Baseline Study on the Level of Digital Skills in Nigeria (Women, Youth, and the Physically Challenged) (RD-1)

FINAL REPORT

Contents

Tables

ACRONYMS

3D	Three Dimensional
AI	Artificial Intelligence
API	Application Programming Interface
AR	Augmented Reality
AT	Assistive Technology
AU	African Union
CDI	Coalition for Digital Intelligence
CSR	Corporate Social Responsibility
CV	Curriculum Vitae
DBI	Digital Bridge Institute
FCT	Federal Capital Territory
FGN	Federal Government of Nigeria
FinTech	Financial Sector
FMYSD	Federal Ministry of Youth and Sports Development
GPZ	Geopolitical Zone
GSMA	GSM Association
HDI	Human Development Index
ICASA	Independent Communications Authority of South Africa
ICT	Information Communications Technology
IDI	ICT Development Index
IEEE	Institute of Electrical and Electronics Engineers
ILO	International Labour Organisation
IMF	International Monetary Fund
IoT	Internet of Things
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union
JONAPWD	Joint National Association of People Living with Disabilities
KPI	Key Performance Indicator
LGA	Local Government Area
M&E	Monitoring and Evaluation
MDA	Ministries, Departments and Agencies of Government
MNO	Mobile Network Operator
MSME	Micro, Small and Medium-Scale Enterprise
NBS	National Bureau of Statistics
NCC	Nigerian Communications Commission
NCPWD	National Commission for Persons with Disabilities
NDEPS	National Digital Economy Policy and Strategy
NDLF	National Digital Literacy Framework
NGO	Non-Governmental Organisation
NITDA	National Information Technology Development Agency
NNDLF	Nigerian National Digital Literacy Framework

NNPB	Nigerian National Broadband Plan
NPC	National Population Commission
NYCN	National Youth Council of Nigeria
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
OLPC	One Laptop per Child
OLPH	One Laptop per Household
PC	Personal Computer
PDF	Packet Document Format
PIU	Project Implementation Unit
PPP	Public-Private Partnership
PWD	Person with Disability
PLWDs	Persons Living with Disabilities
R&D	Research & Development
RPA	Robotic Process Automation
RTD	Round Table Discussion
SEO	Search Engine Optimization
SDG	Sustainable Development Goals
SME	Small and Medium Enterprise
STEM	Science, Technology, Engineering and Mathematics
TASCHA	Technology & Social Change Group
UAS	Unmanned Aerial Systems
UID	User Interface Design
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USPF	Universal Service Provision Fund
VC	Venture Capital
VR	Virtual Reality
WEF	World Economic Forum
WHO	World Health Organisation
Wi-Fi	Wireless Fidelity

EXECUTIVE SUMMARY

This study seeks to highlight the level of digital skills in Nigeria amongst women, youth and the physically challenged. The study presents a baseline on the level of digital skills among this demographic and goes on to construct a situation analysis of the nature of the digital sector.

The study further seeks to conduct a thorough examination of the type and forms of digital skills required in the Nigerian ICT ecosystem. It flags the gaps that exist within the sector and describes the undercurrents that shape the prevailing situation.

Through identifying, discussing and analysing the array of drivers at the root of the digital skills gap, the study explores a gamut of factors that underpin the digital divide. Findings from the study will bolster the evidence base for policymaking.

Using its findings as the backdrop, the study sketches relevant recommendations and suggestions for consideration by policymakers in formulating policies and strategies to improve digital literacy among women, youth and the physically challenged in Nigeria.

Descriptive Survey Research Design is the methodology used for the study with a sample size of 7400 respondents and 100 Industry stakeholders to a combined total of 7500.

Questionnaires, discussions, interviews and desk review were the instruments used to obtain the primary and secondary data for the study. Data analysis was executed using graph, frequency, mean, percentage and standard deviation.

The reliability of the questionnaire is more than the Alpha values 0.7

Variables	Cronbach's Alpha
Level of Digital Literacy	0.77
Level of Digital Skills	0.81

Primary data for the study were sourced from questionnaires, discussions and interviews with purposively selected stakeholders. Questionnaires were disseminated to a population of 200 respondents per State and the Federal Capital Territory, and 100 Industry stakeholders. Six Project Implementation Units (PIUs) were set up, one per geopolitical zone. Five data enumerators were engaged and deployed per State to achieve the data collection and collation phase of the study.

Discussion and interview sessions were held with relevant stakeholders including the Joint National Association of People Living with Disabilities (JONAPWD), the National Commission for Persons with Disabilities (NCPWD), managers of ICT and Telecom companies, and youth and women organisations. The interviewees and discussants provided further context around the evidence gathered from the survey and shared valuable insights on the prevailing digital skills gap.

Secondary Data were sourced from desk review of related literature and policy documents including the National Digital Economy and Strategy (NDEPS) 2020 – 2030; ICT Adoption in Tertiary Institutions; Digital Economy Diagnostic Report; Framework and Guidelines for Information and Communication Technology; ICT Competency Framework for Teachers in Nigeria; National Information and Communication Technology Policy; National Implementation Guidelines for ICT in Education (2019); National Digital Literacy Framework (NDLF) 2021; and, National Bureau of Statistics (NBS) data repository.

The findings show that clear digital divides exist on the availability of needed infrastructure; access to and use of devices based on gender, geography, education and income levels; and among persons living with disabilities. The study findings point to a huge disparity between women and youth, and between the North and South in the matter of digital skills. While the gap is evident across subnational boundaries and education levels, it is wider for women and the physically challenged in rural areas.

Based on a three-stage rubric of low, moderate and expert, the findings show that the majority of participants have moderate skills in the use of smartphones (68%), laptops and tablets (39%), and desktop computers (31%) while E-Book Reader has the lowest usage among respondents (1%).

The findings further show that the youth have higher digital literacy than women and the physically challenged; and that there is a higher level of digital literacy among the study population in the South than in the North.

The Industry stakeholders interviewed opined that a huge gap exists between available digital talent and labour market demands. They affirmed that the gaps exist in both hard digital skills and soft personal skills. The findings show that the use of smartphones as the key digital tool of choice among the majority of the survey participants. The youth dominate in this category across the 36 States and the FCT.

The study finds that vaster inclusion of women, youth and the physically challenged in the digital economy will accrue social and economic values. The study also finds that hurdles to access, affordance, insufficient education as well as inherent biases and sociocultural norms curtail women and the physically challenged from benefitting fully from the opportunities offered by the digital transformation of the economy.

The study posits that the Nigerian Communications Commission can leverage its central role in the Nigerian telecommunications ecosystem to galvanise efforts to address the challenges women, youth and the physically challenged encounter in accessing digital skills training. The Commission can use its regulatory powers to ease some of the barriers to the acquisition of digital skills by women, youth and the physically challenged by deploying regulations to bridge the divides that exist.

The Nigerian Communications Commission can achieve this through developing sustainable and scalable training with affordable cost structures (using the Digital Bridge Institute); creating bespoke opportunities for the physically challenged with enabling infrastructure (Universal Services Provision Fund); innovating relevant curriculum and adapting programmes to meet the distinctive needs of women, youth and the physically challenged (Digital Bridge Institute); mobilising multistakeholder cross-sector partnerships to obtain input from industry stakeholders with which to institute dynamic, peer-learning curriculum (Digital Bridge Institute); and, incentivising for action by engendering clearly defined pathways from training to earning (Digital Economy Unit).

The study recommends one unified umbrella framework for organizing digital skills and digital literacy across all sectors and demographics in Nigeria. Suggested moniker for the framework is the Nigerian National Digital Literacy Framework (NNDLF).

Domiciled with the NCC's Digital Bridge Institute, the NNDLF can galvanise all national efforts across the Nigerian digital technology ecosystem through multistakeholder collaborations to pull all extant guidelines and strategies together into one national framework. With this overarching concept, the NNDLF would aggregate extant Frameworks and Guidelines and collapse them into one functional national framework.

The study finds that people who are most at risk of being excluded from the digital economy are more likely to be women, rural, poor, older, less educated, and persons with disabilities. To close the digital divide, the study calls on the Nigerian

Communications Commission in particular and other policymakers, in general, to look beyond simple connectivity to universal connectivity which can be achieved by addressing the needs of women, rural and urban poor, older persons, less educated citizens, and persons living with disabilities and removing the barriers they face in accessing and using the internet.

These barriers include affordability; knowledge and digital skills; safety and security concerns; relevant content and services; differences in income and restrictive social norms. To break these barriers, the study invites the Nigerian Communications Commission to wax aggressive in driving the ITU's Meaningful Connectivity Framework with the aim to position Nigeria as the first sub-Saharan country to attain meaningful connectivity.

The study seeks to plot the trajectory of women, youth and the physically challenged on their journey to 95% digital literacy attainment as envisioned by the NDEPS. The study highlights correlations between digital skills and the availability of infrastructure, such as broadband internet, mobile voice telephony, and electricity. The correlations indicate that digital skills move in tandem with access to the internet and electricity.

The study concludes by underlining the central role the Nigerian Communications Commission can play in alleviating the digital literacy gaps through the intentional use of Policies, Regulations and Strategies to mobilise multistakeholder collaborations and partnerships to galvanise mass digital skills acquisition schemes, especially for women, youth and the physically challenged.

1.0 CHAPTER ONE

1.1 Introduction

Information and communication technologies have permeated all aspects of life, providing better and innovative ways for people to work, learn, play, interact, shop, worship, gain access to information, and generally live life. Digital skills encompass the range of abilities to use digital devices, communication applications, and networks to access and manage information. Digital tools make institutions and markets more productive, enhance skills and learning, improve governance at all levels and make it easier for services to be accessed.

In a world that is becoming increasingly digitalised, it is, therefore, imperative if not obligatory, to develop people's capacity to use, understand and manage resources in digital format. Just as having electronic devices in homes has become a convention, information communications technology is already indispensable in the workplace, as workers must know how to interrelate with control panels, computers and other digital equipment.

Living and working in today's world entail understanding and interacting with varieties of software and applications and the panoply of digital equipment as large swathes of work activities, business transactions, learning at school or even shopping for goods and services are done online. Thus it does require that the participants in the economy become more interactive and collaborative. Since much of the interactivity and collaboration are mediated by the use of digital devices, digital literacy has become a necessity.

Furthermore, given the employment opportunities that being digitally savvy promises and with the bulk of future work, social and learning activities in the world being predisposed to go digital, the acquisition of digital literacy is essential. This is especially so for women, youth and the physically challenged if they are to leverage emerging prospects in the economy.

In a similar vein, people already at work ought to constantly update their digital skills to keep pace with the fast-paced digital world and forestall the prospect of their proficiencies becoming out-of-date.

The Covid-19 pandemic with its attendant constraints significantly accelerated the value and necessity of being digitally knowledgeable as most of life's day-to-day activities went digital. The pandemic demonstrated how crucial it is for citizens,

businesses and organisations to be connected with one another electronically.

To underscore the value placed on the acquisition of digital skills, the Federal Government promulgated the National Digital Economy Policy and Strategy 2020-2030 (NDEPS) which envisages that Nigerians would attain 95% digital literacy by the year 2030. The intention of the NDEPS is to accelerate the development of Nigeria's digital economy. It proposes to achieve the acceleration through its eight pillars to wit: 1) Developmental Regulation; 2) Digital Literacy and Skills; 3) Solid Infrastructure; 4) Service Infrastructure; 5) Digital Services Development and Promotion; 6) Soft Infrastructure; 7) Digital Society and Emerging Technologies; and, 8) Indigenous Content Development and Adoption.

Of the eight pillars, two focus on supporting the education sector in implementing digital learning viz: the Digital Literacy and Skills pillar and the Solid Infrastructure pillar. The Digital Literacy and Skills pillar encompasses a policy mandate to integrate digital literacy and skills into the national curriculum for all grade levels. It also calls for training and capacity-building of educators and training institutes and all Nigerians, including children, women, internally displaced persons, and persons with disabilities. The Solid Infrastructure pillar details policy targets and implementation strategies to facilitate Broadband Internet development and to increase its use and access.

Besides the launch of NDEPS, the year 2019 witnessed a raft of Federal Government activities around scaling digital skills in Nigeria. In the wake of the NDEPS, the National Policy on ICT in Education was reviewed and updated. This was followed by the introduction of the National Implementation Guidelines for ICT in Education.

The National Policy on ICT in Education covers the areas of Human Capital Development; Infrastructure; Research and Development; Awareness and Communication; and, Monitoring and Evaluation. The National Implementation Guidelines for ICT in Education (2019) build on the National Policy in ICT in Education and provide details on the activities, deliverables, responsible agencies, timeline, and key performance indicators for implementing ICT in education.

The Government deems that the acquisition of digital literacy will empower more citizens to benefit from, participate in, and contribute to the rapidly evolving digital economy. However, despite Government's best intentions, there is a wide gulf between policy promulgation and implementation. For instance, although the National Implementation Guidelines for ICT in Education describe the strategies

for financing, which include allocating at least 5% of education's annual capital budget to ICT in education and intensifying the use of creative financing models such as public-private partnerships, there is limited government funding for use of technology in education. Contrariwise, Government expenditure on education has been shrinking since 2016 as captured in Table 1.

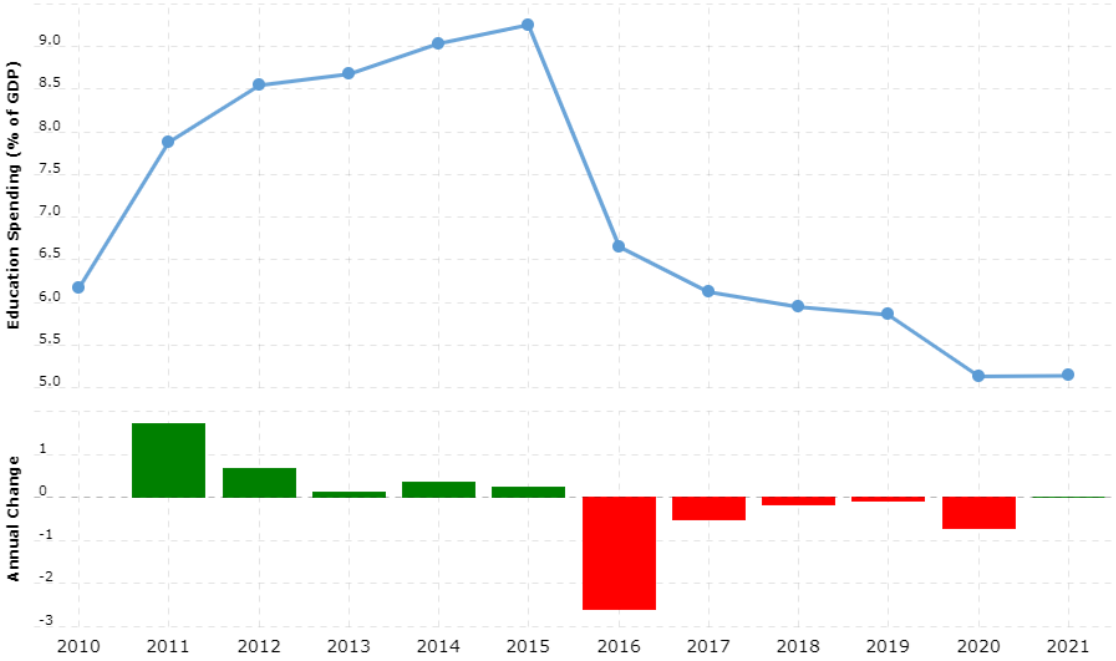
Table 1: Historical Data on Government Spending on Education

Government Spending on Education from 2015 to 2021		
Year	**Spending (% of GDP)**	**Annual Change**
2021	5.14%	0.01%
2020	5.13%	-0.72%
2019	5.86%	-0.09%
2018	5.94%	-0.18%
2017	6.12%	-0.53%
2016	6.65%	-2.60%
2015	9.26%	0.22%

Source: NBS

For 2020 the budgetary slice for education was 5.13% of the total budget, a 0.72% drop from 2019 (5.86%). The education spending for 2019 was a 0.09% decline from 2018 (5.94%) which itself was a 0.18% decline from the 5.94% budgeted for 2018.

