Africa to only 49 to 44% in Mali, Nigeria, and Chad (World Economic Forum, 2017a). Finally, the World Economic Forum digital skills indicator reflects answers to the question: "In your country, to what extent does the active population possess sufficient digital skills (e.g., computer skills, basic coding, digital reading)?" [1 = not all; 7 = to a great extent] Nigeria ranks the lowest among all its regional peers (World Economic Forum, 2018).

In this regard, among its regional peers, Nigeria is the only country that has shown a significant decline in firms, identifying the lack of an educated workforce as a major constraint. This is not necessarily a positive sign as Ghana and Kenya's demands for educated workers are underpinned by growing economies (World Bank, 2014).

B. THE WORKING TO ADVANCE SCIENCE AND TECHNOLOGY EDUCATION FOR AFRICAN WOMEN (WAAW)

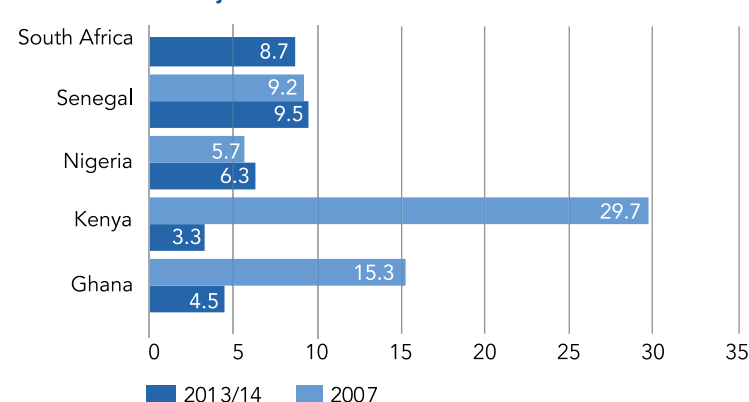
The Working to Advance Science and Technology Education for African Women (WAAW) Foundation is an international nonprofit organization based in Nigeria that works to increase the number of African women entering STEM fields through bootcamps, scholarships, and workshops. WAAW also connects girls and young women with working professionals in the IT industry who have volunteered to serve as mentors. Program beneficiaries receive advice and insights from mentors on a range of personal and professional topics, including: future career options; suggestions for self-learning using online resources and additional trainings; academic challenges at school; the importance of maintaining an online

FIGURE 27: Digital Skills among Population 1–7 (best)



Source: WEF Global Competitiveness Index

FIGURE 28: Percent of firms identifying an inadequately educated workforce as a major constraint



Source: WBG—Enterprise Surveys

presence through social media sites such as LinkedIn; resources to support their success as girls in STEM; and support for internship opportunities. WAAW's STEM and Outreach Mentoring Program is currently being run in 19 chapters across 11 African countries, and reaching over 10,000 young people (World Bank Group, 2018).

C. VIRTUAL ECONOMY: MICROWORK AND ELANCING (VIRTUAL FREELANCING)

According to the World Bank, the virtual economy consists of a three-layer model that comprises the ICT physical infrastructure; the digital economy of services supported by the ICT infrastructure; and also, the virtual economy that emerges from the digital services and the infrastructure. Most of the initiatives in both the developed and developing world, in order to allow the virtual economy to thrive, are focused on the physical infrastructure (pipes, microwave towers, or devices) and the proliferation of high-skilled and semi-skilled businesses around ICT, from BPOs to e-commerce. However, the rise in virtual transactions (both social and monetary) and the use of Internet and smartphones in our daily lives, have created new digital needs, ranging from the lower to the higher set of skills. The virtual economy, therefore, introduces a new paradigm in digital content industries. This low and medium-skilled labor virtual economy opens the door to a growing number of unemployed and underemployed pool of workers, both in the developed and developing world, that are willing to take advantage of the opportunity provided by the virtual marketplace.

Elancing and microwork represent work opportunities for skilled and semi-skilled workers, respectively. While job opportunities in the real economy (as opposed to virtual) may be limited within geographical boundaries, there are over a million tasks available online on just

FIGURE 29: Virtual Economy Three Layer Model Ernkvist, D. V., and Mirko, D. (2011). Knowledge Map of the Virtual Economy: Converting the Virtual Economy into Development Potential.

