NIGERIAN COMMUNICATIONS COMMISSION

FINAL REPORT

Consultancy Study on the Emerging Role of Data and FinTech in the Development of Digital Economy in Nigeria (RD-3).

December 2022

S&S

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ACRONYMS

AI	Artificial Intelligence
API	Application Programme Interface
AT	Assistive Technologies
ATM	Automatic Teller Machine
B2B	Business to Business
B2C	Business to Consumer
B2G	Business to Government
BoI	Bank of Industry
C2B	Consumer to Business
C2C	Consumer to Consumer
CAPEX	Capital Expenditure
CBN	Central Bank of Nigeria
CRC	Community Resource Centre
CSR	Corporate Social Responsibility
DLT	Distributed Ledger Technology
DPA	Data Protection Authority
DPO	Data Protection Officer
EEA	European Economic Area
EPC	Electronic Product Code
ESP	Electronic Service Provider
EU	European Union
FCT	Federal Capital Territory
FDI	Foreign Direct Investment
FIIRO	Federal Institute of Industrial Research Oshodi
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
ICT	Information Communication Technology
ID	Identification
IDE	Innovation-Driven Enterprise
IIoT	Industrial Internet of Things
IoT	Internet of Things
IPv6	Internet Protocol Version 6
ISP	Internet Service Provider
ITU	International Telecommunications Union
IVR	Interactive Voice Response
IXP	Internet Exchange Point
JICA	Japan International Cooperation Agency
KPI	Key Performance Indicators
KYC	Know Your Customer
LPAN	Logical Processing Area Network
LSETF	Lagos State Employment Trust Fund
M&E	Monitoring and Evaluation
M2M	Machine to Machine
MDA	Ministry, Department, Agency of Government
ML	Machine Learning
MSME	Micro Small Medium Enterprise
NAFDAC	National Agency for Food and Drugs Administration and Control
NAICOM	National Insurance Commission
NASENI	National Agency for Science and Engineering Infrastructure
NBTI	Nigeria Board for Technical Incubation
NCAIR	National Center for Artificial Intelligence and Robotics
NCC	Nigerian Communications Commission
NDEPS	National Digital Economy Policy and Strategy
NDIC	Nigeria Deposit Insurance Corporation

NDIET	National Digital Innovation and Entrepreneurship Training
NDPB	Nigeria Data Protection Bureau
NDPR	Nigerian Data Protection Regulation
NFC	Near Field Communication
NFIU	Nigerian Financial Intelligence Unit
NGN	Next Generation Networks
NIBSS	Nigeria Interbank Settlement System
NIMC	National Identity Management Commission
NIN	National Identification Number
NITDA	National Information Technology Development Agency
NLP	Natural Language Processing
NNBP	Nigerian National Broadband Plan
NOTAP	National Office for Technology Acquisition & Promotion
NOTN	Nigerian Office for Trade Negotiations
NRA	National Regulatory Agency
OEM	Original Equipment Manufacturer
ONDI	Office for Nigerian Digital Innovation
P2P	Peer to Peer
PDT	Project Delivery Team
PIU	Project Implementation Unit
PoS	Point of Sales
PPP	Public Private Partnership
PRODA	Projects Development Institute
PSB	Payment Services Bank
PST	Project Supervision Team
PSU	Primary Sample Unit
PSV	Payments System Vision
QoS	Quality of Service
R&D	Research & Development
RFID	Radio Frequency Identification
RTD	Round Table Discussion
RUBI	Rural Broadband Initiative
SaaS	Software as a Service
SANEF	Shared Agent Network Expansion Facility
SEC	Securities Exchange Commission
SEZ	Special Economic Zones
SKC	School Knowledge Centre
SME	Small Medium Enterprise
SME	Small Medium-scale Enterprise
SRD	Short-Range Device
SSU	Secondary Sample Unit
STEM	Science, Technology, Engineering, and Mathematics
TIC	Technical Incubation Centre
ToR	Terms of Reference
TSU	Tertiary Sample Unit
TTT	Train the Trainer
UAV	Unmanned Aerial Vehicle
UID	Unique Identification
USPF	Universal Service Provision Fund
UVP	Unique Value Proposition
VOIP	Voice over IP

PREAMBLES

Acknowledgements

The study team acknowledges the steadfast support of the NCC's Research and Development Department and is appreciative of the instrumental role the R&D's project supervision team played in ensuring the successful and timeous delivery of this study.

Document Purpose and Structure

This Final Report is the fourth and final deliverable due under the Consultancy Study on the Emerging Role of Data and FinTech in the Development of Digital Economy in Nigeria (RD-3).

This document presents the study's findings using the following structure:

CHAPTER ONE

Introduces the study's key objectives as specified in the Terms of Reference; describes the purpose and scope of the study; and, outlines the core issues and questions the study proposes to address.

CHAPTER TWO

Discusses the methodology used for the study; narrates the sources of Data; breaks the work plan down into activity nuggets with associated timelines for each work activity; highlights achieved mileposts; and, signposts the direction of travel to the Final Report.

CHAPTER THREE

Presents the study's findings in detail; this includes analysis from a desk review of relevant literature; results of interviews with key stakeholders; outputs from roundtable discussions; and, the comprehensive analysis of data from the field survey.

CHAPTER FOUR

Wraps up the report by delivering the study's Suggestions, Recommendations and Conclusion for consideration by the Nigerian Communications Commission

EXECUTIVE SUMMARY

This Consultancy study was awarded by the Nigerian Communications Commission (NCC) to promote a better understanding of the role of Data and FinTech in the development of the Digital Economy in Nigeria.

The study seeks to evaluate the level of adoption of FinTech in Nigeria vis-à-vis developed countries; analyse the factors responsible for the slow adoption of FinTech in Nigeria; proffer solutions on the proper collation, use, adoption, protection and mining of National Data; and, recommend best practices and ways in which the consumers' Data privacy and security can be enhanced.

The study approached these objectives by endeavouring to interpret the interplay between Data and FinTech and amalgamating the duo as the twin springboard for the development and advancement of Nigeria's Digital Economy.

The scope of the study encompassed obtaining an understanding of how people everywhere in Nigeria engage with the Digital Economy. Therefore, the survey questionnaires were succinctly couched to surface technological trends in the socioeconomic space and interrogate the role of data to highlight areas where FinTech users look for trust and innovation and examine the impact of the Digital Economy on Nigeria's national economic development.

The study describes the overall shape of Nigeria's FinTech - identifying the challenges stakeholders face; the impact of those challenges on the drive towards a Data-driven Nigeria; examining the emerging sub-sectors within Nigeria's FinTech ecosystem; and, tracking the maturity of the FinTechs across many dimensions.

The various aspects of Data including its role, benefits and challenges in the growth of a digital Nigeria are dissected in this study including the Government's role and involvement in digitalisation.

The analysis, views, and recommendations expressed in this Report are informed by the research findings drawn from the review of available literature, survey responses, interviews, communications and discussions held with the identified industry stakeholders.

To ensure integrity of the data in this study, Cronbach's Alpha was used to test the internal consistency reliability of the questionnaires using the below formula:

Where:

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}}$$

- N = the number of items.
- $\bar{c}$ = average covariance between item-pairs.
- $\bar{v}$ = average variance.

The test returned a Mean Score of 0.8387. Cronbach's Alpha value above 0.7 is considered reliable and acceptable while Cronbach's Alpha in the ranges of 0.8 and up to 1.00 is considered to be good.[1] This is corroborated by George and Mallery (2003) who provide the following rules of thumb: "_ > .9 – Excellent; _ > .8 – Good; _ > .7 – Acceptable; _ > .6 – Questionable; _ > .5 – Poor; and, _ < .5 – Unacceptable."[2]

The survey was sent out to 3,792 respondents and 2663 responses were received. There was a 70.23% yield from those who participated in the survey. The sample size is big enough to ensure statistical significance and generalizability.

The study made findings in the following broad lines to address the objectives and scope of the study:

Study Objective #1: To Promote a Better Understanding on the Role of Data and FinTech in the Development of Digital Economy in Nigeria.

The respondents were asked to state the extent to which they use the Internet. The results show that majority of the respondents (61%) use the Internet. The respondents were asked about their devices usage. The findings reveal that majority of respondents (96%) use smartphone devices.

[1] Nunnally and Bernstein, 1994 - Presentation of coefficient alpha - http://wdsinet.org/Annual_Meetings/2011_Proceedings/papers/Paper131.pdf

[2] Joseph A. Gliem and Rosemary R. Gliem - Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales - https://scholarworks.iupui.edu/bitstream/handle/1805/344/gliem+&+gliem.pdf?sequence=1

In general, the study finds that Data and FinTech play a key role in the development of the Digital Economy in Nigeria.

Table 1: Mean ratings for Data and FinTech in the Development of Digital Economy in Nigeria

	Mean	Std. Dev.
Internet Usage	1.035263	.184474
Digital Devices Usage	2.961411	.8961971

Study Objective #2: To Evaluate the Level of Adoption of Fintech in Nigeria Vis-À-Vis Developed Countries

To investigate this objective, the survey asked participants about making online purchases of goods and services. The results show that majority of the respondents (61%) do not purchase goods online.

The study also sought to find out the usage of ATM services with or without assistance. The findings show a high number of people do not use ATMs (40%) combined with those who require assistance when using ATM (9%).

These findings reveal a low adoption of FinTech in Nigeria.

Table 2: Mean ratings for the level of adoption of FinTech in Nigeria vis-à-vis other countries

	Mean	Std. Dev.
Online Purchases	1.216234	.4213313
Usage of ATM	1.392548	.6817793

Study Objective #3: To Analyse the Factors Responsible for the Slow Adoption of FinTech in Nigeria

The cost of data (30%) and epileptic electricity supply (41%) were fingered by respondents as a major hindrance to the adoption of FinTech in Nigeria.

The FinTechs beamed their torchlight on shortage of skills in the FinTech industry as a major dampener in the adoption of FinTech in Nigeria.

Table 3: Mean ratings on the analysis of factors responsible for slow adoption of FinTech in Nigeria

	Mean	**Std. Dev.**
Cost of Data	1.019627	.1748229
Shortage of skills	1.246174	.5107272

Study Objective #4: To Proffer Solutions on the Proper Collation, Use, Adoption, Protection and Mining of National Data

The study finds that cybersecurity, data privacy, threats online and safety online are major sticky points that require addressing to underpin proper collation of National Data.

The study also notes that non-standardisation and a lack of coordination on data mean that data collected by one organisation cannot easily be used by another.

The study observes that treating data as a strategic asset, with appropriate governance mechanisms will engender more coordinated use and protection of data across the wider Nigerian Digital Economy space.

Table 4: Mean ratings for Proper Collation of Data

	Mean	**Std. Dev.**
Threats online	2.382441	.9859615
Safety online	3.278776	1.128718

Study Objective #5: To recommend best practices and ways in which the data privacy and security can be enhanced

The study findings call for the expedited passing of the Data Protection Bill 2020 which is currently before the National Assembly and urges the Nigerian Communications Commission to be at the helm pushing the Bill's passage.

The study further calls for the establishment of a Data Protection Directorate domiciled with the Nigerian Communications Commission which should act as Nigeria's Data Protection Authority (DPA) to consolidate on the benefits of NDPR and provide provenance for National data security.

Table 5: Mean ratings for Data Privacy and Enhancement

	Mean	**Std. Dev.**
Government Support	2.917831	1.823009
Government's Role and Involvement in digitalisation	1.066201	.3190178

CHAPTER ONE

1.0 Introduction

The National Digital Economy Policy and Strategy handbook states that the Digital Economy is any aspect of the economy that is based on or driven by digital technologies. The Digital Economy - also known as the Internet Economy, Web Economy, and New Economy - runs on the fuel of Data and information communication technologies such as the Internet, World Wide Web, Blockchain and the smartphone. These technologies have become vital for almost all economic and social activities and have radically transformed the economic landscape.

Nowhere is this transformation more impactful than in the financial services sector where Data has assumed a pivotal role almost as crucial to Nigeria's economy as crude oil. The transformation was further boosted by the lockdown measures occasioned by the Covid-19 pandemic which triggered a seismic shift in the way people live, interact, work and play with one another. The pandemic gave FinTech a shot in the arm as an increased number of consumers flocked online for their financial transactions. The pandemic presented a vivid illustration of the usefulness of Data in dealing with the contingencies and complexities associated with governance.

The study findings show that post-pandemic, FinTech has continued to gain broader acceptance and has become a key contributor to Nigeria's national economy. For example, FinTech is a major driver of financial inclusion through mobile banking and mobile money. Together with Data, FinTech bolsters the creation of new products and services and accelerates innovation. FinTech continues to stimulate cumulative interacting innovations in goods, services and processes and drives a general convergence between platforms and products. These developments augur well for the economy by enhancing financial inclusion, creating job opportunities and improving the productivity of businesses.

However, despite its prevalence among younger consumers and in urban areas, the study finds that FinTech is still far from being the norm as there are considerable proportions of potential consumers who are yet to get familiar with the concept. FinTech's potentials need to be unlocked across all demographics in both rural and urban areas.

Slow Adoption of Fintech – Although FinTech has improved the lives of many people in Nigeria and facilitated access to economic opportunities that were

previously inaccessible to many, it is yet to achieve universal availability and affordability. The study findings point to Broadband penetration as the main cause of the slow adoption of FinTech, particularly, in rural areas. Broadband access is a key enabler of FinTech and an important factor for economic growth. It is estimated that for every 10 per cent increase in Broadband penetration there would be a 1.38 per cent increase in the economic growth in low and middle-income classes. In rural areas increasing Broadband penetration by one per cent could contribute an additional 0.0158 per cent to the GDP growth.[3]

To entice incumbent telecom service providers and new market players to invest in unserved and underserved areas, the study notes that it would help if the Nigerian Communications Commission embarks on accelerated telecommunications infrastructural development in the unserved and underserved areas to ensure that Broadband Internet service is accessible to all segments of the society anywhere and everywhere in Nigeria. The outcome will trigger initiatives and interventions to connect among others Federal, State and Local Government sites, schools, health institutions, and MSMEs to the Broadband infrastructure.

The study observes that by mobilising and engaging the public, private and third sectors the Nigerian Communications Commission would establish strategic partnerships and engagements to lay down mechanisms for these entities to take part in the development of the Digital Economy through investments in information and communications technology.

Furthermore, the study calls on the Nigerian Communications Commission to sponsor the development of local language APIs and plugins to enable Government websites to offer content in English, Hausa, Ibo, Yoruba and other major Nigerian languages to aid the delivery of public services and the creation of citizen engagement platforms across all literacy divides.

In moving towards a knowledge-based economy, this study's findings posit that equipping Nigerians with the ability to use Broadband services and applications becomes essential. By providing capacity-building and information outreach programs, the Nigerian Communications Commission would enable citizens to become aware of the nuances of the Digital Economy and the central role that digital technologies play in it from the provision of education to putting up online businesses and innovation activities.

[3] Kim et al. (2010) - An Empirical Analysis of Fixed and Mobile Broadband Diffusion

To complement the activities of the USPF and the Digital Bridge Institute, the study notes that the Nigerian Communications Commission may also consider the establishment of regional telecommunications/ICT training institutes to enhance and support the development and adoption of the use cases for these technologies. As such, the Nigerian Communications Commission can help produce local talents as well as nurture valuable local businesses that can contribute toward inclusive national Digital Economy development.

To narrow the digital divide, the study suggests that the Nigerian Communications Commission may consider establishing a device subsidy scheme to stimulate Broadband use, especially in rural areas. This can be integrated into existing programs and initiatives of the Commission, particularly with programs dealing with women, youth, and the physically challenged.

The study findings reveal that data offer tremendous potential to create value by improving programs and policies, driving national Digital Economy development and empowering people and businesses. However, economic and political factors typically prevent the benefits of data from being shared equitably. Data improve social and economic outcomes, but only if used systematically in ways that create information. The information created must be good enough to generate insights that can be used to construct policies and programmes to improve lives, businesses and governance. Conversely, the study findings reveal that there are possibilities that data may also be misused in ways that cause harm. How to turn data into information and information into insights that can help businesses and consumers alike to make informed decisions is at the heart of the Digital Economy.

This study's findings show that the data governance arrangements to facilitate greater use of data while safeguarding against misuse remain in their infancy in Nigeria. The statistical capacity to produce and effectively use core economic and social data is limited.

At the Federal level, the data systems and infrastructures such as Colocation Data Centres and direct access to cloud computing facilities that enable interoperability and allow data to flow seamlessly among Ministries, Departments and Agencies of Government and across to more users are incomplete.

Even in the States where nascent data systems and governance frameworks exist, a lack of institutions with the requisite administrative capacity, decision-making autonomy, and financial resources holds back their effective implementation and

enforcement. Many complex policy questions around data governance remain unanswered.

In response, this study surveys the emerging landscape and provides the Nigerian Communications Commission, as policymaker and regulator, with a framework for thinking through the issues, opportunities and trade-offs around data use. The study provides both context and a more nuanced understanding of the role of Data and FinTech in the development of the Digital Economy in Nigeria.

To address gaps in the Government's role and involvement in digitalisation, the study spotlights the need for a structured data governance framework that enables the use of data to create economic and social value, promote equitable opportunities, and foster the trust that businesses and people will benefit from data and will not be harmed by the misuse of the data they provide.

The study finds that a well-functioning Data Governance Framework will ensure that economic policies, laws, infrastructure and institutions work together to support the use of data in a way that aligns with the Federal Government's and each State's or LGA's values while protecting individuals' rights over the use of their data.

The suggested framework defines the rules and associated compliance mechanisms for how data can be safely shared, used, and reused by all stakeholders. The study discourses that such a structured Data Governance Framework should be considered a pressing national policy priority. It will require the strengthening of national data systems and the engagement of all stakeholders at both the national and subnational levels. In doing this, the study posits that the Nigerian Communications Commission should intentionally deploy a whole-of-government, multi-stakeholder approach to data governance.

The study finds that the value of data for development is largely untapped. Realizing data's full value entails repeatedly reusing and repurposing data in creative ways to promote economic and social development. The challenge is to develop a trusted environment that safeguards against harmful misuse of data as they are exchanged between parties and that enables data to be created, reused, and repurposed. A strong Data Governance Framework, composed of appropriate policies, laws, regulations, and institutions, is needed to ensure that the full value of data is realized and shared safely and equitably.

Finally, the study notes that a culture of data use in which people demand transparency and accountability helps foster a high-quality supply of data and will

stimulate the demand for data-informed decision making without which the National Data System is unsustainable. For instance, the majority of people are unable to accurately track public finances or monitor Governments' appropriations due to the paucity of applicable data. Without such data, the ability to hold the Government accountable and track progress shrinks.

When Government agencies, civil society, academia, and the private sector securely take part in a National Data System, the potential uses of data expand and so does the potential impact on development. Because reliable statistics can expose poor policy decisions and performance and increase public scrutiny and pressure on governments, vested interests can be expected to intervene to distort decisions about the collection, reuse and sharing of data.

This Report draws on the analysis, research, and literature reviews of researchers and specialists from across the world and from the survey findings to meet the objectives and scope of the study.

1.1 Objectives of the Study

The central purpose of the study is to explore in detail the functions of Data and FinTech in advancing Nigeria's transformation into an economy where digital innovation and entrepreneurship are used to create value and prosperity for all as envisioned in the National Digital Economy Policy and Strategy (NDEPS 2020-2030). The study is driven by five main objectives which are to:

1. Promote a better understanding of the role of Data and FinTech in the development of the Digital Economy in Nigeria;
2. Evaluate the level of adoption of FinTech in Nigeria vis-à-vis developed countries and other peer developing countries;
3. Analyze the factors responsible for the slow adoption of FinTech in Nigeria;
4. Proffer solutions on the proper collation, use, adoption, protection and mining of national Data; and,
5. Recommend best practices and ways in which Data privacy and security can be enhanced.

The study presents a snapshot of the state of data in Nigeria using the lens of the Who, When, What, Why, Where and How?

- Who is collecting data;
- When do they collect the data;
- What type of data do they collect;
- Why do they collect such data; and,
- How effective and secure are the privacy and protection activities around the data?

1.2 Scope of the Study

The study is tasked to carry out in-depth research with empirical data supporting this exercise within a set of purposively sampled organisations, information technology managers, experts, and top executives and assess the challenges and level of innovation, and develop the best solution model or framework.

(i) The scope of service also covers specifically the Government's role and involvement in digitalisation;

(ii) The study shall consider the impact of the digital economy on national economic development;

(iii) The study shall identify the role, benefits and challenges of Data in the growth of a digital Nigeria;

(iv) The study shall identify the challenges of Fintech and digital financial inclusion and its impact on the drive towards a data-driven Nigeria;

(v) Document findings from key informant interviews, discussions and communications with major Stakeholders and the review of available Data sources related to the project scope are collated and reported.

The survey questionnaires and the interviews with respondents were couched to address the scope of the study and to reveal recent developments in Nigeria's Digital Economy.

The study examines the history of the Digital Economy; its success stories; the business models it has spawned; and, the technologies that underpin it. The study also attempts a prediction for the future of the Digital Economy in the Nigerian context.

CHAPTER TWO

2.0 Methodology and Work Plan

2.0.1 Overview

Design: Descriptive Survey Research Design

Target Population and Sample Size: 3600 individuals (600 per geopolitical zone); 98 FinTechs; 94 Telecom Service Providers

Combined total: 3792

Source of Data: Primary Data and Secondary Data

Instruments Used: Questionnaire, Literature Review

Technique of Data Analysis: Graph, Frequency, Mean and Standard Deviation, Cronbach's Alpha

2.0.2 Sources of Primary Data

Primary Data sources included interviews and questionnaires served on purposively selected individuals using a sample population size of 600 drawn equally from each of the six geopolitical zones; 98 FinTechs; and, 94 telecommunication service providers to a combined total of 3792.

The study effectively kicked off on the 9th of May, 2022 following the acceptance of the Inception Report and the subsequent approval of the study Work Plan submitted to the R&D project supervision team in April, 2022.

The study adopted the administration of the first set of questionnaires to purposively selected industry stakeholders and conducted physical and over-the-phone interviews with information technology managers, experts, and top executives active in the FinTech Industry. The second set of questionnaires was served on individuals considered digital technology consumers.

The interviews and survey questionnaires were conducted in the following locations:

1. Central Business District, Abuja and Gwagwalada – FCT; Bida and Minna - Niger State – for the Northcentral geopolitical zone;
2. Jalingo and Ussa - Taraba State for the Northeast zone;
3. Shinkafi and Gusau – Zamfara State for the Northwest zone;

4. Onitsha and Awka – Anambra State for the Southeast zone;
5. Brass and Yenagoa – Bayelsa State for the Southsouth zone; and,
6. Abeokuta and Shagamu – Ogun State for the Southwest zone.

The rationale for the choice of these locations was to survey a minimum of one State in each of the six geopolitical zones to obtain an idea of the level of FinTech and Digital Economy adoption in the entire country.

The first leg of the field survey commenced on the 12th of July 2022 at the Central Business District, Abuja, FCT with 228 questionnaires disseminated to respondents using a purposive and snowballing sampling technique. The exercise was repeated in Gwagwalada, FCT on the 13th of July 2022 where 153 respondents were surveyed.

The Central Business District and Gwagwalada surveys template was deployed to conduct the surveys in Minna South, Bosso and Bida in Niger State from the 14th of July 2022 to the 19th of July 2022 inclusive. The surveys in Minna South, Bosso and Bida covered 209 respondents in total.

The field survey was rolled out in the five remaining geopolitical zones over a staggered period of five weeks from the 18th of July, 2022 to the 17th of August, 2022 inclusive.

The interviewer-administered questionnaires were conducted on the information technology managers, experts, and top executives active in the FinTech Industry and selected telecommunications service providers mainly in Lagos and Abuja. The location selection criterion for conducting this component of the survey mainly in Lagos and Abuja was based on the dense population of FinTechs and officers of the telecommunications service providers in these two cities.

Data sourcing through the use of questionnaires was targeted at obtaining the perspectives of individual FinTech users and from the organisations active in the industry on how Data and FinTech collaborate to underpin Nigeria's Digital Economy. The designated round table discussions benefited the study by availing the team the opportunity to interact with key players in FinTech who graciously offered the study team a ringside insight on the trends within this critical component of the Digital Economy.

On the questionnaire, the sample population was further delineated into age, gender, education and employment status to obtain a comprehensive understanding of the composition of the demographics participating in Nigeria's Digital Economy.

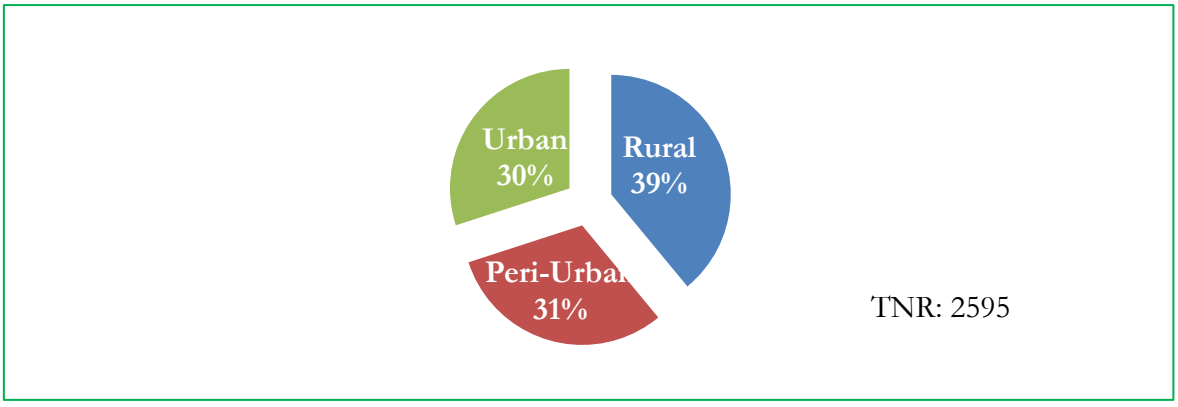
Table 6: Sample Population Size per Zone

S/N	Geopolitical Zone	Sample Population	State
1	Northcentral	600	Abuja, FCT and Minna, Niger State
2	Northeast	600	Jalingo, Taraba State
3	Northwest	600	Gusau, Zamfara State
4	Southeast	600	Awka, Anambra State
5	Southsouth	600	Yenagoa, Bayelsa State
6	Southwest	600	Abeokuta, Ogun State

Abuja and Minna were the selected capital cities for sampling as they are hotbeds of digital activities in the North Central geopolitical zone. Jalingo, Gusau, Awka, Yenagoa and Abeokuta were selected in their respective geopolitical zones to bring predominantly peri-urban dwellers into the sampling umbrella and ensure the widespread inclusion of participants across Nigeria.

This study surveyed a blended combination of rural, peri-urban and urban dwellers with 39% (n=1012) of participants from rural areas, 31% (n=805) registering as peri-urban dwellers and 30% (n=778) urban dwellers. From the foregoing, it can be deduced that majority of the respondents (61%) who filled out the survey and participated in the study are city dwellers.

Table 7: Survey Question #3 - Do you live in the city (urban), village (rural), or town (peri-urban)?



Active FinTechs were sampled in the following population size.

Table 8: List of FinTechs Sampled

S/N	FinTechs	TNR (Total Number of Respondents)
1	Payments, Mobile Money & Digital Banking	18
2	Lending	12
3	Savings, Investment & Crowdfunding	10
4	Enterprise Services & Infrastructure	9
5	Cryptocurrency	7
6	InsurTech	5

Table 9: Size of FinTech Enablers Sampled

	FinTech Enablers	TNR
1	Venture Capital & Private Equity	10
2	Associations & Facilitators	8
3	Accelerators & Incubators	6
4	Regulators	2

Table 10: List of Financial Incumbents Sampled

	Financial Houses	TNR
5	Incumbents	6

Table 11: List of Data Holding Centres Sampled

	Data Access	TNR
6	Data Centres	5
	Subtotal	**98**

Digital Economy Enablers Sampled

Telecommunications can unarguably be considered the bedrock of digital technology. Therefore, the following telecommunication service providers were pencilled in and sampled as Digital Economy Enablers.

Table 12: List of Digital Economy Enablers Sampled

Digital Economy Enablers	TNR
VAS Aggregator	11
AVT Service	10
Interconnect Exchange	9
International Data Access	8
Internet Service Provider	8
PNL-Regional	8
Sales & Installation	7
Value Added Services	7
Collocation/Infrastructure	6
Metropolitan Fibre Cable	5
National Long Distance	5
Unified Access Services	5
Open Access Fibre Infrastructure Network (INFRACO)	4
National Carrier	1
Subtotal	94
Individual Users	3600
FinTechs	98
Grand Total	**3792**

2.0.3 Sources of Secondary Data

The work plan was predicated on the use of a blended combination of qualitative and quantitative research methods to conduct the study. This comprised a rigorous review of available topic-centric literature; examination of extant Digital Economy policies and strategy papers; appraisal of Nigerian National Vision and Plan documents; in-depth study of journals and academic publications.

The meticulous desk research of subject-centric literature yielded copious caches of secondary Data for the study. The review tackled policy and strategy papers, legacy research materials and many more as detailed below:

- The National Digital Economy Policy and Strategy (NDEPS 2020 -2030);
- World Bank Digital Economy Report for Nigeria;
- Nigerian Data Protection Regulation (NDPR) 2019;
- National Digital Innovation and Entrepreneurship Training (NDIET) Policy;
- Nigeria ICT Innovation and Entrepreneurship Vision (NIIEV);
- Nigerian National Broadband Plan (NNBP 2020 - 2025);
- Payments System Vision 2020 (PSV 2020);
- Legacy research materials on Data, FinTech and Digital Economy;
- Leading institutions active in the development and propagation of the Digital Economy globally;
- Internet resources and archived records;
- Related Policy documents from Institutions and Regulators active in the sector;
- Information from other randomly selected FinTech Industry activities;
- Data on other Telecommunications sectors and associated Industry operators; and,
- Carefully selected active digital services consumers drawn from different demographics.

The literature review was instructive to the extent that it allowed the study to gauge the gulf - wide in most instances - between policy, strategy, vision and plan against their actual coalface implementation and enforcement.

As the findings show, policies are surfeit while implementation is insufficient especially around Data mining, storage and protection. As established elsewhere in this Report, Data is central to the Digital Economy and therefore received strenuous scrutiny by the study team.

2.1 Work Plan

The study was conducted in four stages as outlined in the table below.

Table 13: Project Milestones and Deliverables

	Milestone	Deliverables
Stage One	Inception Phase	Inception Report
Stage Two	Field Work/Data Collection Phase	Interim Report
Stage Three	Data Collation & Data Analysis Phase	Draft Final Report
Stage Four	Final Reporting and Presentation Phase	Final Report

2.1.1 Stage One - The Inception Phase

The steps of the Inception Phase comprised the following work activities:

- Coordination meetings with the Commission's Research & Development Department which culminated in the project kick-off meeting anchored by the R&D's project supervision team (PST);
- Detailed analysis of the study's terms of reference with particular emphasis on the deliverables and associated timelines;
- In-house project team brainstorming and roundtable discussion sessions and mind-sharing with the R&D's PST via a WhatsApp group platform specifically assembled for the study;
- Articulation of the project's methodology, work plan and comprehensive deliberation on them with the PST;
- Preparation of survey instruments and their examination with the PST;
- Contacts with various stakeholders to plan focus group meetings;
- Identification and detailed description of the tasks to be performed with which the work plan was developed;

- Construction and timely submission of the Inception Report to the R&D Directorate marking the study's first deliverable;
- Submission of the survey questionnaires to the PST for review and comments; and,
- Approval of the questionnaires by the PST yielded the green light to proceed to Stage Two.

2.1.2 Stage Two – Field Work/Data Collection Phase

The desk research component of Stage Two was completed successfully and contributed to the bulk of the findings detailed in Chapter Three of this Report.

The focus of the field survey segment of the study was to ground truth the results and findings of the desk research with stakeholders at the coalface of Nigeria's FinTech and Digital Economy.

The team conducted the field and data collection phases of Stage Two over a period of eight weeks. Survey Data Enumerators were in locations in the six geopolitical zones of Nigeria executing interviews, holding survey-centred discussions and administering the questionnaires to the sample population.

Two questionnaires were administered – one on the Core FinTechs, FinTech Enablers and Regulators, and the other served the consumers of FinTech.[4]

Both sets of questionnaires were configured to dig deep and tease out the trends, challenges, factors, and forces at play that are hindering and/or enhancing the development of the Digital Economy in Nigeria.

2.1.3 Survey Limitations

The research team proposed to survey a total number of 3600 individuals made up of 600 persons per geopolitical zone, 98 FinTechs and 92 telecommunications service providers. But despite all the strenuous efforts made to accomplish the projected sample size, the survey was hampered by unforeseen events that made the numbers unachievable.

The survey team encountered severe restrictions of movement in the Southeast on account of the seat-at-home agitations occurring weekly in the region. Following local advice there, the team vacated the zone earlier than scheduled.

[4] See Appendix 1 and Appendix 2

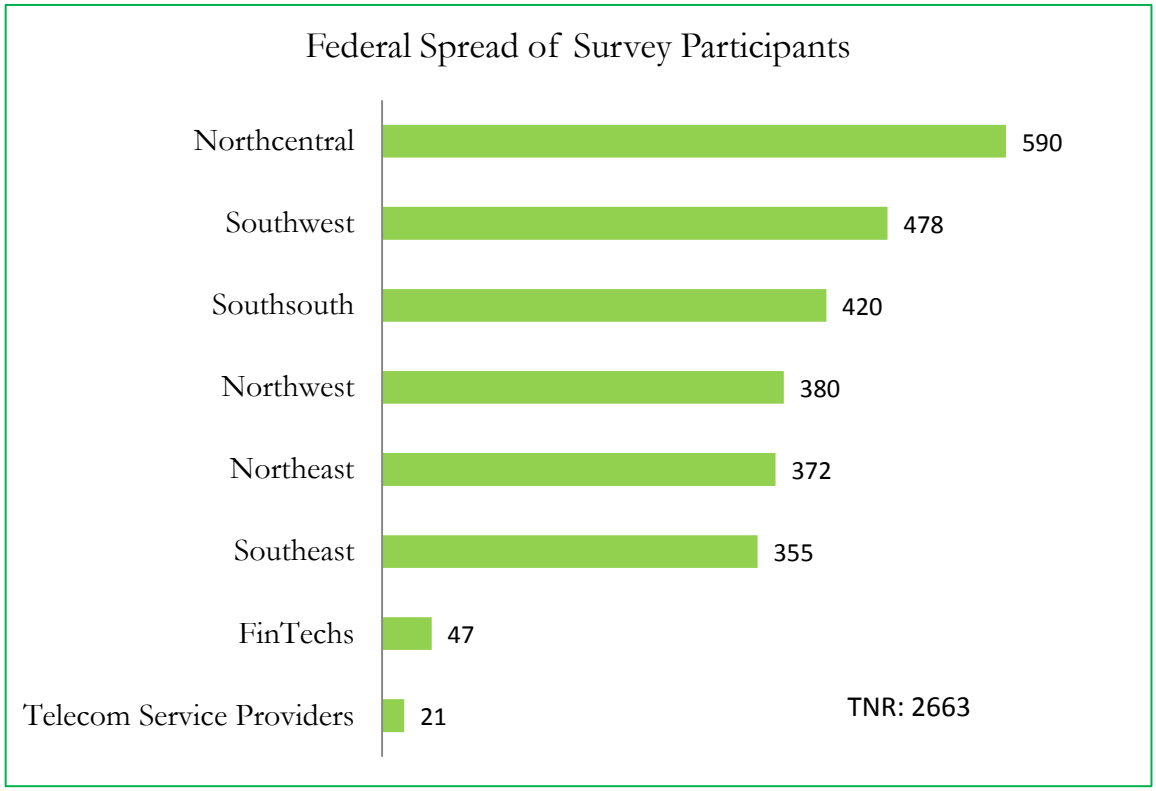
In the Northeast and Northwest zones, the survey team was confronted with respondent apathy as most individuals approached showed little or no enthusiasm to being surveyed.