Table 2: Annual Change in Education Spending from 2010 to 2021



Source: World Bank

The steepest nosedive in Government spending on education occurred in 2016 when it dwindled from 9.26% in 2015 to 6.65% a reduction of 2.6%. The continual year-on-year reduction in education spending has helped to exacerbate the inequalities in digital literacy along socioeconomic, gender and other demographic dynamics among both rural and urban dwellers in Nigeria.

The nature of the digital divide faced in Nigeria does not only signify those who have access to the internet and those who do not, but encompasses several other discrepancies, including the quality of digital infrastructure in rural communities; the speed of connectivity in both rural and urban areas; and, the training and skills required to navigate the available technologies.

Despite the pervasiveness of information communication technologies and the ubiquitousness of digital devices, there is still pervading digital divide among the population. The digital divide manifests in the availability (or lack thereof), of access, knowledge and usage of digital technology.

The first barrier to digital literacy growth in Nigeria is poverty. The cost of digital devices and the poor information technology infrastructure seem to widen the digital divide and result in lacklustre acquisition of digital literacy. Energy supply is also an issue as electricity coverage is still fragmented in various parts of the country.

Contrary to the connotation in its title, the digital divide is not a clear single line of demarcation which divides society into two groups. The digital divide is a socioeconomic issue referring to the differing amount of information between those who have access to the internet and those who do not have access. As enunciated in this study, the digital gap is more than just an access issue and cannot be alleviated merely by providing access to the necessary equipment.

There are at least three factors at play: information accessibility, information utilization, and information receptiveness. More than just accessibility, the digital divide consists of society's lack of knowledge on how to make use of the information and communication tools once they exist within a community.

The digital divide also embodies other factors such as the quality of connection and related services, access to information communications technologies and media that the different segments of society use. For Nigeria, the most cogent considerations in determining the digital divide are the availability of digital skills and access to digital devices at affordable cost and quality.

The digital divide can take such forms as lower-performance digital devices, low-quality or high-price connections, the difficulty in obtaining technical assistance, and lower access to subscription-based content.

Bridging the digital gap is at the front burner of many governments around the world, particularly across Africa. This is because information and communication technologies are vital to quality civic life and crucial in transforming society, improving services, eliminating power differentials, and realizing a truly free and democratic society. Being literate is an essential cornerstone for digital literacy. Unfortunately, 31% of Nigeria's population is illiterate[1] and risks being excluded from the many benefits that the bourgeoning digital economy harbingers.

When the digital divide is bridged, many benefits accrue. The benefits include access to vital information provided via the internet and access to welfare services and interventions that are sometimes administered and offered electronically. Health and other types of emergencies can be handled more efficiently if the person requiring them has access to communication technology. Mass digital literacy would lead to a healthier democracy through increased public participation in elections and decision-making processes.

Information communication technologies in general tend to be associated with productivity improvements. So the development of information communication infrastructure and its active use by a wider population of digitally savvy citizens would be a shortcut to economic growth. The accessibility of rural areas to the internet and lowering of access prices are required to bridge the digital divide.

Since digital skills are not easy to measure without testing actual proficiencies, the study included questions to ascertain respondents' self-assessed levels of confidence in performing digital skills-related tasks. Although these questions do not directly measure digital skills, they provide insights into respondents' skill set and their perceptions of how they could learn new tasks.

This is useful for informing digital skills training and approaches, specifically for women, and provides some insights to inform further research. It also maps to the purpose of the study to establish a baseline on the level of digital skills in Nigeria, especially among women, youth and the physically challenged and to proffer appropriate solutions to bridge the digital gaps.

[1] AIT - Nigeria Illiteracy Rate Drops To 31% - https://ait.live/nigeria-illeteracy-rate-drops-to-31/

1.2 Objectives of the Study

The study is driven by four objectives, which are to:

1. Collate and Analyse Data on the Level of Digital Literacy and Skills amongst Women, Youth and the Physically Challenged across the 36 States of Nigeria and the FCT;
2. Determine the Level of Digital Skills Gap among Women, Youth and the Physically Challenged in Nigeria;
3. Suggest ways of improving Digital Literacy and Skills among Women, Youth and the Physically Challenged in Nigeria; and,
4. Advise the Commission appropriately on all matters and things related to the consultancy or deemed appropriate and necessary to enhance digital skills among Women, Youth and the Physically Challenged in Nigeria.

1.3 Scope of the Study

The scope of the study covers the 36 States and the Federal Capital Territory with responsibilities including but not limited to:

a. Define the concept of Digital Literacy and carry out a comprehensive analysis of the type and forms of Digital Skills required in the Nigerian ICT ecosystem;
b. Engage stakeholders to obtain industry perspectives on the issue of Digital Skills and Learning and how it impacts the growth and development of the telecommunications industry;
c. Highlight innovations to be employed in improving Digital Literacy and bridging gaps where they exist;
d. Produce results and indicative measures that will be used to monitor and evaluate results; and
e. Recommend a stratified implementation approach, framework, or model clearly as possible to enable it to be evaluated by Stakeholders.

1.4 Study Deliverables

The study seeks to provide answers to the following overarching questions:

i. What is the nature and character of the digital sector within the context of employment and job creation?
ii. What key skills (technical and soft) do employers require in the digital sector?
iii. What skills do Women, Youth and the Physically Challenged possess based on schooling and workplace exposure?
iv. How do they perceive the skills they possess and those they lack?
v. What gaps exist between their skills and employers' manpower requirements?

The study is distilled into the following Reports which are yielded in step with the timelines indicated in the Terms of Reference.

	Report	Timeline	Remarks
1.	Inception Report	Marking the successful completion of the study's inception phase and the project's official kick-off	Completed
2.	Interim/Progress Report	At the completion of the field survey phase and in pari passu with the data analysis	Completed
3.	Draft Final Report	Following collation and final analysis of survey data distilled into study findings	Completed
4.	Final Report	Commemorating the successful completion of the study	**This Report**

2.0 CHAPTER TWO

2.1 Methodology

The survey was conducted using the stratified quota sampling technique and via interview-administered questionnaires in all 36 States and the Federal Capital Territory. The interviews were conducted in English language and in some cases Pidgin English. All respondents were adults. All States in Nigeria were proportionately represented in the survey.

A total of 6,318 respondents completed the survey questionnaires, and 7,400 prospective respondents were contacted. This represents a response rate of 85%. The margin of error does not exceed plus or minus 2% at the mid-range with a confidence level of 95%.

Prior to launching the survey, a pilot test was conducted on 30 completed interviews in Abuja. Issues identified during this test were rectified prior to fielding the survey. These interviews were not incorporated into the final data set.

To gain enough data to sufficiently address the overall objectives of the study, the research team proposed a sample population size of 100 Industry stakeholders making a combined survey population size of 7500. This sample size was proposed to the R&D project supervision team for approval through the study's Inception Report. Out of the 100 Industry stakeholders contacted, 78 participated in the survey giving a combined total of 6396 survey participants.

The study geography was delineated into six strata covering the 36 States of the Federation and the FCT with equal emphasis on both the urban and rural areas. Each stratum comprised between five to seven States in consonance with the six geopolitical zones (GPZs) of the Federation. Each State was demarcated into rural and urban area clusters. Altogether there were 73 urban area clusters and 146 rural area clusters making a total of 219 clusters across the six strata.

For field data collection, two instruments of the survey-questionnaire type were prepared. One was used to specify the level of digital skills among the survey population juxtaposed with available technologies - considering infrastructure, technological and digital resources, internet connectivity and technological spaces, among others. The other was deployed to investigate what digital skills employers actually require in the Nigerian ICT ecosystem to accurately articulate the skills gap.

The questionnaires were first submitted to the R&D project supervision team for review and comments. Following their review and instep with their comments and observations, the questionnaires were reworked jettisoning one question and amending two others.

The revised questionnaires were resubmitted to the R&D project supervision team for approval. Once the green light to proceed with the revised questionnaires was received, countrywide dissemination of the questionnaires commenced in earnest.

2.2 Literature Review

Literature review, discussions and interviews were also deployed as instruments for data collection for the study. To understand the emerging evidence within the available literature, the research team engaged a number of secondary data sources in the literature review exercise. The literature review component of the study commenced shortly after the project kick-off meeting between the research team and the R&D project supervision team.

The literature review exercise involved an intensive and extensive review of a variety of literature including extant Government policies, strategy documents, research papers, and documents sourced from other countries to create an international best practices catalogue. Data from the literature review were used to articulate the questionnaires and draft the agenda to anchor the discussions and interviews with sector stakeholders. The interviews were useful in establishing the veracity of the results thrown up by the literature review.

Activities in the literature review segment included: an examination of topic-relevant publications; dissection of the Digital Economy Diagnostic Report; scrutiny of the e-Conomy Africa Report; perusal of the National Bureau of Statistics (NBS) data repository; extraction of information from Techpoint, World Bank blog, etc.; analysis of the National Digital Economy and Strategy (NDEPS); inspection of several Baseline Reports and Soft Skills Training Reports; and meticulous shifting-through online and offline literature from experts and digital enhancement authorities.

2.3 Interviews with Stakeholders

The research team conducted interviews with senior Human Resources executives from corporate organisations, recruitment firms, academics, ICT training providers and StartUps in the ICT space. The purpose of the interviews was to ascertain the

demand side requirements of the Nigerian ICT ecosystem and measure the gaps.

The discourses aided the research team to understand and identify best practices to mitigate the digital skills gap. The interviewees and discussants were drawn from purposively selected organisations and institutions in Abuja, Bauchi, Kano, Enugu, Port Harcourt and Lagos leveraging the location of the study PIUs in these locations. The interviews and discourses followed the schedule detailed in Table 3.

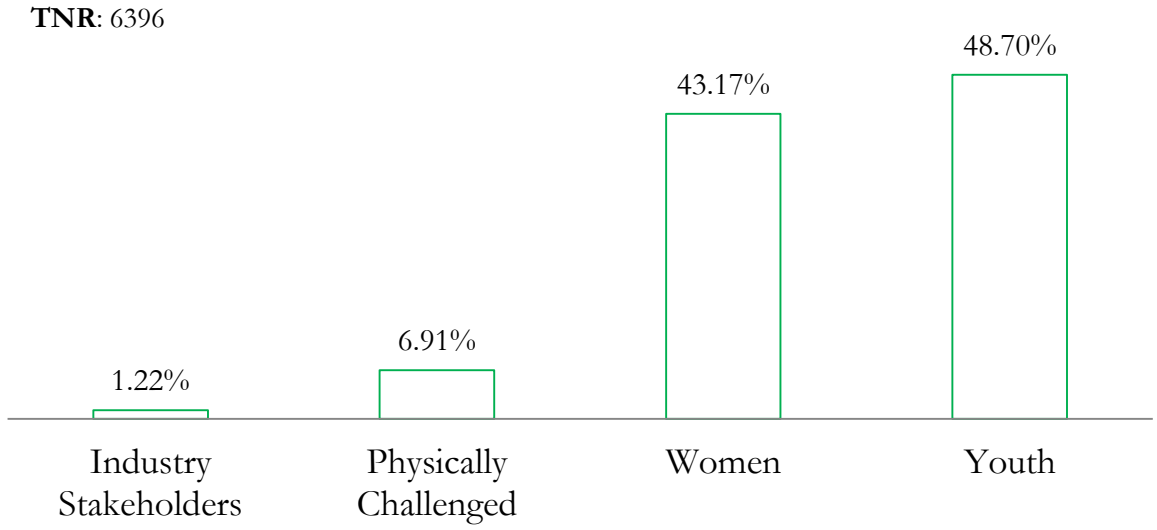
Table 3: Schedule of Stakeholder Interviews

Location	Total Number of Interviewees
Abuja	14
Bauchi	11
Kano	10
Enugu	12
Port Harcourt	13
Lagos	18
Total	**78**

2.4 Geographic, Gender and Age Distribution of Respondents

The urban area clusters comprised Abuja and all the 36 State capitals and one peri-urban location from each State. The rural area clusters included selected headquarters of one Local Government Area per State.

Table 4: Distribution of Survey Population by Subdomain



For ease of data collection and collation, one Project Implementation Unit (PIU) was situated centrally within each stratum as outlined below.

Table 5: Strata Geography and Location of PIU

Strata	Constituent States	Location of PIU
Stratum A (Northcentral)	Benue FCT Kogi Kwara Nasarawa Niger Plateau	Abuja, HQ
Stratum B (Northeast)	Adamawa Bauchi Borno Gombe Taraba Yobe	Bauchi
Stratum C (Northwest)	Jigawa Kaduna Kano Katsina Kebbi Sokoto Zamfara	Kano
Stratum D (Southeast)	Abia Anambra Ebonyi Enugu Imo	Enugu
Stratum E (Southsouth)	Akwa Ibom Bayelsa Cross River Delta Edo Rivers	Port Harcourt
Stratum F (Southwest)	Ekiti Lagos Ogun Ondo Osun Oyo	Lagos

Six PIU coordinators were engaged to manage each of the PIUs. Four data enumerators were recruited per State to a total of 148. The PIU coordinators were invited to Abuja and underwent a train-the-trainer training for a day on the objectives and drivers of the study.

The coordinators returned to their zones and conducted training exercises for the data enumerators in their stratum ahead of launching the survey. The training exercises were supervised by the Project Team Lead who attended both the coordinators' training and the data enumerators' training.

A total of 78 Industry stakeholders (1.22%) distributed across the six geopolitical zones successfully completed the survey. The number of respondents who presented as physically challenged was 7% (442) of the survey population. Women constituted 43.17% (2761) while the youth comprised 48.7% (3115). These percentages reflect the demographic characteristics of Nigeria's population which has women and youth making up 49% and 36% of the general population respectively.[2]

Operating out of the respective project implementation units situated in each stratum, the field survey team traversed the 36 States and the FCT administering the survey questionnaires on staggered dates from 20 June 2022 to 19 August 2022.

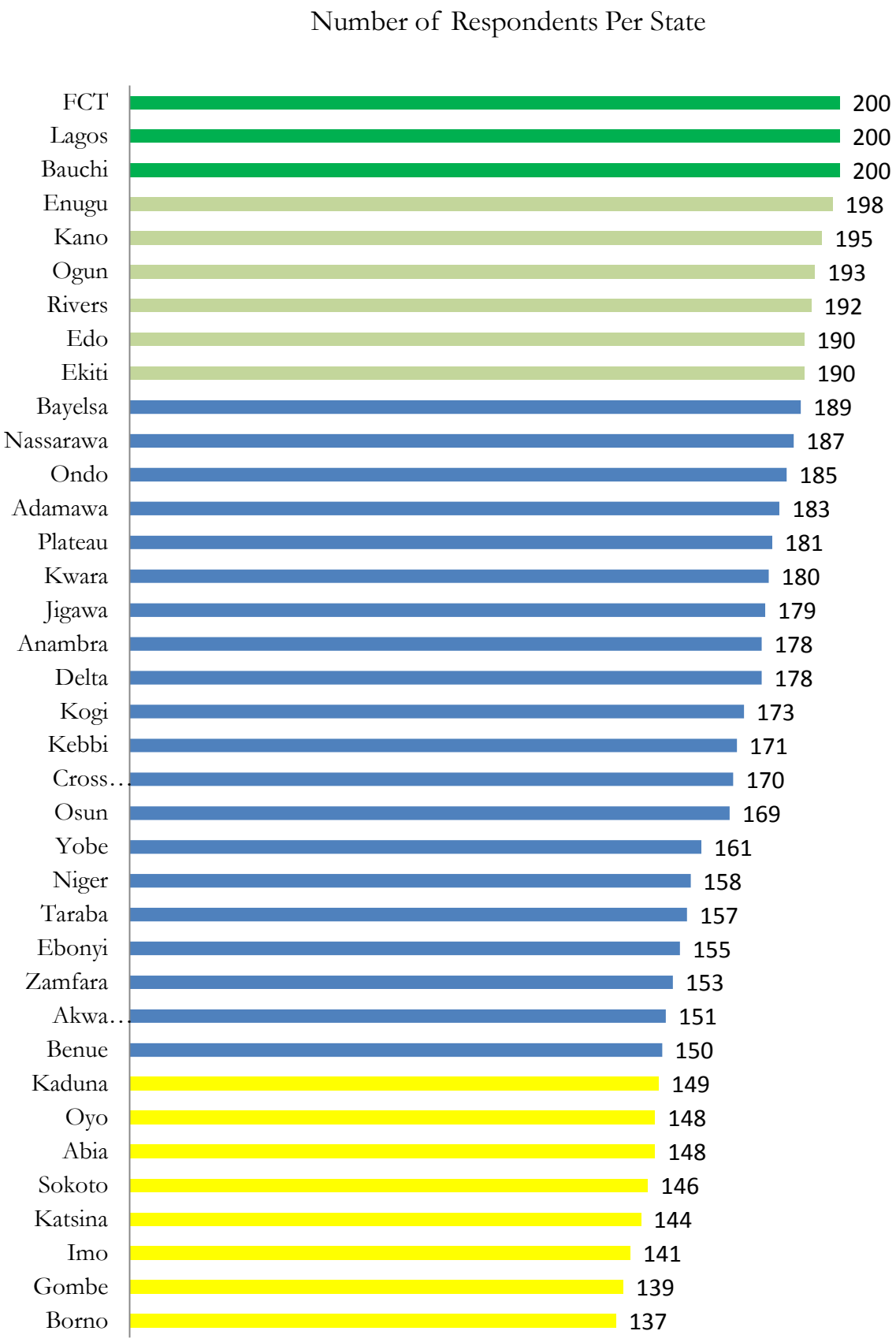
At the end of the exercise, the FCT, Lagos State and Bauchi State returned the full complement of the 200 questionnaires administered in these States. Enugu State, Kano State, Ogun State, Rivers State, Edo State and Ekiti State returned 190 and 198 completed forms respectively.