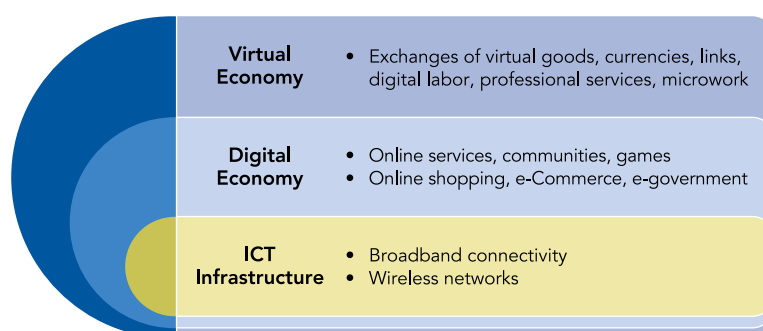
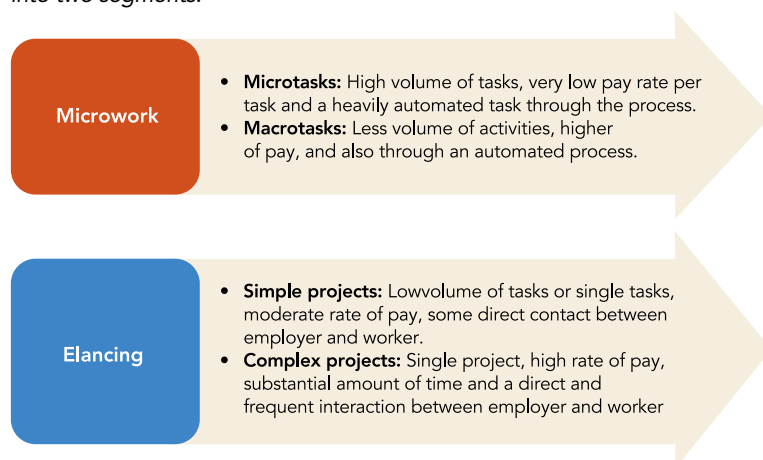


FIGURE 30: Microwork and elancing subsegments. Self-elaboration.

The third layer, i.e., the virtual economy, crosscuts multiple sectors, regions, industries, employers, and workers. Traditionally, this third layer is divided into two segments:



one of many active platforms. Workers are therefore just beginning to scratch the surface of the online work industry. Elancing tasks include writing business plans, designing websites, editing legal documents, etc., for which they may earn from twenty to a few hundred dollars per task. Microwork tasks on the other hand include answering survey questions, tagging images, translating lines of text, etc., with workers earning on average only a few cents to a couple of dollars per task.

According to the report “What is the state of Microwork in Africa?” Nigeria is second in the continent, behind Mozambique, with almost 8% of microworkers. Interestingly, the gender gap observed in both education and the labor market in Nigeria is reverted in the virtual economy, with the microwork gender gap standing at 63% (Onkokame, et al., 2018). Furthermore, according to Upwork, the biggest elance platform in the world (formed from the merger of oDesk and Elance in 2013)⁵⁹ is comprised of 605 Nigerian elancers in Upwork, out of 5,427 elancers in Africa as of December 2018 (11%) (Upwork, 2016).

TABLE 7: Percentage of Microworkers and gender distribution

County	Microwork (%)	Male (%)	Female (%)	Gender gap (%)
Ghana	1.99	1.93	2.08	-7
Kenya	3.36	2.99	3.79	-26
Mozambique	7.90	10.81	3.34	69
Nigeria	7.63	6.26	10.21	-63
Rwanda	3.74	4.25	2.64	37
South Africa	6.48	7.45	5.56	25
Tanzania	0.56	0.22	1.00	-355

Source: Onkokame, et al., 2018.

The same report assesses the level of education and employment status among microworkers. Very small numbers of highly skilled workers undertake the very small amount of high paying freelance work across the seven countries assessed, mostly in South Africa and to a lesser degree in Nigeria and Kenya. Furthermore, while a 47% majority of Nigerian microworkers are bachelor's degree holders, the majority of microworkers in the other countries assessed tend to have a secondary education. In terms of employment, the majority of Nigerian microworkers are self-employed, followed by employed, with both categories accounting for 80% of the sample. Similar trends are observed in the other countries, except for Mozambique, where the majority are students and unemployed (75%) and Ghana, where the majority are unemployed (60%) (Onkokame, et al., 2018).

The Nigerian government, supported by the World Bank and the Rockefeller Foundation, organized workshops in 2013 to introduce thousands of citizens into microwork platforms. NaijaCloud first edition in 2013 targeted both segments in the virtual economy, i.e., microwork and elancing, with workshops in both Lagos and Abuja that provided Nigerian youth and companies with the foundations to start working or hiring in the virtual economy. In 2018, the World Bank and the Rockefeller Foundation, in partnership with the Kaduna State Government, organized Click-On Kaduna. This was a three-day event attended by almost 1,000 participants who were involved in workshops on how to become freelancers, tips from professional Nigerian freelancers, and hands-on profile creation. The event included a selection of Nigerian microwork and elancer platforms, i.e., Efiko (www.efiko.co), Jolancer (www.jolancer.com), Motionwares (www.motionwares.com), and Asuqu (www.asuqu).