Although the actual numbers of FinTechs, telecommunication service providers and individual users that completed the questionnaires and took part in the interviews were not up to the exact numbers of the proposed survey population, they were sufficient enough for Federal spread and met the urban/rural scope of the study.

Out of the 3792 projected survey population, a total number of 2663 respondents participated in the survey comprising 2595 individuals, 47 FinTechs and 21 telecom service providers. The Northcentral zone provided the highest number of respondents in the individual users' category (590), followed by the Southwest (478).

The Southeast zone contributed the fewest number of respondents in the individual users' category (355), closely followed by the Northeast (372).

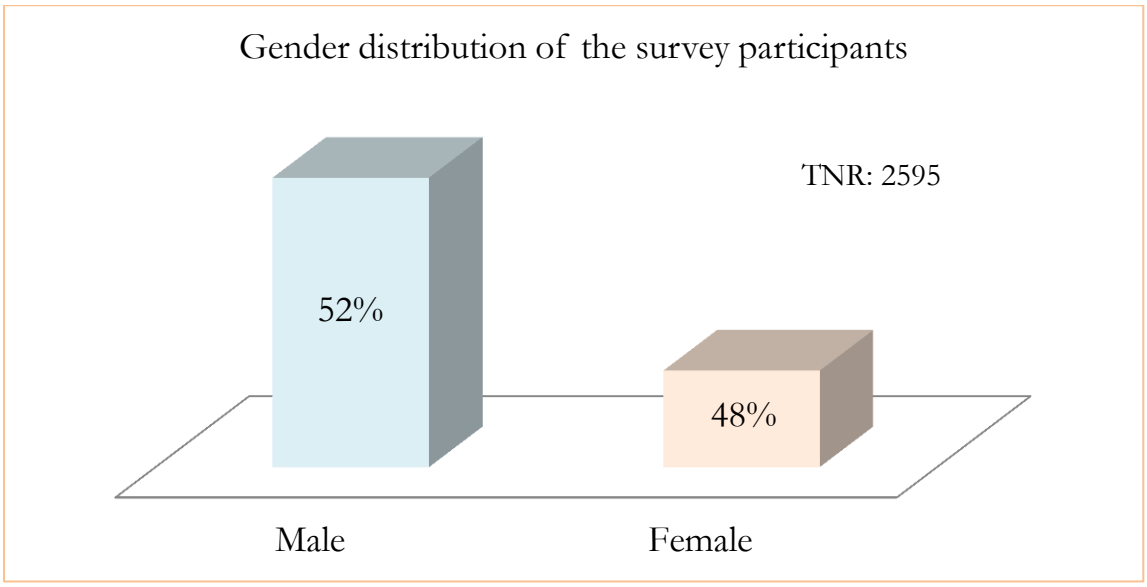
Table 14: Total Number of Survey Respondents



2.1.4 The Demographics of Survey Participants

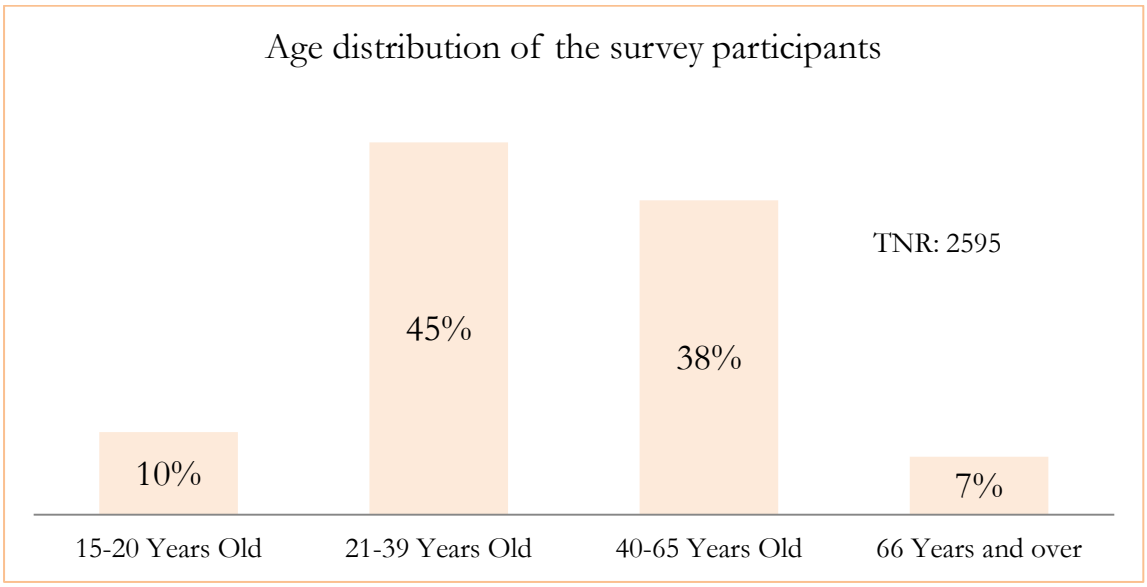
In the individual users' category, 52% (n=1349) are males and 48% (n=1246) are females. This signifies that majority of the survey participants are males.

Table 15: Survey Question #1 - What is your gender?



As illustrated in Table 14, ten per cent of the survey participants (n=259) are young individuals of 15-20 years of age; and 45% (n=1168) are persons aged 21-39 years while 38% (n=986) are people in the 40-65-year-old bracket. Seven per cent (n=182) are senior citizens aged 66 years and above. This denotes that majority of the survey participants (55%) are young people below the age of 40 years.

Table 16: Survey Question #2 - What is your age group?



2.1.5 Detailed Work Plan

Table 17: Stage One – The Inception Phase

Phase	Work Activity	Description	Output	Status
FIRST STAGE Interim Phase	1. Project Interim 2. Project Kick-off Meeting 3. Design of Data Collection Tools 4. Interim Report	a) Review project objectives b) Draft and submit the Interim Report	Harmonise project objectives with the Work Plan	Completed
		a) Design appropriate study instruments for approval by the Commission b) Arrange strata-level logistics (Abuja, Minna, Jalingo, and Yenagoa) c) Procure required survey tools – tablets, handheld and mobile devices, and other project consumables	Submission of Interim Report	Completed
	Articulation of Study Questionnaire	a) Articulate, review and produce interview questions b) Configure tablets and handhelds with study questionnaires accordingly	Questionnaires Configured devices	Completed
	Engagement of Resource Persons	a) Engage PIU coordinator b) Engage Data Analysts c) Engage Data Enumerators d) Plan for engagement of other ancillary resource persons as required	Induction of Resource Persons	Completed
	Orientation/ Induction	a) Execute training exercises for all resource persons b) Conduct orientation of cluster coordinators at the PIU c) Organise orientation and deployment of Data Collectors/ Enumerators	Deployment of all Field Resource Persons	Completed

Table 18: Stage 2 – Field Work and Data Collection Phase

Phase	Work Activity	Description	Output	Status
SECOND STAGE Field Work / Data Collection Phase	Identification of industry and sector resource respondents	a) Populate the clustering schedule with a comprehensive list of sample respondents b) Organise focus group discussions, interviews and meetings as required	1. Stakeholder mapping 2. Efficient matching of resource persons	Completed
	Desk Research	a) Subject Extant Policies, Strategies, Directions and Conditions to rigorous analysis b) Interrogate legacy / archived materials c) Review literature from leading institutions active in the FinTech ecosystem d) Research Internet resources and legacy materials	Mining of Secondary Data	Completed
	Interim Report	Produce and submit the Interim Report	Feedback to NCC	Completed
	Field Work	a) Mobilise resource persons to the field b) Survey in the 6 geopolitical zones c) Execute doorstep interviews of respondents d) Carry out RTD meetings with sector stakeholders	Commencement of active field survey across the 6 geo-political zones of the country	Completed

Table 19: Stages 3 & 4 - Data Analysis and Reporting Phase

Phase	Work Activity	Description	Output	Status
THIRD STAGE Data Analysis Phase	Progress Report	Produce and submit the Progress Report	Feedback to NCC	Completed
	Monitoring and Evaluation (M&E)	a) Feedback on the project performance b) M&E on the processes and platforms c) M&E on the performance of resource persons and other service providers	Continuous monitoring and evaluation of the project to ensure consistency and alignment with the ToR	Continuous
	Data Analysis	a) Collate and analyse primary and secondary data b) Identify the challenges of FinTech and digital financial inclusion and their impact on the drive towards a data-driven Nigeria c) Identify the role, benefits and challenges of Data in the growth of the Digital Economy and its impact on national economic development in Nigeria	Distillation of the Findings into Recommendations and Suggestions	Completed
FINAL STAGE Reporting	1. Draft Report 2. Presentation	PowerPoint Presentation of Study Findings to the Commission	1. Submission of Draft Report 2. PowerPoint Presentation	Completed
	Final Report	Conclude, produce and submit the Final Report	Submission of the Study's Final Report	This Report

CHAPTER THREE

3.0 Findings

3.1 Literature Review

In setting the stage for this Report, the basic characteristics of the Digital Economy and the definitions of Data and FinTech are addressed in detail before providing an overview of the study's findings.

3.2 The Digital Economy

The review of available literature affirms that the term Digital Economy was first coined in the book titled: "The Digital Economy: Promise and Peril in the Age of Networked Intelligence" by author Don Tapscott in 1995. In the book, the Digital Economy is defined as the catch-all term used to describe the panoply of economic activities and professional interactions that are enabled by or based on digital technology.[5] In other words, Digital Economy encapsulates the economic outcomes from billions of everyday online connections among people, businesses, devices, data and processes.[6]

The two major forms of the Digital Economy are digital industrialization and industrial digitization. Digital industrialization describes the development of ICT industries, including electronic information manufacturing, telecommunications, software and information technology services, and the Internet industry.[7] Industrial digitization deeply integrates advanced digital technologies with traditional industries. This accelerates the transformation and upgrading of traditional industries and improves their production efficiency.[8]

The Digital Economy utilises Information and Communications Technology (ICT) to rework conventional exchanges and enable new ones and has become a substantial component of the global economy to the extent that an estimated 70% of new value created in the economy over the next decade will be based on digitally enabled business models.[9]

[5] Don Tapscott: The Digital Economy: Promise and Peril in the Age of Networked Intelligence, 1995
[6] Organization for Economic Co-operation and Development (OECD) 2012
[7] Borisov Et Al., The Digital Divide in Romania–A Statistical Analysis
[8] Kim TY Et Al.,: The Faster-Accelerating Digital Economy
[9] According to the World Economic Forum (WEF)

The Digital Economy is more about analysing real-time flows of mostly unstructured data such as images and videos uploaded to and downloaded from social media; digital movies populating the pixels of high-definition TVs; banking data swiped in ATMs; security footage at airports, banks, hospitals and major events; voice calls zapping through digital phone lines; emails and texts as a widespread means of communications; organizations and their types, activities and business relationships; demographic behaviours and relationships; the natural environment; the built environment and all what not.

The Digital Economy has created and continues to create new types of value chains, partnerships and ecosystems.[10] Digital innovators and companies in these new value chains are making inroads into the socioeconomic fabric of Nigeria and winning a lion's share of the market.

These innovators and companies win because the Digital Economy creates value differently and dents conventional notions about how businesses are structured; how firms interact; and, how consumers obtain services, information and goods.

Four fundamental shifts in the industry are altering the financial services paradigms. These are:

1. A move away from products to an emphasis on customer experience;
2. Less importance on assets and more on data;
3. Shared access instead of ownership; and,
4. Partnering instead of building or buying.

Take for instance Bolt and Uber, unarguably two of Nigeria's largest taxi operators. The duo, between them, owns no vehicle despite the large numbers of drivers gainfully engaged on their platforms. Even Jumia and Jiji, two well-known large retailers, between them hold no stock of their own despite their dominance of Nigeria's online marketplace.

These aforementioned enterprises, it must be noted, were born digital. Their business mainstay is anchored primarily on the use of data and internetworking.

Internetworking is a key characteristic of the Digital Economy requiring businesses to partner, collaborate and cooperate to deliver products and services to their customers without any party in the value chain exercising sole ownership of the entire process. These modern businesses anchored on Internetworking create

[10] Harvard Business Review - Creating Value in a Digital Economy

digital connections that provide data that reach farther into the customers' world and make possible innovative relationships between them and the customers. These relationships spawn a new level of familiarity that allows the companies to personalize service and product offerings.

Also known as the new economy, the Digital Economy consists of all sectors making extensive use of digital technologies (i.e. their existence depends on digital technologies), as opposed to those sectors that make intensive use of digital technologies (i.e. simply employing digital technologies to increase productivity).[11]

The Digital Economy is stratified into three nested tiers comprising:

1. The digital sector and associated core technologies;
2. The digital services and the platform-based economy; and,
3. The digitalized sectors such as e-Business, e-Commerce, and the gig economy.[12]

The Digital Economy is underpinned by three crosscutting building blocks consisting of:

1. The stakeholders (who);
2. The pillars and elements (what); and,
3. The enablers (how).[13]

1. **Stakeholders**

Four main groups are identified as stakeholders in the Digital Economy. All four are producers and consumers (prosumers) of digital tools and content alike. They are:

i. **Individuals**

Individuals play a key role on both the demand and supply sides as they generate and consume Data and pay for products and services.

ii. **Enterprises**

Enterprises are rapidly adapting to remain competitive as technology continues to redefine business models and transform entire industries.

[11] Bukht, Rumana; Heeks, Richard (2017): "Defining, Conceptualising and Measuring the Digital Economy"
[12] Gig work is labour that consists of temporary and flexible jobs usually done over delivery apps
[13] Authur D Little – Digital KSA – Assessment and Way Forward for the Digital Economy

iii. **StartUps**

StartUps are the main drivers of change in the Digital Economy, as they develop and commercialize innovative solutions leveraging technology.

iv. **Government**

Governments at all levels - Federal, State, and LGA - play a key role in Nigeria's Digital Economy, leveraging digital technologies to interact with citizens, improve services and promote ICT across all demographics.

2. The Pillars and Elements of the Digital Economy

The following components have to be available to the stakeholders to create the Digital Economy:

i. Infrastructure and Devices

ICT services and solutions are required in a Digital Economy, ranging from mobile and fixed infrastructure and networks to Data Centres and gadgets such as smartphones and IoT sensors.

ii. Data

Data is the fuel of a digital economy, and consolidation of Open Data platforms to ensure standardization and quality are key to leveraging technologies such as Artificial Intelligence and extracting key insights.

iii. Content and Services

Content and services available, including software and applications, digital platforms and the latest technologies such as Artificial Intelligence (AI), 5G, Machine Learning (ML), and Distributed Ledger Technology (DLT) are vital to reaping all the benefits of the Digital Economy.

iv. Skills

The Digital Economy requires technology-savvy users in all demographic segments and a skilled workforce across sectors that can keep pace with the rapidly changing labour environment.

v. Trust and Security

Stakeholder perception of safety and privacy in digital cybercrime and security threats also need to be effectively addressed.

3. Enablers of the Digital Economy

Certain elements are crucial in providing the enabling environment for a thriving digital ecosystem. They include:

i. Regulation

Impactful regulation capable of keeping pace with the constant evolution of technology plays a major role in digital transformation, balancing economic and social benefits and limiting potential externalities.

ii. Innovation

Innovation brings competitiveness and dynamism to the Digital Economy, consisting of the promotion of initiatives to research and develop or adapt new digital solutions to changing needs across sectors.

iii. Institutional Frameworks

A wide range of institutions is working together to promote digital transformation in Nigeria. The rebranding of the Federal Ministry of Communications and the Digital Economy underscores the Federal Government of Nigeria's commitment to putting the digitalisation of the economy at the centre of its strategic thrust.

iv. Funding

Investment of funds such as bank loans, private equity, venture capital, or seed capital to support and incentivize StartUps and MSMEs is a critical component of the Digital Economy.

4. Components and Elements of the Digital Economy

There are three main components of the Digital Economy,[14] namely:

1. **E-business:** – this is any process that a business organization conducts over a computer-mediated network. Business organizations include any for-profit or not-for-profit entity. Examples of major electronic business process categories include online purchasing, selling, production management, logistics as well as internal communication and support services.[15]

2. **E-business Infrastructure:** - this describes the share of total economic infrastructure used to support electronic business processes and conduct electronic commerce. It includes hardware, software, telecommunication networks, support services, and human capital used in electronic business and commerce.[16]

3. **E-commerce:** – which denotes the value of goods and services sold over computer-mediated networks. An e-commerce transaction is completed when an agreement is reached between the buyer and seller online to transfer the ownership or rights to use goods or services. This online agreement is the trigger for determining an e-commerce transaction, not the payment.

   In broader terms, e-commerce describes the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the Internet.

   E-commerce operates under many segments including business-to-business (B2B); business-to-consumer (B2C); consumer-to-consumer (C2C) or consumer-to-business (C2B).[17]

   There is also business-to-Government (B2G) and peer-to-peer (P2P) types of transactions occurring in this component of the Digital Economy.

[14] **Thomas Mesenburg** - Measuring the Digital Economy (2001)
[15] Ibid
[16] Ibid
[17] **Consumer-to-Business** – a business model where consumers deliver value to a business rather than vice-versa

5. Characteristics of Nigeria's Digital Economy

Description	Characteristics	Situation Analysis
Digital Economy Infrastructure	Secure Internet servers (per million people)	Nigeria's secure Internet servers stood at 73.9 per million people in 2020, down from 74.8 per million people the previous year making a negative change of 1.18%.[18]
	Fixed Broadband subscriptions (per 100 people)	Nigeria had a total number of 525,468 Data-Only Mobile-Broadband Subscriptions and Active Mobile Broadband Subscriptions of 78,041,883 as of December 2021 which decreased from 85,941,222 subscriptions in December 2020. Consequently, Broadband penetration decreased from 45.02% in December 2020 to 40.88% in December 2021.[19]
	Fixed telephone subscriptions (per 100 people)	Fixed telephone subscriptions refer to the sum of the active number of analogue fixed telephone lines, fixed Wireless Local Loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones. Fixed telephone subscriptions in Nigeria stood at 103,984 by May 2022[20] (roughly 0.05192 per 100 people)
	Mobile cellular subscriptions (per 100 people	Mobile cellular subscriptions decreased from 204,601,313 subscribers in 2020 to 195,463,898 active voice subscriptions as at December 2021 with a loss of 9,137,415 subscriptions. This represents a 4.46% decline in total subscriptions within the period under consideration. Although by May 2022 the figures had rallied to 204,214,647 subscriptions. Nigeria`s teledensity decreased from 107.18% in 2020 to 102.40% by December 2021.[21]

[18] World Bank Data figures - https://Data.worldbank.org/indicator/IT.NET.SECR.P6?locations=NG
[19] NCC: 2021-year-end-subscriber-network-Data-report/file
[20] NCC - https://www.ncc.gov.ng/statistics-reports/subscriber-Data
[21] Ibid

	Individuals using the Internet (percentage of population)	The total number of active Internet subscriptions decreased from 154,289,727 in December 2020 to 141,959,496 subscriptions in December 2021. This indicates an 8% decline in the total Active Internet Subscriptions Year on Year. Conversely, the total volume of data consumed by subscribers increased to 353,118.89TB as of December 2021 from 209,917.40TB as of December 2020 representing an increase of 68.2% in data consumption within the period.[22]
Digital Economy Openness	High-tech exports (percentage of manufactured goods exports)	High-technology exports % of manufactured exports in Nigeria was 6.94 as of 2020. Its highest value over the past 11 years was 11.91 in 2015, while its lowest value was 1.09 in 2010.[23] Definition: High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.
	ICT product exports (percentage of total product exports)	The value for ICT goods exports % of total goods exports in Nigeria was 0.002 as of 2019. It reached a maximum value of 0.017 in 2011 and a minimum value of 0.000 in 2002. [24] Definition: Information and communication technology goods exports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other miscellaneous information and technology goods.
Digital Technology	Enrolment in higher education	In the academic year 2018/2019, Nigerian universities counted 1.8 million

[22] NCC – End of Year Report 2021
[23] United Nations, Comtrade Database through the WITS platform
[24] United Nations Conference on Trade and Development's UNCTAD stat Database at http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx

Innovation Environment and Competitiveness	institutions (percentage of the total population)	undergraduate students and 242,000 postgraduate students.[25] In the 2020/2021 academic year the number of undergraduates rose to 2.1 million.[26] This translates to about 1% of the population for undergraduates and an infinitesimal percentage for postgraduates; which spells a very serious problem - almost a crisis for the economy. Among postgraduate students, women accounted for 38 per cent of the total, while the female percentage among bachelor students was 44 per cent. Gender, like geography and poverty, is an important factor in the pattern of educational marginalization in Nigeria.
	R&D (research and development) expenditures (percentage of GDP)	Only 0.2 per cent of GDP is current spend devoted to Research and Development in Nigeria, which is negligible compared to developed nations such as the United States, China, Japan, Germany, and South Korea which spend between 2.5 to 4 per cent or even developing nations such as India, Malaysia and Brazil that spend between 0.7 per cent and 1.2 per cent of their annual GDP on R&D.[27]
	Availability of the latest technologies	Nigeria ranks 118th among the 132 economies featured in the Global Innovation Index 2021. As for innovation outputs, Nigeria ranks 124th. This position is lower than in both 2020 and 2019. Nigeria ranks 28th among the 34 lower middle-income group economies and 16th among the 27 economies in Sub-Saharan Africa.[28]

[25] National Universities Commission (NUC) figures
[26] https://tribuneonlineng.com/2-1-million-students-studying-in-nigerian-universities-nuc
[27] FG Laments Poor R&D Expenditure - https://www.thisdaylive.com/index.php/2021/09/10/fg-laments-poor-rd- expenditure-floats-50m-research-fund/
[28] GII - https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021/ng.pdf

	Venture capital availability	FDI into the Nigerian Telecoms Industry in the Year 2021 was approximately $417.4m against $942.8m at the Year 2019 while CAPEX (domestic investment) stood at N1.1 trillion as of Year-end 2021.[29] Altogether, the total foreign direct investment net inflow (% of GDP) into the Nigerian economy was 0.55 as of 2020. Its highest value over the past 50 years was 5.79 in 1994, while its lowest value was -1.15 in 1980.[30]

The Digital Economy involves intensive and extensive use of Information and Communications Technology (ICT); codification of knowledge; digitalisation of information; transformation of data into commodities or assets; and, the organization of work and production in innovative ways.

The Digital Economy de-emphasises the need for workers to assemble in any specific physical office or location for work as people are now empowered to work from different locations, be it their homes, local restaurants or indeed from anywhere they may be in the world, so long as they have an Internet-enabled device. The Covid-19 pandemic further helped to push remote working to the forefront, thereby propelling the use of ICT as the prerequisite of the Digital Economy.

While colleagues can do their work from anywhere, they still expect to have the same level of connectivity experienced in the physical office - which is where digital technologies come into their element. Thus the backbone of the Digital Economy is hyperconnectivity - the growing interconnectedness of people, organisations, and machines that result from the Internet, mobile technology and the Internet of Things (IoT).[31]

At the heart of the new economy are twelve essential characteristics that differentiate the Digital Economy from the conventional economy. These characteristics are Knowledge, Digitization, Virtualization, Molecularization,

[29] NCC Annual Report 2021
[30] International Monetary Fund, International Financial Statistics and Balance of Payments Databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates
[31] **Deloitte** - What is Digital Economy?

Internetworking, Disintermediation, Convergence, Innovation, Prosumption, Immediacy, Globalization, and Discordance.[32]

- **Knowledge** – While in the conventional economy, land, buildings, labour and money are important factors of production, in the Digital Economy knowledge is the most important resource for an organization. Here, knowledge is everything.

- **Digitalization –** digital, not analogue, email not post office, electronic commerce not brick and mortar – is the mantra of the Digital Economy. Electronic publishing, virtual book store, Internet banking, and telemedicine are examples of a variety of products and services that can be offered on the Internet, digitalised.

- **Virtualization -** Physical things are virtualised – such as virtual money, virtual wallet, virtual ballot boxes, and virtual offices and virtual jobs etcetera.

- **Molecularization** - The old corporation is being disaggregated, replaced by dynamic molecules and clusters of individuals and entities that form the basis of economic activity where traditional large inert structures give way to more adaptive and dynamic clusters such as StartUps.[33]

- **Internetworking** – collaborations, colocations, partnerships - technology vendors, content partners, merchants, suppliers and so forth - any business insisting to control its business processes from conception to consumer does not belong in the Digital Economy.

- **Disintermediation** – where the middle functions between consumers and producers are eliminated through digital networks.

- **Convergence** - created by converging and integrating computing, communication and content to conduct business transactions.

- **Innovation** – On the maxim that if a company doesn't do it first, its competitors will. The Digital Economy is open 24 hours unlike the 8 hours in the conventional economy. In the Digital Economy, competitive advantage is difficult to sustain hence rapid innovation is constantly required.

[32] **Don Tapscott -** The Twelve Themes of the New Economy (1996)
[33] **Nirmala Krishnan**: E-Business in The New Economy

- **Prosumption** - boundaries between producers and consumers become blurred through customization combining production and consumption - almost all consumers of information technology can easily become producers (prosumers).

- **Immediacy** – just-in-time is the truism in the Digital Economy - given that the switching cost on the Internet is very easy and inexpensive, customers will continue to look for companies that must provide the highest benefit to them and quickly too.

- **Globalization** - the collapse of the boundaries of space and time with transnational systems – the Digital Economy is not hampered by either geographic boundaries or time zones.

- **Discordance** - unprecedented social and cultural changes in society as a logical consequence of the impact of the changes in several paradigms related to everyday life. For example, access to other cultures can be had by anyone, anywhere, in the wake of a few clicks on the keyboard.

3.3 Data

Data has meant different things at different epochs, and in different disciplines. Previously defined simply as facts, the term slowly came to mean facts as they related to mathematical representations. Despite the changing nature of data, things such as pictures, sounds, or words would not have been thought of as data even as recently as a few decades ago.

But these are different times and major advances in computing power, together with innovative thinking, have resulted in technology converting all sorts of materials into data.

Because the evolving definition of data stems simply from technological advances in computing and creative thinking, it is challenging to provide a specific description of data that would not soon seem out-of-date.

In general terms, data can be quantitative or qualitative in nature and may be stored on analogue (that is, paper, stone tablets) or digital media.[34] Indeed, some data are still collected on paper in many places in Nigeria. Processing these data, digitizing

[34] Carrière-Swallow and Haksar (2019, 17); https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2019/09/20/The-Economics-and-Implications-of-Data-An-Integrated-Perspective-48596

them and entering them in a spreadsheet or database allows them to be more easily analyzed, but being in a digital format is not necessarily the main attribute of data.

The Organization for Economic Co-operation and Development (OECD) states broadly that data are individual facts, statistics or items of information, often numeric, which are a set of values of qualitative or quantitative variables about one or more persons or objects.[35] Although this description aligns somewhat with how the term is used in this study, one distinction is worth noting. Here, data are not synonymous with information. Rather, data must be processed, structured, and analyzed to be converted into information, which then becomes insight that can be used in decision-making.

Data can further be defined as information, especially facts or numbers, collected to be examined, considered and used to help decision-making or information in an electronic form that can be stored and used by a computer[36] according to the Cambridge dictionary. This definition runs counter to the maxim that there can be Data without information but no information without data.

A more expansive description of data that resonates with how the term is used in this Report is provided by the UK National Data Strategy which defines data to be about people, things and systems. Data about people can include personal data, such as basic contact details, records generated through interaction with services or the web, or data about their physical characteristics (biometrics)—and it can also extend to population-level data, such as demographics.

Data can also be about systems and infrastructure, such as administrative records about businesses and public services. Data is increasingly used to describe the location, such as geospatial reference details, and the environment, such as data about biodiversity or the weather. It can also refer to the data generated by the burgeoning web of sensors that make up the Internet of Things.[37]

Data is the dominant resource in building the Digital Economy. The statistics on data are remarkable. It is estimated that 2.5 quintillion bytes of data are produced every day and that 263 zettabytes of data will be generated daily by the year 2025.[38] Data is the basis of all advanced analytics, Artificial Intelligence (AI), Machine

[35] OECD Glossary of Statistical Terms 2008
[36] https://dictionary.cambridge.org/dictionary/english/Data
[37] What we Mean by Data - https://www.gov.uk/Government/publications/uk-national-Data-strategy/national-Data-strategy
[38] IDC Research

Learning (ML), and the Internet of Things (IoT). Data is considered to be as much of a driver of socio-economic growth in this century as oil was in the last century.

The digital data created, replicated, and consumed in Nigeria - in other words, the Nigerian digital universe[39] - run into the quintillions bolstered by the Covid19 pandemic which saw work and other forms of activities move from physical to virtual.[40]

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With the Internet of Things rendering all sorts of things into sources of data, Nigeria's digital universe is bristling with connected sensors resulting in people leaving digital trails wherever they go, even when they are not connected to the Internet.

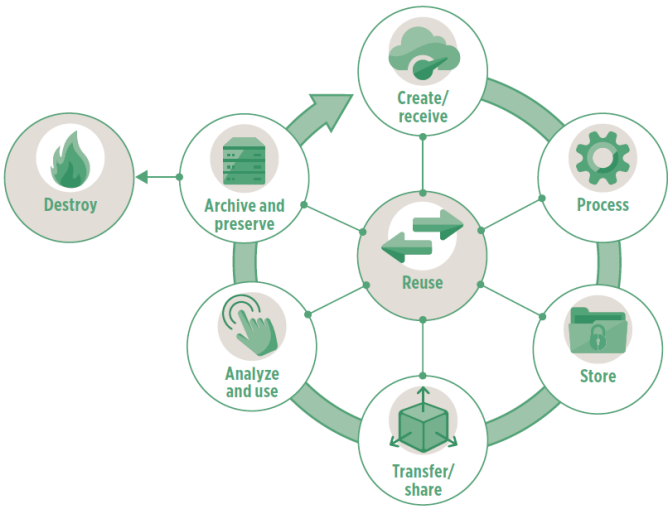
To ingest and digest all these data, forward-facing organisations build data refineries to extract the intrinsic value of data and use it to enhance and maximise their operational efficiency.

Due to its ability to bridge the information asymmetry between supply and demand, data now has an economic value. When platforms compile personal data, they gather preferences and interests, which allow companies to exert a targeted action on the consumer through advertising and other product and service promotion gimmicks.

Corporate data has become a cohesive living thing that flows throughout information systems. The data life cycle, also called the information life cycle, refers to the entire period that data exists in an organisation's data system.

It encompasses all the stages that data goes through, from the first capture to eventual destruction as illustrated in Figure 1.

Figure 1: The Lifecycle of Data



Source: WDR 2021 team.

[39] https://www.cs.princeton.edu › archive

[40] https://technext.ng/2021/08/26/nigerias-Data-usage-hits-205880-terabytes

Create/receive - from the data entry dashboard; acquired from existing data from other sources; or received as signals from devices or sensors.

Process - involves cleaning and preparing raw data for later analysis; integrating data from multiple sources; validating, reformatting, summarising, standardising, and enriching data as part of the data processing workflow.

Store – this is most commonly achieved through the creation of databases or datasets. These datasets may then be stored in the cloud, on servers, or using another form of physical storage like a hard drive, CD, cassette, or flash drive.

Transfer/share - where forecasts and insights turn into decisions and direction.

Analyse and use - this is where the magic happens. Data is analysed, interpreted and used. Some of the more commonly used methods include statistical modelling, algorithms, artificial intelligence, data mining, and machine learning.

Archive and preserve - once data has been collected, processed, analysed, and shared, it is typically archived for future reference.

Destroy - storing data that no longer serves a purpose is costly and can pose liabilities and risks, hence the necessity to destroy redundant data. This is particularly true in the case of sensitive personal data.

3.4 FinTech

Although solving prevalent financial challenges remains FinTech's primary goal, it is changing the culture of finance in Nigeria and shows up wherever people require money. This has positioned it at the centre of the Nigerian Digital Economy.

As Nigeria's financial space expands, FinTech's impact will continue to stretch beyond financial inclusion to a full transformation of the role financial services play in the everyday lives of Nigerians.

So what exactly is FinTech?

FinTech - a portmanteau of financial technology – describes a cross-disciplinary subset that combines financial technology and innovation management.[41] As a core element of the Digital Economy, FinTech is the intersection of technology and financial services encompassing all innovations that use technology solutions to replace, supplement, or enhance financial service processes.

[41] https://www.forbes.com/advisor/banking/what-is-fintech/

Since its advent, FinTech has continually spawned many neoteric businesses and employment opportunities in various segments including Payments, Mobile Money & Digital Banking, Lending and Savings, Investment and Crowdfunding, Enterprise Services and Infrastructure, Cryptocurrency and InsurTech etcetera. Also active in the FinTech ecosystem are enablers such as Venture Capital & Private Equity Investors; Associations & Facilitators; Accelerators & Incubators; and, of course, Regulators and Policymakers.

Smart mobility is another part of the tech ecosystem that has gained some traction in recent times. Following the launch of the Uber ride-sharing service in 2014, several other models have been introduced and adopted including bike-hailing services. Smart mobility is certainly one major area where FinTech has had a lot of positive impact in Nigeria. It is also forecast to remain a disruptive force in the market as other aspects of the transportation system key into the technology.

The technological innovations that accelerated the pervasiveness of FinTech include smartphones, Distributed Ledger Technology, Big Data Analytics, Machine Learning, Artificial Intelligence, APIs and to a large extent Automatic Teller Machines (ATM).

FinTech encompasses any digital tool consumers use to manage their money including the digital interfaces provided by traditional banks; products and services built by new entrants; and, connected financial capabilities built into the consumer experiences of platforms and applications.