The States where less than 150 forms were returned included Kaduna State with 149, Oyo State and Abia State with 148 apiece, Sokoto State brought in 146 forms, Katsina State with 144, Imo State with 141, Gombe State turned in 139 forms and bringing up the rear was Borno State with 137 forms.

Data Enumerators in twenty (20) States turned in forms ranging from Benue State 150 to Bayelsa State 189. In between these figures were Anambra State and Delta State where 178 forms apiece were returned. Out of the 7400 survey questionnaires disseminated across the country, a total number of 6318 (85%) usable forms were returned.

[2] The National Population Commission (NPC) - https://nationalpopulation.gov.ng/

Table 6: Survey Question #3: In which State do you live?



2.5 Work Plan

Contained in the study's Inception Report the following work plan was proposed by the research team and following its approval by the R&D project supervision team was used to guide the study throughout its lifecycle.

Table 7: Detailed Work Plan for the Study

	Activity	Description	KPI	Status
1	Project Review	Review project objectives and structure the Work Plan to align with the ToR	Structured Work Plan	Completed
2	Survey Population Identification and Stratification	a. Draw the demographic map of the Women, Youth and Physically Challenged across the Federation; b. Delineate the survey geography into six strata and two clusters; c. Identify the location of each stratum PIU and go live	Coordinated approach to the study	Completed
3	Inception Report	Draft and submit the Inception Report	Submission of Inception Report	Completed
4	Desk Review	Review of project-centric literature including policies and strategy documents	Secondary Data	Completed
5	Field Survey	Dissemination of questionnaires; active field survey and interviews	Primary Data	Completed
6	Round Table Consultations	Identification of stakeholders, a compilation of a comprehensive list of respondents and execution of Round Table Discussions (RTD)	Primary Data	Completed

7	Interim/ Progress Report	Produce and submit Interim/Progress Report	Feedback to Client	Completed
8	Data Collation	Collation of data from Desk Review, Questionnaires, Interviews and RTDs	Materials for Draft Final Report	Completed
9	Project Monitoring and Evaluation	a. Feedback on project performance b. M&E on processes and platforms c. M&E on the Performance of Resource Persons	Continual monitoring and evaluation of the study	Completed
10	Data Analysis	Correlation and analysis of primary and secondary data	Distillation of study findings	Completed
11	Draft Final Report	a. Feedback on project performance b. M&E on processes and platforms	Submission of Draft Final Report	Completed
12	PowerPoint Presentation	Presentation of study findings to NCC and other stakeholders invited by NCC	Comments and observations from NCC	Completed
13	Final Report	Produce and Submit the Final Report	Submission of the Final Report	This Report

2.6 Survey Limitations

The research team encountered survey apathy, particularly in Kaduna State, Oyo State, Abia State, Sokoto State, Imo State, Gombe State and Borno State where it became a struggle to achieve the proposed numbers of the population to partake in the survey. Despite keeping the questionnaires as simple and short as possible, people were largely unenthused in partaking in the exercise.

In the Northeast and Southeast geopolitical zones, security concerns dictated that survey enumerators were constrained in the areas they could attend and on what days and times to do so. For that reason, much of the survey in these zones was done largely in the State capitals on days and times considered safe.

3.0 CHAPTER THREE

STUDY FINDINGS

3.1 Objective One – Level of Digital Literacy

To Collate and Analyse Data on the Level of Digital Literacy and Skill Amongst Women, Youth and the Physically Challenged Across the 36 States of Nigeria and the FCT

Before delving into the details of digital skills and digital literacy, it is logical to firstly have a clear understanding of what the two concepts mean. Digital skills are defined as a range of abilities to use digital devices, communication applications and networks to access and manage information.[3]

Digital literacy, on the other hand, is the ability to use information and communication technologies to find, understand, evaluate, create, and communicate digital information - an ability that requires both cognitive and technical skills.[4]

In other words, digital skills focus on what and how, while digital literacy focuses on why, when, who, and for whom - a combination of technical knowledge, working methods and cross-cutting competencies.[5]

A few examples of basic digital skills include being savvy enough to use the phone or computer to check emails; create and manage an online profile on a social media or eCommerce platform; carry out online shopping on eCommerce channels; transact banking services online; and/or use a search engine to find the answer to a question. Whereas digital literacy involves the ability to use digital devices, communication applications and networks to access and manage information, communicate and solve problems while staying safe and legal online.

A digital literate would evaluate online resources for the verification of information, choose appropriate images, recognize copyright licensing, and cite or get permissions if necessary, and when creating or uploading content would be mindful of the diversity of readers' sensitivities.[6]

[3] Cornell University - https://guides.library.cornell.edu/home
[4] UNESCO - Media and Information literacy: Policy and strategy guidelines - 2013
[5] UNICEF - https://gdc.unicef.org/resource/digital-divide-and-digital-literacy
[6] Maha Bali - Knowing the Difference Between Digital Skills and Digital Literacies, and Teaching Both- https://www.literacyworldwide.org/blog/literacy-now/2016/02/03

The skills to use a computer are not the only ICT competencies required to make valuable use of information stored on the internet. To make adequate use of these online resources, digital literacy is also essential.

It has been estimated that these technological advances will render over 75 million current jobs obsolete over the next few years while creating 133 million new ones over the same period.[7] These new types of jobs will require contemporary skills that allow people to productively utilize technology. The new jobs would require abilities that go beyond physical and digital skills to include soft skills.

Soft skills are interwoven around universal moral values such as respect, kindness, and compassion. These values make humans unique and distinguishable from machines. The values are distilled into being cognitive, constructive, communicative, civic, critical, creative, confident and cultural. They enable an individual to have a strong identity as a master of technology who can fully capitalize on new technologies and thrive in this fast-changing digital age. Any individual with such an agency is described as possessing digital literacy.

Over 90 per cent of jobs now have a digital component.[8] So without increased digital adoption and use, women, youth and the physically challenged will have fewer employment opportunities. They may also face additional barriers to being competitive and participating gainfully in the new economy.

Digital workplace tools like Zoom, Slack and Teams have become the new office hallways and meeting rooms. The use of these digital platforms is growing exponentially. The world of work has shifted to a setting where collaboration and connectivity are replacing hierarchy and bureaucracy. The transformation is profoundly changing the content and nature of jobs and the skills needed to perform them.

Employers expect the vast majority of their employees, not just a select few, to have digital skills. By developing better digital skills, employees have a chance to contribute productively to their employers' organisations; future-proof their careers; and, discover a wide range of professional opportunities. Technology has wormed itself to the centre of the economy, and as dependence on the internet and digital communications increases, the workforce must keep up with the evolving skills demand.

[7] World Economic Forum (WEF) - The Future of Jobs Report - http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf
[8] Skills4Girls - https://www.unicef.org/gender-equality/skills4girls

These days, digital skills are required in the workplace in all sectors of the economy. Farmers no longer merely sow seeds and harvest crops; they now use sensors and information technology to automate, monitor, and regulate their systems to become more profitable, efficient, and sustainable. They use digital wallets to electronically manage their finances or use tracking devices that allow them to book tractor services from local tractor owners via mobile phone apps.

Restaurants use food delivery apps to provide their menu options to their patrons without them having to leave their homes. Taxis are hailed from the comfort of the home using digital devices. Mechanics deploy digital gadgets to diagnose faults in vehicles. Even estate agents, traditionally a face-to-face industry, now use digital tools to do virtual walk-throughs for prospective clients looking to relocate. Once deals are agreed upon, documents are signed remotely using digital tools such as DocuSign as a quick and convenient way to finalize agreements.

Hitherto, the talent pool was restrained by geography as workers were tethered to their desks. The digital economy has made the talent pool global, offering employers the ability to hire the best from anywhere. In this scenario, it is not uncommon for persons to reside in Nigeria and work in Europe or America doing their daily commutes digitally.

The Fourth Industrial Revolution which began within the last two decades has brought together digital, physical, biological, and technological advances in an integrated fashion. Just as the Second Industrial Revolution triggered the replacement of human physical labour with machines, the Fourth Industrial Revolution triggered the replacement of human mental labour with artificial intelligence, automation, and other digital innovations.

The First and Second Industrial Revolutions of the late 18th and late 19th centuries enabled mechanical means of production at a mass scale with increased levels of efficiency. With industrial machines, the workers' physical abilities became less important and mental strength - knowledge and skills - became a more valuable trait thereby changing the focus of a human's worth shifting from body to mind, especially knowledge.

The Third Industrial Revolution of the late 20th century led to the proliferation of computers and the shift to a service-based economy. The rise of electronic devices and the internet changed how people interact, work, and play. This evolved society, with its heightened complexity, demanded that individuals have skills that enable them to deal with multi-layered interactions, complex conflicts, and

sophisticated negotiations, thereby again changing the focus of a human's worth: from knowledge to emotions and relationships. The Fourth Industrial Revolution has also yielded another shift in the focus of a human's worth - shifting from the mind, including knowledge, emotions, and relationships, to spirit, including wisdom and values. This wisdom, together with contextual understanding and insights, has become more important than practical knowledge and skills, which can now be easily aggregated through the internet.[9]

However, the indicators suggest that Nigeria is underprepared for the impending disruption to jobs and skills brought about by the Fourth Industrial Revolution. According to the World Economic Forum (WEF), the quality of Nigeria's education system ranks amongst the lowest on the continent at 2.8 over 7, and below the world average, which stands at 3.8. Nigeria has one of the lowest shares of government expenditure in education (7%) and ranks 125th out of 137 countries on key indicators that measure ICT adoption and digital skills development.[10]

The study's assessment of the women's and youth's preparedness to leverage the prospects of the digital sector indicates institutional lapses in how they are being socialized for the future of work. Although market indicators suggest that Nigeria is positioned to reap the dividends of the digital transformation, the willingness of relevant stakeholders to make strategic investments in creating the enabling environment, supporting innovation within the ecosystem and in human capital development will be expedient. The study finds that women, youth and the physically challenged are aware of their deficiencies in digital skills. They are also mindful of the importance of digital literacy for the workplace and for living in today's world. But what they are not conscious of is what soft skills are and their relevance in the scheme of things.

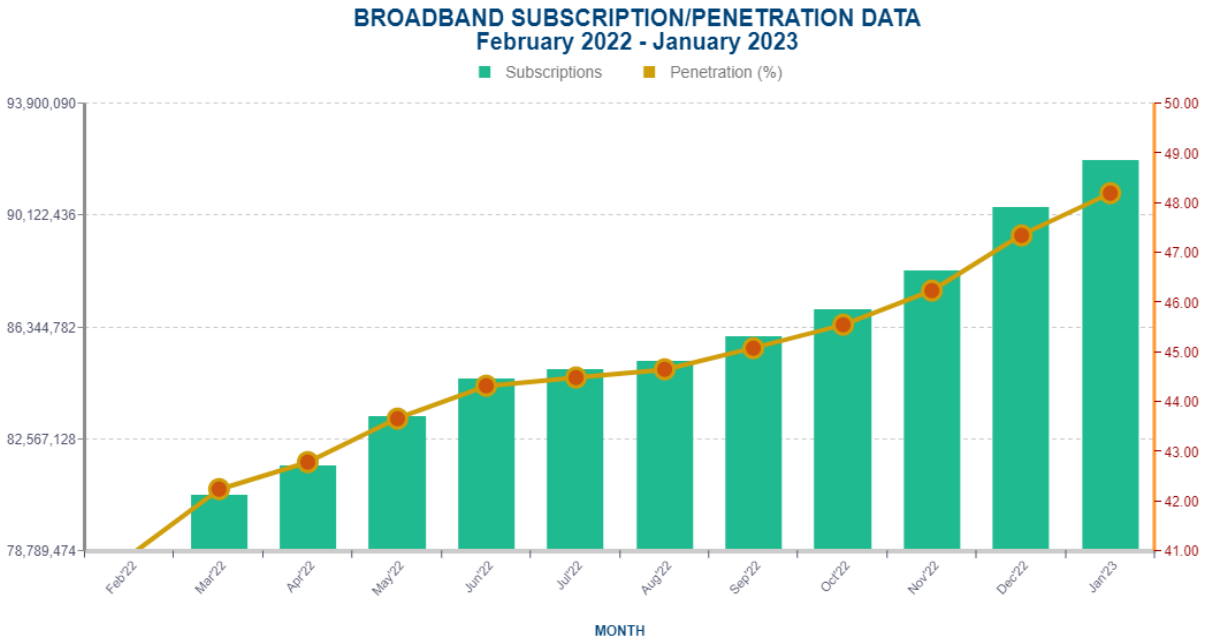
The respondents appreciate the new reality that most of life's daily routines are to be done digitally having witnessed the Covid-19 pandemic when the Federal Government and some State Governments issued stay-at-home orders and established lockdowns, quarantines, restrictions, and closures.

Nowadays, education is delivered in virtual classrooms; household goods are procured via online shopping; social interactions are largely mediated by technology-based platforms; and, most office work is done remotely. All these

[9] DQInstitute - DQ Global Standards Report 2019 Common Framework for Digital Literacy, Skills and Readiness
[10] WEF Executive Opinion Survey - The Global Competitiveness Index 2017-2018 edition - https://www3.weforum.org/docs/GCR2017-2018/03CountryProfiles/Standalone2-pagerprofiles/WEF_GCI_2017_2018_Profile_Nigeria.pdf

require participants to have digital skills and digital literacy anchored on unfettered access to broadband internet and digital technologies. Regarding broadband internet, the Nigerian National Broadband Plan (NNBP) 2020-2025 envisions the attainment of 70% broadband internet penetration across Nigeria by 2025. As of January 2023, broadband internet penetration stood at 48.2% with internet subscriber numbers at 92million and a teledensity of 107.17%.[11]

Table 8: Percentage Broadband Penetration/Subscription Data



Source: NCC

Between 2000 and 2021, internet subscriptions grew by 101,484% in Nigeria marking one of the highest growth rates in Africa and placing Nigeria as the biggest market for telecommunication services in Africa.

Table 9: Percentage Internet Subscription Growth Rate 2000-2021

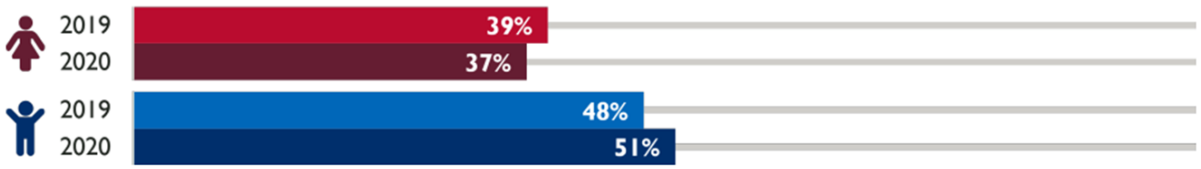
Country	% Internet Growth 2000 - 2021
Kenya	23,335 %
Algeria	50,756 %
Nigeria	**101,484 %**
Gabon	9,017 %
South Africa	1,339 %
Zambia	49,252 %
Egypt	12,064 %
Ghana	49,126 %

Source: Internet World Stats

[11] NCC – Internet Subscriber Data - https://ncc.gov.ng/statistics-reports/industry-overview#view-graphs-tables-5

Notwithstanding the phenomenal growth in internet subscriptions, the digital skills gap has continued to persist across several dynamics. For example, between 2019 and 2020, women's smartphone ownership was negatively affected compared to men's. While there was a slight increase in men's smartphone ownership, women's smartphone ownership dropped from 39% in 2019 to 37% in 2020.[12]

Table 10: Smartphone ownership by gender 2019 -2020



Source: GSMA Survey 2021

The GSMA survey also revealed that households prioritise men's use of smartphones over women so men can seek new work opportunities, stay socially connected, and watch sports.