TABLE 8: Distribution of microworkers by education and employment status

	Ghana	Kenya	Mozambique	Nigeria	Rwanda	South Africa	Tanzania
EDUCATION							
Primary					16.37		22.03
Secondary	56.36	50.15		44.10	65.46		49.21
Certificate/Diploma	43.64	49.06		7.45	8.63		
Bachelor's		0.79		47.39	9.54		28.75
Master's				1.06			
EMPLOYMENT							
Student/Pupil	12.18	18.07	51.30	7.99		16.71	28.75
Unemployed, active	59.79	16.26	24.57	13.66	16.37	15.17	
Employed	7.35	21.32	18.81	31.86	58.46	60.08	22.03
Self-employed	20.68	44.35	4.16	46.49	25.18	7.31	49.21

Source: Onkokame, et al., 2018.

SWOT Matrix

Strengths	Weaknesses
<ul style="list-style-type: none"> – Secondary and tertiary education growth – Google Digital Skills for Africa – Andela – WAAW – Gender gap in microwork – Microwork ranking 	<ul style="list-style-type: none"> – Quality of education – Low basic education enrollment – Gender gap in education and labor – Digital Skills in Curriculum – TVET and digital skills
Opportunities	Threats
<ul style="list-style-type: none"> – Universal basic education – Vision 2020 – Labor force – Virtual economy – Upcoming digital skills programs (Click-On Kaduna, IDEAS, Smart Nigeria Digital Economy Project) 	<ul style="list-style-type: none"> – Institutional structure – Government expenditure – Human capital potential – Regional disparities

com), as well as local SMEs interested in using the virtual economy labor force. In addition, Click-On Kaduna included an innovative pilot with a selection of 150 best profiles from the three-day event, who accessed a set of five paid tasks aimed at improving the Job Success Score (JSS)⁶⁰ of these new elancers.

2.5.3 Digital Skills Recommendations and Next Steps

The findings from the assessment of the current state of Digital Skills in Nigeria aimed to identify the factors in the macro and microenvironment that influence the behavior of companies and individuals. Each factor in the macro and microenvironment and its impact help in the identification of the factors in the generic external environment, i.e., Opportunities and Threats; and the factors in the generic internal environment, i.e., the Strengths and Weaknesses, both of which constructed the final SWOT Matrix.

As observed in the SWOT Matrix, despite the challenges and bottlenecks related to digital skills in Nigeria, there are clear strengths and opportunities that indicate the country can achieve much greater digital inclusion in the future. This section details recommendations and next steps based on the SWOT Matrix built, which would support Nigeria toward developing digital skills in the country. Indeed, the importance of digital skills are still evolving and gaining more recognition in Nigeria. As such the analysis in this chapter indicates a knowledge gap that requires further analytical exploration to better understand the state of digital skills in Nigeria.

R1. Leverage the Smart Nigeria Digital Economy Project, using it to improve government coordination

The established institutional framework in Nigeria is

underscored by ineffective policy making and implementation, mainly because of conflicts of jurisdiction between the three tiers of government that undermine policy coordination. Likewise, accountability mechanisms along the service delivery chain are inadequate. This recommendation will focus on integrating digital skills in the curriculum, starting in primary school, and all the way to tertiary and TVET education, as well as reducing regional disparities. This will require an increase in public funding for education, which as described in the diagnostic section is half the average of SSA, in order to improve the poor infrastructure conditions in schools across Nigeria.

R2. Explore innovative ways of including digital skills in the wider curriculum and scale up private sector-led initiatives

The process of developing, aligning, testing, training, and implementing new formal curricula (in schools and post-school institutions) is too lengthy to be responsive to the fast-changing demand. Innovative ways of training through partnerships (public/private, inter-sectoral, intra-sectoral, regional, and so on) should be considered as part of meeting this need. Leverage initiatives such as Google Digital Skills for Africa, Andela, or WAAW, have wider experience in delivering this type of curriculum, including addressing the gender gap.

R3. Emphasize formalized teacher training in general, as well as use of technology to enhance learning

Going beyond showing teachers how technology works, partnerships with educational technology consultants and closer collaboration with teacher training centers and universities are required, in order to align formal teacher education with the technological revolution envisioned in schools.

R4. Tackle out-of-school children issue

The large number of out-of-school children is the result of a wide range of demand- and supply-side factors that vary by state and geographic location. Demand-side constraints have become increasingly severe, especially in the conflict-affected North-East, while supply-side challenges include distant school facilities, and overcrowded and ill-equipped classrooms. It is also paramount to address the issues that prevent children from enrolling in school, including perceived low benefits of education, especially for girls.