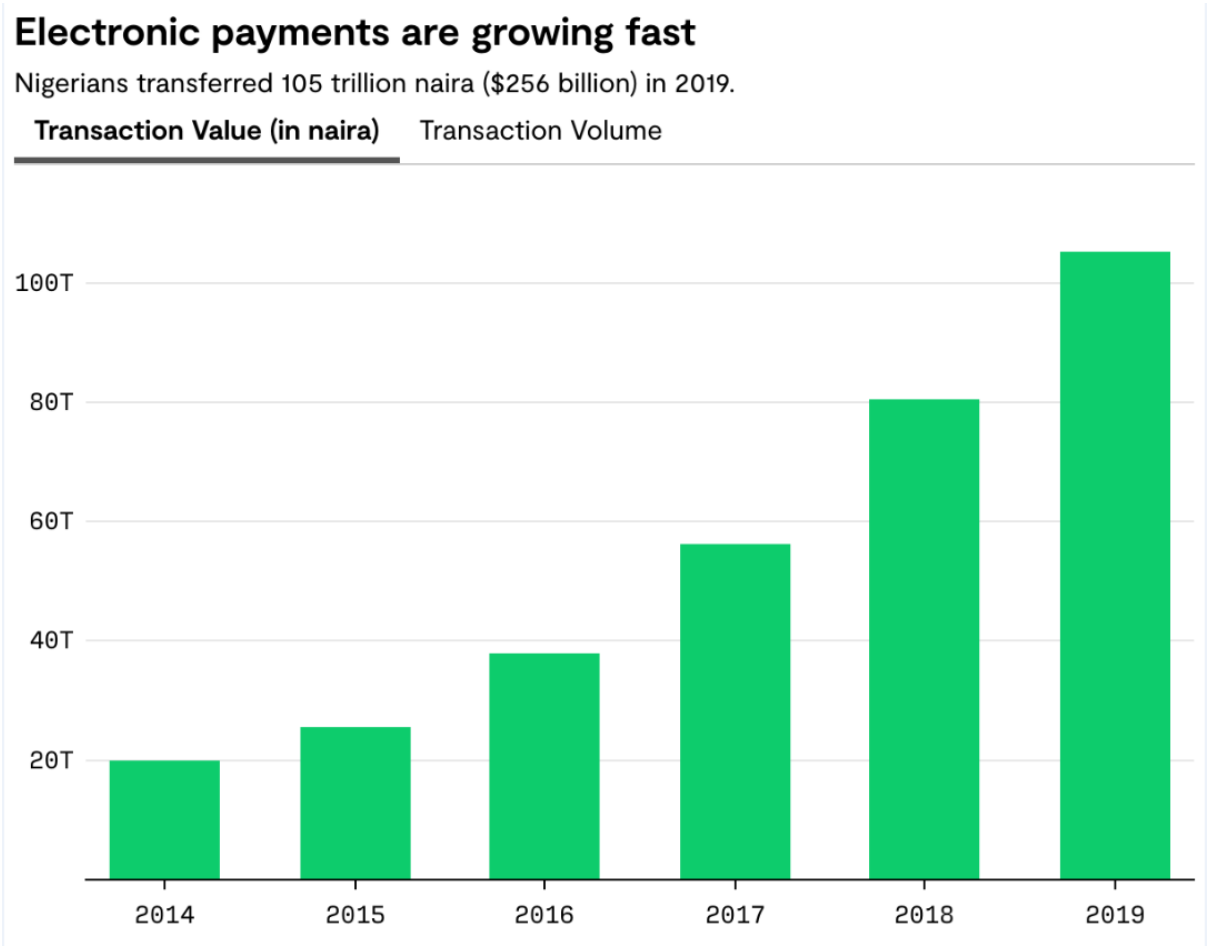
FinTechs offer innovative and customer-friendly solutions and a level of flexibility that traditional institutions struggle to provide. It has revolutionized finance in Nigeria, particularly in the consumer sphere where access to financial services and payment methods has increased substantially.

FinTech and rising customer expectations have forced conventional institutions to leave their comfort zones, change their business models and rework their technology architecture, thereby triggering a digitalisation tsunami in Nigeria's economy. FinTech has sent the hitherto go-it-alone players in Nigeria's financial space into a surge of partnerships and collaborations. It has led to banking products and services being bundled, unbundled and re-bundled via platforms where users can satisfy their variety of financial needs.

Incumbent Financial Institutions are beginning to realise the value of folding FinTech into their business strategies to fill service gaps or bolster their

competitiveness. The incumbents have adapted by adopting new technologies and disaggregating their products and services to improve efficiency and compete in an ever-changing market.[42]

FinTech as technological innovation and the prevailing model of delivering financial services has different types of players including the Incumbents (e.g. Banks, Insurance companies etc.); Non-financial services providers (e.g. technology companies) and StartUps/New entrants all playing in different parts of the value chain (e.g. B2B, B2C, C2C, P2P and Infrastructure); delivering a wide range of services (e.g. Payments, Lending, Savings and Investments, insurance etc.); and leveraging various technology (e.g. Blockchain, Machine Learning, Application Programming Interface, Cloud, Data Analytics, Biometrics etc.).



Source: NIBSS

[42] Take for instance Guaranty Trust Bank's QuickCredit; Access Bank's QuickBucks; and, Sterling Bank's Specta all Apps designed to provide loans to customers quickly without the tedious traditional hurdles

Data gleaned from the NIBSS portal attests that individuals used electronic channels 86.57 per cent more in the first two months of 2022 than they did in the corresponding period of 2021. This posits that electronic payment adoption in Nigeria has been on the rise in the wake of the Covid-19 pandemic.

The penetration of FinTech into the Nigerian financial space is reflected in the rise of activity in electronic transfers. About N54.98tn was processed through Nigeria's electronic channels in the first two months of 2022. This is a 45.49 per cent increase from the corresponding period of 2021 when N37.79tn was processed through the nation's electronic channels. In 2019 alone Nigerians transferred N105tn. [43]

In a nutshell, FinTechs lean on digital technology to enhance and improve the performance of conventional financial services by reducing or eliminating existing intermediaries, processes and procedures that have over the years constituted hurdles and impediments to the optimum efficiency of the industry. By offering alternative pathways to financial services, FinTechs enable customers to receive faster, more convenient and cheaper services, while also yielding higher and more appealing returns on investment to investors and funders.

[43] According to Data from the Nigeria Inter-Bank Settlement System (NIBSS) portal

3.5 Study Objective Item #1 - Role of Data and FinTech

To Promote a Better Understanding of the Role of Data and FinTech in the Development of the Digital Economy in Nigeria

3.5.1 Findings

Data is best understood as an untapped resource that technology has finally unlocked. Data's unlocked potential now allows businesses to, among other things, exploit the resource to gain data-driven insights; improve customer engagements; consolidate processes and operations; enhance business operational efficiency; improve employee engagements and culture; increase agility and innovation; and, overwhelm competitors.[44]

FinTechs differentiate themselves by strategically using data to unlock new revenue streams, create value and boost insightful decision-making. Organisations leverage data for a better understanding of market conditions and to uncover customers' purchase patterns and budgets, as well as growth predictions and determine relationships and behaviours that can be used to reduce or eliminate the need for collateral in cases of lending or purchasing on credit.

Early disruptors focused on the consumer and SME payments space generating therefrom enormous caches of data. The data from payments and advanced Data Analytics have led to newer savings, lending and investment models. Innovations in the use and application of data by businesses are creating tremendous economic value by enhancing data-driven decision-making and reducing transaction costs.

Governments too require data for the design of policies, planning of interventions, the anticipation of possible changes, forecasting of citizens' needs and provision of public services and utilities.

For many companies, their data infrastructure is fast transitioning from a cost centre to become a profit centre as they continue to deepen the use of the data to improve business processes, day by day.

[44] Johnny Ch Lok - The Relationship Between Technology and Industry Development (2019)

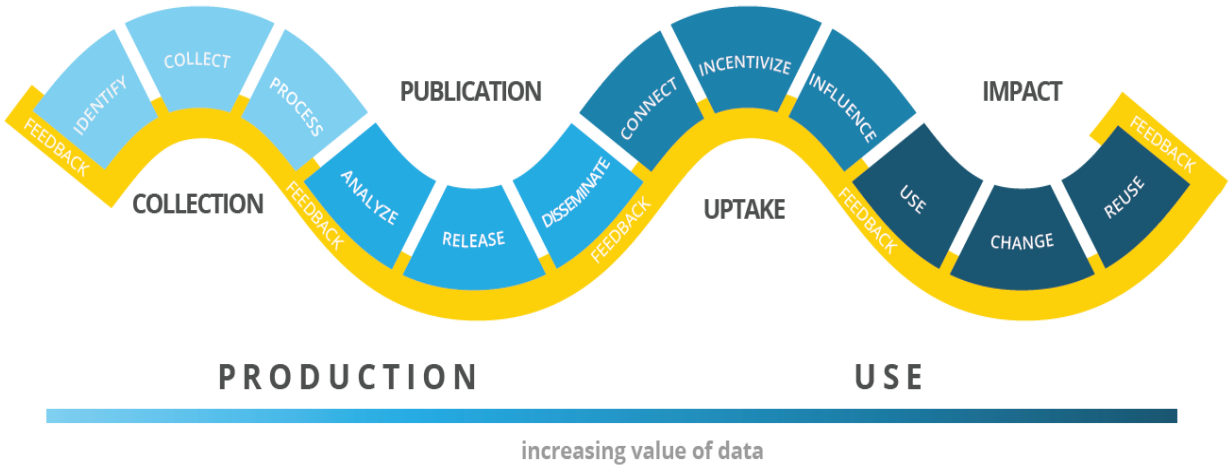
Unarguably, data is the livewire of businesses and Governments at all levels. This study, therefore, scrutinizes the data value chain to underscore the role Data and FinTech play in the development of the Digital Economy in Nigeria.

3.5.2 Data Value Chain

The data value chain describes the process of data creation and uses from first identifying a need for data to its final use and possible reuse. The data value chain has four major stages: collection, transmission (publication), storage (uptake), processing and use (impact).[45]

These four stages are further separated into twelve steps: identify, collect, process, analyse, release, disseminate, connect, incentivize, influence, use, change, and reuse as illustrated in the figure below.

Figure 2: The Twelve Steps in the Data Value Chain



Source: Data2X by Open Data Watch

Throughout the process, from one end of the value chain to another and back again, there should be constant feedback between producers and stakeholders. It is imperative therefore, that utmost care is exercised in its gathering, processing and use.

When data is put to use, it has an impact - a decision is made, a condition is altered, goods and services may exchange hands, a transaction is accomplished or someone's situation is affected and a data lifecycle is completed.

[45] **Open Data Watch:** The Data Value Chain - Moving from Production to Impact

But what are the processes involved from the collection of data to its impact? How is data transformed from its raw form into actionable information?

The answers to these questions are the essence of the data value chain.

Figure 3: Data Value Chain

3.5.3 Data Collection

This is the starting point for the application of data and refers to the collection of raw data from both internal and external sources. This first phase of data collection involves identifying what data to collect and then establishing a process to do so. Decisions made here will affect the quality and usability of the data throughout its shelf life.

The data can take many forms and come from multiple sources. It could involve the consumption of a third party's published dataset, or via an application programme interface. It could be generated by another piece of technology, perhaps an IoT device or it could be information requested as part of the design and provision of a service such as application forms for a driver's licence, international passport, voter's card, bank account opening, school admission, and, club membership form etcetera.

3.5.4 Data Transmission

Although data is intangible, it is not an ethereal entity. Therefore, it needs physical support and is often transmitted through physical infrastructures such as mobile Broadband, submarine cables, satellites, Internet exchange points (IXP), cloud markets and Data Centres.

It is estimated that about 99 per cent of international traffic goes through submarine cables.[46] Their advantage over other channels, such as satellites, is that cables can carry far more data at far less cost. Satellites are useful in reaching remote areas that are not wired by fibre. IXPs are physical locations where

[46] ITIF, 2019 - Submarine Cables: Critical Infrastructure for Global Communications

different networks connect to exchange Internet traffic and data via common switching infrastructures.

3.5.5 Data Storage and Warehousing

The Data Warehouse is a centralized system that allows for the storing, analysing, and interpreting of data to facilitate better decision-making. Transactional systems, relational databases, and other sources provide data into Data Warehouses on a regular basis. Data Warehouses are primarily designed to facilitate searches and analyses and usually contain large amounts of historical data. A Data Warehouse is developed by integrating data from varied sources into a consistent format and universally acceptable manner in terms of naming, format and coding to facilitate effective data analysis.

Although a Data Warehouse and a traditional database share some similarities, they are not necessarily the same. The difference is that in a database, data is collected for multiple transactional purposes while in a Data Warehouse data is collected on an extensive scale to perform analytics. Databases provide real-time data, while Data Warehouses store data to be accessed for big analytical queries.

Another distinguishing feature is the non-volatility of data in a Data Warehouse. Data once entered into a Data Warehouse ought to remain unchanged as all data are read-only. Previous data are not erased when current data are entered. This helps with data analysis.

Data Warehousing integrates data and information collected from various sources into one comprehensive database. For example, a Data Warehouse might combine customer information from an organization's point-of-sale systems, mailing lists, and website. It might also incorporate confidential information about an organisation's employees and suppliers etc.

The benefits of Data Warehousing for enterprises include improved data consistency; better business decisions; easier access to enterprise data for end-users; better documentation of data; reduced computer costs and higher productivity; enabling end-users to ask ad-hoc queries or do reports without deterring the performance of operational systems; and, collection of related data from various sources.

3.5.6 Data Processing or Analysis

This describes any operation performed on data from its collection to recording, organisation, structuring, storage, adaptation, alteration, use and destruction. It involves cleansing data - identifying and correcting corrupt, inaccurate, or irrelevant data - as well as converting raw data into a format that is usable, integrable and machine-readable.

As the saying goes, you can have data without information, but you cannot have information without data.[47] Data analysis primes the cleansed data to extract usable information from it for labelling and usage. Data analysis has become such a crucial part of doing business in the new economy that some organisations have entire units dedicated to it.

Accurate data analysis begets for businesses such advantages as:

- **Better Customer Targeting:** Data analysis helps businesses to focus their advertising efforts; tracks how well a company's products and campaigns are performing within the target demographic; gives businesses a better idea of their target audience's spending habits, disposable income, and most likely areas of interest. This Data helps businesses set prices, determine the length of ad campaigns, and even help project the number of goods needed.

- **Reduce Operational Costs:** Data analysis shows businesses which areas of their business need more resources and money, and which areas are not producing and thus should be scaled back or eliminated outright.

- **Better Problem-Solving Methods:** Informed decisions are more likely to be successful decisions. Data provides businesses with information to see where their business progression is leading. Data analysis helps businesses make the right choices and avoid costly pitfalls.

- **More Accurate Data:** Data analysis helps businesses acquire relevant, accurate insight suitable for developing future marketing strategies and business plans and realigning the company's vision or mission.

Data analysis produces Datasets that can be used to uncover trends, patterns and other insights to enhance organisational decision-making.

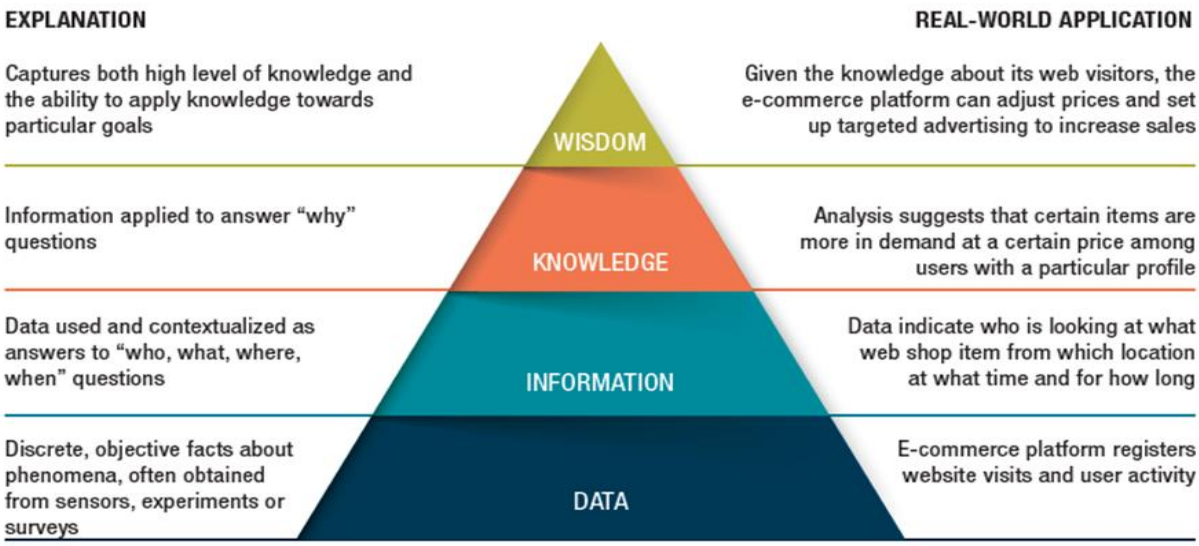
[47] David Keys Moran, Computer Programmer and Author

3.5.7 Data Use or Visualization

Data Visualization is one of the steps of the data lifecycle which states that after data has been collected, processed and modelled, it must be visualized for conclusions to be made. Data Visualization aims to identify, locate, manipulate, format and deliver data in the most efficient way possible. It is the practice of translating information into a visual context, such as a map or graph, to make data easier for the human brain to understand and pull insights from.

The main goal of Data Visualization is to make it easier to identify patterns, trends and outliers in large datasets. In the early days of visualization, the most common technique was using an Excel spreadsheet to transform information into tables, bar graphs or pie charts. While that visualization method is still commonly used, more intricate techniques are now available, including infographics, bubble clouds, bullet graphs, heat maps, fever charts, time series charts, line charts, area charts, scatter plots, treemaps, and population pyramids etcetera.

Figure 4: The Data Pyramid



Source: UNCTAD

- **Data** – characterised "as being discrete, objective facts or observations, which are unorganized and unprocessed and therefore have no meaning or value because of lack of context and interpretation."[48] Data can also be "signal readings" from sensors, such as IoT devices.

[48] Rowley, Jennifer; Richard Hartley (2008) - Organizing Knowledge: An Introduction to Managing Access to Information

- **Information** – described as "organised or structured data, which has been processed in such a way that the information now has relevance for a specific purpose or context, and is therefore meaningful, valuable, useful and relevant."[49] Information is contained in descriptions and is differentiated from data in that it is "useful". Information is inferred from data in the process of answering interrogative questions (e.g. who, what, where, how many, when).

- **Knowledge** – Knowledge is defined as information having been processed, organised or structured in some way, or as being applied or put into action. Knowledge has also been described as the "synthesis of multiple sources of information over time, and the organisation and processing to convey understanding".[50]

- **Wisdom** – Wisdom is the ability to increase effectiveness and "do the right thing".[51]

3.5.8 Scope of Study Item #4 - The Role and Benefits of Data

The Role, Benefits and Challenges of Data in the Growth of a Digital Nigeria

Data serves as the critical energy source of the Digital Economy. It is, unarguably, the cornerstone of digital transformation. Organisations leverage the value of data to unlock new opportunities, including support for new business models, improved customer services and the use of Artificial Intelligence to generate vital new insights.

Data quality and governance offer organisations a major opportunity for generating a competitive advantage. Enterprises that capitalise on this early will differentiate themselves and move to the front as market leaders in their sector.

One interesting aspect of data is that as an asset, it lends itself to being infinitely shareable, thus data can be shared between multiple people without any loss to its value.[52] Regardless of how many people have access to the data, it would behave as though each person had exclusive access to it, meaning that the data's value is

[49] Ibid
[50] Ibid
[51] Ibid
[52] Moody and Walsh: Seven "Laws" of Information

cumulative, not apportioned, therefore, the greater the access, the greater the benefits.

This attribute is different from other assets, where multiple actors hold a proportion of the total value. This attribute makes data indisputably the most important asset in the Digital Economy.

Worthy of note is that despite the residual value of data, information is perishable. That is to say that the value of data may depreciate over time. The speed at which that depreciation occurs would depend on the data type.

Conversely, there are certain datasets whose value may increase after a period but this is usually through being combined or contrasted with other comparative data. It is only when data is used that it has value. Unused and unusable data, therefore, is a liability rather than an asset, incurring costs of storage, maintenance and security.

The value of data increases with accuracy as inaccurate information can be incredibly costly in the context of the public sector. Decisions taken about policies or service outcomes that rely on incorrect data can have serious consequences. Accuracy, therefore, is an important consideration when developing a mechanism for valuing data as an asset.

Another important mechanism for unlocking the value of data is ensuring that it can be compared and combined with other sources. The challenge of interoperability within the public sector can impede realising the full value of data both in preventing potential benefits and in adding costs by efforts to extract and reconcile different sources instead.

However, it should be noted that with data, more is not necessarily better.[53] With most assets, the more an organisation has, the wealthier the organisation appears. The inverse is true for data, with increasing proliferation causing greater challenges in allocating limited resources.

In general, the more an asset is used, the less there is but data can often be self-generating - the more it is used, the more it exists. The value of the original data persists, plus the value of what has been derived from it through the process of further analysis and use.[54]

There are several Data Centres across the country with four enterprise-grade and multi-tenant Data Centres categorized as Tier III and Tier IV respectively. These

[53] Moody, D.L. Et Al., 1999: Measuring the Value of Information – An Asset Valuation Approach
[54] Uckelmann, Et Al ., 2011: An Architectural Approach Towards The Future Internet Of Things

provide major Data Center offerings including software as a service (SaaS), platform as a service (PaaS), infrastructure as a service (IaaS), and back-up as a service (BaaS).

Commercial activities within this segment of the market are expected to remain buoyant as the Government is pursuing a data localization policy. The NITDA Guidelines for Nigerian Content Development in ICT require telecommunications companies to host all subscriber and consumer data in Nigeria.[55] Further, the Guidelines require all Ministries, Departments, and Agencies of Government to host their websites locally and under a registered.gov.ng domain and to host all sovereign data locally on servers within Nigeria.

Data has become an integral input to (and output from) the operation and production processes of both the private and public sector organisations. Data collected and curated by the private sector for commercial purposes are unleashing great potential and spurring transformational development in the organisations producing and using the data.

Better use of data is helping organisations of every kind succeed – across the public, private and third sectors in the following ways:

1. Data provide detailed information on individuals, businesses, economic outcomes, and phenomena;
2. Data are used by the Government and international organizations to support evidence-based policymaking and improved service delivery;
3. Data enhance the economic efficiency of organisations;
4. Data are used by civil society to monitor the effects of Government policies and by individuals to enable them to monitor and access public and commercial services; and
5. Data help private firms in the production process—use that fuels their growth as well as wider economic growth.

Using data, FinTechs are increasingly adopting alternative credit scoring techniques to solve the long-standing issue of lack of collateral of potential borrowers. These techniques take advantage of users' digital footprints to assess creditworthiness for those who otherwise lack documentation.

[55] NITDA Guidelines for Nigerian Content Development in ICT – Guidelines 11.1(4), 12.1(4), 12.2(1), 13.1(2) and, 13.2(3)

Two prominent examples of this approach are Lydia and Migo – thriving FinTechs whose core value proposition is quick, unsecured working capital loans to MSMEs with minimal documentation.

Data is now the driving force of Nigeria's Digital Economy. It fuels innovation in businesses large and small and was a lifeline during the global coronavirus pandemic.

The fact that the Federal Government, State Governments, MDAs, business organisations and public services were able to share vital information quickly, efficiently and ethically during the pandemic not only saved countless Nigerian lives but also enabled people to work from home, keep the economy running and stay connected with loved ones during a period of unprecedented disruption.

Data supports the delivery of existing services, from manufacturing to logistics, and is being used to create entirely new products and services. Data is the driver of scientific and technological innovations and is central to the delivery of a whole range of vital services.

As more businesses embrace technology, data creates jobs, opens up whole new markets and drives demand for a highly skilled workforce.

On the individual level, the use of data benefits people every day in many ways. From the lives saved due to data-driven medical discoveries to personal budgeting, quick loans, hassle-free digital banking and hailing taxis from the comfort of one's smartphone as democratised by Bolt, Uber and other ride-hailing apps.

By having access to more of it, combined with the ability to analyse it through modern techniques, businesses get greater insight into what works and what does not – both in terms of selling their products and services and in terms of making their processes and practices more efficient.

Data has significantly enhanced the economic competitiveness and productivity of many businesses across the Nigerian economy, through new data-enabled business models, as well as through the adoption of data-driven processes by existing businesses.

Data has also injected tremendous efficiencies in the delivery of public sector services, particularly around payment for Government utilities, citizens' identity

management, remittance of taxes and also the implementation of civil service payroll systems.

3.5.9 Scope of Study Item #4 (Contd.) - The Challenges of Data

As the potential of data to serve a productive use is broadly limitless, so too are the openings for data to be used in ways that harm people. A rogue Government, for instance, can subject data to abuse for political ends, such as politically-motivated surveillance or discrimination along lines of tribe, religion, gender, disability, health status or sexual orientation.

The potential is there is for cybercriminals to inflict considerable harm by stealing and manipulating sensitive information. Denizens of the "dark net" – a vast parallel network of hidden websites that provides an underground digital platform for a wide array of criminal activities – can be relentless in their quest to hijack legitimate data to facilitate illegal trade in drugs, counterfeit currency, stolen goods, credit card fraud, forged papers, firearms, and human organs etcetera.

Similarly, the private sector examples of harmful use include, among other things, the exploitation of information about consumer preferences and behaviour to engage in aggressive or manipulative marketing techniques based on microtargeting of persuasive messages or to apply algorithms that facilitate collusion among market players.

There are concerns about excessive data collection, insufficient governance of data held by private organisations, and inadequate protection of personal data. Many of these concerns revolve around the misuse of personal data. Such misuses include the failure of firms to properly protect the financial information of clients—exposing them to the theft of funds or identity—or health organisations' engagement in unauthorized use of, or failure to protect, individuals' confidential health or location data.

Since many of the processes through which firms create value with their data are driven by algorithms and machine learning and these models, algorithms determine, among other things, what information, products, or services individuals are exposed to and at what price; what insurance packages they are offered; whether their loan applications are approved; what jobs they qualify for; and what medical advice they receive, it is crucial to be certain of the integrity of the data fed into the machine learning.

So if the data fed into the machine learning embed discriminatory assumptions, machine learning will amplify that discrimination, not only producing harmful results but also magnifying them.[56] This validates the decades-old Data Science adage that says "garbage in garbage out". This means that a data processing system such as machine learning is no better than the data it is given to process. [57]

[56] For an extensive discussion of this problem and many other concerns about machine learning, see O'Neil (2017).
[57] Techopedia - https://www.techopedia.com/definition/3801/garbage-in-garbage-out-gigo

3.6 Study Objective Item #2 – Adoption of FinTech in Nigeria

To Evaluate the Level of Adoption of Fintech in Nigeria vis-à-vis Developed Countries

3.6.1 Findings

Nigeria is currently home to over 250 FinTech companies spread across six broad FinTech segments supported by an ecosystem of enablers.[58] Payments, Mobile Money and Digital Banking (38%); Lending (23%); and, Savings, Investments and Crowdfunding (15%) constitute the major focus areas for FinTech investors.

Compared to FinTech ecosystems in developed countries, the Nigerian FinTech industry is nascent. Nonetheless, the industry is blossoming at an exponential pace as evidenced by the rising profile of many of the Nigerian FinTechs, their breadth of coverage and their increasing level of global connections and partnerships.

Confidence in the industry is soaring, and this is reinforced by some astounding success stories recorded by Nigerian FinTechs in recent times. It is estimated that Nigerian FinTechs raised $439 million in 2020, which is equivalent to 20% of the amount raised by all African tech StartUps in the same period.[59] It is also projected that Nigerian FinTech revenues will reach $543 million by the end of 2022, driven by increasing smartphone penetration and a large number of the unbanked population.

Although FinTech's emergence in Nigeria may be relatively recent compared to other developed economies, it has nonetheless witnessed a swift adoption, particularly with the outbreak of Covid-19, which increased the demand for technology-enabled financial products and services. The pandemic prompted a rapid shift of consumer demand online, creating opportunities for emerging digital industries.

[58] EY Analysis - Nigerian FinTech Census 2020: https://proshare.co/articles/nigerian-fintechs-raised-439m-in-2020
[59] Ibid

Several factors underpin the increasing demand for FinTech services in Nigeria. These factors include consumers' financial literacy, a youthful, digitally savvy population and increasing smartphone penetration levels.

FinTechs in Nigeria are undoubtedly major drivers of financial inclusion, with the percentage of financially-excluded adults in Nigeria reducing from 41.6% in 2016 to 36.8% in 2018. With a tepid 0.9% growth, Nigeria's financial inclusion rate improved to 64.1% in 2020 from 63.2% in 2018. This means that the financial exclusion rate slowed marginally from 36.8% in 2018 to 35.9% in 2020. However, the excluded adult population of 38.1 million reported in 2020 was higher than the 36.6 million recorded in 2018, meaning 1.5 million adults fell into the excursion circle in the last two years to 2020.[60]

As queues to enter physical banks lengthened because of crowd restrictions during the pandemic, customers turned online to digital platforms, some of which saw customer enrolments quadruple.

The local dynamics bolstering the adoption of FinTech services in Nigeria include:

a. Nigerian consumers' preference for easy on-boarding processes by wanting seamless digital transactions that require minimal verification bottlenecks;
b. Nigerian FinTechs' penchant for consolidation of products as they seek to provide services across the FinTech value chain. Some FinTechs have even gone as far as doing backward integration through the acquisition of incumbent Microfinance Banks enabling them to provide expanded services such as micro-savings, micro-credits, and other financial products;[61]
c. FinTechs' use of the agency banking platforms to serve the banked and unbanked population with their Mobile Money Solutions;
d. CBN's licensing of Payment Service Banks has seen some FinTechs use the platform to facilitate low-value transactions in micro-savings and payment services; and,
e. Incumbent Financial Institutions are keen to collaborate with FinTechs for corporate solutions or even develop their FinTech products and services.

Out of the total number of 38.1 million adult Nigerians that were financially excluded in 2010, further analysis has revealed that 54.4% of that population were women, 73.8% were younger than 45 years, 34.0% had no formal education, and

[60] Facts behind financial inclusion figures: Nigeria's 2021 indices - https://businessday.ng/financial-inclusion/article/facts-behind-financial-inclusion-figures-nigerias-2021-indices/
[61] E.g. DLM Capital's acquisition of Links MFB and CreditVille's acquisition of TouchGold MFB etcetera

80.4% resided in rural areas.[62] Therefore, it can be argued that Nigeria is characterized by rudimentary financial infrastructure, a large unbanked adult population, a large population of young people and a distinctive economic and demographic environment.[63] Conversely, these characteristics present a treasure trove of opportunities for FinTech investments.

By providing a pathway to financial services to this population, FinTechs are profoundly changing the financial services landscape and playing a pivotal role in improving financial inclusion. The FinTech industry is fast establishing itself as an engine of growth and a driver of innovation and transformation across Nigeria's financial services sector.

Aided by the Government's regulatory drive for financial inclusion, FinTechs have enormously helped to accelerate the inclusion of many Nigerians who hitherto were excluded from traditional banking services. FinTechs for example, are instrumental in the massive growth in digital payments. Underpinned by FinTech, the Industry ePayment transactions figures for January to August 2020 stood at ₦ 31.2 trillion up 28% from ₦24.2 trillion.[64]

Nigerian FinTechs are increasingly gaining international recognition almost at the same rate as they are being embraced in large numbers by consumers in Nigeria. Within the financial industry in general, stronger collaborations are being forged between FinTechs and the incumbents. These collaborations and interconnected synergies constitute the building blocks, or even the cornerstone, in the development of a vibrant Digital Economy in Nigeria.

Nigerians have already affirmed their readiness for the Digital Economy by attaining one of the highest mobile phone penetration levels in Africa.[65] Nigeria is comprised of a young, digitally-enabled population that represents a large local digital consumer base. It is a receptive population keen to be involved in adaptive innovative solutions and services in the financial market. The increase in mobile penetration and smartphone ownership is the keystone supporting the acceleration of the Digital Economy in Nigeria.

[62] CBN –National Financial Inclusion Strategy 2012
[63] BusinessDay.ng: Facts behind financial inclusion figures: Nigeria's 2021 indices
[64] https://www.cbn.gov.ng/paymentsystem/epaymentstatistics.asp
[65] GSMA 2021

The FinTechs have redefined the art of putting data together and processing it to yield information, knowledge and wisdom that they use to make informed decisions about both their customers and the market potentials to explore and exploit.

3.6.2 FinTech Segmentation in Nigeria

The FinTech ecosystem in Nigeria is an interconnected, interdependent network of various actors that combine to create innovative products and services in technology.

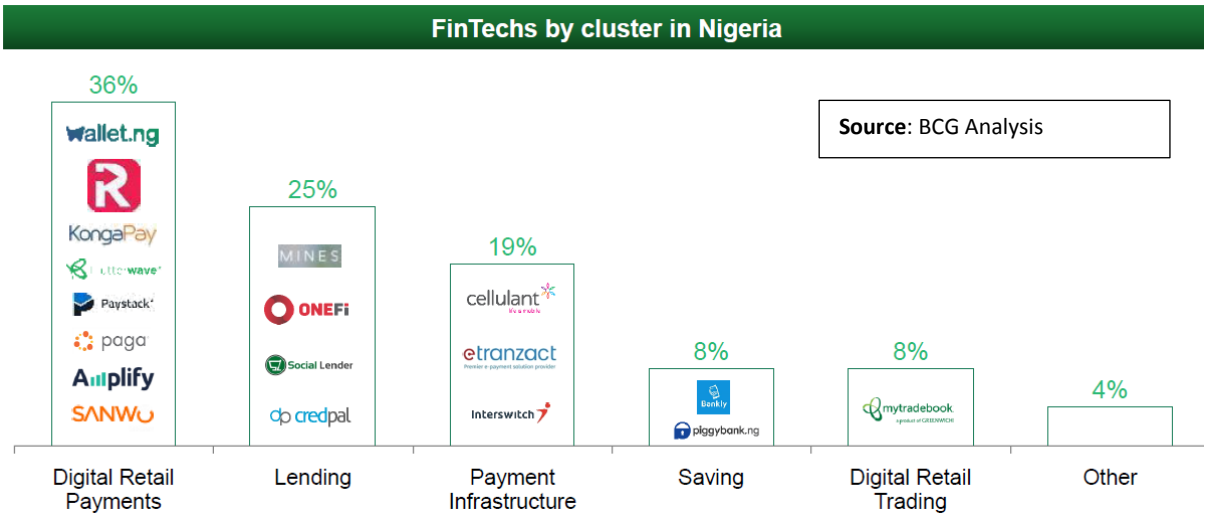
Overall, the FinTech landscape in Nigeria can be divided into two groups:

(i) Core FinTechs - those that directly provide financial technology services; and,
(ii) Enabler FinTechs - those that enable the provision of such financial technology services.