The proportion of women who own a smartphone increases as education and wealth increase. Women in the higher wealth brackets are much more likely to own a smartphone than those in the lower wealth quintiles.[13] Anther published research corroborates these findings by positing that 90% of people with more education compared to just 59% of those with less education own a smartphone.[14]

Table 11: Mobile device ownership and Mobile internet use by gender

Source: GSMA Survey 2021

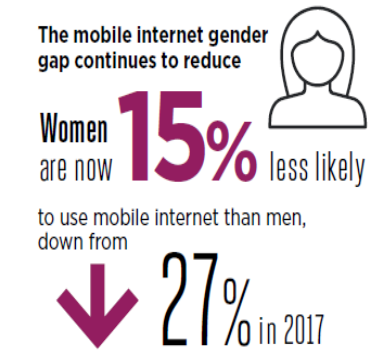
There is a paucity of data linking wealth and income levels with mobile internet use, so a closer look at how women use their mobile phones for financial transactions can provide some pointers. The Nigeria DHS 2018 study posits that only 20% of women in the lowest wealth quintile use mobile phones for financial transactions, compared to 51.2% of women in the highest bracket.

[12] GSMA Survey 2021 - The Mobile Gender Gap Report 2021 - https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf
[13] Nigeria DHS 2018
[14] Pew Research 2018

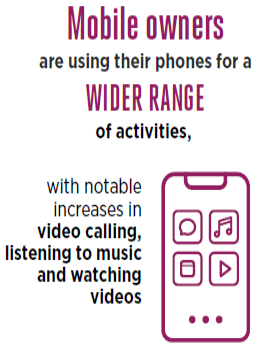
3.1.0 Baseline Level of Digital Literacy and Skills amongst Women

Findings

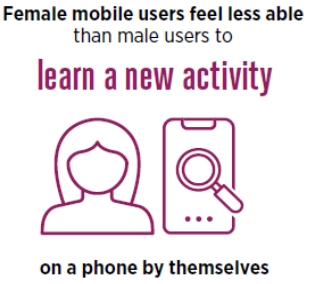
1



2

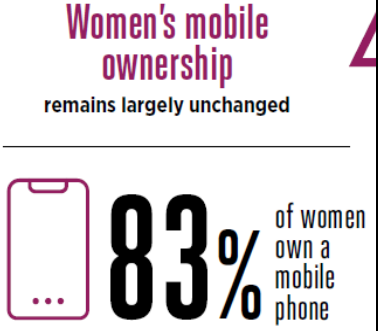


3

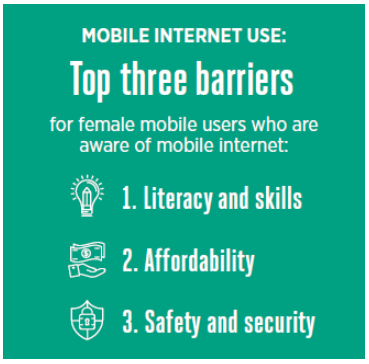


4

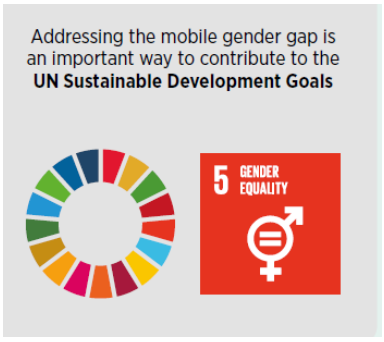
5



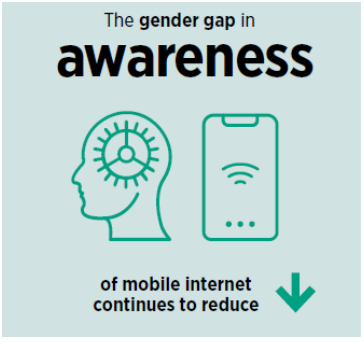
6



7



8



9

Women, described as better versions of men, play integral roles as mothers, educators, household managers, and life-givers, constituting half of the world's human capital and population. Globally, information and communication technology innovations are tremendous enablers of women's empowerment and capabilities. Despite these important virtues, numerous investigations have shown significant gender gaps in internet use (15%), literacy rate (48.6%), pay gap (22%), tech-related positions (26.7%), tech workforce (19%), tech leadership positions (22%), developer workforce (5%), etc., resulting majorly from restrictions placed by ICT contents, language, and environment that are not pertinent, comfortable and gender-sensitive.[15]

Section 29(4) of the Nigerian Constitution 1999 (as amended) describes a woman as a female who has attained full age (18 years old) or is married. Different countries have different laws, but age 18 is frequently considered the age of majority - the age at which a person is legally considered an adult.

This study aligns with the Nigerian Constitution by categorising in the women subdomain all female respondents who identified on the questionnaires as belonging to the 15-30, 31-49 and over-50 age groups.

Although digital technologies are generally gender-neutral, their use in Nigeria however, reflects wide sociocultural differences among men and women. Research has shown that men dominate in the use of ICTs compared to women.[16] Even in situations where men and women are given equal access to ICTs, men are more likely to be the main users than women.

Men tend to be interested in how digital technologies work while women prefer to focus on what the technology can do. While men can happily sit for hours exploring what a computer can do and how it works, women on the other hand, tend to want the computer to just do something useful for them.

A recent study which examined the relationship between gender and computer attitudes reported that men tend to have more positive attitudes towards computers than women.[17] Similarly, results of a computer competency test which

[15] World Journal of Advanced Research and Reviews - Closing ICT usability gaps for Nigerian women and girls: Strategies for reducing gender inequality - https://wjarr.com/sites/default/files/WJARR-2022-0665.pdf
[16] Geissler, J. Et Al, 1993 - University Students' Computer Knowledge and Commitment to Learning - Journal of Research on Computing in Education, Vol.25, no.3: 347<365.
[17] Comber, C. 1997 - The Effects of Age, Gender and Computer Experience Upon Computer Attitudes. Educational Research, Vol. 3, no. 2.

included both theoretical and practical knowledge showed that girls were slightly less adept than boys.[18]

Social norms and limited opportunities for female education limit the participation of women in the science, technology, and engineering sectors. Some social settings for instance socialise women in ways that limit their aspirations to specific kinds of jobs that are not tech-heavy.

Women are being left behind in an increasingly connected world as they are still less likely than men to have access to smartphones and use mobile services. This is particularly true for women who have low literacy levels; low incomes; live in a rural area; and/or have a disability.[19]

In a comparison of female and male computer literacy competencies, a study found that women reported more computer anxiety, less computer self-efficacy, and less stereotypical computer attitude than men.[20]

Published research asserts that both user adoption and usability of technology are affected by four constructs: performance expectancy, effort expectancy, social influence, facilitating conditions, and moderated by four characteristics: literacy level, gender, age, experience and voluntariness of use.[21] Therefore, analysing the digital literacy gap for women requires an understanding of how gender inequality is underpinned by the aforementioned system usability factors.

To draw an accurate baseline on the level of digital skills among any demographic in Nigeria, it is expedient to cross-reference how relevant global authorities in the ICT ecosystem rate Nigeria. First off, the ICT Development Index (IDI) created by ITU to measure the level of development of the information and communication technology sector positioned Nigeria at the 143rd spot out of 176 countries in its report last published in 2018.

[18] Bain, A., Et Al, 1999 - Gender Difference and Computer Competency: The Effects of a High Access Computer Programme on the Computer Competence of Young Women - International Journal of Educational Technology, Vol. 1, no.1.
[19] GSMA (2020) - The Digital Exclusion of Women with Disabilities - https://www.gsma.com/mobilefordevelopment/resources/the-digital-exclusion-of-women-with-disabilities-a-study-of-seven-low-and-middle-income-countries/
[20] Jackson, L.A., Et Al - Gender and the Internet: Women Communication and Men Search. Sex Roles: A Journal of Research, Vol. 44, no. 5<6: 362<379.
[21] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), 425. https://doi.org/10.2307/30036540

From the report, peer countries such as Kenya, Ghana and South Africa placed ahead of Nigeria by several ranks as illustrated in Table 12.

Table 12: ICT Development Index Ranking 2018

Country	Rank/176	IDI Value
Nigeria	143rd	2.60
Kenya	138th	2.91
Ghana	116th	4.05
South Africa	92nd	4.96
China	80th	5.60
Brazil	66th	6.12
United States	16th	8.18
United Kingdom	5th	8.63

Source: ITU - ICT Development Index

The implication of an IDI Value[22] of 2.60 presupposes that Nigeria still had a lot of catching up to do in the development of her information and communication technologies sector when compared with South Africa with an IDI Value of 4.96 or Ghana that placed 116th with an IDI Value of 4.05.

Of a truth, Nigeria has made some not-too-heady headway on the road to developing a robust ICT sector and dovetailing into a bourgeoning digital economy. Nigeria's ranking and/or rating on some world bodies show slightly improved placement than ITU ICT Development Index.

For instance, the Global Innovation Index (GII) published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations places Nigeria at 117th, 118th and 114th positions for 2020, 2021 and 2022 respectively. The GII also ranks Nigeria 13th among 27 sub-Saharan African countries.

[22] IDI Value is computed by summing the weighted values of the indicators included in the respective subgroups comprising ICT readiness (infrastructure, access); ICT Use (intensity) ICT Capacity (skills) and ICT Impact (outcomes)

Table 13: GII Rankings for Nigeria (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	117	115	121
2021	118	115	124
2022	114	113	107

As can be seen from the ratings, Nigeria performed better in 2022 in both innovation outputs (107)[23] and innovation inputs (113) resulting in an improved GII ranking of 114. This indicates that Nigeria produced more innovation outputs relative to its level of innovation investments in 2022.

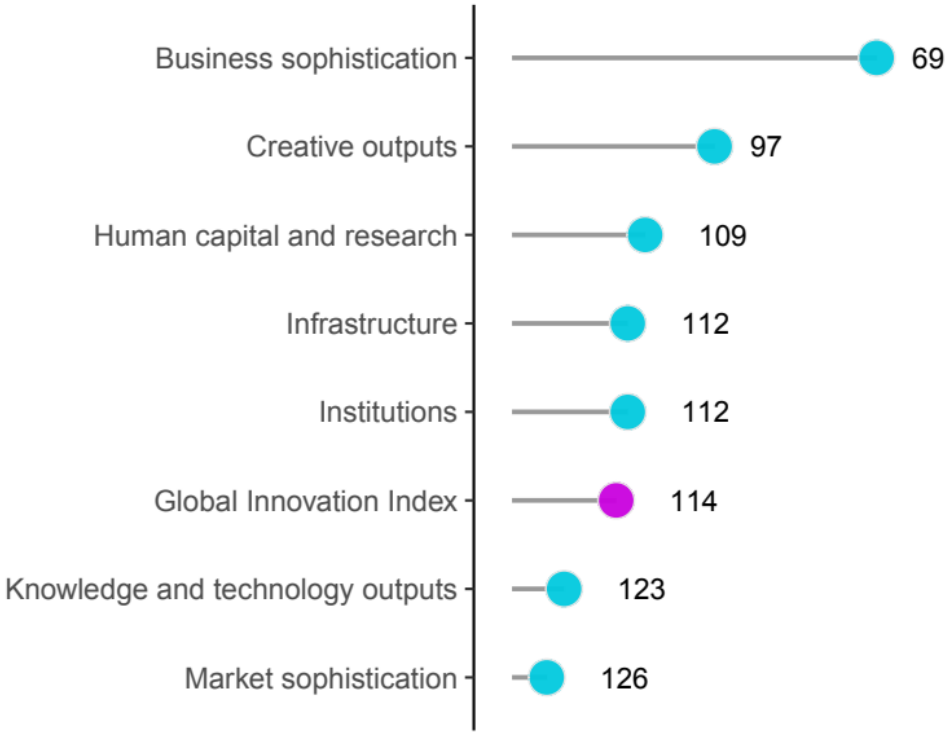
The Innovation Output Sub-Index used by GII to measure innovation is based on criteria that include Knowledge and Technology Outputs - knowledge creation, knowledge impact and knowledge diffusion; and, Creative Outputs - intangible assets, creative goods and services, and, online creativity.

The Innovation Input Sub-Index has criteria that encompass five prongs: 1). Institutions - political environment, regulatory environment, business environment; 2). Human Capital and Research - education, tertiary education, research and development; 3). Infrastructure - information and communication technologies, general infrastructure, ecological sustainability; and 4). Market Sophistication – credit, investment, trade, diversification, and market scale; and 5). Business Sophistication - knowledge workers, innovation linkages, knowledge absorption.[24]

Several factors that resonate social, economic, cultural and religious norms and beliefs have been identified as underlying grounds of digital gender gap in Nigeria. These issues continue to work against the interest of women in the digital space. Similarly, the perception of science and technology as a male-only field of study, poses a drawback for women and girls. Women tend to see the ICT sector as unfriendly, alienating, and intimidating as it is dominated by men.[25]

[23] The highest ranking possible on the index is 1.
[24] Global Innovation Index 2022 – Nigeria - https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/ng.pdf
[25] This assertion was aptly captured in a presentation by Dr. Amina Sambo-Magaji, at a conference organized in Abuja, Nigeria by the Nigerian Women In Information Technology (NIWIIT), under theme: "Promoting Digital Inclusion: Harnessing Opportunities With A Gender Lens

Table 14: The seven Global Innovation Index pillar ranks for Nigeria



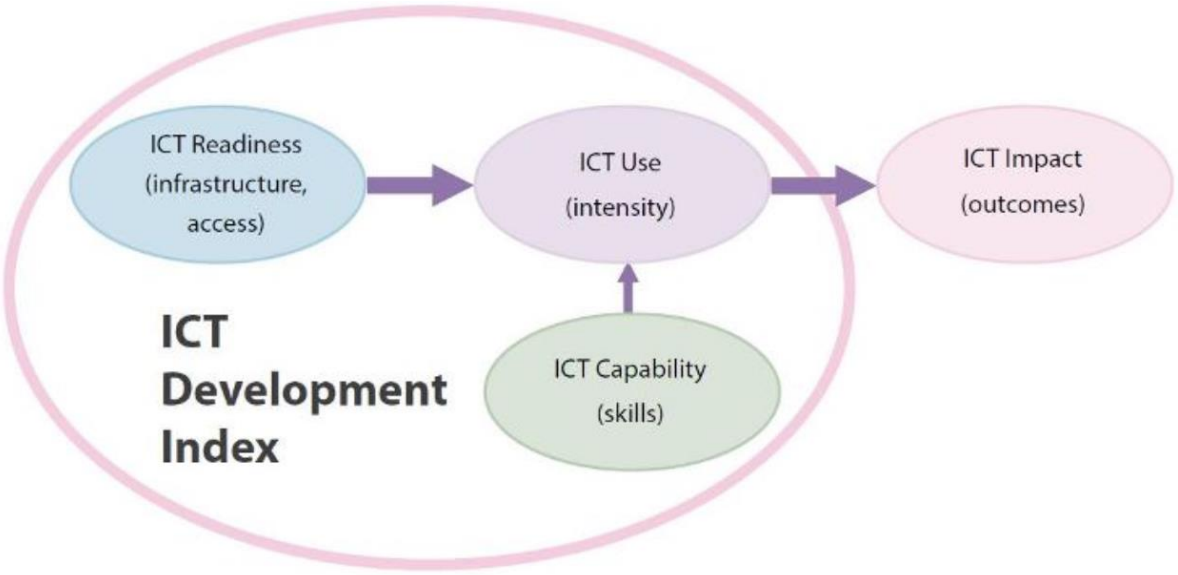
Source: Global Innovation Index

The ranking denotes that Nigeria performs best in Business sophistication (69) and its weakest performance is in Market sophistication particularly infrastructure (126). A deeper interrogation of the Business sophistication metric revealed that it encompasses Knowledge workers /Innovation linkages /Knowledge absorption while Market sophistication is premised around Credit / Investment /Trade, diversification, and market scale.