R5. Implement post-school curriculum reform pertaining to qualifications related to professional digital skills

Innovative ways of speeding up the responsiveness of formal qualifications to the needs of the labor market should be explored and developed. Examples of partnerships between public and private sectors show great potential to help in this regard.

R6. Formalize the entrepreneurial link between ICT and business studies within and beyond higher education

The trend of merging ICT subjects with business degrees or vice versa could be broadened and incorporated into qualifications offered by TVET colleges. Curricula could also be reviewed to optimize the relevance of complementary subjects to enhance entrepreneurship, as described in the digital entrepreneurship pillar recommendations.

R7. Improve virtual economy awareness in Nigeria, making the country a hub for microwork and elancing

Leverage initiatives such as Click-On Kaduna, and Nigeria's current ranking in Africa with regards to microwork, to transform Nigeria into a hub for microwork and elancing activities. This will require revising the current labor law, as well as addressing infrastructure deficits (i.e., electricity, Internet, and payment services) so as to maximize the virtual economy impact in Nigeria. In addition, since Nigeria seems to start from a positive gender gap in microwork, it is important to maintain this and support more initiatives that target women, especially within the digital ecosystem.

R8. Create a centralized digital database of skills programs to track digital training provision via the public education system

With the exception of Artificial Intelligence Lagos, which is a self-organized group of learners studying data science and artificial intelligence, there is a scarcity of detailed digital skills training data in Nigeria. The Ministry of Education should create a database tracking the number of students that receive skills training, the curricula undertaken, their assessment results, and their education profiles. With a national database, it would be possible to track Nigeria's progress in developing a skilled workforce for the digital economy.

NOTES

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9. Draft Open Data, Federal Ministry of Communications, 2018.
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12. Ibid.
13. Open Government Partnership Secretariat, Federal Ministry of Justice.
14. Kale, Y. (Statistician General of Nigeria and CEO of National Bureau of Statistics) Keynote Presentation at the 1st Summit on Big Data, October 12, 2017.
15. Federal Ministry of Communications correspondence.
16. Insight 2 Africa (2018), "Africa's digital platforms and financial services: An eight-country overview." The eight countries covered were Nigeria, Ghana, Kenya, South Africa, Rwanda, Tanzania, Uganda, and Zimbabwe.
17. Ibid. Page 24. A more recent assessment (May 2019) has indicated that there are currently 116 platforms operating in Nigeria.
18. Global Startup Ecosystem Report 2019, page 13.
19. Bola Adetunji et al. "Microeconomics of Competitiveness Final Paper—Lagos ICT Services Cluster," Harvard Business School (2017).
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26. Op. Cite. note 15, page 25. The UPU assessed Nigeria's reliability as being the highest in the sample of 25 countries. This is partly due to the country adopting the innovative "what3words" addressing system. This system has divided the world into 57 trillion 3X3 meter cells with each cell associated with three words. Nigeria became the seventh country in the world to adopt this system in 2018 and the third in Africa (after Côte d'Ivoire and Djibouti).
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32. Ibid, and FIRS in <https://iclg.com/practice-areas/corporate-tax-laws-and-regulations/nigeria>
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34. (EFInA, 2018).
35. (Macheel, 2017).
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37. (United Nations Population Division, 2017).
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41. (Transparency International, 2018).
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44. (Securities and Exchange Commission, 2019).
45. Ministry of Budget and National Planning, 2016.
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47. Awojulugbe, 2019.
48. Awojulugbe, 2019.
49. Adeyemi, 2018.
50. This number aligns with the 2017 Global Findex data, reporting that 40% of adult Nigerians have an account.
51. While a number of Ethiopian brands (e.g., M-BIRR) marketed themselves as mobile money providers, in accordance with the central bank regulations, they actually offered mobile access channels to accounts formally held with traditional banks or microfinance institutions.
52. These include *Guidelines on Mobile Money Services in Nigeria, Guidelines For Licensing and Regulation of Payment Service Banks in Nigeria, Regulation for Bill Payments in Nigeria, Regulation on Instant (Inter-Bank) Electronic Funds Transfer Services in Nigeria, Circular on the Implementation of Interchange Fee, Guidelines on Operations of Electronic Payment Channels in Nigeria, Guidelines on International Mobile Money Remittance Service in Nigeria, Regulatory Framework for Mobile Money Services in Nigeria, Regulatory Framework for Licensing Super-Agents in Nigeria, and Regulatory and Supervisory Guidelines for Micro-finance Banks*.