Both the Core FinTechs and the Enabler FinTechs are supported and regulated by an assortment of Government agencies that function as the policymakers and regulators providing the required plans, strategies, regulations, policies, guidelines and rules for the industry in general.

The Core FinTechs are arranged into six distinct segments and focus on the delivery of financial solutions and services to both individual consumers (B2C) and businesses (B2B) as illustrated in the table below.

Table 20: FinTechs by Cluster in Nigeria



Similar to the rest of the Middle East and Africa, Digital Retail Payments (36%) is by far the largest FinTech subsector in Nigeria receiving the most interest from investors and regulators; followed in second place by Lending (25%) and third place is Payments Infrastructure (19%).

FinTechs in Nigeria are gaining traction by addressing customer pain points (access, affordability, and ease of use) across the value chain and attracting significant funding in the process leading to an increasing focus on driving financial inclusion and a fast-maturing ecosystem from FinTech 1.0 (with a B2B focus) to FinTech 3.0 (B2B, B2C and P2P etc.).

Table 21: The Trajectory of Nigerian FinTech

		2000 – 2007	2007 – 2018	2019 - present
		FinTech 1.0	FinTech 2.0	FinTech 3.0
	Key players	SystemSpecs, UP, eTranzact, Interswitch	Paystack, paga, cellulant, CowryWise, Flutterwave, piggyvest, carbon	OPay, palmpay, JUMIA ONE
	Core focus	▪ B2B services enabling banks and other financial institutions mainly in payments	▪ CBN launched PSV 2020 to drive cashless economy ▪ Prominence of mobile payments ▪ B2C players focused on specific niches	▪ Ecosystem players offering full array of financial and non-financial services e.g. ride-hailing, music
Key drivers	Regulation	▪ NA	▪ Cashless policy, financial inclusion/ SANEF	▪ NA
	Infrastructure	▪ EurOPay MasterCard and Visa (EMV) to enable pin and chip card transactions	▪ NIBSS Instant Payment ▪ MasterCard Internet Gateway	▪ NA

Source: EFInA

3.6.3 Core FinTechs

Table 22: FinTech Segmentation in Nigeria

FinTech Segment	Value Proposition	Sub-Category	Key Players
Payments, Mobile Money & Digital Banking	FinTechs here provide payments and account solutions for consumers and financial institutions alike	Digital Payments Mobile Money & Wallets Payments Processing & Switching Digital Banks & Accounts Global Transfers & Remittances Terminal & Infrastructure Providers	Interswitch, Flutterwave, eTranzact, cashenvoy, kuda., paystack, cellulant
Lending	Actives in this segment provide lending platforms that give loans to consumers and MSMEs online	Retail Lending SME Lending Credit Data Analytics & Loan Assessments	carbon, FAST CREDIT LIMITED, branch, ferratum, Lidya, KwikCash
Savings, Investment & Crowdfunding	FinTechs in this segment offer solutions that help consumers save money; help private and institutional investors to buy, sell and manage assets and securities; and, provide platforms for crowdfunding	Digital Wealth & Asset Management Automatic Savings Platforms Alternative Investments International Investment Platforms Crowdfunding	piggyVest, Bankly, trove, donate-ng, QUICKRAIZ, sumotrust, bamboo, RIBY, paymyrent

Segment	Value Proposition	Sub-Category	Key Players
Enterprise Services & Infrastructure	FinTechs here offer enterprise software and solutions for the financial sector with infrastructure and platforms that enable and enhance banks' services	Financial Services Solutions Credit Infrastructure APIs and Connectors	Oucoon, APPZONE, accounteer, SmartTeller, FinTrak, SEAMFIX, SoftAlliance, mono, SPACEPOINTE
Cryptocurrency	Market players in this segment provide access to digital currency markets and exchanges that enable users to pay or accept digital currencies	Cryptocurrency Exchanges & Wallets	PATRICIA, BINANCE, Instantcoins, Belfrics, BuyCoins, KuBitX, bitfxt, Tradefada, Atech
InsurTech	Provide digital technologies that enable traditional insurers to deliver insurance to consumers either directly or virtually	Digital Insurers Insurance Comparison Services Digital Agents and Distribution Platforms Insurance System Providers	compare, Tangerine Life, SOSO CARE, casava, wellahealth, helium health, CURACEL, AutoGenius

3.6.4 Enabler FinTechs

The Enabler FinTechs empower other businesses by providing them with financial services through their array of unique value propositions. They are categorized into three segments as illustrated in Table 23.

Table 23: Enabler FinTech Segments

Enabler FinTech	Unique Value Proposition
Venture Capital & Private Equity	Equity firms dominate here with investors that provide capital to StartUps at various stages of growth.
Associations & Facilitators	Umbrella Associations & Facilitators here promote collaboration among FinTechs and the wider financial services sector.
Accelerators & Incubators	Encompass organisations that support seed funding, business operating models and workspaces, and link the StartUps to investors and influencers.
Regulators	Policy and regulatory functions.

Table 24: Enabler FinTechs Map

Source: EY FinTech Census

3.6.5 FinTech Accelerators

In collaboration with their strategic partners, three types of Accelerators play significant roles in the Nigerian FinTech ecosystem, especially in the critical area of enabling and accelerating tech StartUps. They come in three distinct flavours viz: (a) Independent accelerator; (b) Corporate accelerator; and, (c) Entrepreneur hubs as illustrated in Table 25.

Table 25: A Selection of FinTech Accelerators

	Focus	Alumni FinTechs	Strategic partners
1 Independent accelerator,e.g. Micro traction	Payments, Lending, Cryptocurrency, Payment infrastructure, Trading	CowryWise, thankucash, RIBY, allpro, wallet.ng, accounteer, BuyCoins	PAVE INVESTMENTS, SINGULARITY INVESTMENTS, Y Combinator, launchpad, STARTA VENTURES, Google for Startups, 500 STARTUPS
2 Corporate accelerator,e.g. Ecobank Fintech Challenge 2018	Payments, Lending, Security, Cryptocurrency, Big Data, Trading	wallet.ng, nala, Eversend, ZIROO, Kudi, awamo	Microsoft, FMO, ACCION Venture Lab, FINCONECTA
3 Entrepreneur hub, e.g. Co-Creation Hub NIGERIA	Smart Infrastructure, Governance, Health and Well-Being, Digital Security, Educating	Tender.ng, RIBY, eko Analytic, identity, Sarafu, CTOORA	VISA, facebook, Google for Startups, Microsoft

Source: BCG Analysis

Based on emerging trends and Data gleaned from other markets, 3 models of FinTech as captured in Table 26 will continue to exist in Nigeria.

Table 26: Archetypes of Sustainable FinTechs

	Description	Indonesia examples	India examples	Nigerian examples
Ecosystem orchestrators (Fintech 3.0)	▪ Large, deeply funded players, operating as a platform/superapp that acts as a gateway for customers to a wide range of services beyond financial services (e.g. transportation) ▪ These type of players could also be 'TechFin'- technology companies with existing customer bases that offer financial services as an add-on offering	GO-JEK, Grab	paytm	OPay
Mid-sized niche players (Fintech 2.0)	▪ Longer tail of medium sized businesses who are focused on executing on individual verticals (e.g. payments, savings) or geographies (e.g. Northern Nigeria) or segment (e.g. SMEs) ▪ Experience in other markets suggest, these type of players thrive in their domain of expertise, solve distinctly local problems and are often acquisition targets for the larger players	MOKA, Kredivo, C88	LENDINGKART, Pine Labs, policybazaar, CRED, digit	piggyVest, Bankly, paystack, carbon
B2B enablers (Fintech 1.0)	▪ FinTech focused on enabling banks, telcos, corporates or other FinTech to improve their offering ▪ Could start out as B2B or have pivoted from a B2C model with a great product but limited traction and challenging economics	Mbiz	redcarpet	

Source: EFInA

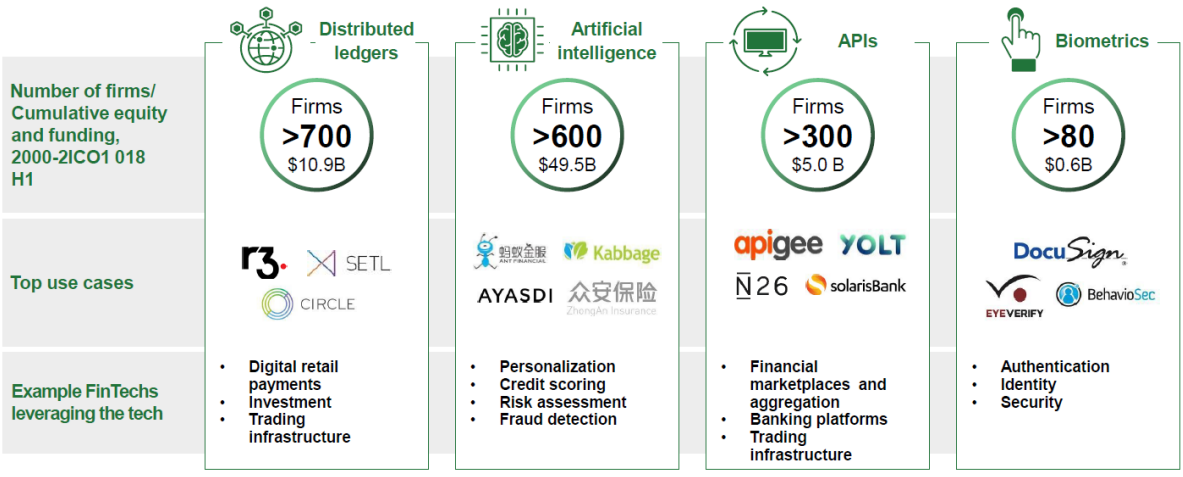
3.6.6 The Underpinning Technology

Application Programme Interface (API), Cloud technology and Artificial Intelligence (AI) are the most utilized technology by FinTechs in Nigeria. Big Data and Advanced Analytics (AA) have the potential to enjoy wider use as FinTech continues to mature.

Table 27: Technologies Underpinning FinTech in Nigeria

Technology	Description	Number of FinTech leveraging tech trend, 2019
API	Set of programming code that enables data transmission between one software product and another	476
Cloud	On-demand availability of computer resources especially data storage and computing power	449
AI	Using machine learning and artificial intelligence for activities such as fraud detection and automated customer support	407
Big Data/ Advanced analytics	Leveraging data and analytics to provide insights that allows for more personalized customer offerings	369
Blockchain	Distributed ledger and record systems with use cases in cryptocurrency, registries & identity systems	166
Other	This consists of other tech trends such as Regtech, ComplianceTech, Internet of Things and Virtual Reality	143
Biometrics	Measurement and statistical analysis of people's unique physical and behavioral characteristics with use cases in KYC & fraud detection	87

API, Cloud, DLT and AI remain the foundational technology on which many FinTechs are built. Although Big Data and Advanced Analytics are becoming the mainstream globally, they remain in the early stages in Nigeria. Biometrics and other new technologies are emerging including RegTech, Virtual Reality, ComplianceTech etcetera.



Nigeria's FinTech industry is emerging as one of the most important FinTech networks within the African continent and continues to attract attention globally. In Nigeria, FinTechs are coasting towards mass adoption considering that between 2020 and 2021, the proportion of Nigerians using FinTech rose to 68% from 36% in 2017[66] - a massive leap in adoption. Achieving similar adoption leaps in the past took the refrigerator twenty years, the computer ten and the smartphone five.[67]

In terms of consumer technology penetration, FinTech is nearing par with the Internet heralding an era in which financial technology is no longer a corner of the financial system, but approaching its centre. FinTech's move to the centre of finance is happening both at the ecosystem level and an individual level.[68] To the extent that more and more individuals are beginning to leverage FinTech in the management of their finances as much as enterprises and Governments leverage it for their operations.

Incumbent commercial banks have not taken FinTech's disruption of their business lying low. Many, if not all, are responding by developing their value propositions to parallel those of the FinTechs. Take for instance Guaranty Trust Bank and its QuickCredit offering, or Access Bank's QuickBucks; there's also Sterling Bank's Specta all geared into muscling in on the FinTechs' niche.

However, despite all the adoption levers offered by FinTech, and the increase in digital activity, a considerable portion of the population remains financially excluded, especially those in rural areas. Financial exclusion denotes individuals and businesses lacking access to basic financial services and products such as bank accounts, loans and insurance, in a manner that is sustainable and affordable. The lack of access to these financial products or services results in recourse to cash-based transactions, and savings being done through informal channels such as *Esusu*, *Ajo* or the local thrift collection system - with their attendant risks. Conversely, this gives more expansionary headroom for further FinTech infiltration in the retail finance space.

Interestingly, it's not only young people that are causing this seismic paradigm shift in the Nigerian FinTech space. Every generational cohort plays in the financial arena subject to its needs and idiosyncrasies[69] as illustrated in Table 28.

[66] FintechNGR
[67] Harvard Business Review - https://hbr.org/2013/11/the-pace-of-technology-adoption-is-speeding-up
[68] McKinsey - Harnessing-Nigeria's-Fintech-Potential
[69] Brian Reno – Understanding Generational Preferences

Table 28: Generational Disposition towards FinTech

Cohort Label	Year Range	Financial Habits
The Baby Boomer Generation	1946 to 1964	The Baby Boomers prefer to go into a Bank branch to perform their transactions. This generational group still prefers to use cash and was the most inconvenienced during the pandemic due to their traditional branch usage patterns;
Generation X (MTV Generation; Latchkey Generation)	1965 to 1980	Since they are digitally savvy, Gen X will do some research and financial management online, but still prefer to do some transactions in person. They see banking as a person-to-person business and demonstrate brand loyalty;
Millennials (Gen Y; Gen Me; Gen We; Echo Boomers)	1981 to 1996	Millennials have less brand loyalty than previous generations. They prefer to shop for products and features first, and have little patience for inefficient or poor service. They seek digital tools to help manage their debt and see their banks as transactional and not relational;
Gen Z (iGeneration; Post-Millennials; GenTech; Gen Y-Fi; Zoomers)	1997 to 2012	The typical Gen Z received his or her first mobile phone at the age of 10-11 years. They have grown up in a hyper-connected world and the smartphone is their preferred mode of communication. On average, they spend 3 hours a day on their mobile devices. They have adopted a more fiscally conservative approach. They want to avoid debt and appreciate accounts or services that aid in that endeavour and have a strong appetite for financial education; and,
Generation Alpha	2012 to Date	Alphas are being raised in homes with smart devices everywhere; technology is built into everyday items. Many of them attend school virtually thanks to the pandemic. Many have had a digital presence before they were born; with their Millennial parent creating social media handles for them. They are digital natives that will expect fully integrated, personalized consumer experiences. Alphas will be one of the most highly digitally savvy generations. As digital natives who view the world through a collection of screens, Alphas will be even more disconnected from the idea of cash. They will likely first encounter money virtually as a number on a screen and spend it through Apps and other forms of eCommerce.

3.6.7 Nigeria's FinTech Map

Nigeria is certainly a major adopter of FinTech in Africa and has seen a significant increase in the number of StartUps over the past 5 years. From as few as 12 companies in 2008, the Nigeria FinTech map currently comprises over 250 companies[70] operating across the financial services value chain, from Payment and Remittance to Digital Wealth Management and CreditTech platforms as well as bespoke Digital Banking platforms as illustrated in Figure 5.

Figure 5: The Nigeria FinTech Map 2021

Source: Segun Adeyemi (@segunhq)

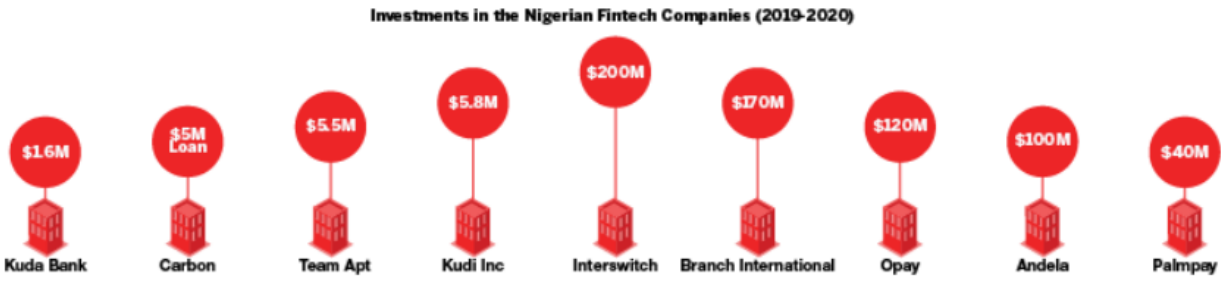
[70] TechNet Report 2021

3.6.8 Nigeria's FinTech Unicorns

Nigeria's FinTech industry attracted more than $400 million in investments in 2019 alone,[71] ranking Nigeria amongst the top four destinations for FinTech investments in Africa - alongside Egypt, Kenya and South Africa. These inward investments have led to the rapid development of products and services in the financial sector, and in turn, triggered the awakening of conventional banks to the reality of a vibrant global Digital Economy and stimulated them to overhaul their banking offerings and technology services to remain competitive.

Interswitch, the company that in 2002 spearheaded the FinTech disruption by pioneering the first digital transaction switching and electronic payments processing in Nigeria, received a lion's share of these investments elevating it to join the lofty ranks of Africa's nine unicorns.[72]

Figure 6: Investments in the Nigerian FinTech



Source: Redwire Group

Furthermore, in 2019, Africa received over $1Billion from African Venture Capital investments, with Nigeria receiving the highest share of over 50.5%.[73] Nigerian Core FinTechs - Interswitch, OPay, Palmpay, and Andela - accounted for most of the top venture deals on the continent in 2019.

Although 2020 did not witness mega-deals of the sort witnessed in 2019, the support received by Nigerian StartUps remained impressive. The top deals in Nigerian FinTech in 2020 included Flutterwave - $35million, Bitfxt -$15million, AellaCredit - $10million and Kuda - $10million.

Overall, Nigeria's FinTech has experienced remarkable performance in the inflow of funds from foreign as well as indigenous investors. With the inflow of

[71] Nigeria Investment Promotion Commission - https://www.nipc.gov.ng/2019/12/04/financial-inclusion-fintech-firms-got-400-million-investment-in-2019-cbn/
[72] Unicorn = any company valued at $1B and above
[73] Decoding Venture Investments In Africa 2019 Report by WeeTracker

investments reaching new levels and an influx of innovative product features, FinTech contributed immensely to Nigeria's economy every year from 2018 to the present.

Table 29: Snapshot of FinTech Funding Activities in 2018

	Top 8 funded firms	Cluster	Cumulative eq. funding[1]	Investor	Technology	Value Proposition	Competitors
1	cellulant	Payment Infrastructure	$47.5M	Rise Fund, Endeavour	API	Digitizes payments for banked and underbanked	Flutterwave, Interswitch, kora
2	MINES	Lending	$13.0M	Singularity investments	AI	Develops credit rating system for financial institutions	Pettycash
3	paga	Digital Retail Payments	$10.0M	Global Innovation Fund	API	Delivers innovative and universal access to financial services	Bankly, Kudi, Aiplify
4	paystack	Payment Infrastrcture	$8.0M	Stripe	API	Provides online payment facilities to merchants via APIs	APPZONE, Yellow Card, SystemSpecs
5	Lidya	Lending	$6.9M	Omyidar network	AI	Enables SMEs through provision of working capital loans	Social Lender, credpal, ONEFi
6	piggybank.ng	Saving	$1.1M	Leadpath Nigeria	API	Combines discipline and flexibility for individuals to grow savings	RIBY, MKOBO
7	compare insurance	Insurtech	$0.2M	Conneticut's Global VC	API	Provides core part of insurance value chain on one platform	Cassava Smartech, AutoGenius
8	nvoicia	Lending	$0.1M	MEST	API	Supports SMEs gain access to working capital loans in order	paylater, MAMAMONI

In 2022, the Nigerian FinTechs have continued to attract more foreign investor interest as reflected in the cumulative total of $503.5million raised by the industry in the first quarter of the year. The top deals that part-generated these figures include, among others:

1. **Flutterwave -** recognised as one of the most valuable FinTechs in Nigeria, in February 2022 Flutterwave raised $250million in its single-biggest funding round to date; Flutterwave also announced a collaboration with PayPal to facilitate payments for African businesses;

2. **Moove -** this Nigerian mobility FinTech raised $105million in an oversubscribed Series A2 Round to scale to seven new markets across Asia, the Middle East, North Africa (MENA), and Europe;

3. **ThriveAgric -** a technology-driven agricultural company, secured $56.4million in debt funding from commercial banks and institutional investors in March this year. Additionally, the company received a $1.75million co-investment grant from West Africa Trade & Investment, which is funded by USAID;

4. **Reliance Health -** an emerging markets-focused digital healthcare provider headquartered in Lagos, completed a $40million Series B funding round led by General Atlantic, a leading global growth equity investor;

5. **CredPal -** one of the earliest pioneers of 'buy now, pay later services in Nigeria, closed a bridge round of $15million in equity and debt in March this year to expand its consumer credit offerings across Africa;

6. **Bamboo -** a brokerage app FinTech company that lets Africans buy and trade US stocks in real-time raised a US$15million Series A funding round to accelerate its growth, move into new markets and launch more products; and

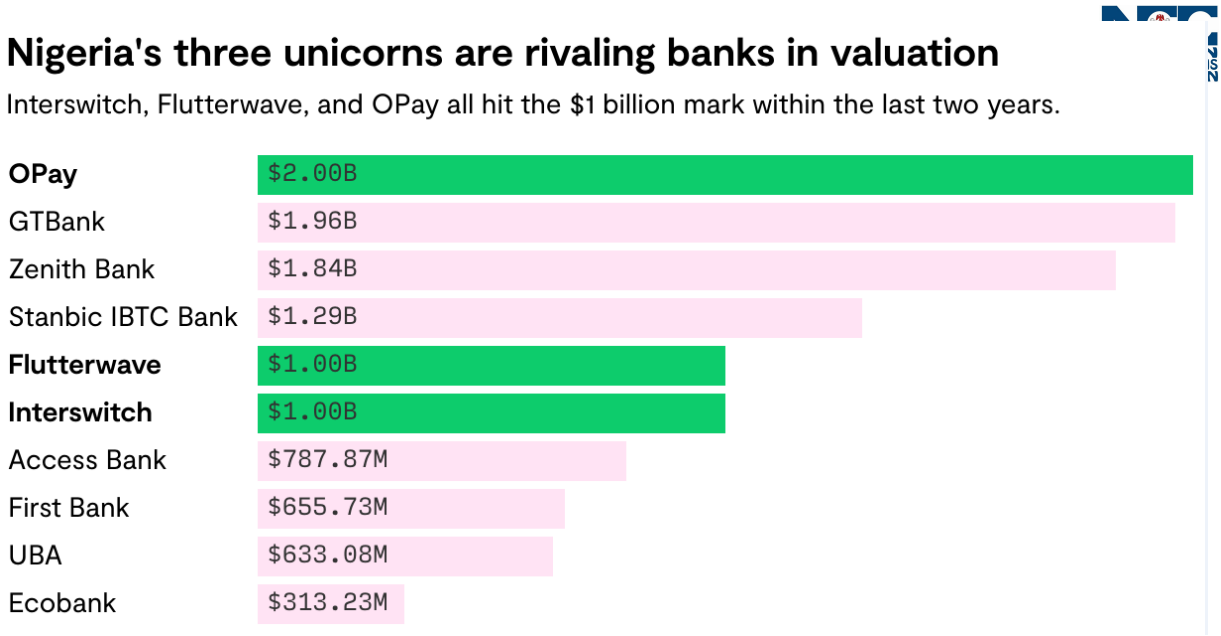
7. **SeamlessHR -** a startup that builds world-class cloud solutions to help organisations manage most HR processes on one platform, raised $10 million in its Series A funding round which will see it expand to new frontiers in Southern and East Africa.

As of 2022, Africa has nine thriving unicorns, with six of them rooted in Nigeria as shown in Table 30.

Table 30: Africa's Nine Unicorns and their Valuation

	Name	Valuation	Value Proposition	Year Founded	Founders Nationality
1	Chippers Cash	$2B	Facilitates cross-border payments across Africa;	2018	Uganda and Ghana
2	OPay	$2B	Enables users to accomplish more with their money by providing smart financial services; designing a mobile payment service and consumer platform for users to send and receive money, pay bills and other online transactions;	2018	Chinese based in Nigeria
3	Wave	$1.7B	Mobile Money provider that promises low fees on accounts, deposits, bills payments and withdrawals;	2018	Senegal

	Andela	$1.5B	Global talent network that connects companies with engineering talent in emerging markets;	2014	Nigeria
5	Flutterwave	$1B	Provides a payment infrastructure for global merchants and payment service providers across the continent;	2016	Nigeria
6	Interswitch	$1B	An integrated digital payments and commerce company designed to make payments an easy and enjoyable experience;	2002	Nigeria
7	Esusu	$1B	Reports rental Data to build tenants' credit scores while helping property owners increase revenue;	2018	Nigeria
8	Jumia	$1B	A Pan-African technology company built around a marketplace; provides logistics services and payment services;	2012	Nigeria
9	Fawry	$1B	The biggest e-payment network in Egypt; provides payment services to clients through several channels.	2008	Egypt



Source: Pew Research

3.6.9 Nigeria's Ranking on the Global FinTech Index

Despite hosting six of Africa's nine unicorns, Nigeria does not sit at the top of the pyramid on Africa's FinTech Adoption Index. In 2021 Nigeria dropped 22 places to place 93rd on the Global FinTech Ranking.

On the 2021 Africa FinTech Adoption Index, Nigeria was ranked in the 2nd position making her West Africa's highest-ranking country.[74]

Table 31: Africa FinTech Adoption Index

AFRICA				
Region Rank	Global Rank	Change from 2020	City	Country
1	37	▲ +26	Nairobi	Kenya
2	93	▼ -22	Lagos	Nigeria
3	97	▼ -10	Cape Town	South Africa
4	99	▼ -37	Johannesburg	South Africa
5	117	▼ -11	Cairo	Egypt*
6	151	▼ -28	Accra	Ghana
7	158	▲ +38	Tunis	Tunisia*
8	166	▼ -34	Kigali	Rwanda
9	168	▶ ±0	Kampala	Uganda
10	200	new	Casablanca	Morocco*
11	227	new	Harare	Zimbabwe
12	236	▼ -25	Pretoria	South Africa
13	247	new	Victoria	Seychelles
14	248	new	Quatre Bornes	Mauritius
15	257	new	Douala	Cameroon

Source: STATISTA Pew Research 2021

[74] https://technext.ng/2021/07/01/nigeria-drops-to-57th-in-global-fintech-ranking-but-remains-3rd-in-africa/

On the Middle East and Africa Index, Nigeria placed 5th position ahead of many other African countries such as Ghana, Rwanda, Uganda, Egypt and Tunisia came in 11th, 7th, 8th, 12th and 10th positions respectively.

Table 32: The Middle East & Africa FinTech Index

MIDDLE EAST & AFRICA				
Region Ranking	Overall Ranking	Movement		Country
1	3	▲	9	Israel
2	28	▲	6	United Arab Emirates
3	31	▲	11	Kenya
4	44	▼	-7	South Africa
5	57	▼	-5	Nigeria
6	59		new	Seychelles
7	61		new	Rwanda
8	64	▶	±0	Uganda
9	65		new	Saudi Arabia
10	68		new	Tunisia
11	71	▼	-13	Ghana
12	72	▼	-12	Egypt

Source: STATISTA Pew Research 2021

At the top of the Middle East and Africa (MEA) list, Israel, the United Arab Emirates and Kenya held their own in 1st, 2nd and 3rd positions respectively; Israel having climbed 9 places, UAE 6 places and Kenya 11 places to attain their respective ranks.

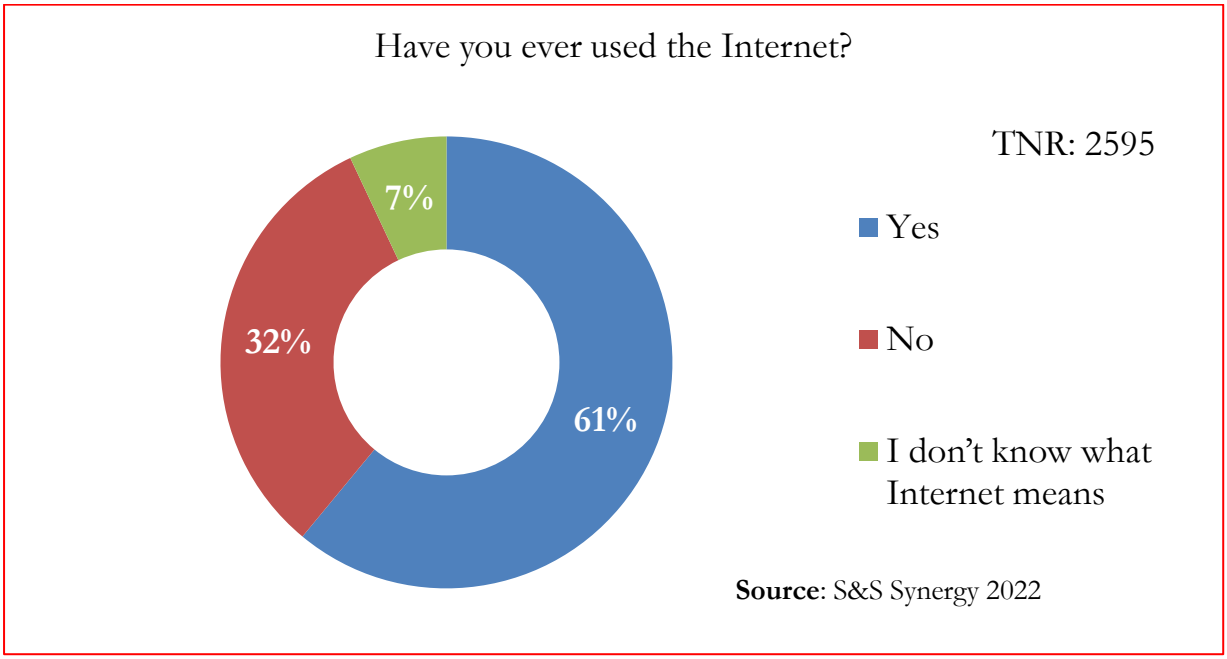
Ghana dropped 13 places to place 11th on the list; Egypt dropped 12 places to place 12th while South Africa fell 11 places to land in the 4th position. Nigeria dropped 11 places to place 5th.

Nigeria's modest outing on both the Africa Index and the MEA Index may be largely due to paucity of funding, insufficient cash flows and the numerous infrastructure challenges confronting businesses in the country.

Nigeria's Broadband penetration increased from 21.2% in April 2017 to 40.6% in April 2021 and as of August 2022 stood at 44.6% with 85.2million Broadband Internet subscriptions. There are 152.2million active Internet subscriptions and 209.9million cellular connections.[75]

These figures denote a population ready to partake in a digitalised economy. Not only is the population ready, but a sizable chunk of it is also already actively participating as study findings show.

Table 33: Survey Question #4 - Have you ever used the Internet?



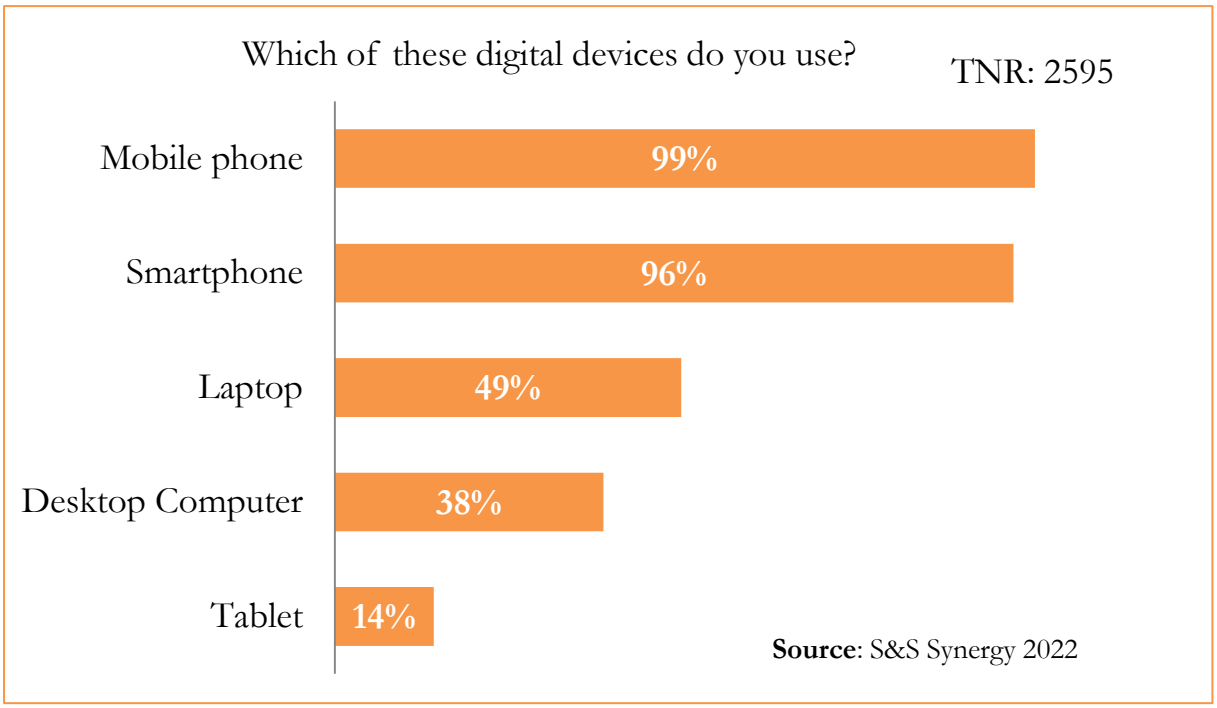
The survey sought to ascertain how many participants had essentially been predisposed to use the Internet. Sixty-one per cent (n=1583) of survey participants admitted to having used the Internet while 7% (n=182) respondents did not know what the Internet means. Thirty-two per cent (n=830) of the participants had never used the Internet before.

Nigerians have become increasingly savvy in the use of digital devices as the study findings reveal. Asked about their use of digital devices and being conversant with selected pervasive digital technology terminologies, respondents reported a degree of awareness that suggests the existence of considerable knowledge among the population

[75] NCC - https://www.ncc.gov.ng/statistics-reports/industry-overview#view-graphs-tables-6

Mobile phones and smartphones are the devices with the highest ubiquity among the survey participants as outlined in Table 34.

Table 34: Survey Question #5 – Assessing devices used to access digital services?