Market sophistication (102): displays strengths in the sub-pillar Trade, competition, and market scale (58) and in the indicators Ease of getting credit (14), Ease of protecting minority investors (27), Intensity of local competition (66) and Domestic market scale (23). GII also lists other Nigeria's weaknesses including: Political and operational stability (126); Creative goods exports, % total trade (131); applied tariff rate, weighted avg., % (130); Production and export complexity (120).[26]

[26] Global Innovation Index 2022 – Nigeria - https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/ng.pdf

Table 15: Three stages in the evolution towards an information society



Source: ITU

ICT Readiness is measured by fixed-telephone subscriptions per 100 inhabitants, mobile-cellular subscriptions per 100 inhabitants, broadband internet bandwidth, and the percentage of households with a computer; ICT Use is measured by the percentage of individuals using the internet, fixed-broadband internet subscriptions per 100 inhabitants and active mobile-broadband subscriptions per 100 inhabitants; while ICT Skills are approximated by mean years of schooling, secondary gross enrolment ratio and tertiary gross enrolment ratio.

The computation of these measurement indices earned Nigeria a placement of 143rd out of 176 countries by Global Innovation Index as shown in Table 12.

Elsewhere on the global ratings, Nigeria trails such outperformers as South Africa, Mauritius, Namibia, Gabon, Cape Verde, Ghana, Kenya, Botswana and Senegal in the UNCTAD's 2021 Technology and Innovation Report where she is Nigeria ranked 10th in Sub-Saharan Africa and 124th among 158 countries in a global index. Out of the five blocks, Nigeria only performed well in research and development activities, standing 74th. The country's positions in other blocks are 124th in ICT development, 106th in skills, 155th in industry activity, and 149th in access to finance. [27]

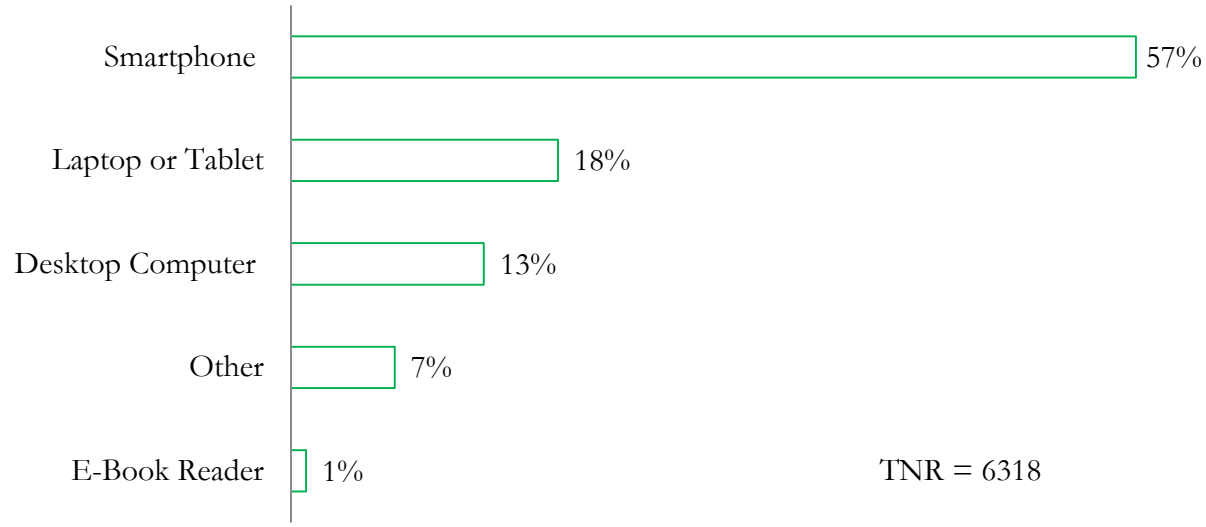
According to the index, the United States, Switzerland, the United Kingdom, Sweden, Singapore, the Netherlands and South Korea are the top seven countries on the log.

[27] UNCTAD – Technology and Innovation Report 2021

Nigerians use their mobile phones to connect to the internet more than other technologies. As such, mobile phones are the primary modality for creating, distributing, and consuming digital content and services across multiple sectors.[28]

The study findings show a higher percentage of ownership of smartphones by survey participants (57%) than laptops or tablets (18%) and desktop computers (13%) or other personal digital devices.

Table 16: Survey Question #8- Which of the following devices do you use?



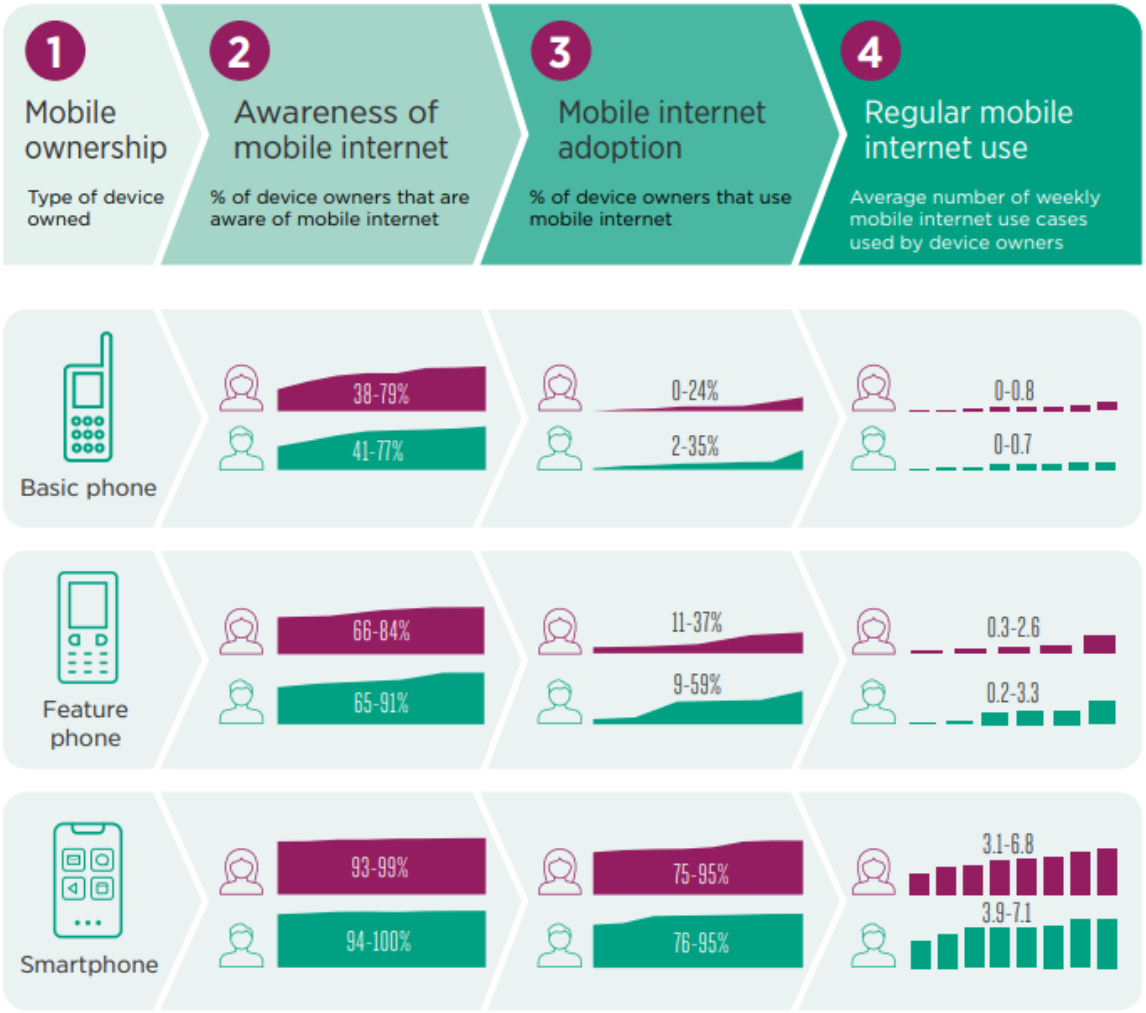
It is pertinent to note that device use differs somewhat from device access as elsewhere in the Report, respondents self-assessed themselves on a three-stage rubric of low, moderate and expert, with the majority of participants registering moderate skills in the use of smartphones (68%), laptops and tablets (39%), desktop computers (31%) while E-Book Reader has the lowest usage among respondents (1%).

What this indicates is that even without exercising ownership of a device, most people can still lay their hands on and engage with digital devices. Perhaps those could belong to their friends and families. Or they use them at public places such as libraries and internet cafes.

[28] GSMA - The Role of Mobile Technology in Building Nigeria's Digital Economy - https://www.gsma.com/publicpolicy/wp-content/uploads/2019/02/GSMA-Spotlight-on-Nigeria-Report.pdf

Awareness of mobile internet is a critical step in the digital skills and digital literacy acquisition journey. As shown in Table 17, there is some growth in mobile internet awareness among women in Nigeria with 75% mobile internet adoption by those who own smartphones.

Table 17: Mobile internet user journey, by handset type



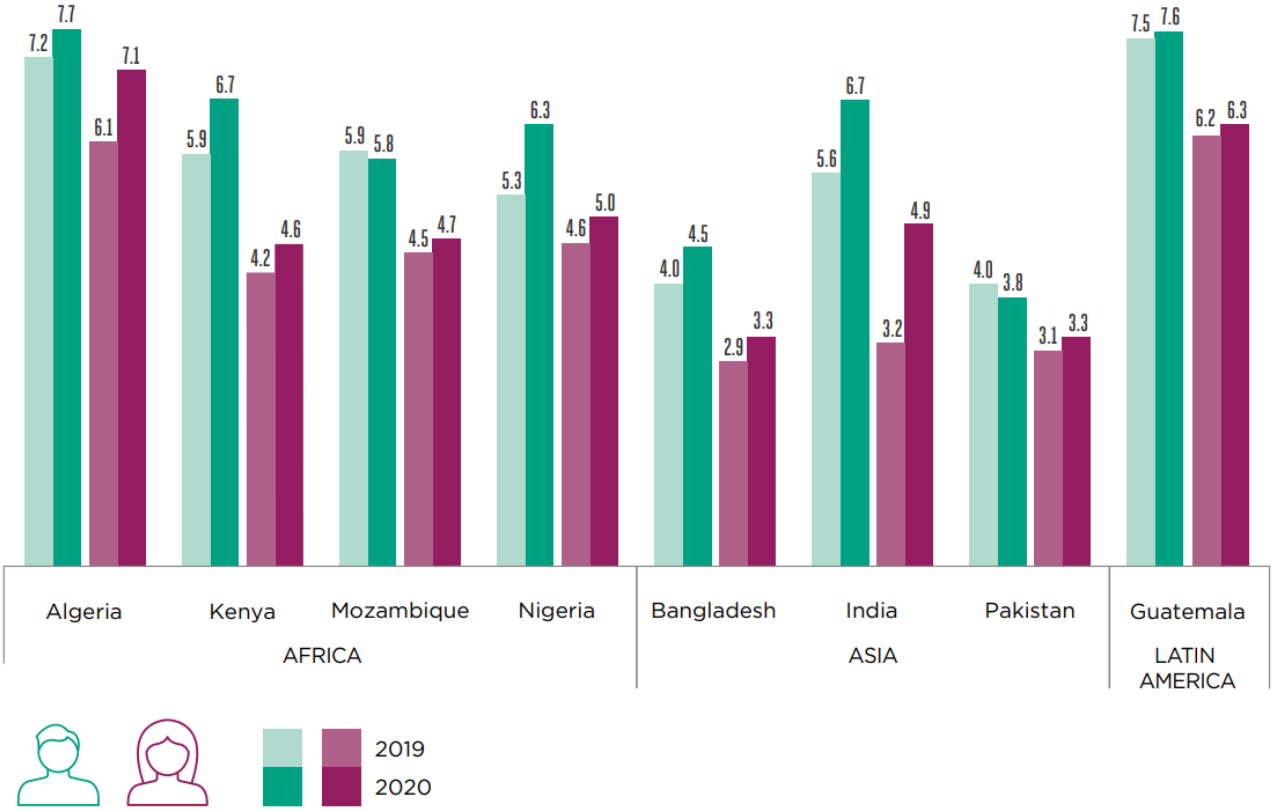
Source: GSMA

Awareness of mobile internet continues to expand as women and people living in rural areas are increasingly aware but still lag behind men and those living in urban areas. Affordability and skills remain the two greatest barriers to mobile internet adoption and use.

For example, among mobile users who are aware of mobile internet but don't use it, the top-reported barriers preventing mobile internet users are still affordability, particularly of handsets, and literacy and digital skills.

The gender gap in mobile internet use is wider in rural areas. For example, the urban gender gap is 23% while in rural areas this rises to 38%. The gender gap is widest among the unemployed with the gap in mobile internet use at 19% among those who are employed compared to 41% among those who are unemployed.[29]

Table 18: Average number of mobile use cases per week



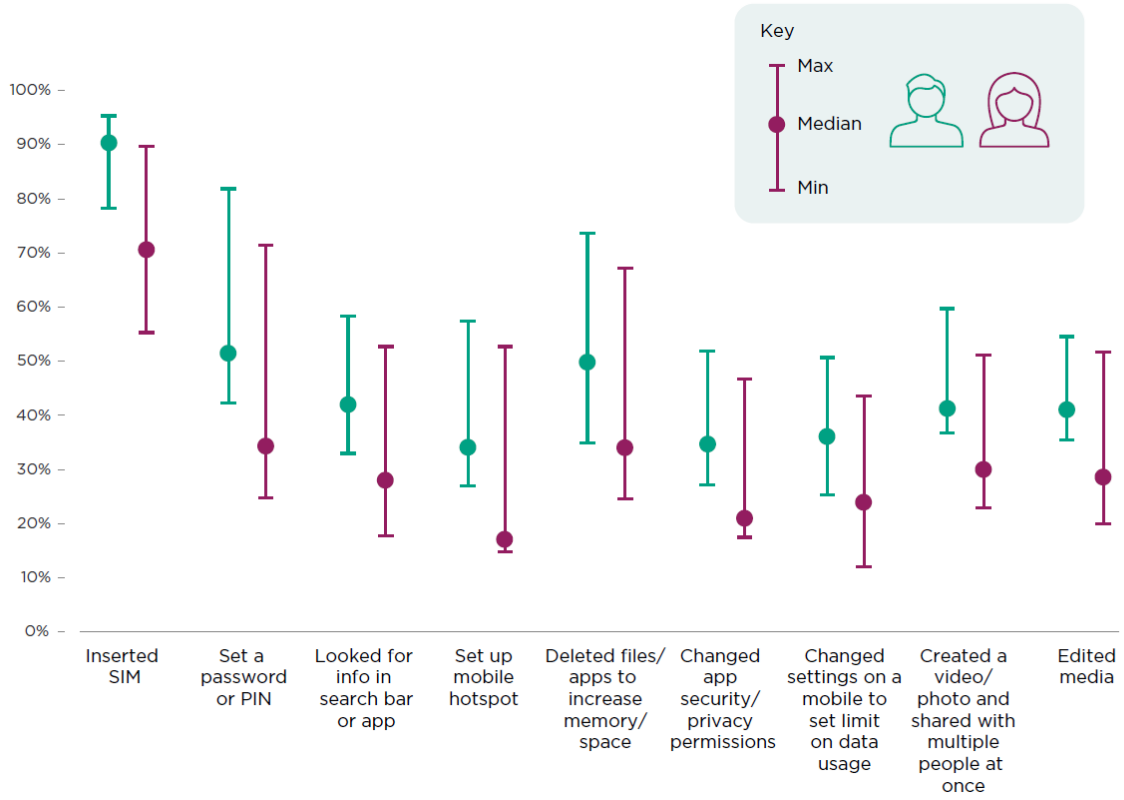
Source: GSMA

Women in Nigeria clocked more mobile use cases per week in 2020 (5.0) than they did in 2019 (4.6). In the same year, women in Nigeria accrued more mobile use cases than their peers in Kenya (4.6) and Mozambique (4.7). Women in Nigeria were beaten in the mobile use cases by women in Algeria (7.1) and those in Guatemala (6.3).