53. Central Bank of Nigeria, 2017.
54. For a description of a large-scale unofficial agent business, see Egbejule, 2018.: "Acheme [the shop-keeper] says he handles approximately NGN 9 million (USD 24,840) daily and takes an additional NGN 400 (USD 1.09) on every NGN 10,000 (USD 27.39) or NGN 50 (USD 0.13) on every NGN 1,000 (USD 2.73). The additional amount works out to between USD 981 and USD 1,170 a day. Half that amount goes to the bank as fees—so the bank, which otherwise can't charge for over-the-counter transactions of up to NGN 500,000, also benefits. And Acheme's net earnings—at least USD 490 a day—are at least 70 times the per capita daily income of USD 7 in Nigeria."
55. Established by the Secured Transaction in Movable Asset Act (STMA) 2017 and being operationalized through the National Collateral Registry.
56. The Nigerian Bureau of Statistics (NBS) includes the following subsectors in ICT: Telecommunications and Information Services; Publishing, Motion Picture, and Sound record; and Broadcasting
57. 10% of the Fund is allocated to grants, capacity building, and administrative costs while 90% is to be allocated to Participating Financial Institutions at 2% for on-lending to MSMEs at a maximum interest rate of 9% per annum.
58. Regulation on Investment of Pension Fund Assets, April 2010.
59. In 2016, Upwork paid USD 1 billion in salaries among the 12 million freelancers registered in the platform.
60. A Job Success Score is a measure of the client's satisfaction with the freelancer's work and success on Upwork. Talented freelancers who deliver high-quality work to their clients find that the scores on their profiles help them promote their freelance businesses in the Upwork marketplace and win new clients.



3

CONCLUSION: A WAY FORWARD

A holistic approach to digital economy development is necessary to maximize Nigeria's chance of attaining its digital potential. Rather than implementing multiple, fragmented interventions, a coordinated and high-level cross-boundary approach that maximizes complementarities is needed to build an inclusive digital economy. This would ultimately spur the development of high-impact applications for health, education, e-commerce, agriculture, and social service delivery, among others, while mitigating exclusion, fraud, and cyber risks.

DIGITAL INFRASTRUCTURE

Nigeria is currently capturing just a small fraction of its potential for digital development. Strategic investments and interventions are needed for Nigeria to develop a vibrant digital economy and kickstart its digital transformation. *First*, the supply of broadband infrastructure is the necessary condition to expand access, which requires strategies for promoting the deployment of networks and appropriate solutions in underserved areas. *Second*, with evidence that the spectrum is not used to its full capacity and that prices of devices and even low-priced data services are not affordable to most Nigerians living under the poverty line, the government needs to find ways to support the reduction of these costs, provide additional complementary public access, and stimulate demand by addressing awareness and attractiveness issues. *Third*, as a cross-cutting issue, the government needs to design policies and interventions to mitigate the risks of skewing the benefits of broadband toward the well-educated and wealthy, which entrenches the digital divide and inequalities, and instead they should ensure that investments in technology benefit the bottom of the pyramid.

DIGITAL PLATFORMS

Nigeria is only realizing a small part of the potential of its digital platforms. Some of the recommendations and next steps for Nigeria are:

- Remove the overlap of responsibilities between the different entities responsible for the regulation of the ICT sector in Nigeria;
- Review procurement policies and practices in order to ease access to public procurement for local companies;
- Build core capacity on Internet-era skills, focusing on teams responsible for the procurement, development, and maintenance of digital services;
- Undertake a value for money audit of investments made in government digital systems;
- Prioritize citizen-centric digital services and improve QoS monitoring;
- Promote bottom-up interoperability;
- Implement the Strategic Road Map for a digital ID system in Nigeria; and
- Provide special support to Lagos so it emerges as the leading ICT hub in Africa.

DIGITAL FINANCIAL SERVICES

Nigeria is currently capturing just a small fraction of its DFS potential. Some issues currently present in Nigeria include lack of institutional coordination; provision of digital financial services being dominated by commercial banks; nonbank DFS providers presently not being suc-

cessful in targeting unbanked customers; mobile network operators being, until recently, not eligible to provide financial services; and agent-based models being unsuccessful in Nigeria in increasing the number of access points. The following measures could be introduced in Nigeria to expand DFS, together with the private sector:

- NIBSS and NIMC should expediently complete the integration between the NIN system and the BVN database;
- The authorities should implement the guidelines for licensing and regulation of PSB by expediting the review of applications for PSB licenses with a view of making the final decision on this process by end of 2019;
- The CBN and state licensing authorities should reduce the number of different license types and the overlap between them;
- Regulations on agent networks should be revised to incentivize investments in access points in financially excluded communities;
- Incentives need to be given to merchants to encourage acceptance of digital payments;
- The government should accelerate the digitization of its own payments, social transfers, and tax collections, including via related awareness and training programs;
- The financial consumer protection frameworks should be accompanied by detailed, clearly binding, priority guidelines tailored to the full range of DFS products as well as regular financial products; and
- Advancing digital literacy in the economy, both for youth and adults, to advance the DFS sector in Nigeria.