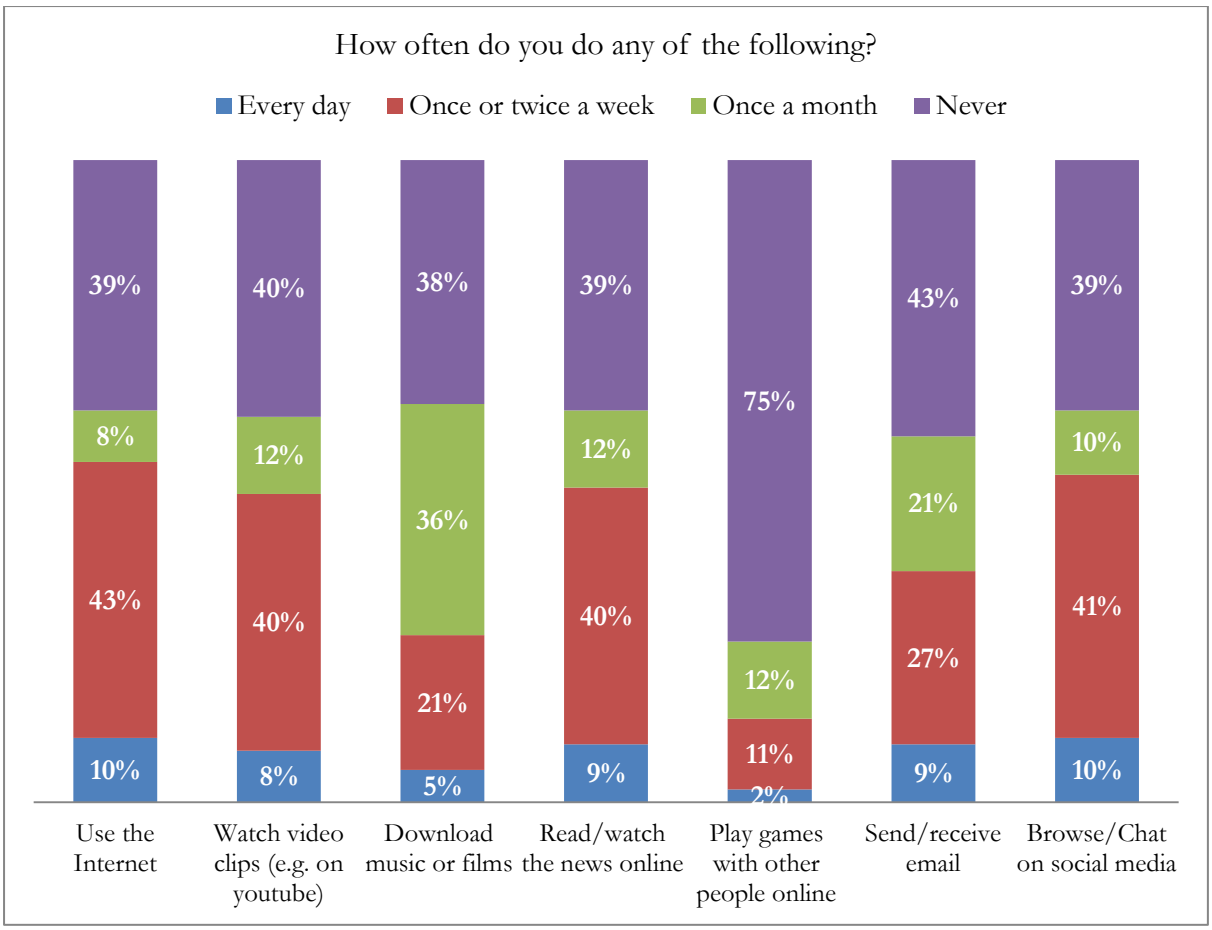
A cumulative total of 99% (n=2569) of the survey respondents presented to have used a mobile phone. Similarly, 96% (n=2491) participants registered the use of a smartphone. The smartphone is the device most used by Nigerians to access the Internet according to several reports.[76] [77] [78]

More than ninety-five per cent of mobile Broadband users access mobile Broadband on smartphones. Wanting to remain constantly connected might be a strong motivator for consumers when opting for Internet services. The significant use of mobile Broadband on mobile phones provides consumers with more mobility, further allowing them to remain connected and updated.

The findings show that laptops (49%) enjoy more popularity among the respondents than desktop computers (38%) or tablets (14%). Again portability and mobility might account for this preference as users like the flexibility of taking their Internet connectivity with them as they move about.

[76] Statista - Distribution of devices used for internet access in Nigeria in 2020 - https://www.statista.com/statistics/1139297/distribution-of-devices-used-for-internet-access-in-nigeria/
[77] Internet Goes Mobile Report - Ericsson ConsumerLab - https://www.techcityng.com/93-of-internet-users-in-nigeria-surf-the-net-via-mobile/
[78] 48% Nigerians To Access Internet Via Mobile Devices In 2027 - https://www.newtelegraphng.com/48-nigerians-to-access-internet-via-mobile-devices-in-2027/

Table 35: Survey Question #12: Assessing Internet Usage?



The low adoption of FinTech in Nigeria is made manifest in the number of respondents (39%) who voted that have never used the Internet; 40% of respondents say they have never watched video clips (e.g. on YouTube); 75% of survey participants attest to never played games with other people online.

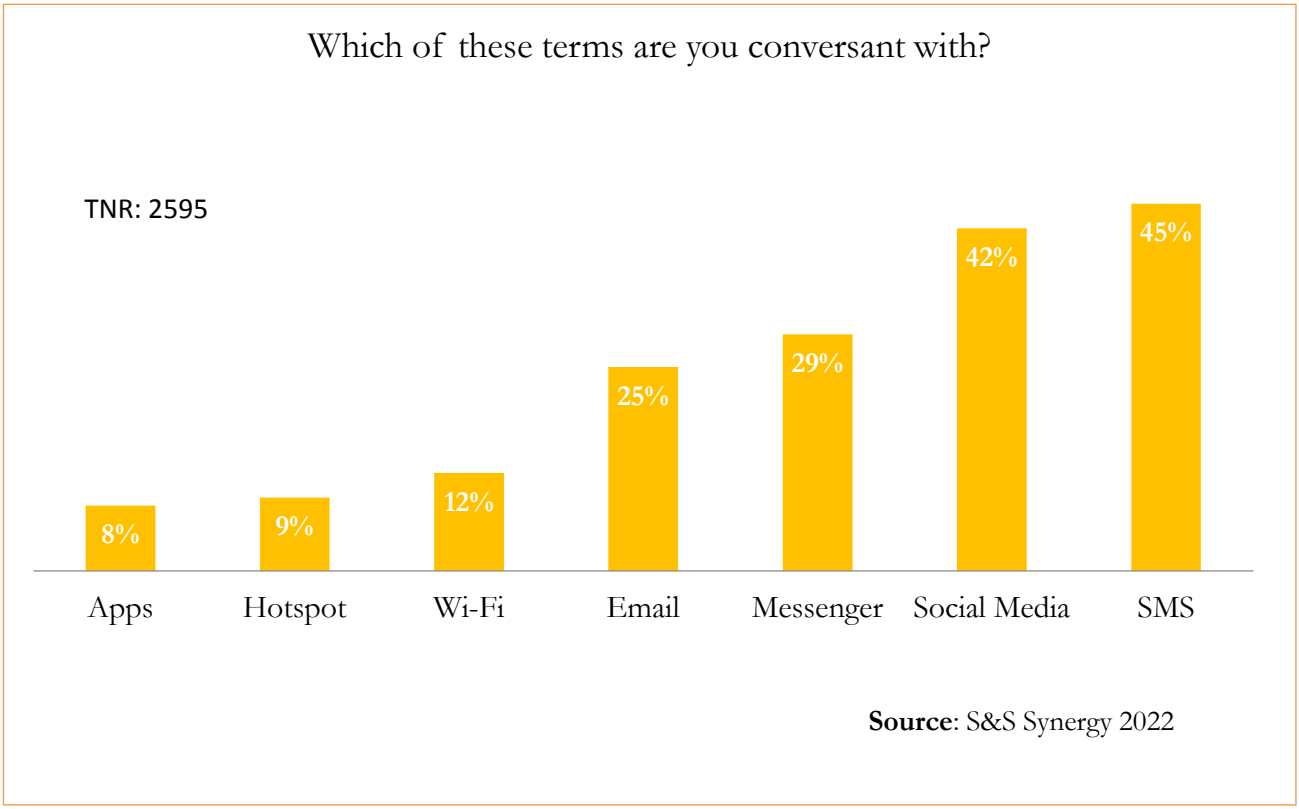
On the flip side, only 10% of respondents use the Internet every day with similar percentage browsing and chatting on social media daily. Five per cent of respondents download music or films daily

Once or twice a week, 43% of the respondents use the Internet. In the same frequency, 40% of respondents read/watch the news online.

Once a month, 36% of respondents download music or films from the Internet and 21% send/receive email

Seeing as the digital economy is largely based on computers, the Internet and digital technologies, the study sought to assess the respondents' grasp of selected prevalent terminologies that are useful in finding one's way around the maze of competing lexicons.

Table 36: Survey Question #7 - Measuring knowledge of technology terminologies



Most of the respondents (45%) know about SMS more than know about Apps (8%). Social Media (42%) and Messenger (29%) appear to be better known among survey participants than Hotspot (9%) and Wi-Fi (12%).

A quarter of the respondents (25%) posit to be conversant with the term Email even though, as captured in Table 37, they may not have sent or received any email themselves.

Table 37: Gauging respondents' ability to use basic digital economy services

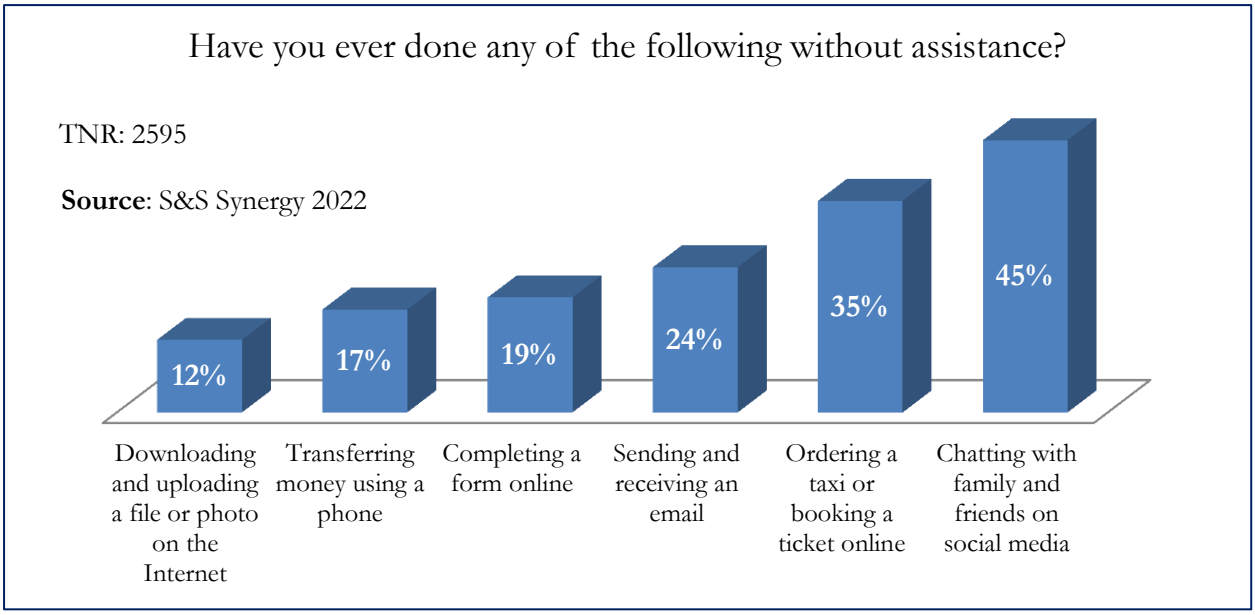
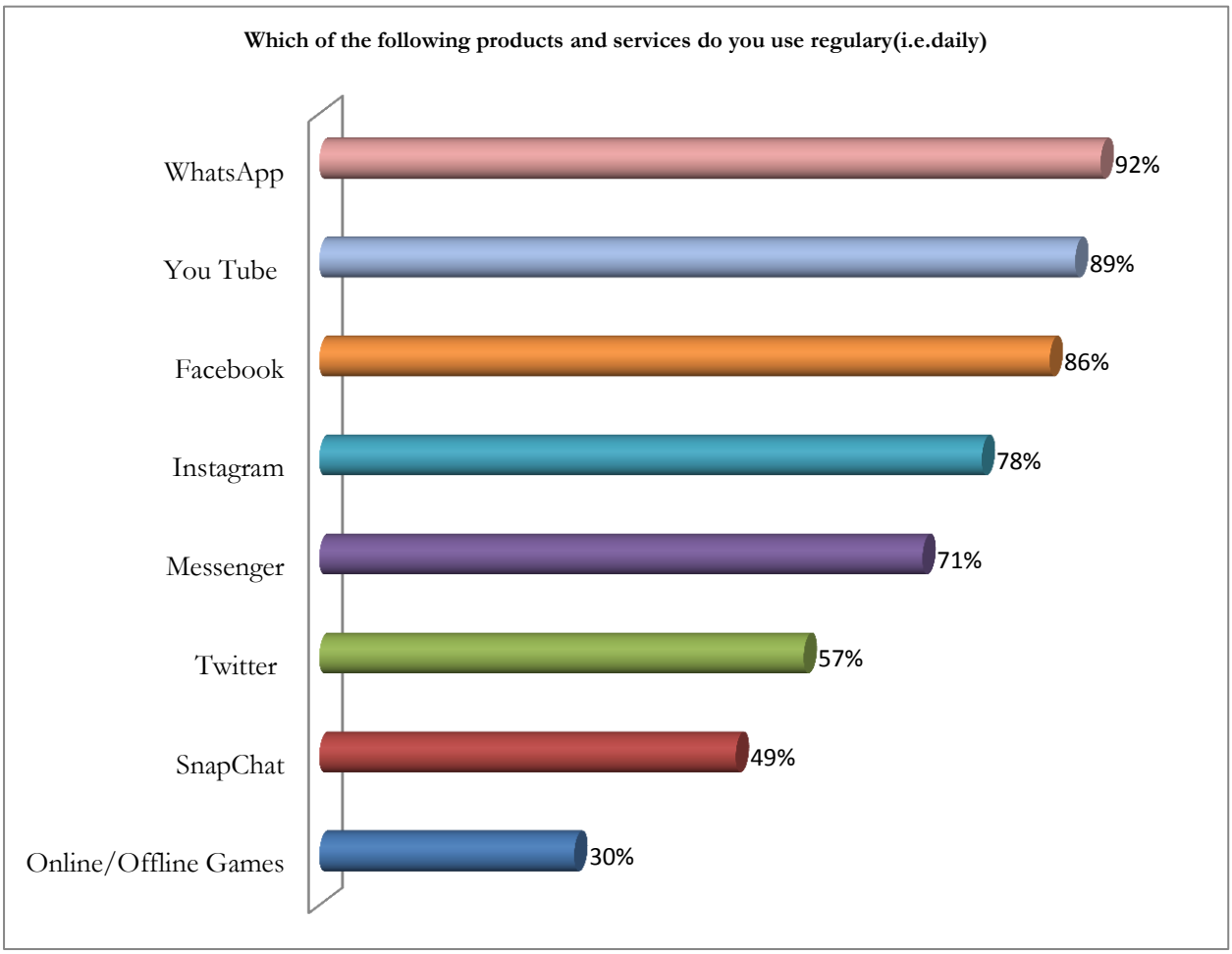


Table 38: Survey Question #13 - Use of Digital Technology tools



The study's findings show that chatting with family and friends on social media is the activity mostly conducted by the majority of the survey participants (45%) without assistance.

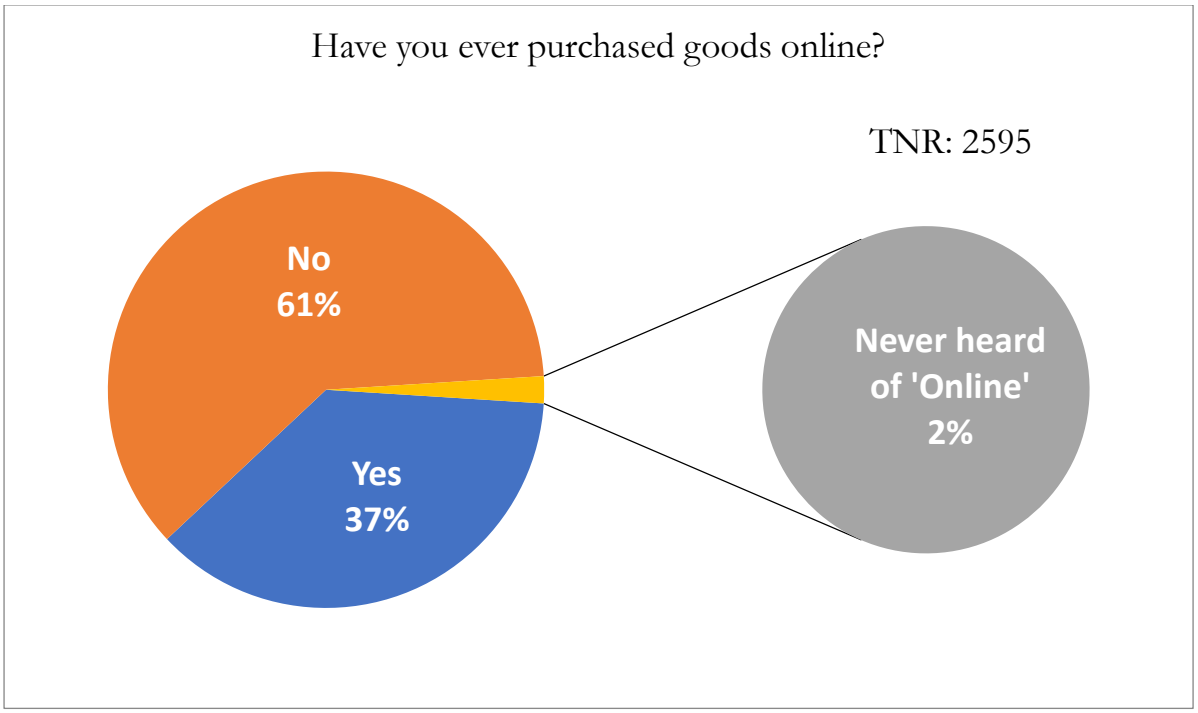
The ability to order a taxi or book a ticket online unassisted is one of the elementary skills required to participate in the Digital Economy. Thirty-five per cent of the survey participants indicated that they can carry out this function without help.

Twenty-four per cent of respondents can send and receive emails unassisted with 19% able to complete forms online unaided.

Downloading and uploading a file or photo on the Internet (12%) and transferring money using a phone (17%) represent digital activities that many respondents claim they cannot do unless with third-party assistance.

When asked whether they had ever purchased goods online, 61% of survey participants responded in the negative and 37% responded in the affirmative. Two per cent of respondents claimed to have never heard of the term 'Online'.

Table 39: Survey Question #7 - Assessing Online Shopping Activities



The high percentage of participants (63% cumulative) who said they had not shopped online or heard of the term 'Online" underscores the low level of adoption of FinTech in Nigeria.

3.6.10 Scope of Study Item #3

The Impact of Digital Economy on Nigeria's National Economic Development

Key Levers/Description	Impact
Digital Financial Inclusion	The Digital Economy has impacted national economic development by enhancing the digital financial inclusion of many hitherto excluded Nigerians through: ▪ Providing financial service products to rural communities and the unbanked populations; ▪ Enabling digital and financial inclusion of women which drives increased spending on education and healthcare and raised the quality of human capital in the economy; ▪ Leveraging technology to increase coverage extension such as Mobile Money, POS stands etcetera.
Multiplier Effect	Increased activity in the Digital Economy triggered multiplier effects in the economy manifested by: ▪ Unlocking new business models beyond financial services; ▪ Fuelling the growth of e-commerce; ▪ Increasing job and employment opportunities; ▪ Enabling increased consumer consumption and MSME growth through innovation; ▪ Expanding the revenue pools by attracting foreign direct investment from global investments; ▪ Contributing to the Digital Financial Services GDP uplift driven by increased productivity.

To assess the impact of the Digital Economy on the economic development growth of Nigeria, this study had to first build a comprehensive evaluation index system based on the concept and characteristics of the Digital Economy from three dimensions:

(i) Digital Economy infrastructure;
(ii) Digital Economy openness; and,
(iii) The innovation environment and competitiveness required for digital technology development.[79]

The first category of indicators mainly reflects Nigeria's Digital Economy infrastructure and applications, including secure Internet servers (per million people); fixed Broadband subscriptions (per 100 people); fixed telephone subscriptions (per 100 people); Mobile cellular subscriptions (per 100 people); and, individuals using the Internet (percentage of population).

The second category of indicators measures the development of Nigeria's ICT industry and its international market share, and also reflects the degree of outward orientation of the Digital Economy. It includes two indicators: high-tech exports (percentage of manufactured goods exports) and ICT product exports (percentage of total product exports).

The third category of indicators reflects the innovation environment and competitiveness of Nigeria's digital technology, including enrolment in higher education institutions (percentage of the total population); R&D expenditures (percentage of GDP); venture capital availability; and, availability of the latest technologies.

The study findings show that although there is an obvious regional imbalance in the Digital Economy development in Nigeria, Digital Economy has had a significantly positive effect on economic growth everywhere across Nigeria.

In particular, the Digital Economy played an active role in mitigating economic losses and promoting economic recovery during the Covid19 pandemic. The stringency measures implemented by the Government to minimize social mobility during the lockdown brought serious shocks to Nigeria's economy by directly affecting production, disrupting the supply chain and harming firms and financial

[79] Afonasova Et Al., Digitalization in Economy and Innovation: The Effect on Social and Economic Processes

markets, but businesses were able to weather the shock through the use of digital technology.

The Digital Economy, with its advantages of high technology and integration with other industries, stepped up to the plate during the pandemic to become a new opportunity for the digital transformation of industries. Compared with the real economy, digital technologies, industries and online services played an important role as stabilizers, lubricants and boosters of the economy during the lockdown.

These online services reduced the movement of people and the risk of the epidemic becoming devastating for Nigeria, and also contributed to Nigeria's economic stability. Nigeria's Digital Economy played a hugely positive role in curtailing the pandemic, and in driving value-added distribution of goods and services, and ultimately spurring Nigeria's economic development.

During the pandemic, digital services received a large portion of the resources reallocated from traditional industries, which became a strong driver for economic growth. In addition, digital technologies not only empowered pandemic response strategies in the short term but also served as a godsent for FinTechs.

Technology and innovation constitute the engine room of economic progress for consumers and businesses in the Digital Economy. This combination stimulates economic growth by engendering higher productivity, which leads to increased improvement in the quality of products and services.

Advances in technological innovation stimulate economic growth and prosperity. Most businesses in Nigeria and Nigerians anticipate a future when a significant proportion of their productivity and economic growth would be attained through the application of new digital technologies.

In cognisance of this digital revolution, the Nigerian Government is taking deliberate steps to diversify and transform the economy into a Digital Economy anchored on ingenuity and innovation.

3.7 Study Objective Item #3 – Slow Adoption of FinTech in Nigeria

To Analyse Factors Responsible for the Slow Adoption of FinTech in Nigeria

3.7.0 Findings

FinTech has led to the disruption of both human and logistic flows, forcing the digital transformation of traditional trade in goods and services. Digital trade will become the main form of global trade driven by emerging digital technologies such as big Data, cloud computing, artificial intelligence and Blockchain.[80]

However, FinTechs in Nigeria face several challenges which exist in different forms and dimensions, including:

- Existing public procurement regulations in Nigeria are not StartUp friendly;
- There are currently no policies to incentivise angel investors to drive investment in tech entrepreneurship;
- Although innovation hubs exist, the numbers and capacity of the hubs are not sufficient to meet demand;
- Collaboration between ecosystem stakeholders is low;
- There are no StartUp associations that advocate meeting the challenges of StartUps and lobby for the needs of the FinTech entrepreneurship ecosystem;
- FinTech entrepreneurs find it difficult to find and retain good technical talent;
- University-led incubators that can foster innovation do not exist in sufficient numbers and those that exist lack depth;
- When compared to more established global FinTech ecosystems such as the USA, China, India and the UK, Nigeria's FinTech is still considered underdeveloped;[81]
- The unreliable and irregular power supply is an ongoing concern together with other energy, communications, logistics and market linkage issues; and,

[80] Zhang Et Al.: The Impact of Digital Economy on the Economic Growth and the Development

[81] GSMA Report - https://dailytrust.com/nigerias-economy-and-tech-ecosystem

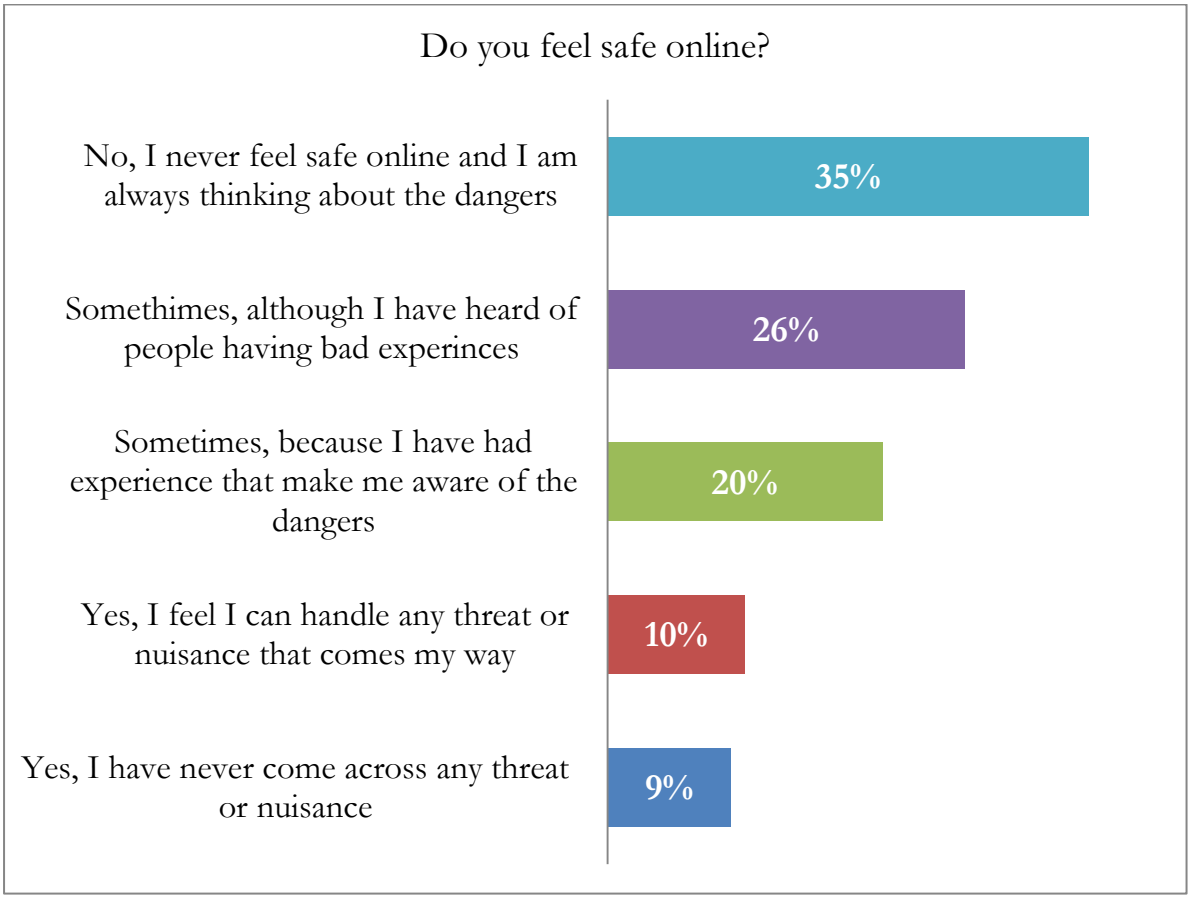
- The paucity of innovation and research commercialization capabilities of leading Nigerian universities and polytechnics.

3.7.1 Cybersecurity and Data Privacy

The survey finds that 35% (n=908) of the respondents do not feel safe online and are always thinking about the dangers that lurk in the shadows while 26% (n=675) of the participants feel safe online sometimes, although they have heard of people having had bad experiences. Twenty per cent (n=519) of the participants had had actual experiences that make them aware of the dangers.

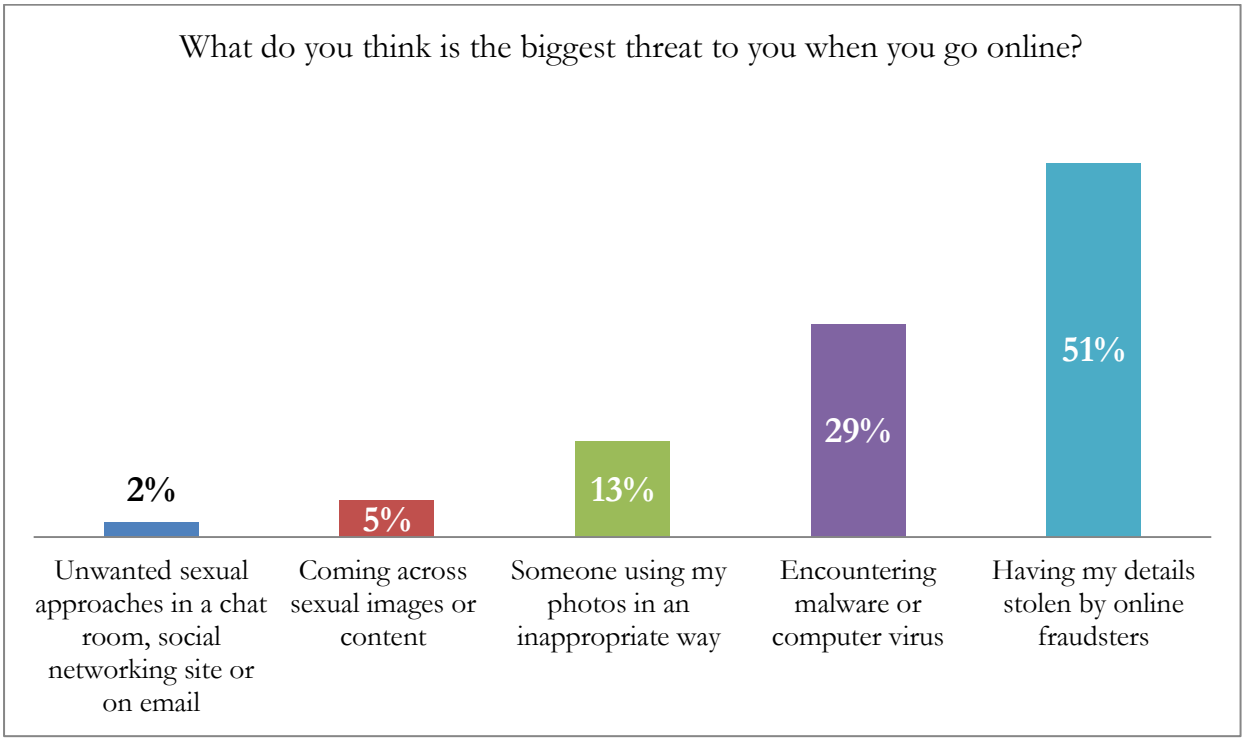
Ten per cent (n=259) and 9% (n=236) of the participants responded in the affirmative about feeling safe online presenting respectively that they can handle any threat or nuisance that comes their way or have never come across any threat or nuisance.

Table 40: Survey Question #14 - Do you feel safe online?



To further explore issues around Data Privacy and the part it might be playing in the slow adoption of FinTech in Nigeria, survey participants were asked to identify what they think is the biggest threat to them when they go online.

Table 41: Survey Question #16 - Biggest Threat Online



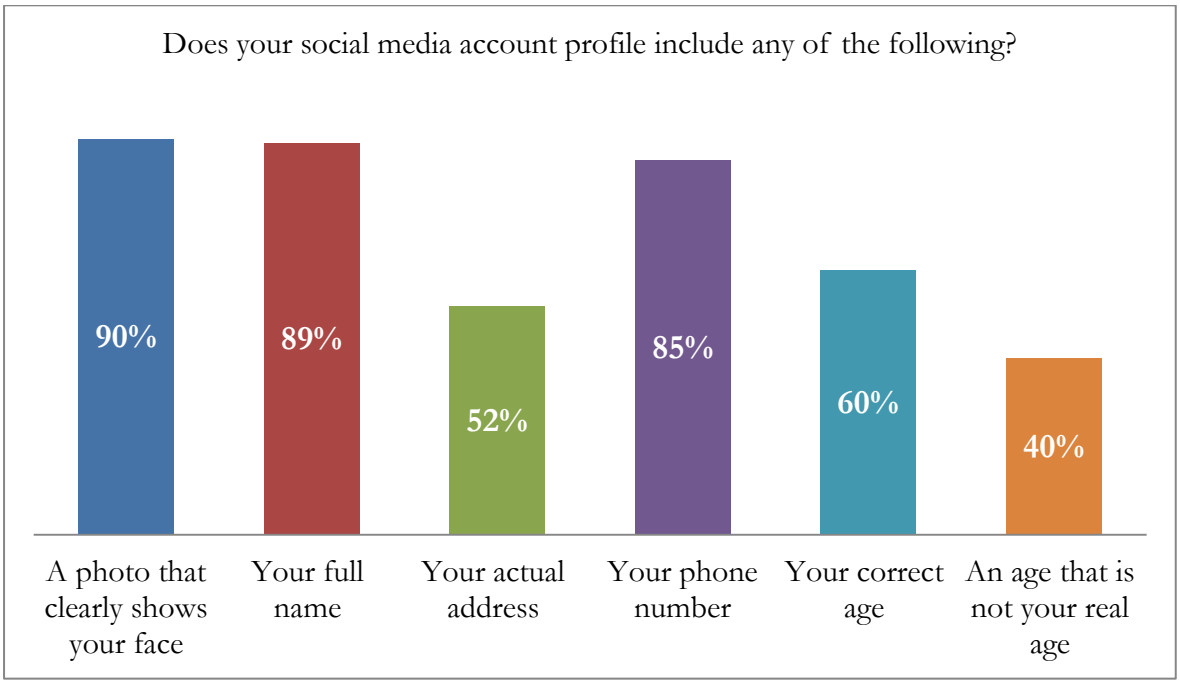
Having their details stolen by online fraudsters was fingered by 51% of the survey respondents as the biggest threat to them online. Encountering malware or computer virus poses the biggest threat to 29% of the survey participants. Someone using their photos in an inappropriate way or coming across sexual images or content were threats to 13% and 5% of the respondents respectively. Unwanted sexual approaches in a chat room, social networking site or email was considered a threat by only 2% of the participants.

Balancing online opportunities and risks remains a challenge for all stakeholders in the Nigerian Digital Economy ecosystem. Without unduly exaggerating the dangers, it is essential for the Nigerian Communications Commission to be at the forefront of the discourse of the risks that exist with digital technologies and even more importantly to empower users and consumers alike to recognise the risks and be better equipped to prevent them or at least minimise exposure to them.