Across the ocean, women in India (4.9) amassed slightly fewer mobile use cases than their Nigerian counterparts. Across all the countries spotlighted, women's mobile use cases were higher in 2020 than they were in 2019; denoting a further narrowing of the gender gap in mobile use.

[29] GSMA Survey 2021 - https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf

Table 19: Self-assessment of Digital Skills for both men and women



Source: GSMA Survey

It is important to note that performing a task is not necessarily an indication of possession of relevant skills. While most women have performed the basic task of inserting a SIM card, other tasks particularly those relating to mobile internet, have been performed by fewer women than men. Overall, female mobile users are less likely than male users to have performed each of these tasks.

Female mobile users are less likely than male users to feel confident performing a new task on a phone by themselves. Female users who had never tried to use a search bar are less likely to feel confident doing this by themselves compared to their male counterparts.

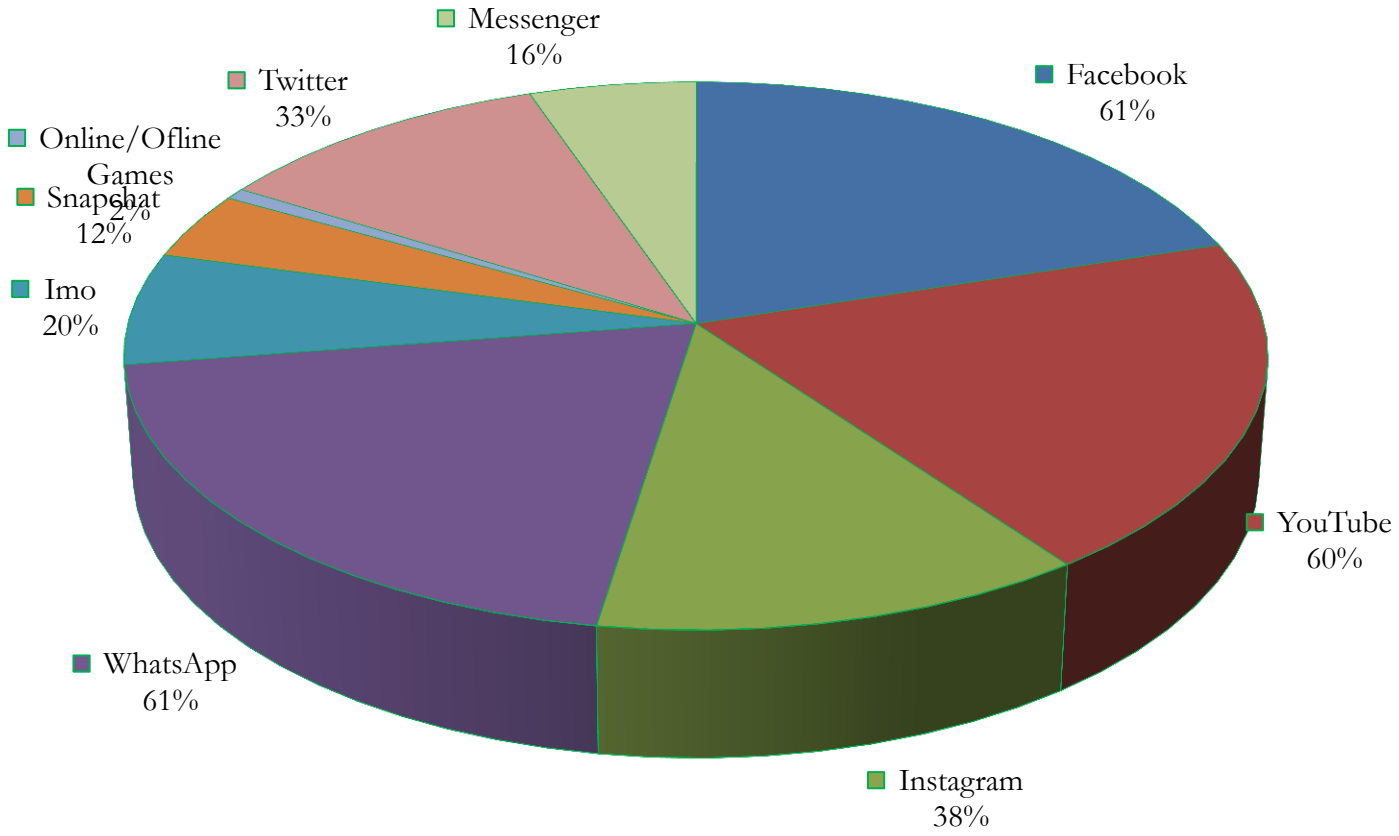
Female mobile users who had already performed a mobile-related task feel confident repeating the task almost on par with male users.

Once women have tried a task on a mobile, their confidence in doing it again seems to increase substantially, and more so than for men.

Survey participants demonstrated robust awareness and use of social media apps with WhatsApp and Facebook enjoying strong usage (61% apiece), and YouTube (60%).

While social media has been used by varying groups with shared motivations to mobilise and enhance social interactions and relationships same has been employed to advance economic and individual self-growth such as introducing and advertising businesses online, searching for job opportunities as well as chatting, uploading photos and life events and keeping in touch with friends and families.[30]

Table 20: Survey Question #16 - Which of the following products and services do you use regularly?



[30] Global Media Journal - Adoption, Motivation and Patterns of Social Media Use among Women in Nigeria - https://www.globalmediajournal.com/open-access/adoption-motivation-and-patterns-of-social-media-use-among-women-in-nigeria.php?aid=89046

3.1.1 Baseline Level of Digital Literacy and Skills amongst Youth

Digital divides along location and gender lines prevail even amongst the youth as males have higher internet use in comparison to females. The youth in urban areas have higher digital skills than their contemporaries in rural areas. Among the youth with digital skills, 55.7% are males while 46.3% are females. The majority of the youth use the computer for either internet browsing or word processing. In the Southeast and Southsouth, the computer-literate female youths are 50.3% and 51.2% respectively. The Northwest has the least percentage of computer-literate female youth at 19.4%.[31]

Most youth in Nigeria (95%) can surf the internet, while less than half (44.1%) know how to use the computer for word processing. Youths that are certified IT professionals are 4.7% of the total youth population.[32]

Nigeria has one of the largest populations of youth in the world, with a median age of 18.1 years. About 70% of the population is under 35, and 42% is under the age of 15.[33] The bulge in the youth population is occurring pari passu with rising urbanization. Many of the youth migrating from rural to urban areas encounter new technologies. This improves their opportunities for employment as well as expands their prospects for entrepreneurship or self-employment.

For statistical purposes, the United Nations defines those persons between the ages of 15 and 24 as youth without prejudice to other definitions by Member States.[34] But this age bracket is largely considered too narrow for countries in Africa, given their political, economic and socio-cultural circumstances.

In Nigeria, as in many other African countries, the transition to independent adulthood, in terms of achieving the economic and social stability that comes with steady employment, may extend into the late twenties and sometimes, beyond.

Thus, the African Youth Charter of 2006 defines youth as persons between the ages of 15 and 35 years.[35] On a similar basis, Nigeria's 2009 National Youth Policy chronologically defines youth as persons of age 18 to 35 years.[36]

[31] NYS 2020 – Federal Ministry of Youth and Sports and association with National Bureau of Statistics (NBS)
[32] Ibid
[33] Baseline Youth Survey - National Bureau of Statistics - https://www.nigerianstat.gov.ng/pdfuploads /2102%20National%20Baseline%20Youth%20Survey%20Report
[34] UN Secretary-General's Report to the General Assembly, A/36/215, 1981
[35] Section 1 – African Youth Charter (2006)
[36] Section 1, Subsection 1.3 – National Youth Policy (2019)

However, on the basis of the available demographic evidence, the National Youth Policy (2019) specifies 35 years as the upper age limit for the chronological definition of youth. This provision also recognises that the "Not Too Young to Run" law specifies 35 years as the age of eligibility for running for governorship and the presidency of the country. It follows, therefore, that the age of eligibility for the office of the President of Nigeria should signal an adult period of life in the country.[37]

Therefore, in qualifying respondents for categorisation in the youth population subdomain, the study pegged the upper age limit for youth at 35 on the strength of the "Not Too Young to Run" law,[38] and the lower rung at 15 in line with the UN definition.

As captured in its mission statement, the Federal Ministry of Youth and Sports Development (FMYSD) is the organ of Government with first line charge to provide a sustainable framework for the formulation and implementation of policies, programmes and other initiatives which promote and enhance youth and sports development in collaboration with stakeholders.[39]

The FMYSD through the 2009 National Youth Policy recognizes key priority areas that need to be addressed to enhance youth lives. These include the impact of globalisation, and access and use of digital technologies among others. The National Youth Policy envisions the development of critical fields of knowledge in applied science and technology, technical skills, vocational skills and the promotion of the use of information and communication technology.

Also active in the youth sphere is the National Youth Council of Nigeria (NYCN) - a non-governmental, non-partisan, and not-for-profit organisation that functions as the voice and umbrella body for youth organisations in Nigeria. The NYCN has aspirations to, inter alia, deep-root in the youth the culture of leadership and nation building and increase their participation in the decisionmaking process.[40]

[37] Ibid
[38] An act of parliament which sought to reduce the age limit for running for elective office in Nigeria - https://en.wikipedia.org/wiki/Not_Too_Young_To_Run
[39] Mission Statement – Federal Ministry of Youth and Sports Development - https://youthandsports.ng/
[40] National Youth Council of Nigeria - https://nycn.ng/

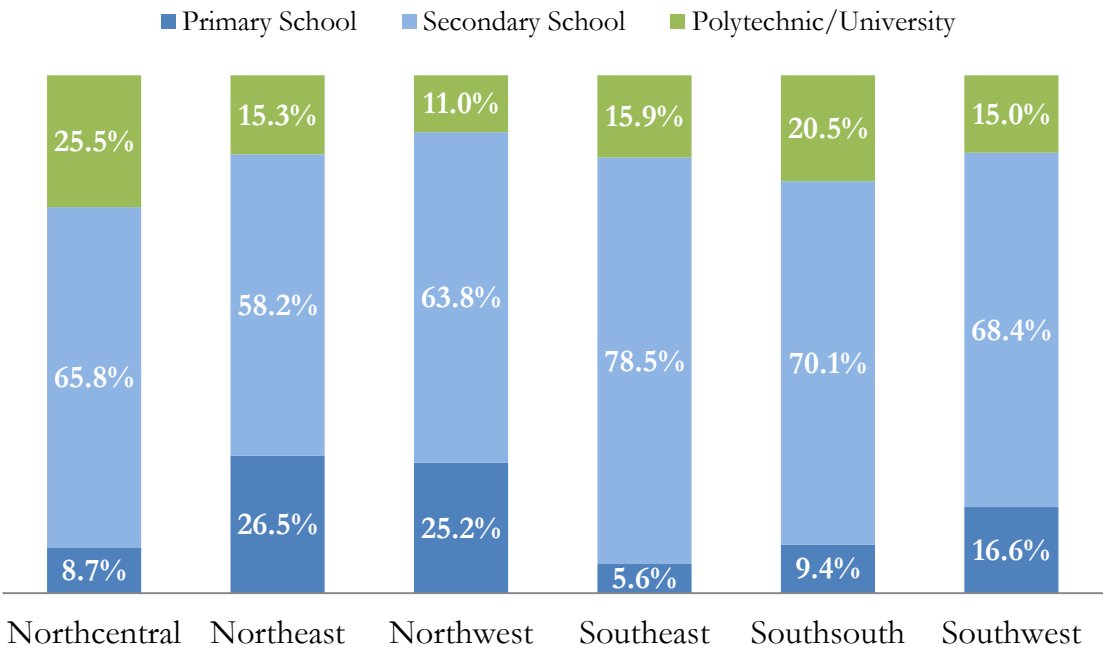
Table 21: Distribution of the Youth Population by State, Gender and Group

PERCENTAGE OF YOUTH BY AGE GROUP AND GENDER										
	AGE GROUP									
	15 - 19		20 - 24		25 - 29		30 -35		National	
STATE	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Abia	47.8	52.2	40.8	59.2	52.2	47.8	45.1	54.9	46.1	53.9
Adamawa	51.5	48.5	59.2	40.8	47.3	52.7	42.7	47.3	50.4	49.6
Akwa Ibom	51.8	48.6	49.0	51.0	52.5	47.5	50.3	49.7	50.8	49.8
Anambra	54.0	46.0	46.2	53.8	41.1	58.9	45.5	54.5	47.6	52.4
Bauchi	52.5	47.5	40.8	59.2	43.8	56.8	55.4	44.6	48.9	51.1
Bayelsa	55.0	45.0	46.8	53.2	37.6	62.4	52.8	47.2	47.2	52.8
Benue	63.9	36.1	49.5	50.5	51.8	48.2	62.0	38.0	57.6	42.4
Borno	59.1	40.9	38.4	61.6	39.0	61.0	50.1	49.9	49.5	50.5
Cross River	45.8	54.2	47.4	52.6	38.7	61.3	39.7	60.3	43.0	57.0
Delta	40.4	59.6	57.0	43.0	41.7	58.3	42.9	57.1	46.0	54.0
Ebonyi	49.5	50.5	62.0	38.0	42.9	57.1	51.0	49.0	50.0	49.3
Edo	57.3	42.7	48.6	51.4	51.2	48.8	49.3	50.7	51.8	48.2
Ekiti	47.9	52.1	44.5	55.5	46.8	53.2	44.4	55.6	46.2	53.8
Enugu	50.8	49.2	43.6	56.4	34.1	65.9	39.6	60.4	43.0	57.0
Gombe	43.8	56.2	36.7	63.3	38.8	61.2	55.2	44.8	45.0	55.0
Imo	53.5	46.5	51.8	48.2	49.0	51.6	50.6	49.4	51.6	48.4
Jigawa	51.3	48.7	47.6	52.4	48.7	51.3	46.4	53.6	48.5	51.5
Kaduna	48.1	51.9	41.9	58.1	45.0	55.0	47.0	53.0	45.8	54.2
Kano	55.3	44.7	40.7	59.3	32.2	67.8	42.4	57.8	43.5	56.5
Katsina	58.1	41.9	49.5	50.5	46.9	53.1	41.0	59.0	49.6	50.4
Kebbi	58.1	41.9	41.7	58.3	41.2	58.8	53.9	46.1	49.4	50.6
Kogi	55.7	44.3	44.7	55.3	52.5	47.5	47.6	52.4	50.3	49.7
Kwara	42.2	57.8	50.0	50.0	42.7	57.3	49.0	51.0	45.2	54.6
Lagos	52.4	47.6	50.7	49.3	53.5	46.5	50.3	49.7	51.7	48.3
Nasarawa	52.5	47.5	48.4	51.6	43.3	56.7	59.5	40.5	50.9	49.1
Niger	56.3	43.7	31.3	68.7	28.2	71.8	46.2	53.8	42.5	57.5
Ogun	42.9	57.1	43.8	56.2	48.1	51.9	39.6	60.4	43.1	56.9
Ondo	57.1	42.9	59.8	40.2	48.5	51.5	42.5	57.5	52.9	47.1
Osun	48.0	52.0	43.8	56.2	49.6	50.4	43.1	56.9	45.9	54.1
Oyo	45.7	54.3	50.5	49.5	51.6	48.4	49.6	50.4	49.0	51.0
Plateau	48.2	51.8	41.6	58.4	27.6	72.4	53.6	46.4	43.5	56.5
Rivers	57.7	42.3	56.2	43.8	37.3	62.7	55.6	44.4	51.7	48.3
Sokoto	59.8	40.2	44.2	55.8	50.5	49.5	42.8	57.2	50.0	50.0
Taraba	62.4	37.6	50.0	50.0	45.1	54.9	56.8	43.2	53.5	46.5
Yobe	55.7	44.3	50.8	49.2	42.9	57.1	44.3	55.7	49.3	50.7
Zamfara	60.2	39.8	37.8	62.2	21.9	78.1	34.1	65.9	43.3	56.7
FCT	50.6	49.4	49.4	50.6	54.8	45.2	57.3	42.7	53.4	46.6
National	52.8	47.2	47.2	52.8	44.1	55.9	47.9	52.1	48.4	51.6

Source: Nigerian Population Commission (NPC)

Despite the opportunities that the digital economy portends, the youth struggle to benefit due to the digital skills and soft skills gap. The scenario is made worse by Nigeria's labour market which is already characterised by high unemployment and underemployment. According to recent data from the National Bureau of Statistics (NBS), 1 in 4 Nigerians (33.3%), is unemployed while the number is worse for the youth with 1 out of 3 being unemployed (34.9%). Nigeria has a combined unemployment and youth unemployment rate of 55.7% and 63.1% respectively.[41]

Table 22: Percentage Distribution of Youth by Level of Education and GPZ



Source: National Youth Survey, 2020 – National Bureau of Statistics (NBS)

A clear correlation has already been established between the level of education attained and the level of digital literacy. The ability to read, write and comprehend information is a prerequisite skill on which digital skills and digital literacy can be bolted. As statistics show, those who have attained post-primary education do better with digital technologies than their peers with only primary education or no education at all.