DIGITAL ENTREPRENEURSHIP

To support the development of digital entrepreneurship in Nigeria there will need to be the following: (i) legal, regulatory, and institutional reforms, (ii) the pipeline of digital entrepreneurs must be strengthened, (iii) early-stage funding needs to be de-risked and institutional investors incentivized to invest; and (iv) markets for digital products and services must be strengthened. Nigeria's legal and regulatory frame-

work must be assessed and structured to ensure that it can support the development of a digital economy. To ensure the effectiveness of reforms, it will be critical to strengthen the institutional structure, collect and assess data on digital entrepreneurs, update the legal framework for private equity investment, and allow for the introduction of innovative financing mechanisms. It will also be critical to foster collaboration between ecosystem players, including digital entrepreneurs, innovation hubs, academia, big corporates, investors, and the government, and to develop a Monitoring and Evaluation framework (M&E) for innovation hubs in partnership with the private sector. The government could play a catalytic role for early-stage investments in digital ventures by exploring avenues to help de-risking the market. It will also be essential to increase the scale of early-stage funding for digital entrepreneurs and incentivize institutional investors to invest in public and private equity markets. Markets for digital products and services can be strengthened by facilitating the provision of services to large corporations by start-ups with innovative products/services, supporting technology adoption in strategic industries, and facilitating the inclusion of digital entrepreneurs in the provision of public services through transparent public contracting, digitalization of public services, and ICT up-skilling of public workers.

DIGITAL SKILLS

Ensuring that every person has the appropriate skills for an ever-growing digital and globalized world is essential to promote inclusive labor markets and to engender innovation, productivity, and growth. The following measures could be introduced in Nigeria to expand digital skills. *First*, leverage the Smart Nigeria Digital Economy Project, using it to improve government coordination, explore innovative ways of including digital skills in the wider curriculum, scale up private sector-led initiatives. *Second*, formalize the entrepreneurial link between ICT and business studies within and beyond higher education, so digital entrepreneurship and skills are seen by both males and females as a viable livelihood. *Third*, improve virtual economy awareness in Nigeria, making the country a hub for microwork and elancing, leveraging initiatives such as Click-On Kaduna, and Nigeria's current ranking in Africa with regards to microwork.



4

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5

ANNEXES

5.1 DIGITAL INFRASTRUCTURE INDICATORS AND INDEXES

TABLE 9: Key digital infrastructure indicators and indexes

	Nigeria	Southern Africa region	Sub-Saharan Africa	Source
PENETRATION				
Percentage of population using Internet	25.7	29.1	19.9	ITU, 2017
Number of mobile-cellular subscriptions (per 100)	81.8	91.4	74.7	ITU, 2017
Number of fixed-broadband subscribers (per 100)	0.1	1.4	0.6	ITU, 2017
COVERAGE				
Percentage of population covered by at least 3G mobile network signal	54	67.7	68.4	ITU, 2017
International bandwidth (bit/s per Internet user)	11.3	N/A	N/A	DAI, 2016
AFFORDABILITY				
Average retail price of mobile broadband—1GB (% of GNIPC)	1.7	12.7	11.0	ITU, 2017
Fixed-broadband basket (% of GNIPC)	13.4	41.5	34.0	ITU, 2017
MARKET				
ITU country ranking	143	132	150	ITU, 2017
ICT Development Index (1–6)	2.6	3.2	2.4	ITU, 2017
TECHNOLOGY				
Infrastructure and digital content pillar	2.6	3.1	2.6	WEF, 2016
Network Readiness Index country ranking	119	105	114	WEF, 2016