In an age of Internet trolling, coupled with the ubiquity of smartphones and varieties of recording equipment, a person is only one click away from digital disgrace. It is pertinent therefore that people are mindful of the granularity of their personal data available on online platforms especially social media.

To this end, the survey sought to know from the respondents how much of their personal data is supplied on their social media profiles.

Table 42: Survey Question #15 - Granularity of Personal Data on Social Media



The majority of survey respondents (90%) posit having a photo that clearly shows their face on the social media profile with 89% having their full names and 52% providing their actual addresses.

Eighty-five per cent and 60% of respondents have their phone numbers and correct age on their social media profiles respectively while 40% supply an age that is not their real age.

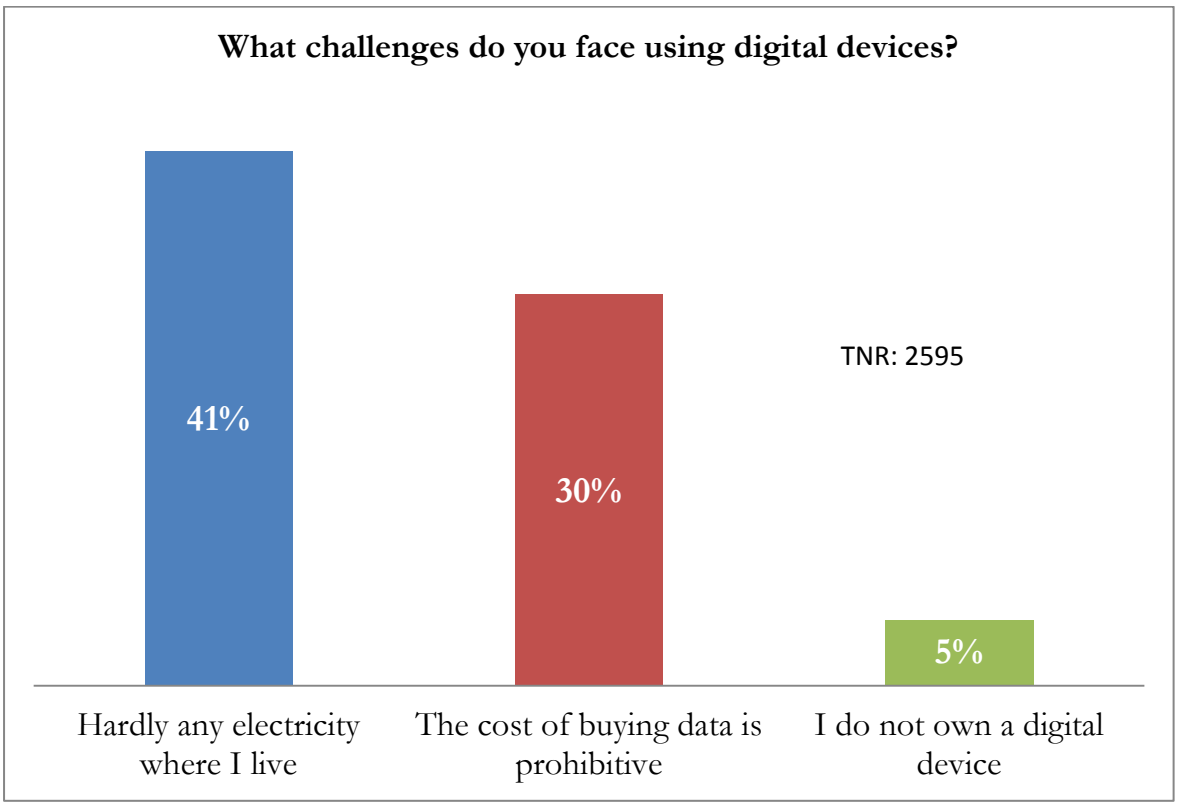
It is perhaps crucial to note too that most of the social media platforms are configured to not authenticate or enable profiles and accounts until such personal details are supplied.

Probing deeper to uncover the impediments behind the slow adoption of FinTech in Nigeria, the survey participants were asked to torchlight the challenges they face using digital devices.

Forty-one per cent (n=1063) of the respondents posit that there is hardly any electricity where they live.

The prohibitive cost of buying data was identified by 30% (n=778) of the respondents as their major challenge they face using digital devices. Five per cent of the respondents (n=129) posted that they do not own a digital device.

Table 43: Survey Question #10: Challenges using digital devices

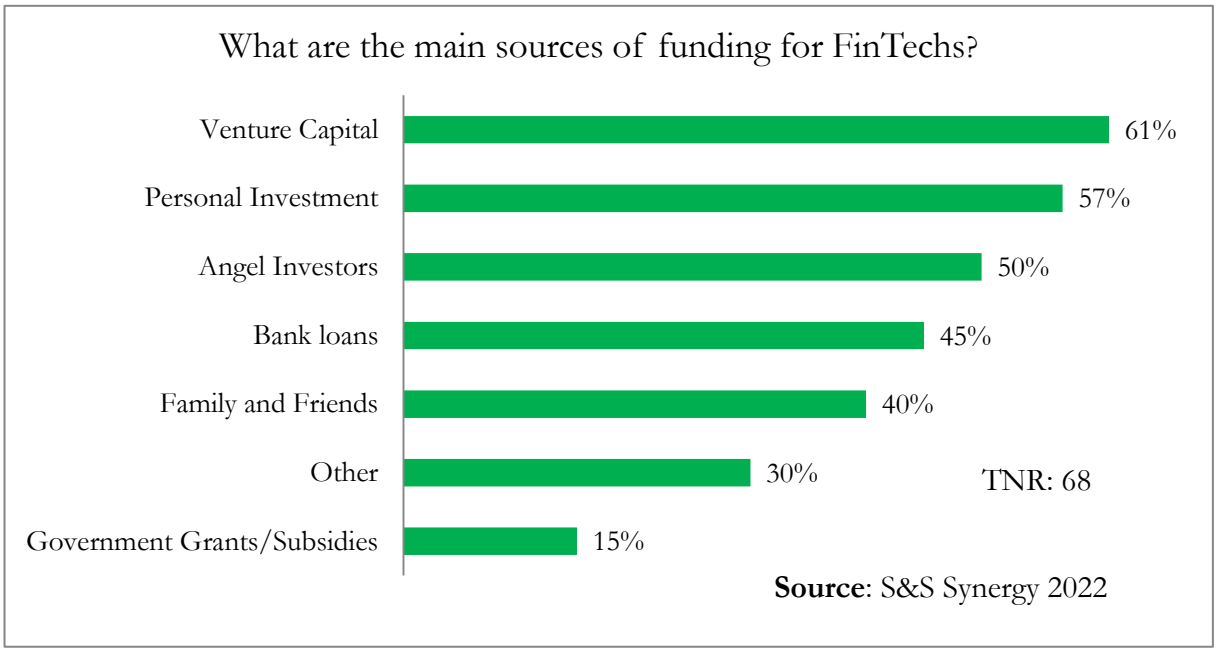


3.7.2 Access to Capital

FinTechs' ability to raise funds is fundamental to the growth of the sector. Despite the considerable increase in inward investment in the FinTech industry, findings indicate that access to late-stage and growth capital remains a challenge for Nigerian FinTechs.

Findings suggest that foreign investors are more involved in the FinTech space than their local counterparts. A higher percentage of FinTech funding comes from more than 20 countries around the globe with the United States and the United Kingdom dominating the list.[82]

Asked about their main sources of funding, respondents revealed that most FinTechs leverage at least two or more sources of funding.



The study finds that the major chunk of commercial funding is formed by Venture capital, Angel investment and bank loans. Most FinTechs (61%) leverage commercial sources particularly Venture Capital investment, to raise capital while personal investment is the second major source of capital (57%). Family and friends are also sources of funding capital according to 40% of the respondents. Government grants and subsidies, where they exist, only come in trickles going by

[82] EY – Nigeria's Fintech Census 2021 - https://assets.ey.com/content/dam/ey-sites/ey-com/en_ng/ey-fintech-nigeria-census-final.pdf

the number of respondents (15%) who indicated obtaining funding from that channel.

There is also a funding skew to the more established players, with a higher percentage of post-revenue FinTechs receiving more funding.

There are five main sources of finance available for entrepreneurs:[83]

- **Individual Investors** - personal networks, angel investors, crowdfunding – at the seed stage;
- **Venture Capital** – institutional investment, from seed to later stages with expectations of high returns;
- **Public Funding** - grants, sovereign investment funds, funds of funds – to fill funding gaps at various stages and stimulate priority sectors;
- **Corporate Investment** - direct investment and via corporate venture funds – at the investment and takeover stages, to acquire industry-specific solutions, or for corporate innovation exposure; and,
- **Initial Public Offerings (IPO)** – these offer additional capital raises in local and foreign stock exchanges to realize an exit and return capital to shareholders.

Nigeria lacks richness, both in terms of numbers and versatility, in funders active in the tech entrepreneurship ecosystem.[84] The funding landscape in Nigeria resembles that of the rest of the continent, with 57% of entrepreneurs starting their businesses with their savings, 40% receiving friend and family support, and 15% receiving grants and donations.

Public funding is scarce and where it exists, the geographic coverage is limited – often State or regional level. For instance, the Lagos State Employment Trust Fund (LSETF) is mandated to create jobs in Lagos State specifically and its funding program is designed to support SMEs and StartUps within that geography.

Although there are small numbers of active business angel networks, there are no Federal or State incentive schemes to support and motivate high-net-worth individuals to become angel investors in Nigeria.

[83] OC&C Report 2018 – Tech Entrepreneurship Ecosystem in Nigeria
[84] OC&C Strategy: A Comparative Report on Focus Countries 2018

Equity crowdfunding was suspended by the Securities Exchange Commission (SEC) in 2016 because it wasn't covered under existing laws that regulate the formation and operation of companies and the sale of securities to the public.

The pools of domestic Government grants in Nigeria though limited are not inclusive, not openly communicated, and their application processes are opaque. So most of the time, entrepreneurs are not aware of available grants and, as a result, do not get the capital they require to start or scale their businesses.

Ecosystem players, both investors and entrepreneurs, agree that there is a need for more financing capital at all stages of the tech entrepreneur's growth cycle.

3.7.3 Skilled Manpower

Attracting and retaining a skilled workforce remains one of the biggest challenges facing FinTechs in Nigeria. The quality and quantity of FinTech skills in Nigeria, findings reveal, cannot adequately meet the needs of the industry. Skills such as Data Analytics, Cybersecurity and Software Engineering are among the most difficult to find, presenting barriers to growth for FinTechs, and an area where many believe more support is required.

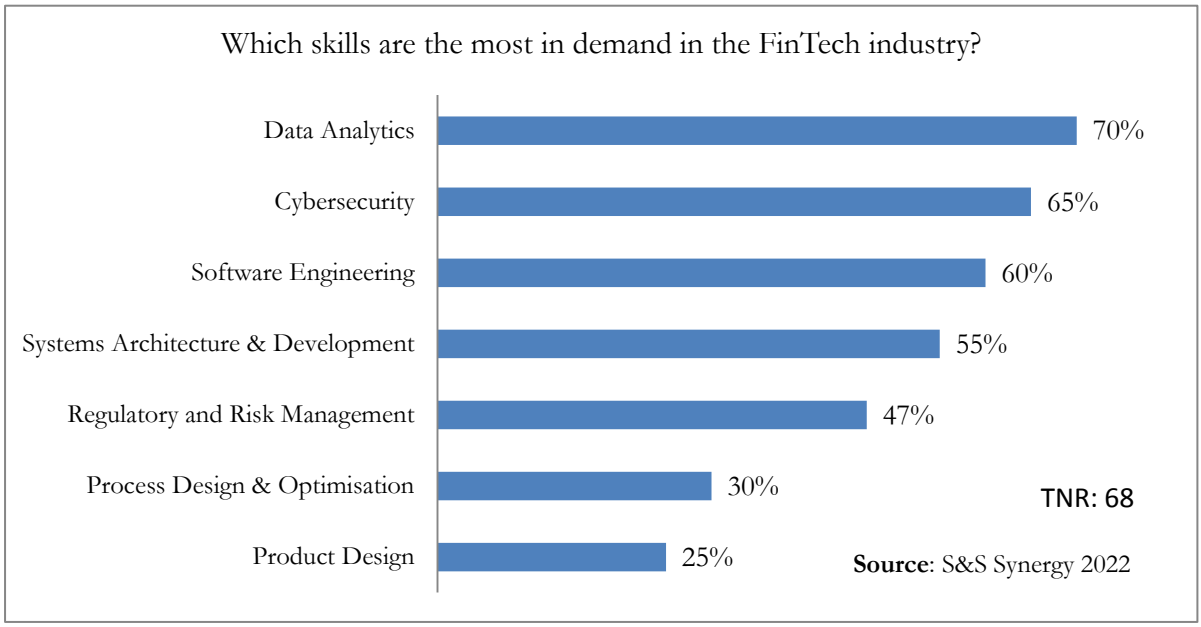
Nigeria's standard of general education is low, with quality at all levels suffering from poor funding and deteriorating teaching capabilities. Graduates from tertiary institutions often lack marketable skills and are considered unemployable by the competitive private sector, even after they graduate from degree programs.

Significant gaps exist between what the education system offers and what is needed to support a thriving technology-driven economy. The curricula of current degree programs are grossly out of date and so do not adequately prepare students for the needs of the labour market.

Asked to identify the skills most in demand in the FinTech industry, respondents rated Data Analytics (70%) as the highest sought-after skill in the Industry. Cybersecurity (65%) and Software Engineering (60%) are also in the Top 5 of the skillsets required to keep Nigeria's Digital Economy engine running optimally.

Skills such as Systems Architecture & Development (55%), Regulatory and Risk Management (47%) and Process Design and Optimisation are also required in the emerging digitalised workplace.

Table 44: The Skills most in Demand in Nigeria's FinTech



Tackling the skills shortage may require multi-stakeholder partnerships between the Industry and Government to retool citizens through an improved education system, constant training and re-training to upskill the current workforce, and collaboration with academia to develop modern and relevant digital course content and curricula.

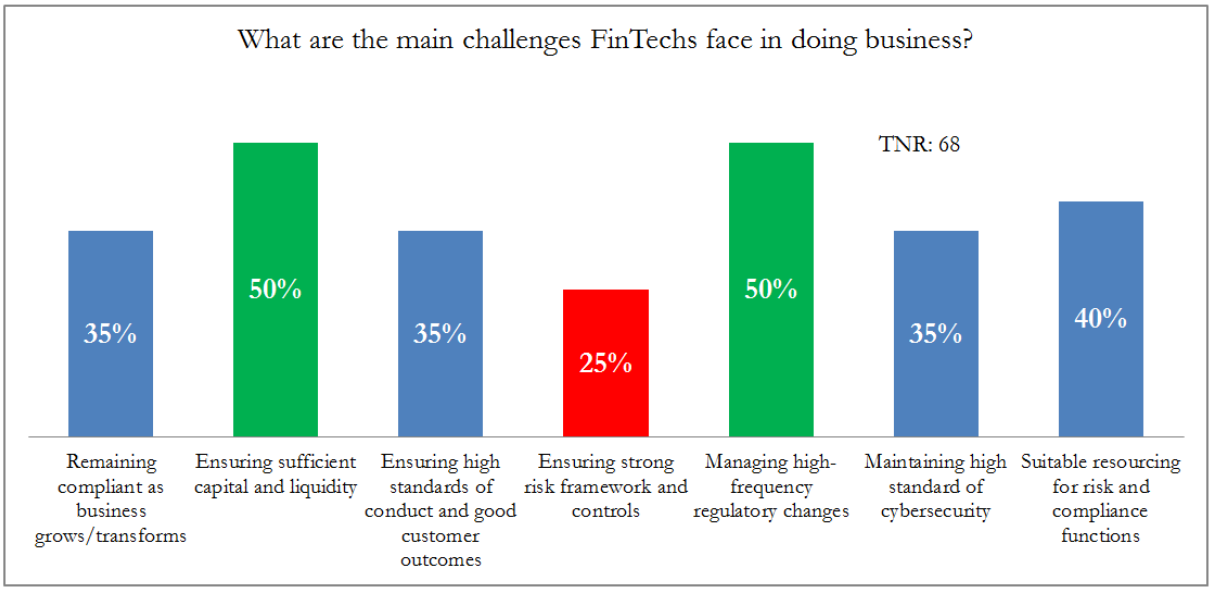
Lacking the required partnerships with the private sector, Nigerian universities are rarely able to adapt quickly to the emerging realities in the world of work to unlock the potentials derivable from good quality technical education.

3.7.4 Policy and Regulation

The evolution of the FinTech industry has happened ahead of regulations. As the FinTech environment advances and the complexity of disruptive technology intensifies, the strength and maturity of Nigeria's policy and regulatory environment will be critical to protecting the nation's financial system as well as consumers, while creating an enabling environment for FinTechs to thrive.

Well-thought-out and judiciously implemented policies and regulations are almost always good for business as they portend to institutionalize best practices and signal confidence to investors and customers alike. Although some progress has been made by Policymakers and Regulators to create a supportive environment for FinTechs, there are, however, many opportunities to improve the policy and regulatory landscape and make Nigeria's FinTech a differentiator in Africa.

Table 45: The Main Challenges FinTechs face in Nigeria



Evaluation of the challenges FinTechs face in doing business in Nigeria revealed that managing high-frequency regulatory changes and ensuring sufficient capital and liquidity hold the joint top spot as the issues respondents identified as their main challenges.

There are prevailing concerns around the lack of clarity and certainty on the regulation of emerging segments such as cryptocurrency and Distributed Ledger Technology. For example, the Federal Government's regulatory posture on cryptocurrency recently moved from guarded to hostile as the CBN outlawed dealings in cryptos and facilitating payments for cryptocurrency exchanges and ordered all banks to stop transacting in and with entities dealing in cryptocurrency. The CBN also directed banks to close accounts of persons or entities that are involved in cryptocurrency transactions. Such incertitude in policy can stifle innovation and degrade global competitive advantage.

However, despite the Government's stance on cryptocurrencies, or perhaps because of it, cryptos are still popular in Nigeria. Perhaps the 2016 economic recession in the country and the downward spiral of the Naira against major world currencies could be the reason Nigerians flock to digital currencies to protect their savings and assets. This behaviour change has propelled Nigeria to have the largest crypto market in Africa and one of the largest user bases in the world.

With one of the major challenges of StartUps in Nigeria today being funding and ensuring sufficient capital and liquidity, many organisations would have liked to turn

to crowdfund as a means of raising funds to finance their StartUps. But unfortunately, the Companies and Allied Matters Act (2020) as well as the Investment and Securities Act (2007) expressly exclude private companies from engaging in crowdfunding. The type of crowdfunding envisaged in this circumstance is equity crowdfunding.[85]

Section 67(1) of the ISA 2007 and Section 22(5) of CAMA 2020 specifically prohibit equity-based crowdfunding by private entities and allows only public companies and statutory bodies or banks established by or under an Act of the National Assembly to accept deposits and savings from the public.

There are myriad Government agencies active in the policy and regulatory space for businesses in Nigeria's financial industry. The multiplicity of their number sustains the insinuation that the industry is over-supervised and perhaps overregulated.

There is also a palpable lack of capacity by Government policymakers to understand new technologies resulting in poor regulatory frameworks and Government-supported monopolies. There appears to be a bias by Governments toward old, existing technologies and hesitancy to adopt new technologies.

The speed at which technology evolves makes it very hard to get a resilient and updated regulatory framework in place. Rushing into regulation may be counterproductive, and sometimes regulation is not even the best solution to optimize social and economic benefits.

Study respondents opined that the development of policies and regulations could benefit from much deeper engagement and involvement of the MSMEs so their views can be taken into account in policy formulation. The study notes that regulating the Digital Economy will require coordination and coherence among Government and private entities across sectors.

It is pertinent to point out that regulation does not always portend gloom and doom for businesses. As has been highlighted elsewhere in this Report, well-thought-out and judiciously implemented policies and regulations are almost always good for business. One positive proof of this is the Payment Services Bank (PSB) Regulation which holds great promise for FinTechs.

Premised on permitting the use of technology and agency banking to mobilize deposits and facilitate transfers from the unbanked population in the rural regions,

[85] Rules 2, 4, 10-13: Rules on Crowdfunding 2021 - https://www.sec.gov.ng

the PSB regulation is a win-win for all stakeholders in the FinTech industry - although stringent regulatory requirements for issuance of the PSB licenses appear restrictive for the smaller organisations.

The policy thrust behind the PSB licence is to enhance financial inclusion by increasing access to payments and remittance services to small businesses, low-income households and other financially excluded entities through high-volume low-value transactions in a secured technology-driven environment.[86]

The PSP regulation puts the ball firmly in the court of the FinTechs to provide financial inclusion levers to the unbanked - which is naturally their forte.

Interestingly, all four major mobile network operators in Nigeria have PSB subsidiaries. MTN has MoMo; 9mobile has 9PSB; Airtel has SmartCash; and, Globacom has MoneyMaster.

3.7.5 Multiplicity of Taxes

Another challenge for the adoption of FinTech in Nigeria is Nigeria's tax system which is as complex as it is varied. There are, in most parts, three layers of Government taxes including Federal, State and Local Government.

Asides from the taxes, there is a panoply of levies, dues, tariffs and sometimes fines for companies to negotiate. Each layer of Government has its procedure on taxes and levies; none are designed to include incentives or reprieves for enterprises; and, all are seemingly configured to be as arduous as possible for most entrepreneurs to navigate.

The issue of multiplicity and duplication of taxes is one factor that has continually impacted negatively on the efficiency of the Nigerian tax system. Consequently, although Nigeria moved up 15 places to be ranked 131st out of 190 economies in the World Bank Ease of Doing Business Ranking 2020, Nigeria recorded a downward movement on the Ease of Paying Taxes dropping two places to 159th position in the world and 35th in Africa.[87]

In general, ecosystem stakeholders feel that the lack of clarity, the vagueness around the definition of obligations and the inconsistencies in the implementation of

[86] CBN – Payment Service Banks Supervision Framework https://www.cbn.gov.ng/supervision/Inst-PSB.asp
[87] World Bank Ease of Doing Business Report 2020 - https://www.worldbank.org/en/news/feature/2019/10/24/doing-business-2020-sustaining-the-pace-of-reforms

guidelines are some of the challenges the Industry contends with and which they hope that regulators would iron out at the first opportunity.

3.7.6 Culture

Nigeria has a highly entrepreneurial culture marked by positive associations with individuality and competition, a laissez-faire attitude to established rules, and citizens at ease with uncertainty. Nigerian society, it can be argued, is majorly driven by individual achievement and success.

The lack of long-term orientation manifests in Nigerians' general fondness for quick wins. This is reflected in the expectations of investors, entrepreneurs, tech talents and different stakeholder groups in the ecosystem. Thus the drive behind most entrepreneurial endeavours is often based on immediate necessity rather than following up on an opportunity to create a long-term legacy.

When it comes to payments for online shopping, Nigerian consumers still rely heavily on cash-on-delivery payments, partly given the lack of credit-card penetration among key target segments such as women, youngsters and lower socioeconomic classes, but also due to cultural preference for receiving goods before paying for them.

In addition to digital payments, the difficulty of returning online purchases and lack of trust in the quality of online products hinder the growth of e-commerce, especially when the purchase is urgent.

3.7.7 Interconnectedness

FinTechs bring to the table technological and human-centred design expertise, agile methods, and a collaboration mindset triggering significant growth in many metrics bolstering the digital maturity of players and attracting funding from investors eager to partake in the boom.

The Digital Economy derives its suzerainty over the conventional economy by leaning heavily on collaborations, colocations, and partnerships among ecosystem players. In the new economy, hardly any company owns an entire business process from conception to consumer. Companies are content to play in just one or two segments of a service's or product's value chain.

Technology has made the business competition more collaborative and less combative necessitating lateral and vertical cooperation among and between erstwhile competitors to work together to deliver products and services, each playing in only one or two links in the value chain.

However, the collaboration between ecosystem stakeholders in Nigeria's Digital Economy is still low. There is only one StartUp association that advocates meeting the challenges of StartUps and lobbying for the needs of tech entrepreneurship. Innovation hubs are the most visible network resources in Nigeria, providing physical clustering and access to infrastructure, training programs, and initial funding for their participants. However, their numbers and capacity are not sufficient to meet demand.

3.7.8 Unique Value Propositions

It is important to note that StartUp ecosystems function better when developed on a city rather than a national basis.[88] Entrepreneurs in Nigeria tend to adopt one-size suits all approach, instead of understanding or focusing on a city's unique selling proposition and deploying the ecosystems that are best suited to developing their ideas for that location.

The study finds that the majority of the FinTechs in Nigeria are clustered around mainly Lagos, a handful in Abuja, one or two in Kaduna and hardly any elsewhere.

Nigeria's Digital Economy should go beyond just replicating ecosystems, and leverage its unique strengths. Such a differentiation strategy would herald a tremendous burst of activity in other tech areas such as AgriTech, InsurTech etc. This is a process in which both the public and private sectors have roles to play and should embrace a cooperative approach when doing so.

3.7.9 Flaky IP Protection Systems

The lack of robust Intellectual Property protection is a key concern for entrepreneurs. Pushing to raise awareness of IP in the country and facilitating entrepreneurs' access to key aspects of IP protection, such as patenting, copyrighting, regional, national and international registration, as well as support with international patent protection is something ecosystem stakeholders need to prioritise to grow the Digital Economy.

[88] Arthur D Little - ICT Start-Ups In KSA - https://www.adlittle.com/kr-de/node/23792

3.7.10 Scope of Study Item #5

The Challenges and Impact of FinTech and Digital Financial Inclusion Towards a Data-driven Nigeria

FinTech has had a tremendous impact on the economy vis-à-vis how it affects digital financial inclusion and its differentiation from, as well as competition with, the existing intermediaries of credit such as incumbent Financial Institutions. As illustrated in Table 46, FinTech is relentless in democratising inclusion and access to digital financial products and services.

Table 46: The Impact of Fintech on Digital Financial Inclusion

Key Levers /Description	FinTech Impact
Ease of Access Brought financial products and services within easy reach of all segments of the population	Increased access to savings and loans for both old-timers and first-timers alike through platforms such as: piggyvest carbon Social Lender CowryWise KwikCash thankucash
Lower Costs Financial affordability and ability of products to accommodate various income/economic groups	FinTech has lowered the costs and increased the affordability of products and services through reduced charges and cheaper transfer fees as FinTechs tend to be 50%-80% cheaper than traditional players in transfers, bill payments and airtime purchases; most FinTechs offer two to three times the interest rates on savings compared to traditional players: SureRemit CHIPPER Bit Pesa
Innovative Products New models of financial products and services that cater to the needs of consumers across all ages, genders, locations, cultures etcetera.	FinTech has spawned innovations in various product areas such as: - Digitization of Cooperative savings RIBY chaka barter Digitization of Esusu models

	- Aggregation of smartphone Data points to disburse collateral-free loans:  - Online IVRs in various languages:  - Migration of customers to wallets via lifestyle use cases: 
Enlightenment & Awareness Education of consumers on the needs and benefits of financial products and services	Enhanced consumer enlightenment on such matters as: - Credit health (free credit reports):  - Financial health (enlightens users on the improvement of saving habits): 

The digital financial services and FinTech sector is continually evolving with new players and product launches. This is spurred both by Government policies to promote a cashless economy and the high number of digital natives in the ecosystem.

So far, digital financial services in Nigeria mainly revolve around savings, lending, and payments. The payments acceptance market, especially merchant and bill payment services, is fast becoming dominated by third-party aggregators and other nonbanks including switch operators, all of which combine to bring more people into the formal economy – most especially the financially excluded.

ATMs offer a digital touchstone with a personal connection, enabling users to pay bills, transfer funds and even engage with tellers. While bank branches may be reducing their opening hours and locations, ATMs continue to bridge the divide between the physical and digital worlds while propagating digital financial inclusion.

Key drivers of the growth of digital Financial Inclusion include:

- The lofty financial inclusion target of 95% by 2024 set by the CBN (currently at 65%)[89]
- Increasing smartphone penetration, with a smartphone penetration rate of 20%
- The surge in e-commerce activity in Nigeria
- The Government's intervention in establishing innovation hubs across Nigeria
- The regulatory impact from the introduction of the Payment Services initiative

[89] Nigeria will attain 95% Financial Inclusion by 2024—Godwin Emefiele https://www.cbn.gov.ng/Out/2019/CCD/Q2%202019%20Financial%20Inclusion%20Newsletter_Final_08.08.19.pdf

3.8 Study Objective Item #4 – Mining of National Data

To Proffer Solutions for the Proper Collation, Use, Adoption and Mining of National Data

3.8.1 Findings

With data redesigning the economy and reshaping the way people live, strictures and structures are required for the proper collation, use, adoption and mining of National Data. But first, what are National Data and how do they differ from other data?

National Data are usually collected and curated primarily by Government agencies using the census, administrative data collection, and more, for public intent. National Data ordinarily ought to be used for designing, executing, and evaluating public programs and policies.

With proper use, National Data can be beneficial to both the public and the Government and can lead to better lives through three pathways:

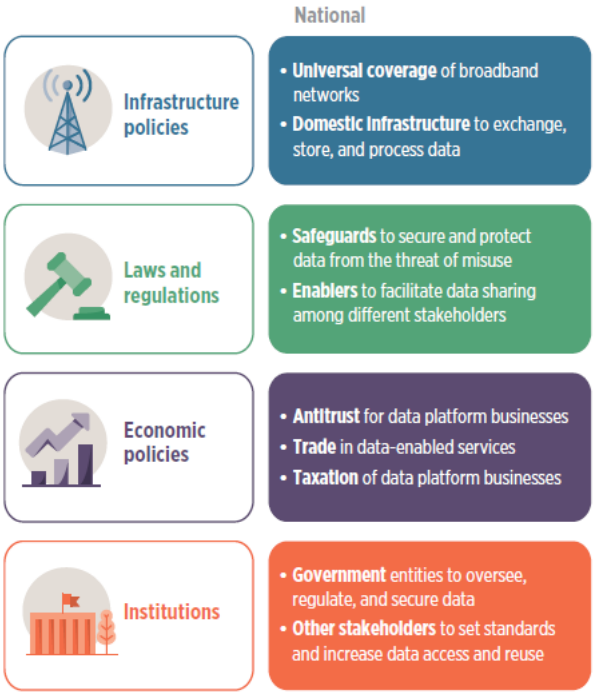
1. By improving policymaking and service delivery;
2. By prioritizing scarce resources and targeting them to reach marginalized populations and areas; and
3. By holding the Government accountable and empowering individuals to make better choices through more information and knowledge.

An example that illustrates the power of National Data to improve and target service delivery is the 2015 National Water Supply and Sanitation Survey commissioned by the Federal Government. That survey gathered data from households, water points, water schemes, and public facilities, including schools and health facilities. These data revealed that 130 million Nigerians did not meet the standard for sanitation set out by the Millennium Development Goals and that inadequate access to clean water was especially an issue for poor households majorly in the Northeast and Northwest geopolitical zones.

In response to the findings from the report based on these data, the Federal Government declared a state of emergency in the sector and launched the National Action Plan for the Revitalization of Nigeria's Water, Sanitation and Hygiene (WASH).

National Data alone will not improve society and the economy. National Data can improve social and economic outcomes, only if they are used systematically in ways that create information and generate insights that improve lives. Therefore, fulfilling the potential of National Data requires the following:

a. Investing in Data infrastructure and technical capacity and providing long-term and stable financing of data;
b. Enacting laws conducive to safe data production and reuse;
c. Addressing the low levels of data literacy affecting the demand for data;
d. Addressing policymakers' lack of incentives for and interest in using data;
e. Addressing low trust in the quality of National Data; and
f. Providing the infrastructure for accessing and using the data.

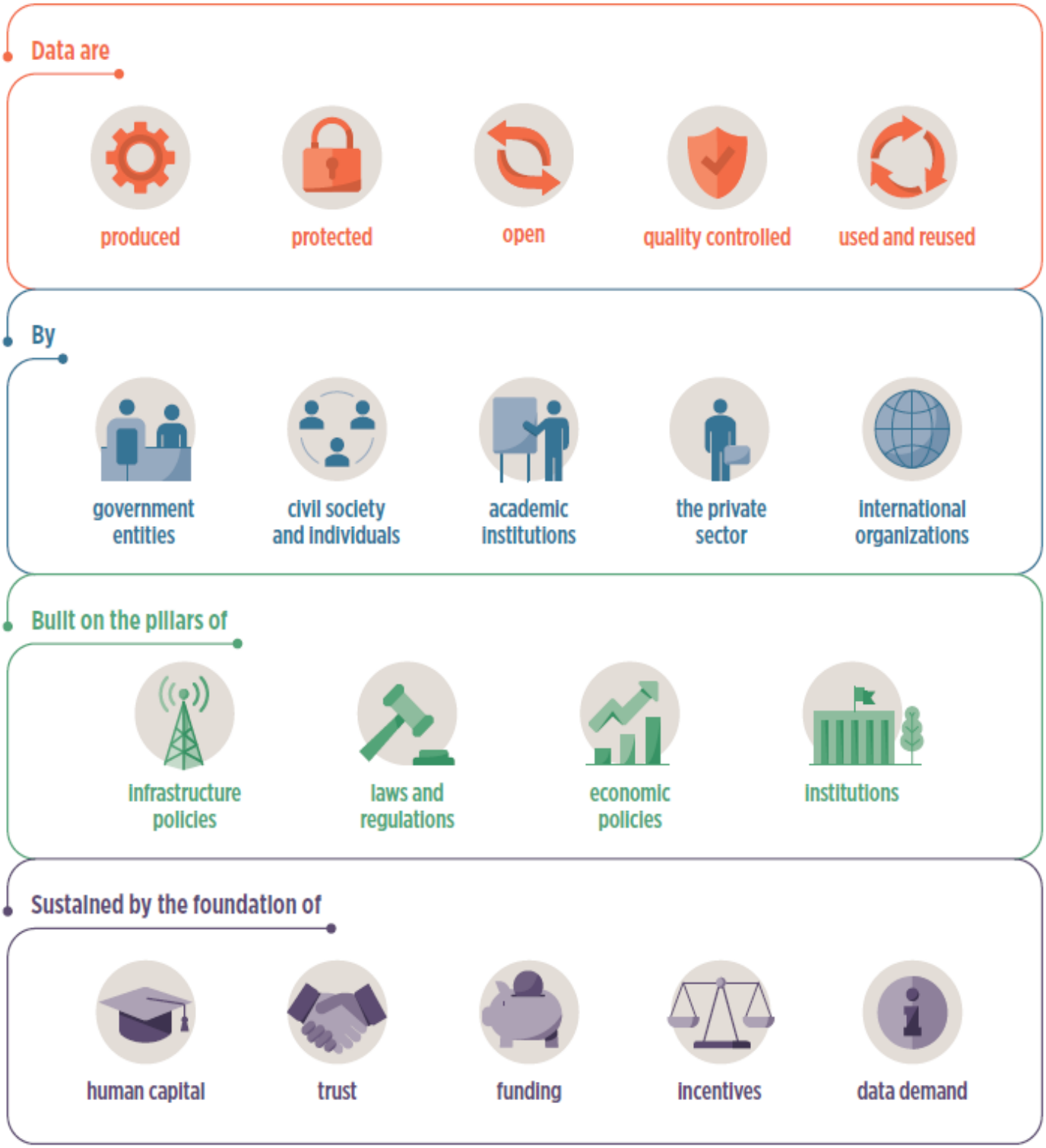


Source: WDR 2021 team.