[41] Unemployment rate hits 33.3%, 23.18million Nigerians jobless – NBS - https://punchng.com/unemployment-rate-hits-33-3-23-18million-nigerians-jobless-nbs/

3.1.2 Baseline Level of Digital Literacy and Skills amongst the Physically Challenged

Nigeria does not have a large disability gap as people with disabilities are 11% less likely to use the internet and 16% less likely to own a smartphone than those without disabilities.[42]

Table 23: Disability gap in mobile internet use for persons with and without disabilities

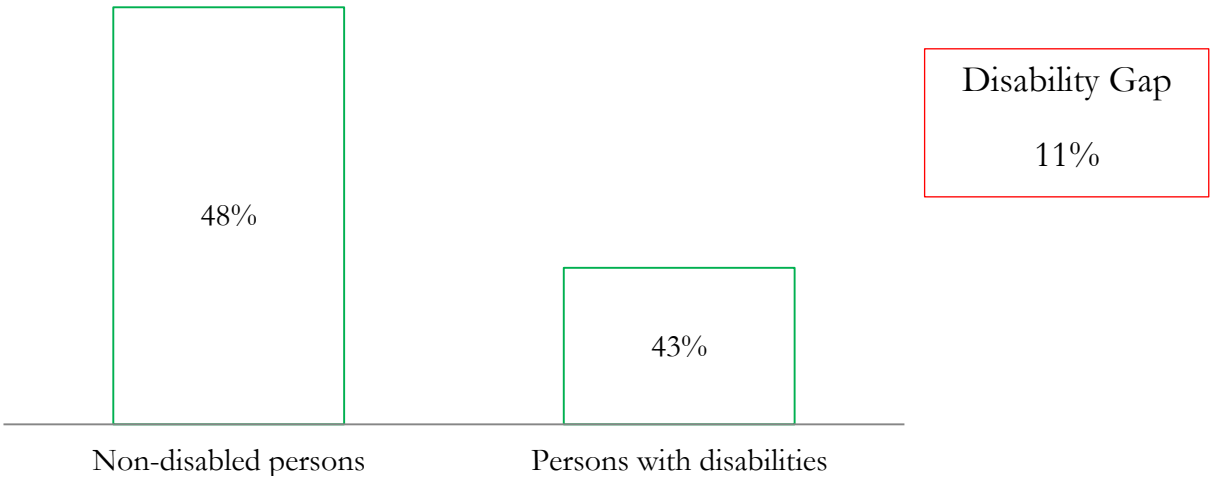
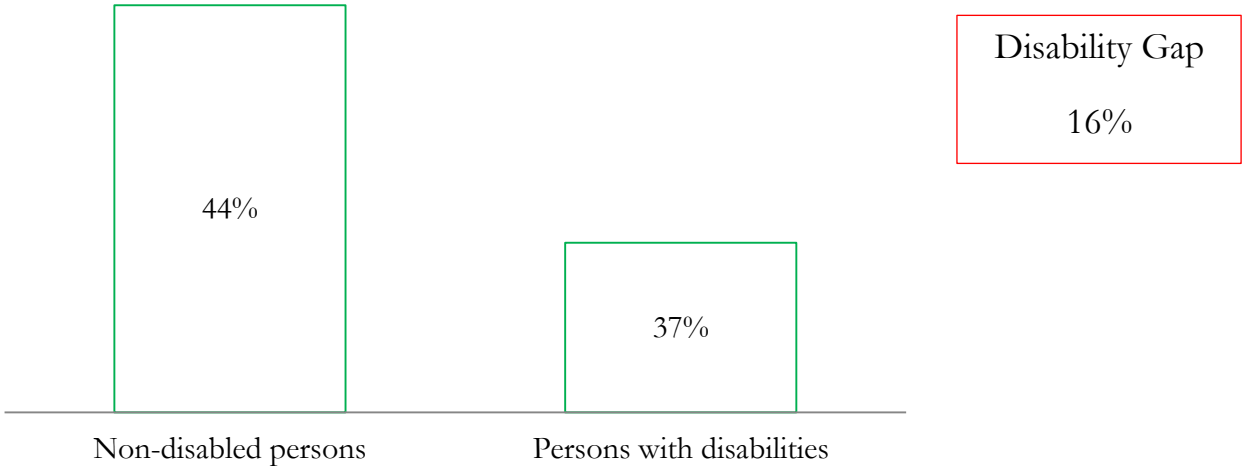


Table 24: Smartphone ownership by persons with and without disabilities



The United Nations Convention on the Rights of Persons with Disabilities defines persons with disabilities to include those who have long-term physical, mental,

[42] GSMA Intelligence - United States Agency for International Development (USAID)

intellectual or sensory impairments which in interaction with various barriers may hinder their full and active participation in society on an equal basis with others.[43]

The World Health Organisation defines disability as difficulty in functioning at the body, person or societal levels, in one or more life domains, as experienced by an individual with a health condition. This entails any restriction or lack of ability to perform an activity in a manner or within the range considered normal for a human being.[44]

This study leaned on the UN Convention on the Rights of Persons with Disabilities to determine those to group under the physically challenged category. Since, according to the Convention, the challenges afflicting the physically challenged can manifest in forms that may not readily be visible to the cursory observer, the survey questionnaire was couched to elicit that information directly from the respondents.

Nigeria signed the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and ratified its Optional Protocol in 2010 and in January 2019, the Discrimination against Persons with Disabilities (Prohibition) Act 2018 was passed into law.

Some State Governments have demonstrated measures to adopt the Act by enacting disability laws that protect persons with disabilities in their States. The States include Kogi State, Kwara State, Nasarawa State, Niger State, Plateau State, Bauchi State, Jigawa State, Kaduna State, Kano State, Sokoto State, Zamfara State, Abia State, Anambra State, Cross River State, Edo State, Ekiti State, Lagos State, Ondo State, Oyo State and Ogun State.

The actions of these State Governments and the Federal Government underscore Nigeria's aspirations to address the issues physically challenged persons face in society. However, according to the Centre for Citizens with Disabilities (CCD), the States and Federal Governments' aspirations are not being matched with requisite action as evidenced by the non-provision of necessary measures to enhance access to MDAs, and the non-inclusion of persons with disabilities in several Government programmes and activities.

[43] Convention on the Rights of Persons with Disabilities - https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-persons-disabilities

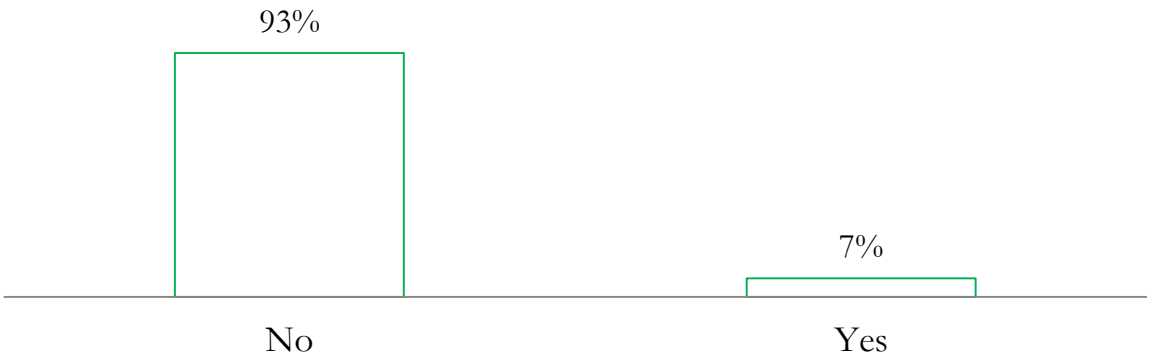
[44] WHO - International Classification of Functioning, Disability and Health - https://unstats.un.org › unsd › pdfs › ac.81-b4.pdf

Many States across the federation struggle to budget for the integration and rehabilitation of citizens with disabilities. Even when and where budgetary provisions are made, persons living with disabilities hardly benefit from such provisions.

To be clear on the actual numbers of the physically challenged partaking in the survey, question #4 of the questionnaire specifically enquired about the respondents' physical health status.

Table 25: Survey Question #4: Do you have any disability?

TNR: 6318



In Nigeria, the physically challenged are noticeably absent in politics and political offices and have limited access to electoral process participation. There is low labour market absorption of them as both public and private sectors absorb fewer than expected people with disabilities into their workforce. Persons with at least a lot of functional difficulty have a higher unemployment population ratio than persons with no difficulty, at 60% and 38% respectively.[45]

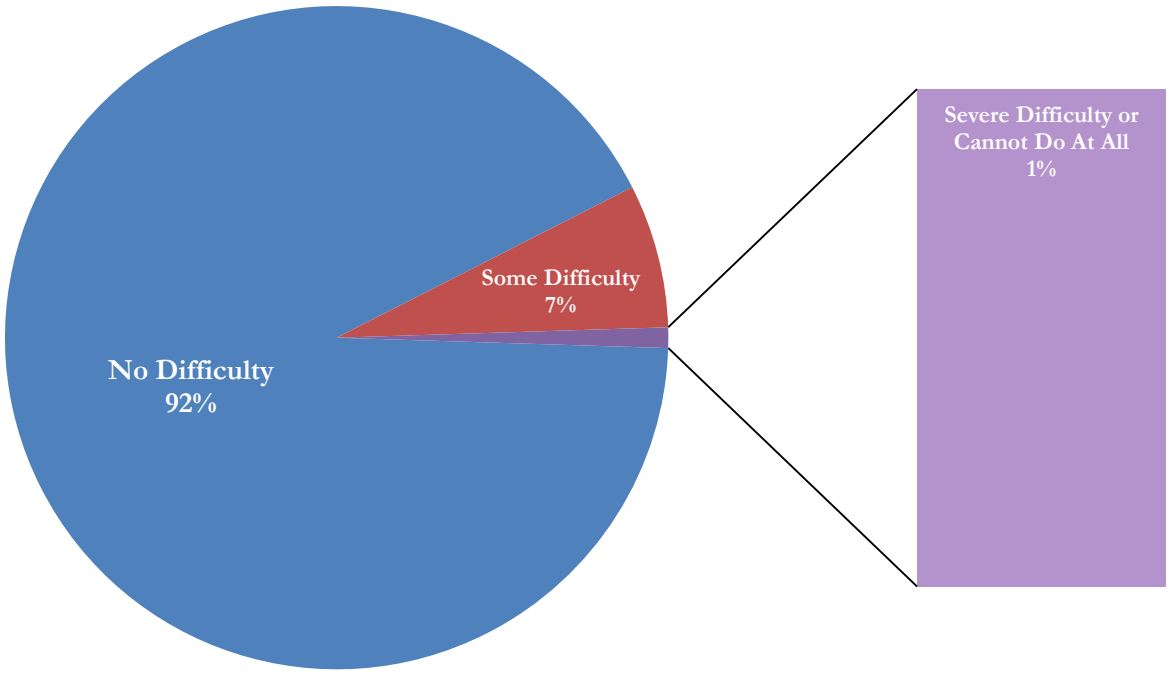
The physically challenged are impacted not only by the negative perception of disabilities in society, but also by corporate policies, mainstream computing technologies, and real-time online communications that fail to factor in their particularities. Some types of disabilities are not always considered as severe such as psychotic disorders and other cognitive impairments.

Some of the physically challenged in this demographic may also be affected by their symptoms and medications and might suffer from function impairments resulting in less access to digital technologies, further widening the digital divide.

[45] Nigeria - General Household Survey Panel (GHSP)

Data from the National Commission for Persons with Disabilities posit that around 7% of Nigerians have some impairment and 1% cannot do at all in at least one functional domain – visual, hearing, physical, and mental.

Table 26: Prevalence of Functional Difficulty in at least one domain



Source: National Commission for Persons with Disabilities

The proportion of household members who have difficulty in each functional domain generally rises with increasing age.

According to the World Bank, 15% of the world's population (circa 1 billion people) has some form of disability and is more likely to experience adverse socioeconomic outcomes than persons without disabilities.[46]

The World Health Organisation estimates that around 29 million persons in that demography live in Nigeria. Many of them are not educated and have limited access to both employment and public spaces.[47] Only 5% is literate among the Nigerian persons with disabilities while more than 50% are females.[48]

Disability knows no race, age, gender or status and may be congenital or acquired. Congenital disabilities are those that are genetic or hereditary. Acquired disabilities may occur through sickness, accident or violent conflict. Disabilities vary and take

[46] Disability Inclusion - https://www.worldbank.org/en/topic/disability
[47] World Health Organisation - World Report on Disability - https://www.who.int/publications/i/item/9789241564182
[48] Grassroots Researchers Association - They Called Us Senseless Beggars - https://www.grassrootresearchers.org/challenges-of-persons-with-disabilities-in-north-eastern-nigeria/

different forms and dimensions. The most common impairments found in Nigeria include visual, hearing, mobility, and mental disability.

Table 27: Percentage Prevalence of Disabilities in Nigeria

Group	With Disability %	Moderate%	Severe %
All Adults	6.92	4.59	2.33
Females	7.52	5.12	2.40
Males	6.29	4.03	2.26
Rural Residents	7.38	4.75	2.63
Urban Residents	5.80	4.19	1.61
Ages 15 to 29	1.85	1.27	0.58
Ages 30 to 44	3.67	2.54	1.13
Ages 45 to 64	9.71	6.83	2.88
Ages 65 and over	38.75	24.04	14.71
Seeing	2.80	2.16	0.64
Hearing	1.14	0.81	0.32
Mobility	3.95	2.76	1.19
Cognitive	2.13	1.66	0.46

Source: Nigeria 2018 GHSP

The International Labour Organization (ILO) reports that unemployment among the physically challenged in some countries is as high as 80% and employers often assume that persons with disabilities are incapable of working. In both the private and public sectors, employers aim to create equal opportunities for recruitment on the basis of experience and eligibility but in reality, they seldom consider persons with disabilities.

Across Nigeria, the share of persons aged 15 and over with any functional difficulty stands at 6.9%. The prevalence of functional difficulties is higher for women (7.5%) than for men (6.3%). Functional difficulties are more prevalent among older age groups, at 1.9% for ages 15 to 29; 3.7% for ages 30 to 44; 9.7%

for ages 45 to 64; and, 38.8% for ages 65 and over.[49]

The prevalence of functional difficulties is higher in rural areas compared to urban areas at 7.4% and 5.8% respectively. Among households in rural and urban areas, the prevalence of functional difficulties is 19.4% and 15.6% respectively.[50] The North hosts the highest number of persons with disabilities more than the South.

The States affected with the highest levels of disability are Borno, Yobe, Taraba, and Adamawa in the Northeast and Zamfara, Kano, and Sokoto in the Northwest. The Southwest has the lowest number of persons living with disabilities.

Similar to other countries in Sub-Saharan Africa, in Nigeria, people with disabilities experience poor educational outcomes because of the absence of adequate facilities, including accessible infrastructure, learning materials, and teachers trained in inclusive education. Assistive technology devices are expensive and not easily available, which limits mobility and access to technology for people living with disabilities.

The physically challenged are at greater risk of suffering physical, sexual and economic abuse than those without disabilities. It is to ameliorate such anomalies that the Discrimination against Persons with Disability (Prohibition) Act was enacted into law in 2018. The Act states, inter alia, that an individual with a disability shall not be discriminated against on the grounds of his or her disability by any person or institution in any manner or circumstance.