5.2 DIGITAL ENTREPRENEURSHIP INDICATORS AND INDEXES

TABLE 10: Key digital entrepreneurship indicators and indexes

	Mozambique	Nigeria	Botswana	South Africa	Source
PERFORMANCE					
Entry rate of new firms (new registrations as % of total)	13.9 (2016)	0.76 (2016)	18.37 (2016)	10.22 (2016)	National firm-level census or registered firms
Number of registered firms in ICT sector per 100,000 people in the working age population	N/A	N/A	N/A	N/A	National firm-level census or registered firms
Number of green field FDI (ICT & Internet infrastructure, R&D, business services) per 100,000 people in the working population	6,476 (2017)	4,506 (2017)	37 (2017)	4,240 (2017)	fDi Intelligence Database
POLICY					
Research and development expenditure (% GDP)	0.34 (2015)	N/A	0.54 (2015)	0.72 (2015)	World Bank
Innovation capacity—ranking; and score	115; 23.1 (2018)	118; 22.4 (2018)	91; 28.2 (2018)	58; 35.1 (2018)	Cornell University, INSEAD, WIPO: Global Innovation Index
Regulatory Framework for Digital Markets	N/A	N/A	N/A	N/A	World Bank Digital Business Indicators
IP protection (index 1–7)	3.18 (2017)	3.16 (2017)	4.2 (2017)	4.82 (2017)	WEF Global Information Technology Report (GITR)
Barriers to entrepreneurship (aggregate indicator representing the complexity of regulatory procedures, administrative burdens on start-ups, and regulatory protection of incumbents)	N/A	N/A	N/A	2.17 (2013)	OECD—Product Market Regulation Database
Ease of doing business—ranking in the Doing Business survey	135 (2019)	146 (2019)	86 (2019)	82 (2019)	World Bank DB
Total tax and contribution rate (as % of profit)	36.1 (2019)	34.8 (2019)	25.1 (2019)	29.1 (2019)	World Bank DB
Infrastructure and supports					
Number of tech hubs and accelerators in the country	5 (2019)	55 (2016)	2 (2016)	59 (2018)	Desk Research (F6S, Afrilabs, Seed-DB, GAN, etc.)
% of firms with access to e-mail or website	E-mail: 13.7 (2007) Website: 13.7 (2007)	E-mail: 22.3 (2014) Website: 22.3 (2014)	E-mail: 36.6 (2010) Website: 36.6 (2010)	E-mail: 36 (2010) Website: 36 (2010)	World Bank Enterprise Survey
FINANCIAL CAPITAL					
Venture capital availability [1 = extremely difficult; 7 = extremely easy]	2.18 (2017)	1.8 (2017)	2.86 (2017)	2.87 (2017)	WEF Global Competitiveness Report, Executive Opinion Survey, 2016–17 weighted average
Venture capital: deal flow by country (number of deals, capital invested (USD))	N/A	# of deals: 6 (2017) USD: 43.1 (2017)	N/A	# of deals: 6 (2017) USD: 3.31 (2017)	EMPEA
Debt: % of firms identifying access to finance as major constraint	50.1 (2007)	33.1 (2014)	25.5 (2010)	15.5 (2007)	World Bank Enterprise Survey
Access to credit (as score from 1 to 100)	25 (2019)	85 (2019)	55 (2019)	50 (2019)	World Bank DB

TABLE 10, continued

	Mozambique	Nigeria	Botswana	South Africa	Source
MARKETS					
New product early-stage entrepreneurial activity (% of 18–64-aged population who are either a nascent entrepreneur or owner-manager of a new business)	N/A	N/A	33.23 (2016)	10.96 (2017)	GEM
Share of firms that invest in R&D	0 (2007)	13.8 (2014)	0 (2010)	0 (2007)	Enterprise surveys
Firm-level technology absorption, [1 = not at all; 7 = to a great extent]	4.24 (2016)	4.34 (2016)	4.32 (2016)	5.43 (2016)	WEF-GITR, Executive Opinion Survey, 2016–17 weighted average
Trade openness (share of exports and imports in respect to GDP)	108.91 (2017)	20.72 (2016)	97.13 (2016)	58.18 (2017)	World Bank Development Indicators
ICT service exports (% of service exports, BoP)	3.18 (2017)	5.77 (2017)	1.99 (2017)	4.22 (2017)	WITS data (sectors ISIC rev 4, division 61, 62, 63)
Value B2C E-commerce Index, Index (0–100)	N/A	46 (2016)	43 (2016)	54 (2016)	UNCTAD
Culture					
Risk taking index	N/A	0.39	0.69	0.97	Global Preferences Survey
Gender/percent of firms with female participation in ownership	24.4 (2007)	16.2 (2014)	55.3 (2010)	22.6 (2007)	World Bank Enterprise survey
Whether discrimination based on gender or marital status prohibited in access to credit	N/A	N/A	N/A	N/A	World Bank Women, Business and Law Indicators