These initiatives rely on one another, and so a failure in one area may jeopardize the overall value that National Data can bring. The Government would need to prioritize the production of high-quality National Data and the open and transparent use of the data for decision-making. Transparency and reliability of official statistics can help build trust in this respect.

What happens in an integrated National Data system?

Figure 7: How an Integrated National Data System Works



Source: WDR 2021 team.

3.8.2 Scope of Study Item #2

Covering Specifically the Government's Role and Involvement in Digitalization

In 2021, one of the biggest news headlines in Nigeria's financial firmament was the Federal Government's introduction of the e-Naira - a central digital bank currency (CDBC). The launch of the e-Naira marked the culmination of several years of research work done by the CBN backed by a series of engagements with relevant stakeholders including the banking community, FinTech operators, merchants and indeed, a cross-section of Nigerians.

Beyond the economic gains envisaged by the e-Naira, unveiling the digital currency underscores the Federal Government's ambitions to fast-track the digitalisation of the economy. The CBN envisions the e-Naira as a tool to enhance the Government's capacity to deliver targeted social assistance and support financial inclusion by providing less costly, more efficient and safe means of payment while boosting diaspora remittances through formal channels.

The e-Naira has the objective of advancing the boundaries of payment systems to make financial transactions easier and seamless for every stratum of society.

The Federal Government's first vaunt towards digitalisation was the CBN's cashless policy of 2012 which predates the e-Naira by a decade. The cashless policy sought to encourage digital banking by placing a limit on the amount of physical cash bank customers could withdraw without incurring charges. The policy helped to grow digital money transfers as much as it discouraged the prevalent habit of people transacting with raw cash.

One other step in Nigeria's digitalisation journey was the rebranding of the Ministry of Communications to the Ministry of Communications and Digital Economy. This repositioned the Ministry to take the pilot seat and proactively drive the digitalisation thrust using datafication as a key strategy.

The Federal Government recognises information technology as a key enabler for transitioning Nigeria's economy into a Digital Economy. To this end, the Government is encouraging partnerships between local ICT companies and foreign investors.

To uphold these partnerships and grow an entrepreneurial ecosystem in the technology sector, Government-sponsored and private-sector-led incubator hubs, youth innovation programs and science technology parks are being created. The Abuja Technology Village (ATV) serves as one example. The ATV has received the Government's support to become a destination for research, incubation, development, and commercialization of ICT products and services.

Outstanding among the Government's partnerships with the private sector are collaborations with local accelerators like iDEA and the Co-Creation Hub (CC-Hub). These collaborations have attracted foreign investors such as the Silicon Valley-based Y-Combinator which recently participated in pitches by Nigerian StartUps and New York-based Andela which established an incubation centre in Lagos to recruit and train talented Nigerians to code and subsequently outsource them to foreign firms.

Through the Federal Ministry of Communications and Digital Economy, the Government in November 2019 launched the NDEPS (2020-2030) aimed at repositioning the economy to harness the limitless opportunities that digital technologies can provide. The NDEPS is platformed on 8-pillars to engender the acceleration of the digitalisation of the economy.

The 8 pillars are

1. Developmental Regulation
2. Digital Literacy & Skills
3. Solid Infrastructure
4. Service Infrastructure
5. Digital Services Development & Promotion
6. Soft Infrastructure
7. Digital Society & Emerging Technologies
8. Indigenous Content Development & Adoption

As part of measures to achieve the objectives of NDEPS, the NCC rolled out the National Broadband Plan for 2020-2025 designed to deliver effective connectivity to at least 90% of the population by 2025.

At the second tier of Government, several States have begun to key into the Federal Government's digitalisation ambition by implementing policies and ICT projects in their rights.

In June 2021, for example, the Lagos State Government announced its intention to construct West Africa's largest technology cluster within the State. The initiative aims to ramp up the State's promotion of technology infrastructure and expand the tech space to accommodate more StartUps. Similarly, Edo State also announced in December 2020 that it is developing the Edo Tech Park.

The Government has created the enabling environment for several other technology-rich projects including, for instance, Cisco Systems' proposal to develop six IoT labs across the country, with the focus of building the necessary skillset among students. IBM is also championing its Digital Nation Africa (IBM DNA) program in Lagos focused on empowering youths on the continent. The platform is designed to provide digital knowledge with practical understanding to enhance digital careers.

The Government has also given the go-ahead for the deployment of 5G technology in Nigeria aimed at providing a platform for new and emerging technologies such as IoT, AI and Big Data.

The expansion of the e-Government initiative is another way the Federal Government is using to provide better information and services to people in Nigeria. For example, there have been extensive efforts to automate business registration, and most of it can now be done online. The recent introduction of the e-Naira underscores that the Government is deliberately deepening the digitalisation of the economy.

When it comes to paying for Government utilities and services, almost all payments for them are now done online through electronic payment platforms. Major participants in the Government online payments space are Remita, Cellulant, Flutterwave, Paystack, Systemspec, WebPay, Paga, eTranzact, Quickteller, and Payarena etc.

The digitalisation of public services is also creating new opportunities for entrepreneurs. For example, the e-voucher system has been introduced for distributing subsidies for seeds, fertilizer, and other farm inputs that are managed by the private sector on the Government's behalf. This scheme has helped to reduce corruption and leakages and enhanced efficiency. This has also opened the market for digital platforms and other ventures that integrate digital technology into their services and delivery systems.

The increasing pressure on the Government to extend the reach of basic services to marginal communities and regions, and to be more responsive, accountable, and transparent, creates more demand for public agencies to hire digitally skilled workforce and to partner with digitally enabled businesses for delivering services.

Digital financial services are gaining widespread use and acceptance as the Government continues to push for a cashless economy. The NCC in collaboration with the CBN recently licensed some of the MNOs to perform mobile money payment services.

That move expanded the payment services market and is driving several segments of the ecosystem to record new or increased investments. It has also helped to extend the availability of digital financial services to people living in rural and peri-urban areas that hitherto did not have access to regular traditional banking services.

On the legislative side, the National Assembly passed the Nigeria StartUp Bill on 20 July 2022. The Bill has been transmitted to the President for presidential assent to enact it into law.

The StartUp Bill is a joint initiative by Nigeria's tech ecosystem and the Presidency to harness the potential of the Digital Economy through co-created regulations. The StartUp Bill's main aim is to harmonise all pieces of legislation governing StartUps and to contribute to the creation of an enabling environment for the growth, attraction and protection of investments in tech StartUps.[90]

3.8.3 Policies and Regulations Impacting Digitalisation

A key characteristic of ICTs in Nigeria is that they are regulated by Federal Government agencies that are keen on ensuring that principles of fair competition and universal access are upheld in the public interest. Government regulations extend into many disparate areas, ranging from pricing, mergers and market entry to the content, copyright, and privacy.

Given the speed of technological innovation, it is not surprising that the substance of ICT regulation has had to evolve rapidly. The liberalisation of the telecommunications sector, for instance, has stimulated cumulative interacting innovations in products, services and technologies with a general convergence or

[90] Nigeria StartUp Bill Draft - https://startupbill.ng/

blurring of distinctions between platforms, products and services. These developments necessitate regulatory response to keep them in check.

Regulators and regulations contribute to the growth of the Nigeria FinTech market as they demonstrate a commitment to creating an enabling environment that will support innovation in financial services, without compromising stability within the overall financial system.

The CBN, for instance, released the Framework for QR Code Payments in Nigeria in January 2021 targeted at driving the growth of contactless payments, as a safer option for transacting within Nigeria.[91]

In the same month, the CBN also released the Framework for Regulatory Sandbox Operations (the "CBN Sandbox Regulations"), which is designed to aid innovations by StartUps amidst stringent regulations.[92]

The CBN issued the Supervisory Framework for Payment Service Banks (PSBs), targeted at streamlining the operations of PSBs, ensuring transparency in their operations, and ensuring adequate customer protection. Subsequently, in November 2021, the subsidiaries of telecom giants MTN and Airtel were granted approvals in principle (AIPs) to operate PSBs by the CBN.

In February 2021, the CBN released the Regulatory Framework for Open Banking in Nigeria (the "Open Banking Framework"), to facilitate access to financial Data while the Securities and Exchange Commission (SEC) issued the Rules on Crowdfunding (the "Crowdfunding Rules"), which provide a formal regulatory and supervisory framework for investment-based crowdfunding in Nigeria.

The SEC also issued the Major Amendments to the Securities and Exchange Commission Rules and Regulations (the "SEC Rules"), requiring digital sub-brokers and those who utilise digital platforms to serve clients to be registered with the SEC.

These major amendments to the SEC Rules and Regulations are notable in that it is a recognition that sub-brokers utilising digital platforms to engage investors to have the ultimate effect of encouraging digital innovations in the capital market space.

[91] Central Bank of Nigeria - https://www.cbn.gov.ng/Out/2021/CCD/FRAMEWORK%20FOR%20QUICK%20RESPONSE%20(QR)%20CODE%20PAYMENTS%20IN%20NIGERIA.pdf

[92] https://www.cbn.gov.ng/out/2021/ccd/framework%20for%20regulatory%20sandbox%20operations.pdf

In June 2021, Chaka became the first FinTech to acquire a digital sub-broker licence issued by the SEC on the strength of the SEC Rules.

Also, in June 2021, the SEC released its Regulatory Incubation (RI) programme, seeking to create an enabling environment for FinTechs operating, or seeking to operate, in the Nigerian capital market.

The Government has several other initiatives and programmes aimed at digitalising the delivery of public services and bringing as many citizens online as possible. These initiatives include the following.

Table 47: Government Programmes to Encourage Digitalisation of the Economy

	Initiative	Purpose	Agency
1	The National Information and Communication Technology (ICT) Policy	Lays out the sector direction with the main goal of creating a favourable 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 socio-economic sectors; facilitates the development of a nationwide ICT infrastructure that will support national Broadband connectivity and accelerate socio-economic development; connects all Federal and State networks to a national fibre backbone; and, provides reliable, accessible, secure and reasonably priced ICT connectivity to national and international ICT infrastructure.	Ministry of Communications and Digital Economy
2	The National Broadband Policy	Recognises the positive linkages between increased Broadband penetration and GDP growth; envisages more than a fivefold increase in Internet and Broadband penetration for metro fibre infrastructure to be installed in all state capitals and urban cities, with estates and business districts within major cities would have fibre to the home or premises; anchors the intention of Government to facilitate the full rollout of wireless 4G networks by operators and transition to 5G/LTE spectrum.	Ministry of Communications and Digital Economy

3	Community Resource Centres (CRC)	Aims to extend voice and ICT training and other e-services to underserved communities on a shared basis and bridge the digital divide in the communities. The centres are fully equipped with desktop computers, furniture, telephones, power generators and bandwidth to provide access to the telephone, Internet, ICT, and e-initiatives in peri-urban, rural unserved and underserved areas.	Universal Service Provision Fund (USPF)
4	The Rural Broadband Initiative (RUBI)	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 rural areas at wholesale, and at the same time catalyses the uptake of other Broadband-dependent projects in those locations, such as e-library, e-health, and e-Government.	USPF
5	School Knowledge Centres (SKC)	Provide public secondary schools with connectivity, computers and power backup. Teachers and students are taught how to use ICT as well as one-year technical support. The USPF is also supporting the development and deployment of local content under this program.	USPF
6	e-Accessibility Project:	Provides ICT tools and Assistive Technologies (ATs) to the blind, deaf, dumb, crippled, cognitively impaired, and other categories of people living with disabilities; 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	USPF

		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.	
7	The Smart Nigeria Digital Economy Project	Expands Broadband coverage, increase e-Government and establish ICT clusters, starting in the Special Economic Zones (SEZs). The 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; and, envisions creating 2.5 million new jobs and increasing the contribution of ICT and ICT-enabled activities to GDP by an estimated 10%.	Nigerian Office for Trade Negotiations (NOTN)
8	Vision 2025	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 the implementation of policy within the ICT sector.	Federal Government of Nigeria

3.8.4 Policymakers and Regulators

Nigeria's Digital Economy space is sustained by the ecology of Government agencies that provide regulations, policies, guidelines and rules for the industry in their different segments as illustrated in Table 48.

Table 48: FinTech Regulators and Policymakers and their functions

Body	Regulatory Function	Role in FinTech	FinTech Segment
CBN	The Central Bank of Nigeria is the principal regulator mandated by the Banks and Other Financial Institutions Act (BOFIA) to issue licenses to banks and other Financial Institutions.	Administering operating licenses to FinTechs	Banks, all FinTechs
SEC	The Securities Exchanges Commission develops and regulates the capital market ensuring that it remains fair, transparent and efficient	Deploys innovative products or processes in the Nigerian Capital Market; Provides access to capital	FinTechs in the Capital Market; or those listed on the Capital Market
NDIC	The Nigeria Deposit Insurance Corporation protects depositors and guarantees the settlement of insured funds when a deposit-taking financial institution cannot repay its deposits; maintains financial system stability	Identifies, develops and promotes technology solutions that protect depositors with Insured Financial Institutions	Deposit-receiving FinTechs
NOTAP	The National Office for Technology Acquisition and Promotion carries out evaluation, registration of technology agreements; promotion of intellectual property; oversight over R&D commercialization/industry links	Issues permits for the transfer of technology	FinTechs with foreign shareholders and partners

NCC	The Nigerian Communications Commission is responsible for the regulation of the Telecommunications Industry	Regulates FinTech services that leverage mobile phones	Mobile Money Operators, Value Added Service (VAS)
NITDA	The National Information Technology Development Agency creates a framework for the development, standardization, coordination, monitoring, evaluation and regulation of Information Technology practices in Nigeria	Regulates the use of policies such as Data Privacy and Protection across the nation	All FinTechs
NAICOM	The National Insurance Commission oversees the ministration, supervision, regulation and control of the insurance business in Nigeria and the protection of insurance policyholders and beneficiaries	Oversights the activities of InsurTechs that overlap with the mandate of NAICOM	InsurTech
NFIU	The Nigerian Financial Intelligence Unit is responsible for the receipt of disclosures from reporting organisations, the analysis of these disclosures and the production of intelligence for dissemination to authorities	Monitoring money laundering and terrorist financing risks within the ecosystem	All FinTechs
NIMC	The National Identity Management Commission regulates matters of national identity with services covering National Identification Number (NIN), National e-ID card issuance, identity verification as well as Data harmonization and authentication	Identity verification and authentication, KYC processes	Mobile Money and Digital Banking, Lending, Wealth Management and InvesTech

NIBSS	The Nigeria Inter-Bank Settlement System delivers payment/settlement services to financial institutions; mitigates operational and credit risks in funds transfer	Provides infrastructure for the automated processing and settlement of transactions between financial institutions	FinTechs leveraging Inter-Bank Transactions
SANEF	The Shared Agent Network Expansion Facility deepens financial inclusion in Nigeria through a robust ecosphere with strong regulatory oversight, consumer protection and interoperable systems	Provides support to super agents, banks and other stakeholders to acquire agents in the 6 geo-political zones	Mobile Money and Digital Banking, Lending

3.8.5 Policies, Regulations and Schemes

Table 49: Selection of Government Policies for Digitalisation

	Description	Agency	Purpose
1	Nigeria Data Protection Regulation (NDPR) (2019)	NITDA	Covers transactions around the processing of personal Data of person(s) residing in Nigeria or residing outside Nigeria but of Nigerian descent;
2	General Data Protection Regulation (GDPR) (2018)	EU	A regulation in EU law on Data protection and privacy; addresses the transfer of personal Data outside the EU and EEA areas;
3	National Digital Economy Policy and Strategy (NDEPS).	NITDA	Towards repositioning the Nigerian economy to exploit the many opportunities presented by digital technologies

4	Bridge to MassChallenge (B2MC) Nigeria	Office for Nigerian Digital Innovation (ONDI)	A national startup competition in partnership with the National Information Technology Development Agency that identifies and accelerates the top startups in Nigeria while connecting them to the MassChallenge global network
5	iHatch Startup Incubation Programmes	NITDA with National Center for Artificial Intelligence and Robotics (NCAIR) with Japan International Cooperation Agency (JICA)	Aimed at strengthening the Nigerian digital innovation ecosystem to create more Innovation-Driven Enterprises (IDEs), as well as promoting the development of indigenous content in the Nigerian digital sector.

3.9 Study Objective Item #5 – Best Practices in Data Privacy

To Recommend Best Practices and Ways in which Data Privacy and Security can be Enhanced

3.9.1 Findings

To gain a proper perspective on the topic of Data Privacy and Security, it is crucial to be conversant with the following terms:

- **Personal Data** is any information relating to an identifiable natural person. This could be employees' information in an organisation, customers' and subscribers' data, vendors' and service providers' information, etc. Information usually found in personal data includes name, phone numbers, contact information; location information, financial information, transaction history; gender, ethnicity, health records, and sexual orientation.[93]

- **Data Subject** is an identifiable person; a person who can be identified directly or indirectly.

- **Data Controller** is a person(s), or statutory body, who determines the purposes for and how personal data is processed.

- **Processing** means any operation performed on personal data such as collection, recording, organisation, structuring, storage, adaptation or alteration, making available, restriction, or destruction.

- **Data Breach** is an infringement of security that leads to unlawful destruction, loss, unauthorized disclosure of, or access to personal data transmitted, stored or processed.

[93] **Michael Mas Chambers**: https://www.michaelmaschambers.com/insight-page.php?i=19&a=the-nigerian-Data-protection-regulation-2019-its-key-features-and-benefits

3.9.2 Characteristics of Data

Data can be of different kinds and classified according to different taxonomies along a multitude of dimensions as outlined in Table 50

Table 50: Dimensions of Data

Grouping	Category	Description	Example
Type	Public	Information that can be freely used, reused and redistributed by anyone with no restrictions on access or usage	Press releases, job descriptions and marketing materials intended for the general public
	Personal	Any information relating to an identifiable natural person	Employees' information in an organisation, customer and subscribers' data
	Proprietary	Privileged or confidential information or that may be withheld under the Freedom of Information Act	Commercial secrets, trade or financial information
	Open	Open Data and content can be freely used, modified, and shared by anyone and for any purpose	License templates, data marked open by the producers
Features	Sensitivity	Higher tier of information that may require greater protection than personal data	Health records Salary details Sexual Orientation
	Purpose	The intent, aim and objective of having the data	The use to which data is put
Usage	Human Resources	Information retained by the employer	Biodata, Credentials Appraisals
	Corporate	Data maintained by a company including, but	Sales, warehouse, or inventory data;

		not limited to, data related to its finances, taxes, employees etc.	customers contact list, suppliers list, staff records
	Technical	Recorded information, regardless of the form or method of the recording, of a scientific or technical nature	Designs, dimensions, specifications, drawings, patterns, process sheets, manuals, technical reports,
	Governance	Information held by the Government	Tax records, National Identity, Driver's License International Passport
Origin	Volunteered	Information provided by the user intentionally and voluntarily	Information shared such as photos, emails, blogs, tweets, registration forms
	Observed	Information collected by an application or third-party software, with or without the consent of the user	Internet browsing history, surveillance video, location data, call detail records, web usage behaviour
	Inferred	An amalgam of different data types originating from advanced computational analytics and machine learning and generally used for predictive purposes	Consumer profiles Targeted advertisement Credit scores Patterns in the spread of infectious diseases

3.9.3 Data Privacy and Security

Data protection is such an integral component of the Digital Economy that many economies around the world have rolled out one form of legislation or another to oversee it. Robust regulatory focus on data protection worldwide birthed regulations such as the European Union's General Data Protection Regulation (GDPR); the Asia Pacific's Data Protection and Cyber Security Guide 2020; and Germany's IT Security Act 2015, etcetera.

Here in Nigeria, the National Information Technology Development Agency (NITDA) generated the Nigerian Data Protection Regulation (NDPR) 2019 to govern the privacy and protection of the personal Data of Nigerians.

The NDPR is purposed to, among other things:

a) Safeguard the rights of natural persons to data privacy;
b) Foster safe conduct of transactions involving the exchange of personal data;
c) Prevent manipulation of personal data; and,
d) Ensure that Nigerian businesses remain competitive in international trade through the safeguards afforded by a just and equitable legal regulatory framework on data protection and which regulatory framework is in tune with global best practices.[94]

The NDPR imposes compliance obligations on data controllers and processors. It behoves them to understand the data in their custody; how such data is classified; their responsibilities in ensuring the security of that data; and other relevant commitments relating to the data.

Data controllers are required by the NDPR to ensure that all data collected are secure; that they have the tools to guard against data manipulation; and, that explicit consent from the data subject must be obtained if the personal data is to be shared with a third party.

It is pertinent to register here that the NDPR applies to every Nigerian residing inside or outside the country covering all transactions that involve, among other things, collecting, structuring, and making available an individual's data in respect of natural persons.

[94] NDPR – Section 1.1

3.9.4 Data Privacy and Security Enhancement

Although the NDPR contains several best practices, gaps still abound for enhancement. For example

One: The NDPR applies exclusively to all transactions intended for the processing of personal data. The regulation is completely silent on data privacy protection for corporate organisations or legal entities. As entities are normally constituted by people – i.e. shareholders, members, or employees - a breach of the privacy of data relating to them may have dire implications on natural persons.

Two: The NDPR is domiciled with the National Information Technology Development Agency (NITDA) which as a Federal Government Agency may not exercise sufficient independence of province when situations arise to sanction the Government should it or its other agencies breach the regulation. The best practice in this regard would be to establish an enforcement agency independent and distinct from the Government.

Three: Unlike the GDPR the NDPR fails to comprehensively define a Data Protection Officer (DPO) or outline the role's responsibilities. The only mention of DPO in the NDPR is in Section 4.1(2) and Section 4.1(3). While the former specifies the purpose for which the DPO shall be designated by the Data Controller the latter enjoins the Data Controller to ensure continuous capacity building for DPOs and the generality of the personnel involved in the data processing.

Outlining the functions of the DPO and basing the appointment on professional qualities or expert knowledge of data protection would lead to greater efficiency in the dispatch of its duties. Thus, an amendment as regards the aforesaid lacunae in the NDPR is recommended.

Furthermore, the NDPR is mute on the independence of the DPO from the probable influences of the Data Controller. Considering the key role that the DPOs are supposed to play in ensuring compliance with the regulation, best practice requires that they enjoy regulation-backed independence from the Data Controller.

Last but not least the awareness of the NDPR is very low among the citizens whose personal data the regulation was promulgated to protect. It won't be amiss, therefore, to have a mass sensitization campaign about the NDPR, especially with the advent of the information age where almost every aspect of human life is

migrating to the Internet and virtually all citizens have their data online – in one form or another.

The Nigeria Data Protection Bill 2018, now in abeyance, would have addressed most of the gaps highlighted above. But from all indications, the Bill appears to have suffered a dead-on-arrival predicament as, for reasons as yet unknown, it did not receive the required presidential assent necessary to transmute into an Act of Law.

In its wake came the Data Protection Bill 2020 which is currently before the National Assembly, but of which nothing much has been heard since a stakeholder session held in September 2020. The Bill provides a much more robust approach to data protection, providing for more categories of data than the NDPR. It also proposes a Data Protection Commission which should act as Nigeria's Data Protection Authority (DPA).

The study's findings indicate that the Bill has suffered a fate worse than its predecessor as it has been abandoned without making it through the floor of the National Assembly as evidenced by the Federal Government seeking a consultant to draft a new one.[95]

In another vein, not much is known about the Nigeria Data Protection Bureau (NDPB) supposedly created to consolidate the gains of the NDPR and support the process for the development of the primary legislation for data protection and privacy. In other words, the said NDPB has the underlying aim of metamorphosing into Nigeria's de facto Data Protection Authority.

Again, like the NDPR, the NDPB is under the auspices of NITDA with aspirations to morph into Nigeria's DPA - a scenario that, this study's findings show has raised a wave of uncertainty around NITDA's power to appoint itself a DPA.

Non-standardisation and a lack of coordination on data mean that data collected by one organisation cannot easily be used by another. This results in duplication of effort and wasted resources. Treating data as a strategic asset, with appropriate governance, will save time and money and drive better outcomes for Nigeria's Digital Economy. Some of the biggest benefits can be realised by better, more coordinated use of data across the wider Digital Economy space.

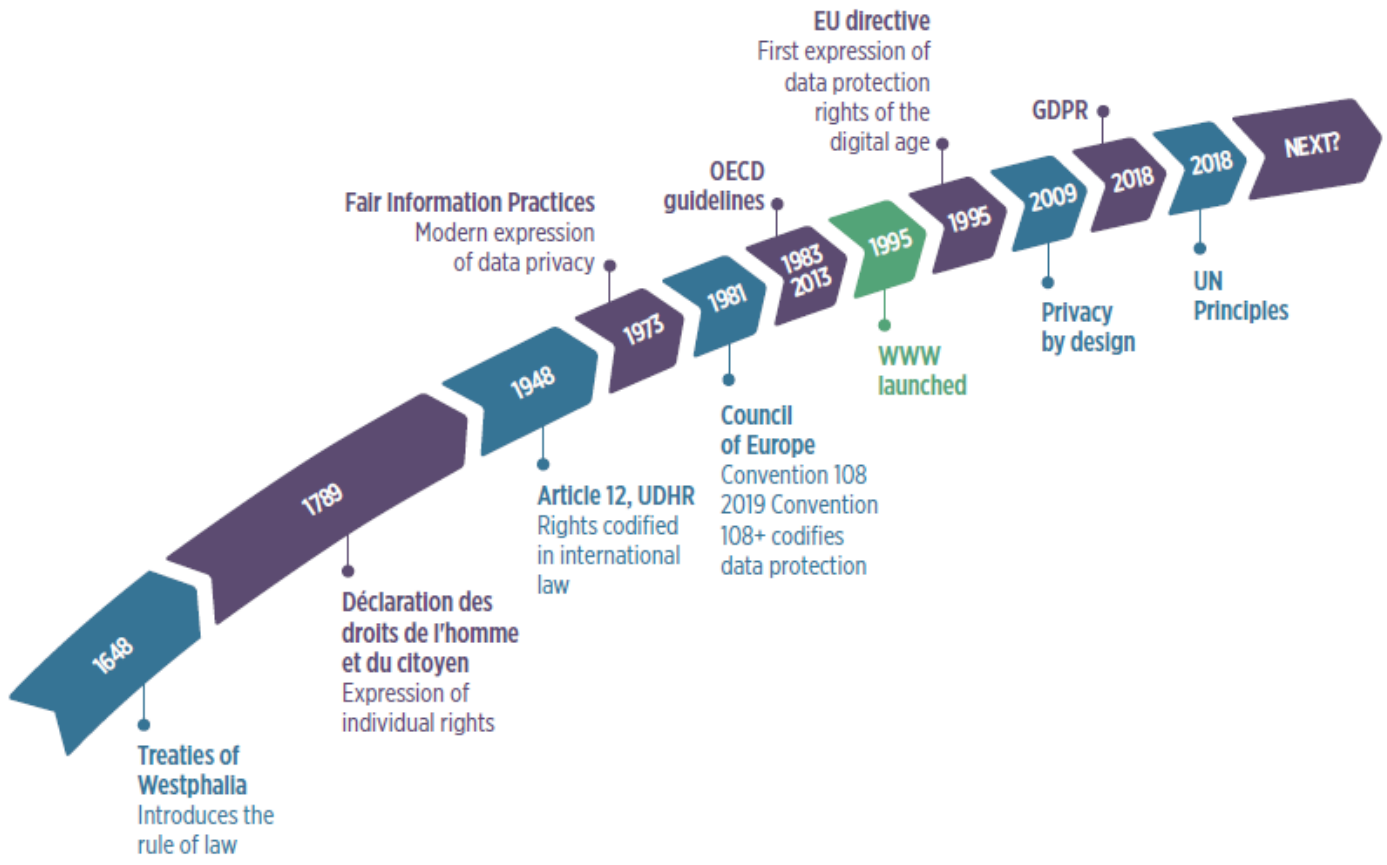
[95] https://iapp.org/news/a/nigeria-seeks-consultant-for-new-Data-protection-bill-draft/

3.9.5 Data Protection

The evolution of data protection laws has been especially remarkable over the last two to three decades. The highly networked and interconnected world of today was a glimmer on the horizon as recently as the late 1980s. The Internet itself was still a fairly novel innovation. Concepts such as social media, smartphones and artificial intelligence did not exist. Over the last 20 – 30 years, these concepts have made vast leaps driving new ways of collecting and processing data.

From the Treaties of Westphalia (1648) that introduced the rule of law to the UN Principles (2018) that set out a basic framework for the processing of "personal data", which is defined as information relating to an identified or identifiable natural person ("data subject")[96] regulatory authorities have increasingly had to adapt data protection laws to keep pace.

Figure 8: The Evolution of Data Protection



Source: WDR 2021 team.

[96] UN - PERSONAL DATA PROTECTION AND PRIVACY PRINCIPLES - https://archives.un.org/sites/archives.un.org/files/_un-principles-on-personal-Data-protection-privacy-hlcm-2018.pdf

3.9.6 Six Crucial Data Qualities

These six categories of data quality dimensions cover several metrics that indicate the overall quality of data stored in files, databases, data lakes, and Data Warehouses. Although the list is by no means exhaustive, these six are critical to most organisations and users alike:

1. **Completeness:** Is the data sufficiently complete for its intended use? Because if the data does not provide a clear and accurate picture of reality, it will lead to poor decisions, missed opportunities, increased costs, or compliance risks.

2. **Accuracy:** Is the data correct, reliable, and/or certified by some governance body? Using the date of birth as an example, if a person's birthday is 10 January 1980 in one system, yet it is 13 June 1983 in another, the information is unreliable. This should factor in data provenance and lineage, in other words, where data originates and how it has been used fall in this dimension, as certain sources are deemed more accurate or trustworthy than others.

3. **Timeliness:** Is this the most recent data? Is it recent enough to be relevant for its intended use?

4. **Consistency:** Does the data maintain a consistent format throughout the dataset? Does it stay the same between updates and versions? Is it sufficiently consistent with the other Datasets to allow joins or enrichments?

5. **Relevance:** Is the information obtained relevant and usable for decision-making? It does not matter how interesting or uninteresting the information may be.

6. **Accessibility:** Is the data easily retrievable by the people who need it?

In addition to these common dimensions, business-domain-specific dimensions may be added as well, especially to meet compliance requirements.

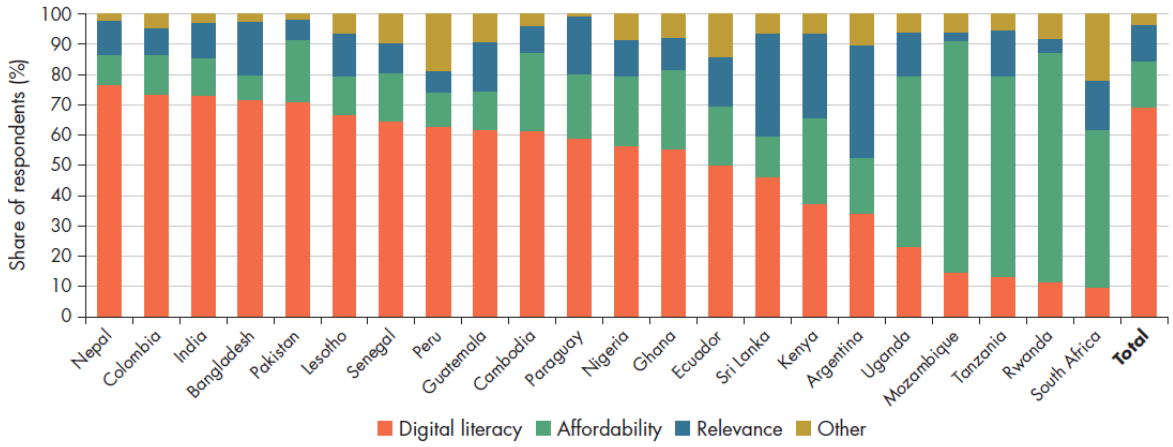
CHAPTER FOUR

4.0 Suggestions, Recommendations and Conclusion

Many people and businesses in Nigeria remain excluded from the digital ecosystem as a result of limited access to Broadband and the affordability of adequate devices such as smartphones and computers to fully utilize the Internet. As recent research revealed, 70% of those who do not participate in the Digital Economy are held back by digital literacy.[97]

While other demand-side barriers relate to digital illiteracy, lack of local content and low electrification rates, for Nigeria to gain the critical number of Internet subscribers needed to build the Digital Economy and kick-start Nigeria's digital transformation, innovative solutions and strategic interventions and investments will be required.

Table 51: Barriers to Digital Literacy



Source: Chen 2021. Data at http://bit.do/WDR2021-Fig-5_5.

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 as well as digital support to StartUps and existing businesses.

When such synergy is deployed, the Nigerian economy can harness digital data and new technologies to generate new content, link individuals with markets and Government services and roll out new and sustainable business models.

[97] Digital Literacy Primer - https://www.usaid.gov/sites/default/files/documents/USAID_Digital_Literacy_Primer.pdf

The Nigerian Communications Commission needs to 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.

The ecosystem approach involves building the key foundational elements of a Digital Economy. These foundations are synergistic and require the collaboration of the public, private and third sectors.

The foundational elements include

- **Digital Infrastructure** - anchored on good and affordable Internet connectivity;
- **Digital Platforms** - for Government through the Nigerian Communications Commission to offer citizen-facing Government services and commercial firms to offer their array of products and services;
- **Digital Financial Services** - to enable individuals and businesses to conduct transactions electronically;
- **Digital Entrepreneurship** – to create an ecosystem that brings the Digital Economy to life with new growth-oriented ventures and the transformation of existing businesses for growth and enhancement of competitiveness and productivity; and
- **Digital Skills** – to grow the digitally savvy workforce that will build a robust Digital Economy.

4.0.1 NCC's Recommended Role in improving the role of Data and FinTech

Ways in which the Nigerian Communications Commission can improve the role of Data and FinTech in the Development of Digital Economy in Nigeria

A robust Digital Economy must be built not only upon the most innovative technologies but also on the confluence and coordination of the building blocks covering the different stakeholders, necessary pillars and enablers to effectively unlock the socioeconomic benefits of the digital transformation.

To meet the skills requirements for Nigeria's growing Digital Economy, it is necessary for the Nigerian Communications Commission to bring together the public, private and third sectors and educational institutions at all levels to identify,

nurture and update critical skills. This would essentially include enhancing the digital skills of education professionals, launching training programs for adults to enhance digital inclusion and promoting collaboration between universities and the private sector.