5.3 INNOVATION HUBS IN NIGERIA (ACCELERATORS, INCUBATORS, AND CO-WORKING SPACES)

Name	Location	Services
Civic Innovation Lab	Abuja	Incubator focused on civic tech Engages with government and international institutions
Enspire Incubator	Abuja	Four-month tech-focused business incubator program
Startpreneurs	Abuja	Accelerator and seed fund. Partners include ABAN and Silicon Valley 500 start-ups accelerator
Ventures Platform	Abuja	Incubator, accelerator and early stage fund focused
Wennovation Hub Initiative Nigeria	Abuja, Ibadan, Lagos	Co-working and incubator
Roar Nigeria	Enugu	Incubator based in the University of Nigeria
nHub	Jos	One of the first hubs in northern Nigeria. Incubation and skills development
CoLab	Kaduna	Incubation and ICT skills training (CoLab Elite)
Blue Sapphire Hub	Kano	Ideation, incubation, and acceleration programs
Founders Hub	Kwara	Incubation, co-working space
Accion Venture Lab	Lagos	Acceleration program by global nonprofit Accion (company builder) to support fintech start-ups in Nigeria
Co-Creation Hub (CcHUB)	Lagos	Nigeria's first incubator. Also offers co-working space, and pre-incubation. Opened in 2011
Google's Launchpad Accelerator	Lagos	Acceleration program for African start-ups
Greenhouse Lab	Lagos	Acceleration program for women-led technology start-ups. Funded by Greenhouse Capital
iDEA Nigeria	Lagos	Incubation and acceleration programs
Impact Hub Lagos	Lagos	Co-working, coaching, mentoring, networking Part of the international Impact Hub network (80 hubs globally)
Itanna	Lagos	Accelerator. Joint-venture between Honeywell Group and African Economic Revolution Fund (AERF)
L5 Labs	Lagos	Co-working and incubation Partnered with The Presidential Enabling Business Environment Council for the first edition of the #PEBECHack
Meltwater Entrepreneurial School of Technology (MEST)	Lagos	Founded in Ghana, provides incubation for African software entrepreneurs. Opened a new center in Lagos in 2017
Microtraction	Lagos	Accelerator funded by
NG_Hub	Lagos	Facebook's first community hub in Africa, in partnership with CcHub. Facebook is also partnering in other parts of the country with Ventures Platform (Abuja), Colab (Kaduna), and Roar (Enugu)
She Leads Africa	Lagos	Acceleration program for female entrepreneurs
The Passion Incubator	Lagos	Co-working space and incubation
The Tony Elumelu Entrepreneurship Program	Lagos	A pan-African \$100-million entrepreneurship program that includes a 12-week training program and \$5,000 seed funding
Hebron Startup Labs	Ogun	Nigeria's first university-based incubator in Covenant University
FocusHub	Port Harcourt	Incubation services
Olotu Square	Port Harcourt	Co-working space and incubation
Root Hub	Uyo	Co-working space and training
Y Combinator	Silicon Valley (United States)	Accelerator which offers \$150,000 investments in seed funding and a three-month acceleration program in Silicon Valley. Nigeria start-ups supported include BuyPower, Kudi, Flutterwave, and PayStack

5.4 INVESTORS ACTIVE IN NIGERIAN DIGITAL ECOSYSTEM (ANGEL NETWORK AND VENTURE CAPITAL)

Name	Services
Acumen Fund	The fund has invested in Nigerian mobile money transfer Paga
Adlevo Capital	Private equity fund manager with prominent investments made in Nigeria include Paga and Interswitch
African Business Angel Network (ABAN)	Pan-African non-profit association founded to support the development of early-stage investor networks across the continent
EchoVC Partners	Seed and early stage venture capital pan-African firm. The average investment sizes range from \$25,000 to several million dollars. Nigerian investments include Hotels.ng, Easyshop Easycook, myPadi.ng, Printivo, and S&T Media
Greenhouse Capital	Fund raised by founders of Ventures Garden Group technology solutions firm. Nigerian investments include Flutterwave, Riby, ESL and Growth Capital
Growth Capital	New fund being raised by CC-Hub founders. Raised NGN 280 M out of targeted NGN 1 billion, from CC Hub, Venture Garden Group, Bank of Industry, and Omidyar Network
Lagos Angel Network	First angel network in Nigeria. 40 active members (meaning they have made a minimum investment of NGN 500,000 within the past year)
Leadpath Nigeria	Seed capital fund that provides short-, medium-, and long-term funding to tech startups. Nigerian investments include Paystack, CoSign, PushCV, and Fashpa
Omidyar Network	Global impact investor. Invested in Andela
Savannah Fund	Kenya-based seed capital fund providing \$25 K–\$500 K investments in early-stage, high-growth tech startups in SSA. Nigerian investments include Supermart.ng, and Lidya
Synergy Capital	Lagos-based private equity firm that invests in technology start-ups as well as traditional businesses. Nigerian investments include Surburban Telecommunications
Tekton Ventures	U.S.-based early stage investor. Nigerian investments include Flutterwave
TLcom Capital Partners	Venture capital firm based in Nairobi, Lagos, and London, investing in Europe, Israel, and Sub-Saharan Africa. Nigerian investments include Kobo 360
Tiger Global	U.S.-based private equity firm. Investments include iROKOTV Partners



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BIRD - IFC

IFC International
Finance Corporation