The Nigerian Communications Commission should work strategically with enabler organizations such as the FinTech Association of Nigeria to synergize FinTechs' collaborations, as well as create a coalescing voice between FinTechs, Incumbents and Regulators in the industry.

Innovation and regulation need to be merged and balanced in such a way that the end-users benefit from it. There is a need to bring together the Government, the tech sector, business and civil society to collectively address the challenges of digitalization and find solutions for the development of national skills and articulate the strategy to increase talent and diversify the supply of skilled workforce within financial services in general and FinTech in particular.

While the Nigerian Communications Commission has provided some support in the creation of innovation hubs around the country, access to Government support by FinTechs should be drastically enhanced to match or exceed those of peer countries in Africa such as Kenya, Egypt and South Africa.

The Nigerian Communications Commission can organise seminars and workshops geared to galvanise the Federal and State Governments to work with education policymakers and educators to consider how the school curricula can best be panel-beaten to provide support for young people to develop sought-after Science, Technology, Engineering, and Mathematics (STEM) capabilities and create 'digitally minded' pipelines of talent.

The Nigerian Communications Commission should create schemes that involve Governments at both Federal and State levels to collaborate with universities and schools to increase awareness of FinTech and financial services innovation, and consider the use of channels such as apprenticeships and work placements to attract talent to the sector.

Consideration should be given to the diversity of the talent pipeline, noting that marginalisation gaps may originate as early as the schooling system. The Nigerian Communications Commission can encourage NCC licensees to play a key role in attracting and retaining a diverse workforce through rebates in Licensing and Annual Operating Levies.

The Nigerian Communications Commission should consider that FinTechs require more than financial support. Therefore, the Commission can provide support for StartUp FinTechs in non-financial areas such as allowing them run in a 'Sandbox' - controlled environment supervised by the Commission within which existing regulations are relaxed or removed to allow the FinTechs to more freely experiment with new products and services.

The Nigerian Communications Commission can galvanise Industry stakeholders for synergy to create university-led incubators and technoparks in sufficient numbers that can foster innovation. Affiliation of innovation hubs and university research institutions for speedy development of commercially viable technology research can be considered in this regard to facilitate collaboration between industry and academia.

Through the Nigerian Communications Commission, the State Governments including the FCT may consider matching investments of private innovation hubs and accelerators in StartUp funding by designing seed-stage technology cum entrepreneurship grants to be allocated by private and or quasi-Government agencies with performance targets. This would help to develop incentives for high-net-worth individuals and encourage them to invest in tech StartUps.

The Nigerian Communications Commission can exercise the latitude to offer fee rebates or exemptions for tech StartUps and the revision of its registration requirements to be more welcoming for tech entrepreneurship.

The Nigerian Communications Commission needs to direct stimulus funds towards digital development and support the financial sustainability of the FinTechs by removing or easing barriers to network deployment.

The Nigerian Communications Commission can leverage its influence on both the Federal and State Governments to support the FinTech ecosystem with various enablers to nurture and help its sustainable growth. This influence can be extended to empower universities to become active builders of the ecosystem in accelerating the development of innovation and innovation capabilities as well as technology transfer.

The Nigerian Communications Commission can galvanise industry stakeholders to institute Train the Trainer (TTT) programs as the changing nature of digital technologies makes it imperative to continuously introduce digital topics in both academic curricula and continual improvement training for the workforce.

Subsidised ICT learning should be offered for the Nigerian workforce to improve workplace productivity, as well as promote the inclusion of marginalized segments of the population in Digital Economy job opportunities. Post-graduate training, internships and rotational programs should be introduced for a successful transition between higher education and the job market.

The important role of the Digital Economy as a stabilizer for the job market needs to be utilized well. In the future, there will be a significant increase in the demand for digital living, working and learning. Therefore, Nigeria should use the employment promotion mechanism of the Digital Economy to promote digital employment, thus improving labour efficiency and contributing to steady economic development.

The Nigerian Communications Commission can partner with the Federal and State Governments to consider providing the appropriate incentives to drive the development of ICT infrastructure and telecommunications services to rural and underserved urban areas.

The Nigerian Communications Commission can galvanise and encourage local production of ICT components and subsystems by providing incentives by way of fees exemptions and rebates for indigenous original equipment manufacturers (OEMs).

The Nigerian Communications Commission can be the arrowhead that drives the Federal Government to be more intentional in implementing the Nigerian National ICT for Development (ICT4D) strategic action plan. This would foster a competitive environment and create ample opportunities and choices for tech entrepreneurs to enter the Nigerian Digital Economy ecosystem.

Lastly, the Nigerian Communications Commission can design initiatives and schemes that encourage the Government at all levels in Nigeria to utilise FinTech products and services.

4.0.2 Conclusion

The results and findings of the study lead to the following conclusion

1. That Data and FinTech are performing an essential role in the development of Nigeria's Digital Economy.
2. That FinTech is still nascent in Nigeria with a low level of adoption compared to other developed economies.
3. That poor infrastructure, high cost of Broadband Internet and concern over data security are some of the challenges bedeviling the adoption of FinTech in Nigeria.
4. That the Nigerian Communications Commission can leverage its authority as the Nigerian telecommunications sector regulator to champion efforts to tackle cybersecurity and data privacy issues on a multi-stakeholder synergistic basis.
5. That passing of the Data Protection Bill 2020 which is currently before the National Assembly should be expedited and that the Nigerian Communications Commission can be at the helm pushing the Bill's passage.
6. That a Data Protection Directorate domiciled with the Nigerian Communications Commission should be established to act as Nigeria's Data Protection Authority (DPA) to consolidate on the benefits of NDPR and provide provenance for National data security.

References

1. Nunnally and Bernstein, 1994 - Presentation of Coefficient Alpha - http://wdsinet.org/Annual_Meetings/2011_Proceedings/papers/Paper131.pdf
2. Joseph A. Gliem and Rosemary R. Gliem - Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales - https://scholarworks.iupui.edu/bitstream/handle/1805/344/gliem+&+gliem.pdf?sequence=1
3 Kim et al. (2010) - An Empirical Analysis of Fixed and Mobile Broadband Diffusion
4. Don Tapscott: The Digital Economy: Promise and Peril in the Age of Networked Intelligence, 1995 - https://www.semanticscholar.org/paper/The-Digital-Economy%3A-Promise-and-Peril-in-the-Age-Tapscott/
5. Organization for Economic Co-operation and Development (OECD) 2012 - 21st Century Technologies Promises and Perils of a Dynamic Future - https://www.oecd.org/futures/35391210.pdf
6. Borisov Et Al., The Digital Divide in Romania–A Statistical Analysis
7. Kim TY Et Al.,: The Faster-Accelerating Digital Economy
8. According to the World Economic Forum (WEF)
9. Harvard Business Review - Creating Value in a Digital Economy
10 Bukht, Rumana; Heeks, Richard (2017): "Defining, Conceptualising and Measuring the Digital Economy"
11. Gig work is labour that consists of temporary and flexible jobs usually done over delivery apps
12. Authur D Little – Digital KSA – Assessment and Way Forward for the Digital Economy
13. Thomas Mesenburg - Measuring the Digital Economy (2001)
14. Ibid
15. Ibid
16. Consumer-to-Business - business model where consumers deliver value to a business rather than vice-versa
17. World Bank Data figures - https://Data.worldbank.org/indicator/IT.NET.SECR.P6?locations=NG
18. NCC: 2021-year-end-subscriber-network-Data-report/file
19. NCC - https://www.ncc.gov.ng/statistics-reports/subscriber-Data
20. Ibid
21. NCC – End of Year Report 2021
22. United Nations, Comtrade Database through the WITS platform
23. United Nations Conference on Trade and Development's UNCTAD stat Database at http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
24. National Universities Commission (NUC) figures

25. https://tribuneonlineng.com/2-1-million-students-studying-in-nigerian-universities-nuc
26. FG Laments Poor R&D Expenditure - https://www.thisdaylive.com/index.php/2021/09/10/fg-laments-poor-rd-expenditure-floats-50m-research-fund/
27. GII - //www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021/ng.pdf
28. NCC Annual Report 2021
29. International Monetary Fund, International Financial Statistics and Balance of Payments Databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates
30. Deloitte - What is Digital Economy?
31. Don Tapscott - The Twelve Themes of the New Economy (1996)
32. Nirmala Krishnan: E-Business in The New Economy
33. Carrière-Swallow and Haksar (2019, 17); https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2019/09/20/The-Economics-and-Implications-of-Data-An-Integrated-Perspective-48596
34. OECD Glossary of Statistical Terms 2008
35. https://dictionary.cambridge.org/dictionary/english/Data
36. What we Mean by Data - https://www.gov.uk/government/publications/uk-national-Data-strategy/national-Data-strategy
37. IDC Research
38. https://www.cs.princeton.edu › archive
37. https://technext.ng/2021/08/26/nigerias-Data-usage-hits-205880-terabytes
38. https://www.forbes.com/advisor/banking/what-is-fintech/
39. Take for instance Guaranty Trust Bank's QuickCredit; Access Bank's QuickBucks; and, Sterling Bank's Specta all Apps designed to provide loans to customers quickly without the tedious traditional hurdles
40. According to Data from the Nigeria Inter-Bank Settlement System (NIBSS) portal
41. See Appendix 1 and Appendix 2
42. Johnny Ch Lok - The Relationship Between Technology and Industry Development (2019)
43. Open Data Watch: The Data Value Chain - Moving from Production to Impact
44. ITIF, 2019 - Submarine Cables: Critical Infrastructure for Global Communications
45. David Keys Moran, Computer Programmer and Author
46. Rowley, Jennifer; Richard Hartley (2008) - Organizing Knowledge: An Introduction to Managing Access to Information
47. Ibid
48. Ibid
49. Ibid

50. Moody and Walsh: Seven "Laws" of Information
51. Moody, D.L. Et Al., 1999: Measuring the Value of Information – An Asset Valuation Approach
52. Uckelmann, Et Al ., 2011: An Architectural Approach Towards The Future Internet Of Things
53. NITDA Guidelines for Nigerian Content Development in ICT – Guidelines 11.1(4), 12.1(4), 12.2(1), 13.1(2) and, 13.2(3)
54. For an extensive discussion of this problem and many other concerns about machine learning, see O'Neil (2017).
55. Techopedia - https://www.techopedia.com/definition/3801/garbage-in-garbage-out-gigo
56. EY Analysis - Nigerian FinTech Census 2020: https://proshare.co/articles/nigerian-fintechs-raised-439m-in-2020
57. Ibid
58. Facts behind financial inclusion figures: Nigeria's 2021 indices - https://businessday.ng/financial-inclusion/article/facts-behind-financial-inclusion-figures-nigerias-2021-indices/
59. E.g. DLM Capital's acquisition of Links MFB and CreditVille's acquisition of TouchGold MFB etcetera
60. CBN –National Financial Inclusion Strategy 2012
61. BusinessDay.ng: Facts behind financial inclusion figures: Nigeria's 2021 indices
62. https://www.cbn.gov.ng/paymentsystem/epaymentstatistics.asp
63. GSMA 2021
64. FintechNGR
65. Harvard Business Review - https://hbr.org/2013/11/the-pace-of-technology-adoption-is-speeding-up
66. McKinsey - Harnessing-Nigeria's-Fintech-Potential
67. Brian Reno – Understanding Generational Preferences
68. TechNext Report 2021
69. Nigeria Investment Promotion Commission - https://www.nipc.gov.ng/2019/12/04/financial-inclusion-fintech-firms-got-400-million-investment-in-2019-cbn/
70. Unicorn = any company valued at $1B and above
71. Decoding Venture Investments In Africa 2019 Report by WeeTracker
72. https://technext.ng/2021/07/01/nigeria-drops-to-57th-in-global-fintech-ranking-but-remains-3rd-in-africa/
73. NCC - https://www.ncc.gov.ng/statistics-reports/industry-overview#view-graphs-tables-6
74. Statista - Distribution of devices used for Internet access in Nigeria in 2020 - https://www.statista.com/statistics/1139297/distribution-of-devices-used-for-Internet-access-in-nigeria/

75. Internet Goes Mobile Report - Ericsson ConsumerLab - https://www.techcityng.com/93-of-Internet-users-in-nigeria-surf-the-net-via-mobile/
76. 48% Nigerians To Access Internet Via Mobile Devices In 2027 - https://www.newtelegraphng.com/48-nigerians-to-access-Internet-via-mobile-devices-in-2027/
77. Afonasova Et Al., Digitalization in Economy and Innovation: The Effect on Social and Economic Processes
78. Zhang Et Al.: The Impact of Digital Economy on the Economic Growth and the Development
79. GSMA Report - https://dailytrust.com/nigerias-economy-and-tech-ecosystem
80. EY – Nigeria's Fintech Census 2021 - https://assets.ey.com/content/dam/ey-sites/ey-com/en_ng/ey-fintech-nigeria-census-final.pdf
81. OC&C Report 2018 – Tech Entrepreneurship Ecosystem in Nigeria
82. OC&C Strategy: A Comparative Report on Focus Countries 2018
83. Rules 2, 4, 10-13: Rules on Crowdfunding 2021 - https://www.sec.gov.ng
84. CBN – Payment Service Banks Supervision Framework https://www.cbn.gov.ng/supervision/Inst-PSB.asp
85. World Bank Ease of Doing Business Report 2020 - https://www.worldbank.org/en/news/feature/2019/10/24/doing-business-2020-sustaining-the-pace-of-reforms
86. Arthur D Little - ICT Start-Ups In KSA - https://www.adlittle.com/kr-de/node/23792
87. Nigeria will attain 95% Financial Inclusion by 2024—Godwin Emefiele https://www.cbn.gov.ng/Out/2019/CCD/Q2%202019%20Financial%20Inclusion%20Newsletter_Final_08.08.19.pdf
88. Nigeria StartUp Bill Draft - https://startupbill.ng/
89. Central Bank of Nigeria - https://www.cbn.gov.ng/Out/2021/CCD/FRAMEWORK%20FOR%20QUICK%20RESPONSE%20(QR)%20CODE%20PAYMENTS%20IN%20NIGERIA.pdf
90 https://www.cbn.gov.ng/out/2021/ccd/framework %20for%20regulatory%20sandbox%20operations.pdf
91. Michael Mas Chambers: https://www.michaelmaschambers.com/insight-page.php?i=19&a=the-nigerian-Data-protection-regulation-2019-its-key-features-and-benefits
92. NDPR – Section 1.1
93. https://iapp.org/news/a/nigeria-seeks-consultant-for-new-Data-protection-bill-draft/
94. UN - PERSONAL DATA PROTECTION AND PRIVACY PRINCIPLES - https://archives.un.org/sites/archives.un.org/files/_un-principles-on-personal-Data-protection-privacy-hlcm-2018.pdf

95. Digital Literacy Primer - https://www.usaid.gov/sites/default/files/documents/USAID_Digital_Literacy_Primer.pdf

APPENDICES

Appendix 1: Schedule of Digital Economy Enablers Surveyed

S/N	Company Name
1	21st Century Technologies Ltd
2	3Way Communication Ltd
3	Accord Engineering Ltd
4	Afrione Ltd
5	Airtel Networks Ltd
6	Ampsolve Ltd
7	Analytiq Telcom Solutions Ltd
8	Arctic Spatials Ltd
9	ATC Nigeria Wireless Infra Ltd
10	Backbone Connectivity Network
11	Basnik Telecoms Ltd
12	Beta Bridges Ltd
13	Big Picture Nigeria Ltd
14	Billyronks Global Ltd
15	Breeze Micro Ltd
16	Briccs International Ideal Ltd
17	Broadbased Communication Ltd
18	Cartrack Engineering Tech Ltd
19	Clickatell Nigeria Ltd
20	Cloud Interactive Associates Ltd
21	Cobranet Ltd
22	Cognys Systems Ltd
23	Coloplus Worldwide Services
24	Cyberspace Ltd
25	Dotmac Technologies Ltd
26	Emerging Markets Telecom Services
27	Exchange Telecoms Ltd
28	Fibre Tech West Africa Ltd
29	Fibre World Telecoms Network Ltd
30	Fun Mobile Ltd
31	Globacom Ltd
32	Hoop Telecoms Ltd
33	Hotspot Network Ltd

34	Huawei Technologies Company
35	I-Cell Multimedia Ltd
36	IHS Nigeria Ltd
37	Infraco Nigeria Ltd
38	Innovis Telecom Services Ltd
39	Inq Digital Nigeria Ltd
40	Intercellular Nig PLC
41	Interconnect Clearing House
42	Internet Solutions Nigeria Ltd
43	IPNX Nigeria Ltd
44	IS Internet Solutions
45	Iykejordan Ltd
46	Just Automobile & Merchanting Ltd
47	Kaid Global Resources Nig Ltd
48	Layer 3 Ltd
49	LM Ericsson (Nigeria) Ltd
50	Mafab Communications Ltd
51	Main One Cable Co Nig Ltd
52	Medallion Communication Ltd
53	MNO VAS Nigeria Ltd
54	M-P Infrastructure Ltd
55	MTech Communications PLC
56	MTN Nigeria PLC
57	MVP Innovations & Technologies
58	MYD Technologies Ltd
59	Neptune Global Services Ltd
60	Niconnx Communications Ltd
61	Nina-Jojer Ltd
62	Nitroswitch Ltd
63	Nova Track Ltd
64	Odee Telecomms Ltd
65	Odua Infraco Resource Ltd
66	Oryo Ltd
67	Pan African Towers Ltd
68	Perpetual Communications Ltd
69	Phase 3 Telecom Ltd
70	Pilgrims Nigeria Security Ltd

71	Radial Circle Technical Services
72	Raeanna Nigeria Ltd
73	Red Uhuru Consulting Ltd
74	Rignet AP Facilities & Services Ltd
75	Routelink Integrated Systems Ltd
76	Seal Towers Ltd
77	Sleekchip Technologies Ltd
78	Smile Communications Nigeria Ltd
79	Solid Interconnectivity Services Ltd
80	SPEC3 Technologies Ltd
81	Suburban Telecoms Ltd
82	Swift Networks Ltd
83	Tizeti Network Ltd
84	Total Spin Nigeria Ltd
85	Towers Support Nig Ltd
86	Tracknet Ltd
87	Trucall Solutions Ltd
88	Upper Crest Ltd
89	Value Added Network Solutions Ltd
90	VDT Communications Ltd
91	Vezeti Services Ltd
92	YellowDot Africa Nigeria Ltd
93	Zinox Technologies Ltd
94	ZTE Nigeria Ltd

Appendix 2: Schedule of FinTechs Surveyed

1	AellaCredit
2	Appzone
3	Ativo
4	Bankly
5	Beeland
6	Belfrics
7	Binance
8	Bitpesa
9	Bolt
10	Branch
11	BrinqAfrica

12	Buycoins
13	C24ng
14	Carbon
15	Cellulant
16	Chaka
17	Chams
18	Cowrywise
19	Decagon
20	EGM
21	EsusuAfrica
22	Eyowo
23	Fairmoney
24	Fastcredit
25	FetsLtd
26	Flutterwave
27	Global AccelerexLimited
28	Inlaks
29	Innovate1Pay
30	Interswitch
31	Jelurida
32	Jumia
33	KudaBank
34	Lidya
35	Luno
36	Migo
37	Netplus
38	Page
39	Paystack
40	Piggyvest
41	Qrios
42	Riby
43	Smarteller
44	SystemSpecs
45	TeamApt

Appendix 3: Schedule of Incumbents Surveyed

1	Access Bank
2	Guaranty Trust Bank
3	Zenith Bank
4	First Bank
5	Ecobank

Appendix 4: Term of Reference

TERMS OF REFERENCE (ToR)

PROPOSAL FOR A CONSULTANCY STUDY ON THE EMERGING ROLE OF DATA AND FINTECH IN THE DEVELOPMENT OF DIGITAL ECONOMY IN NIGERIA

1.0 INTRODUCTION

The impact of the ICT revolution is now evident in virtually all countries, Nigeria, inclusive. Hence, the phenomenal global transition towards a "digital economy" with an estimated worth of $11.5 trillion globally, equivalent to 15.5 percent of global GDP and which has grown two and a half times faster than global GDP over the past 15 years, calls for urgent policy measures in Nigeria for the purpose of providing the necessary regulatory framework to support the spread of these new digital technologies, and ensuring that greater levels of digitalization of Nigeria's economy and the society at large, are achieved.

Data is now considered to be a global leading commodity as every second which passes sees an increase or creation of Data, thereby leading to even greater technological and human advances than has ever been seen or experienced. It is evident that increasing innovations has led to corresponding increase in the amount of Data in the world, and Private and Public companies and Institutions take further steps to mine, harness and capitalize on Data and its value. Over the coming decade, Data will be the resource that defines Nigeria's collective economic opportunity and enable companies to disrupt traditional industries in a way that modern economies have never seen.

The future presents a platform which employs the use of a Data driven economic analytics approach which will be the cornerstone of how all businesses operate; Data obtained from the use of digital technologies can provide new sources of knowledge, innovation and profits, if analyzed effectively and transformed into intelligence.

For example, detailed Data collected from the behavior of online platform users and consumers can allow owners to innovate and offer new, better and/or more customized products and services that can be monetized; giving rise to an advanced Data driven economy, providing new opportunities for wealth creation and addressing development challenges.
But it also raises various potential concerns related to, for example, cross-border Data flow, lack of skilled personnel; Lack of Data security and protection; Lack of Data coordination/no coordinating body; Poor development of e-governance in Nigeria; Poor uptake of e-services; Rural poor, high cost of services and lack of Internet services in rural area; Duplication and control of national Data by various agencies and private sector players; and Data security and market concentration.

In the Fin-tech industry, Big Data plays a very crucial role in the anticipation or prediction of customer behavior, create strategies and protection policies for financial Institutions around the world. A daily estimate of about 2.5 quintiles of bytes of Data are generated. And this is expected to increase in the future. This amount of Data can be utilized in innumerable valuable ways, with the help of appropriate tools and algorithms such as customer segmentation, Fraud detection, customer services, and much more.

The year 2017 witnessed a rise in the total global Start-ups' funding. Globally, up to 45% of all Start-ups focused on financial inclusion and Fin-Tech Start-ups are becoming increasingly attractive. As a result a record $93 million in investment was raised between 2015 and 2017 by Fin-Tech companies globally.

Today in Nigeria, it is estimated that there are about 210-250 FinTech operators/companies operating in the Nigerian space, and these players brought about the valuation of the Industry to $153.1 million in 2017 and are projected to rise up to $543.3 million by 2022. Despite these impressive statistics, Fin-Tech Start-ups in Nigeria still face significant number of problems to their uptake, use and acceptability in Nigeria such as bridging existing gap between Fin-Tech firms and traditional banking systems, the Regulatory environment remains challenging, challenges with collaboration, partnerships & funding, access to financial infrastructure and winning customer trust and access to talent.

These problems pose significant challenges to the Data collection and analysis and act as a hindrances to the growth of Digital Economy in Nigeria, and the achievement of the Digital Economy Policy and Strategy of the Nigerian Government as the financial space in the most critical space in today's Nigeria for collection, storage and mining of citizenry Data. Furthermore, in Nigeria various Agencies of Government and various large Private Entities collect and manage Data on Nigerians. The lack of cohesion amongst these Data

generating and storing Organizations also impact the rollout of a digital Nigeria and therefore a critical analysis of its impact on the proposed Digital Economy is needed.

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Some other challenges which impact on FinTech's uptake in Nigeria include their 'high-risk customers which threaten their financial stability; these providers often lack of sustainable revenue base as their services are usually free or negligible; most FinTechs as new businesses are not deemed trustworthy enough, not have been in operation long enough to determine their survivability during a recession, financial crises or unexpected loan defaults. In addition, as Internet access is not universal, FinTechs may not find a ready market for their products

2.0 PURPOSE AND OBJECTIVES OF THE STUDY

The overall objective of the study:

1. To promote a better understanding on the role of Data and Fintech in the development of digital economy in Nigeria.
2. To evaluate the level of adoption of FinTech in Nigeria vis a vis developed countries.
3. To analyze the factors responsible for the slow adoption of FinTech in Nigeria.
4. To proffer solutions on the proper collation, use, adoption, protection and mining of national Data.
5. To recommend best practices and ways in which the Data privacy and security can be enhanced.

3.0 SCOPE OF SERVICE

1. The Study shall carry out in-depth research with empirical Data supporting this exercise within a set of purposively sampled Organizations, Information Technology Managers, Experts, and top Executives and assess the challenges, level of innovation, and development best solution model or framework.
2. The scope of service shall also cover specifically the Government's role and involvement in digitalization
3. The Study shall consider the impact of digital economy on national economic development
4. The Study shall identify the role, benefits and challenges of Data in the growth of a digital Nigeria
5. The Study shall identify the challenges of Fintech and digital financial inclusion and its impact on the drive towards a Data driven Nigeria

6. Document findings from key informant interviews/discussions/communications with major Stakeholders and review of available Data sources related to the project scope shall be collated and reported.

4.0 *DURATION OF THE ASSIGNMENT*

The Study shall be executed within twenty weeks (20) effective from the date of award. An Inception Report must be submitted within four weeks of acceptance of Award.

6.0 DELIVERABLES

1. The Study shall highlight any innovations to be employed in these different areas.
2. The Commission anticipates results and indicative measures that will be used to monitor and evaluate results.
3. The Study shall recommend a stratified implementation approach, framework, or model clearly as possible to enable it to be evaluated by Stakeholders.
4. The inception Report to be submitted within four weeks of acceptance of letter of award. This Report will detail the study approach/methodology and work plans with timelines including review meetings, in-house or out of office trainings where necessary, presentation periods following the submission of draft interim/progress reports and draft final reports.
   In the event that the Inception report is unacceptable, the Commission reserves the right to cancel the award.
5. The Consultant will deliver the following documents in accordance with agreed timelines as indicated in the work plan:
   a. Interim/Progress Report before and after completion of field survey.
   b. Interim Report
   c. Draft Report.
   d. Final Report.

6. Submission of an **Inception Report** that should include these:

   i. An understanding of the Study;
   ii. A defined methodology and framework to be adopted to conduct the study;
   iii. A detailed Project Scope;
   iv. Work Plan/Approach which should be in consonance with the scope of the study as well as the methodology to be adopted;
   v. Communication Plan; and
   vi. Timelines of activities to be implemented.

7. The **Interim Report** provides a project analysis of the project progress in the following:
    i. Highlight the work that has been done so far in carrying out the Study;
    ii. Outcomes of meetings and engagements with relevant stakeholders to the Study;
    iii. State the achievements and the current efforts put in, including the relevant statistical Data collected;
    iv. Provide details of any problems encountered that is hampering or may hamper the Study; and
    v. Provide details on the next phase of the study to be done.

8. **Draft Final Report** – this final draft report should provide a summary of the preliminary report and should address the stated Objectives of the Study as well as the Scope. The Consultant is to make a PowerPoint Presentation of its findings to the Commission.

9. **Final Report** – The Consultant is expected to submit five (5) hard copies and two electronic copies in Microsoft Word Format. The Final report should include all clarifications, suggestions and comments if these were earlier raised during the presentation of findings to the Commission.

10. The Consultant shall submit five (5) copies of each of the approved Final Report and two electronic copies in Microsoft Office Word or PDF software format.
11. A publishable Executive summary of the Final Report.

Appendix 5: Approved Questionnaire for FinTechs and FIs

Role of Data and FinTech in the Development of Digital Economy in Nigeria

For FinTechs and Financial Institutions

1. In which Segment of FinTech does your Organisation belong?

   Mark only one oval.

   - ◯ Core FinTech
   - ◯ Enabler FinTech
   - ◯ Incumbent Financial Institution
   - ◯ Regulator or Policymaker
   - ◯ Association

2. How do you rate the relationship between FinTechs and Financial Incumbents?

   Mark only one oval.

   - ◯ Indifferent
   - ◯ Antagonistic
   - ◯ Cool
   - ◯ Great

3. If Cool or Great in what areas do relationships exist between them?

   Tick all that apply.

   - ☐ Stronger relationships/collaborations
   - ☐ Growth of our business
   - ☐ More access/engagement
   - ☐ Open to new ideas/innovation

4. What issues do Financial Incumbents face in fully going digital?

Tick all that apply.

- [ ] Non-progressive or legacy mindsets
- [ ] Unwillingness to take a risk with something new
- [ ] Unwillingness to commit financially to new partnerships
- [ ] Difficulty integrating into technology platforms
- [ ] Lengthy procurement processes
- [ ] Set in their old ways

5. What are the main sources of funding for FinTechs?

Tick all that apply.

- [ ] Government grants and Subsidies
- [ ] Bank Loans
- [ ] Family and Friends
- [ ] Angel Investors
- [ ] Personal Investment
- [ ] Venture Capital
- [ ] Other: _____

6. How important to your organisation are the following areas of support?

Mark only one oval per row.

	Strategic direction	International expansion and growth	Access to new customers	Partnership opportunities	Regulatory compliance expertise
Of low importance	◯	◯	◯	◯	◯
Slightly important	◯	◯	◯	◯	◯
Important	◯	◯	◯	◯	◯
Highly important	◯	◯	◯	◯	◯
Extremely important	◯	◯	◯	◯	◯

7. Would you consider that there is skill shortage in the FinTech industry?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

8. Which skills are the most in demand in the FinTech industry?

Tick all that apply.

- ☐ Data Analytics
- ☐ Cybersecurity
- ☐ Software Engineering
- ☐ Systems Architecture & Development
- ☐ Regulatory & Risk Management
- ☐ Process Design & Optimisation
- ☐ Product Design

9. What are the main challenges FinTechs face in doing their business?

Tick all that apply.

- [ ] Remaining compliant as business grows / transforms
- [ ] Ensuring sufficient capital and liquidity
- [ ] Ensuring high standards of conduct and good customer outcomes
- [ ] Ensuring strong risk framework and controls
- [ ] Managing high-frequency regulatory changes
- [ ] Maintaining high standard of cyber security
- [ ] Suitable resourcing for risk and compliance functions

10. Which of the following is your organisation conversant with?

Tick all that apply.

- [ ] The Nigeria Data Protection Regulation
- [ ] The National Digital Economy Policy and Strategy
- [ ] The Sandbox Operations Framework
- [ ] The Banks and Other Financial Institutions Act

11. Which of the following would you consider as important for your organisation for Governement to do to support the financial industry?

Tick all that apply.

- [ ] Provision of infrastructure
- [ ] Reduction of Regulatory hurdles
- [ ] Creating easier pathways to funding
- [ ] Reworking the academic curriculum to include FinTech studies
- [ ] Lifting restrictions on Cryptocurrencies
- [ ] Strengthening Data protection laws
- [ ] Relaxing Data Protection laws

12. How do you rate Government's role in digitalization?

Mark only one oval.

- ◯ Government has been helpful
- ◯ Government frustrates private sector efforts
- ◯ Government is indifferent

Notes:.....

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We thank you for taking part in this survey

Appendix 6: Approved Questionnaire for Individual Users

Role of Data and FinTech in the Development of Digital Economy in Nigeria

For Individual Users

1. What is your gender?

Mark only one oval.

- ◯ Male
- ◯ Female

2. What is your age group?

Mark only one oval.

- ◯ 15 - 20
- ◯ 21 - 39
- ◯ 40 - 65
- ◯ 66 and over

3. Do you live in the?

Mark only one oval.

- ◯ City (Urban)
- ◯ Village (Rural)
- ◯ Or town (Peri-urban)

4. Have you ever used the Internet?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ I don't know what Internet means

5. Which of these digital devices do you use?

Tick all that apply.

- ☐ Laptop
- ☐ Desktop Computer
- ☐ Smartphone
- ☐ Cellphone
- ☐ Tablet

6. Which of these terms are you conversant with?

Tick all that apply.

- ☐ Apps
- ☐ Wi-Fi
- ☐ Email
- ☐ Messenger
- ☐ Social Media
- ☐ SMS
- ☐ Hotspot

7. Have you ever purchased goods online?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Never heard of 'Online'

8. Have you used ATM on your own without assistance before?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ I use ATM but always require assistance

9. Which of these activities do you do regularly?

Tick all that apply.

- ☐ Onling shopping
- ☐ Online banking
- ☐ Browsing the Internet
- ☐ Chatting on Social Media

10. What challanges do you face using digital devices?

Tick all that apply.

- [ ] Hardly any electricity where I live
- [ ] The cost of buying data is prohibitive
- [ ] I do not own a digital device

11. Have you ever done any of the following without assistance?

Tick all that apply.

- [ ] Transferring money using a phone
- [ ] Sending and receiving an email
- [ ] Chatting with family and friends on social media
- [ ] Downloading and uploading a file or photo on the Internet
- [ ] Completing a form online
- [ ] Ordering a taxi or booking a ticket online

12. How often do you do any of the following?

Mark only one oval per row.

	Every day	Once or twice a week	Once a month	Never
Use the Internet	◯	◯	◯	◯
Watch video clips (e.g. on YouTube)	◯	◯	◯	◯
Download music or films	◯	◯	◯	◯
Read/watch the news online	◯	◯	◯	◯
Play games with other people online	◯	◯	◯	◯
Send/receive email	◯	◯	◯	◯
Browse/Chat on Social Media	◯	◯	◯	◯

13. Which of the following products and services do you use regularly (i.e. daily)?

Tick all that apply.

- ☐ Facebook
- ☐ YouTube
- ☐ Instagram
- ☐ WhatsApp
- ☐ SnapChat
- ☐ Online/Offline Games
- ☐ Twitter
- ☐ Messenger

14. Do you feel safe online? Please choose the statement that best applies to you.

Mark only one oval.

- ◯ Yes, I have never come across any threat or nuisance
- ◯ Yes, I feel I can handle any threat or nuisance that comes my way
- ◯ Sometimes, although I have heard of people having bad experiences
- ◯ Sometimes, because I have had bad experiences that make me aware of the dangers
- ◯ No, I never feel safe online and am always thinking about the dangers

15. Does your social media account profile include any of the following?

Tick all that apply.

- ☐ A photo that clearly shows your face
- ☐ Your full name
- ☐ Your actual address
- ☐ Your phone number
- ☐ Your correct age
- ☐ An age that is not your real age
- ☐ None of the above

16. What do you think is the biggest threat to you when you go online?

Mark only one oval.

- ◯ Unwanted sexual approaches in a chat room, social networking site or on email
- ◯ Coming across sexual images or content
- ◯ Someone using my photos in an inappropriate way
- ◯ Encountering malware or computer virue
- ◯ Having my details stolen by online fraudsters

17. What do you think about the following protection measures?

Mark only one oval per row.

	Report Abuse buttons	Social media privacy settings
They are good and play a big part in making me feel safer online	◯	◯
They are ok but more protection would make me feel safer	◯	◯
I don't think most of them are that effective in protecting young people	◯	◯
I don't know - I'm not aware of any protection measures in place	◯	◯

18. Do you have any other comments?

Thank you