The Act provides for the full integration of persons with disabilities into society; establishes the National Commission for Persons with Disabilities; and, vests the Commission with responsibilities for the healthcare, civil rights, education, and socioeconomic welfare of persons with disabilities.

However, despite the Act, persons with disabilities have a lower employment-population ratio than persons with no difficulty at 38% and 60% respectively. With regards to education, the share of adults who have primary school as their highest attained level of schooling is significantly higher among persons with disabilities (62%) compared to persons with no difficulty (34%). This boils down to a gap of 23% between persons with disabilities and persons with no difficulty.[51]

[49] Nigeria General Household Survey Panel (GHSP), 2018 - https://disabilitydata.ace.fordham.edu/country-briefs/ng/
[50] Ibid
[51] Nigeria General Household Survey Panel (GHSP), 2018 - https://disabilitydata.ace.fordham.edu/country-briefs/ng/

3.1.2.1 Main Types of Disabilities in Nigeria

3.1.2.2 Visual Disability

According to the national blindness and visual impairment study, about 4.25 million adults, aged 40 years and above, have moderate to severe visual impairment or blindness in Nigeria. The prevalence of blindness is 4.2% and severe visual impairment is 1.5%.[52] It is said that 84% of all causes of blindness are either preventable or treatable.

Table 28: Prevalence of Cause-Specific Blindness and SVI

Cause	Prevalence %
Cataracts	1.8
Glaucoma	0.7
Uncorrected aphakia	0.35
Cornea (excluding trachoma)	0.33
Trachoma	0.18
Optic atrophy	0.15
Phthisis	0.1
Macular degeneration	0.07
Uncorrected refractive errors	0.06
River blindness	0.04
Diabetic retinopathy	0.02

People living in rural areas had a higher prevalence of cataract and corneal disease than did those from urban areas while the prevalence of glaucoma and conditions like diabetic retinopathy which causes posterior segment disease was higher among urban residents.[53]

All available evidence points to cataracts being the single commonest cause of blindness and visual impairment in Nigeria followed by glaucoma. The prevalence of cataracts is lowest in the Southwest and highest in the Northeast. People who were illiterate have a higher prevalence of all cause-specific conditions.

Visual impairment obtains when there is a reduced ability of an individual to see to a degree that causes problems not curable by usual means, such as glasses and medication with the most acute impairment being blindness. According to

[52] National Library of Medicine - https://pubmed.ncbi.nlm.nih.gov/19387071/
[53] Investigative Ophthalmology & Visual Science - Causes of Blindness and Visual Impairment in Nigeria: The Nigeria National Blindness and Visual Impairment Survey - https://doi.org/10.1167/iovs.09-3507

SightSavers, about 1 million adults are blind in Nigeria and another 3 million are visually impaired. The most common cause of visual impairment and blindness in Nigeria is cataracts.[54]

The Nigeria National Blindness and Visual Impairment Survey reported a higher prevalence of visual impairment and blindness in rural areas (4.3%) compared to urban areas (3.8%).[55] There is an indication that illiteracy and poor literacy levels are associated with visual impairment and blindness with a higher prevalence among the illiterate (5.8%), compared to the literate (1.5%).[56]

The Southwest geopolitical zone (GPZ) has the lowest prevalence of visual impairment at 2.8%, Southsouth at 3.2%, Northcentral 3.7%, and Southeast at 4.6% while the Northwest and Northeast zones have a higher prevalence of visual impairment than the other GPZs at 4.8% and 6.1% respectively. The two zones have also been reported to have the lowest literacy rates in the country.[57]

Table 29: Key barriers to mobile internet adoption for PWDs

Key barriers to mobile internet adoption and use				
Access, accessibility and usability	**Affordability**	**Knowledge and skills**	**Relevance**	**Safety and security**
Lack of access to networks and enablers, such as electricity, agents and formal IDs; and devices, content and services are not accessible or easy to use	Ability to afford devices, data plans or other service fees	Lack of digital skills and literacy, as well as lack of awareness and understanding of mobile and its benefits and how to use accessibility features	Lack of relevant content, products and services that meet the needs and capabilities of persons with disabilities	Concerns about the negative aspects and risks of mobile and the internet, such as harassment, theft, fraud, security and accessible data management

[54] SightSavers: Important Data About Blindness in Nigeria - https://www.sightsavers.net/our_work/around_the_world/west_africa/nigeria/9858.html
[55] The Nigeria National Blindness and Visual Impairment Survey: https://pbunion.org/Countriessurveyresults/Nigeria/Nigeria_survey_Summary_report.pdf
[56] Zheng Y, Lamoureux E, Chiang PP, et al. Literacy is an independent risk factor for vision impairment and poor visual functioning. Invest Ophthalmol Vis Sci. 2011;52(10):7634–7639. https://doi.org/10.1167/iovs.11-7725
[57] National Bureau of Statistics (NBS) - National Literacy Survey http://nigerianstat.gov.ng/pages/download/43

3.1.2.3 Hearing Disability

Hearing impairment is a full or partial decrease in the ability to detect or understand sound. It occurs when there is a problem with or damage to one or more parts of the ear. The severest impairment in this category is deafness.

No fewer than 8.5 million Nigerians suffer from hearing impairments according to the Speech Pathologists and Audiologists Association in Nigeria (SPAAN).[58] While over 5% of the world's population – or 430 million people – require rehabilitation to address their disabling hearing loss. The number is estimated to exceed 700 million people by 2050 – or 1 in every 10 people.[59]

Disabling hearing loss refers to hearing loss greater than 35 decibels (dB) in the better-hearing ear. The prevalence of hearing loss increases with age. Over 25% of those older than 60 years are affected by disabling hearing loss.[60]

Table 30: WHO-proposed grades of hearing-impairment

Grade and corresponding audiometric ISO value	**Performance in Quiet and Noise**
0-No impairment, better than 20 dB	No or very slight hearing problems.
1-Mild 20–34 dB	No problems in quiet but may have real difficulty following conversation in noise.
2-Moderate 35–49 dB	May have difficulty in quiet hearing a normal voice and having difficulty with conversation in noise.
3-Moderately severe 50–64 dB	Needs loud speech to hear in quiet and has great difficulty in noise.
4-Severe, 65–79 dB	In quiet, one can hear loud speech directly in one's ear, and, in noise, has very great difficulty.
5-Profound impairment, 80–94 dB	Unable to hear and understand even a shouted voice whether in quiet or noise.

[58] https://spaan.org.ng/8-5m-nigerians-suffering-from-hearing-impairment/
[59] WHO – Deafness and Hearing Loss - https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss
[60] Ibid

3.1.2.4 Mobility Disability

Physical disability affects a person's mobility, stamina or dexterity. Such a person is constrained from carrying out physical activities independently or lacks the ability to perform an activity in the manner or within the range considered normal for a human being due to impairment.

Mobile disabilities can cause difficulty with, or inability to use the hands, feet, arms, or legs. Typical symptoms include tremors, muscle slowness, loss of fine motor control, or paralysis. Mobility impairments can be caused by conditions such as Parkinson's Disease, muscular dystrophy, cerebral palsy, epilepsy, or stroke.

Mobility impairment is defined as a category of disability that includes people with varying types of physical disabilities. This type of disability includes upper or lower limb loss or disability, manual dexterity and disability in coordination with different organs of the body. Disability in mobility can either be congenital or acquired age problems. This concern could also be the consequence of disease. People who have broken skeletal structures also fall into this category of disability. Persons with physical impairment disabilities often use assistive devices or mobility aids such as crutches, canes, wheelchairs and artificial limbs to obtain mobility.[61]

The physical disability the person experiences may be either congenital or a result of injury, muscular dystrophy, cerebral palsy, amputation, multiple sclerosis, pulmonary disease, heart disease or other reasons. Some persons may experience non-visible disabilities that may include respiratory disorders, epilepsy, or other conditions.

Fortuitously, there is a growing panoply of assistive and adaptive technologies that aim to allow people with mobility disabilities to participate more fully in all aspects of life (home, school, and community) and increase their opportunities for education, social interactions, and potential for meaningful employment.[62] These technologies create greater independence and control for persons with disabilities.

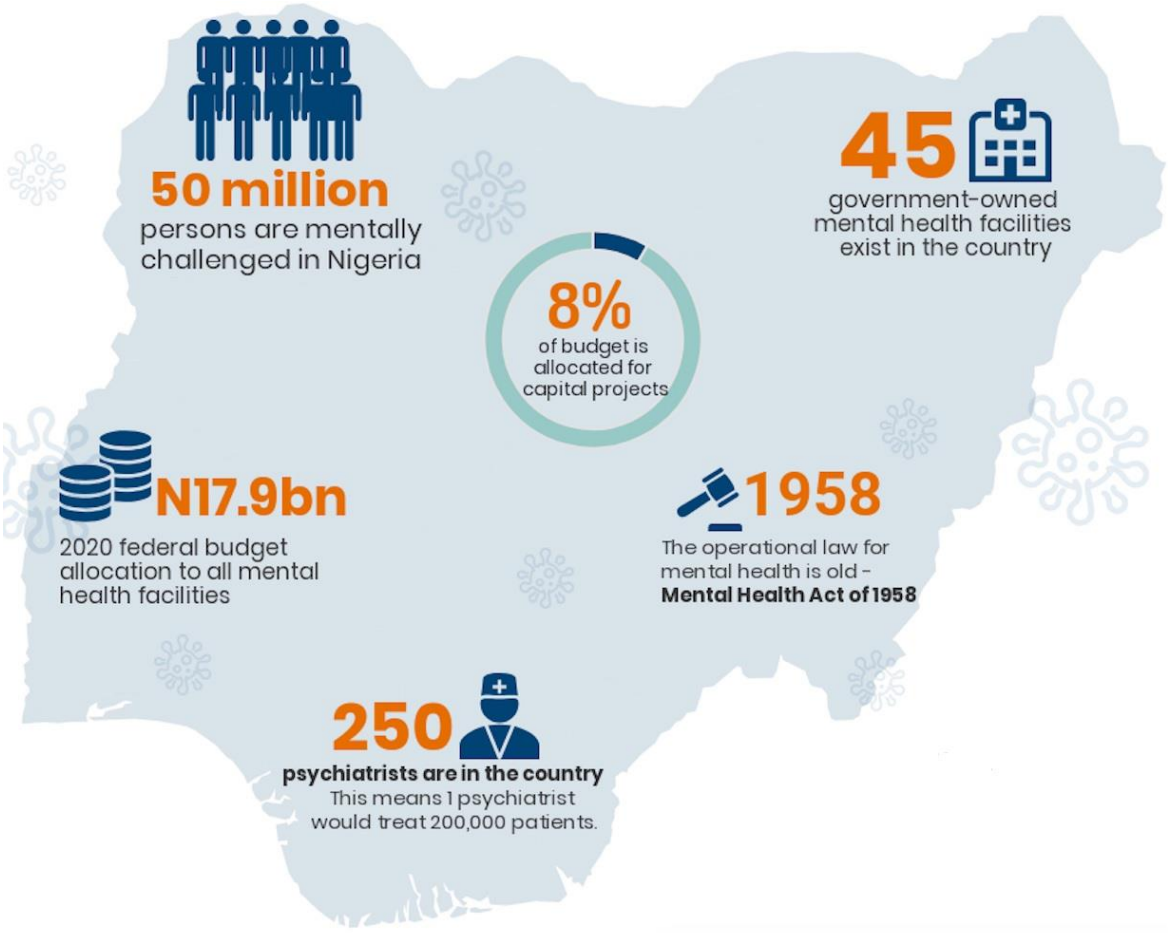
[61] Disabled World - Physical and Mobility Impairment Information - https://www.disabled-world.com/disability/types/mobility/

[62] Considering Assistive Technology - http://www.parentcenterhub.org/repository/considering-at/

3.1.2.5 Mental Disability

Data from the World Health Organization encapsulates the bleak state of mental health in Nigeria. The WHO notes that one in four persons living in Nigeria, which is about 50 million people, suffer from some form of mental disorder. On the global scale, Nigeria has Africa's highest caseload of depression and ranks 7th in Africa and 15th in the frequency of suicide in the world.[63]

Despite the huge number of mental health cases, Nigeria has 250 psychiatrists only and another 200 psychiatry trainees in its 45 government-owned mental health facilities scattered across the country.[64]



Source: Dataphyte

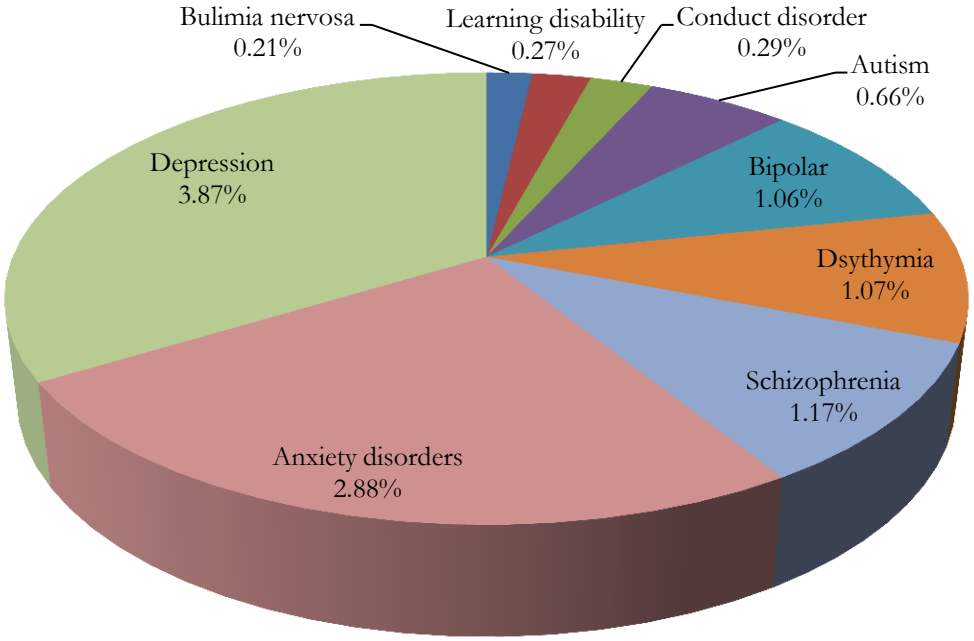
[63] Africa Check - https://africacheck.org/fact-checks/reports/nigeria-ranked-15th-world-suicide-lesotho-tops-african-list

[64] Association of Psychiatrists in Nigeria (APN)

The Association of Psychiatrists in Nigeria (APN) elucidates that mental disability occurs when mental impairment affects a person's cognitive ability, emotional state, and interaction with others. The APN posits that public perception of mental health in Nigeria is still significantly poor as mental health disorders are still commonly connected with their overt psychosocial symptoms without attending to the underpinning triggers like stress, depression or trauma.

A recent study indicated that about 35% of Nigerians will not refer a mentally disturbed person to a hospital, resorting instead to prayer houses and unorthodox rehabilitation centres, where they impose unhealthy restraints on the victim.[65] Some Nigerians even believe that all mental health disorders cannot be successfully treated medically.

Table 31: Prevalence of Mental Health Disorders in Nigeria



Source: Compiled from Data from WHO and Statista

Available data show that depression is the most prevalent form of mental impairment in Nigeria followed by anxiety disorders, schizophrenia, dysthymia, bipolar, autism and other forms of mental disorders[66].

[65] African Polling Institute (API) - https://africapolling.org/2020/01/13/mental-health-in-nigeria-survey-report-2020/

[66] Statista - YLDs for mental disorders in Nigeria 2019 - https://www.statista.com/statistics/1172828/ylds-for-mental-disorders-in-nigeria/

Three levels to understand digital literacy are proposed. The first responds to the use of digital tools, programs and applications; the second to a critical understanding of ICT, or in other words, the ability to analyse and evaluate the content with which one interacts. Finally, the third level is where the user is able to create and share digital content using technological tools.[67]

The study analysed digital skills in four ways:

1. Foundational Digital Skills
2. Hard Digital Skills
3. Soft Digital Skills
4. Digital Roles

3.1.3 Foundational Digital Skills

These are the bare minimum digital skills required to function in the emerging digital economy. In the workplace, foundational digital skills are nonspecialized digital skills that may be important for carrying out a job but are not the job's main substance. The skills include the ability to carry out tasks such as:

- Communicating via email;
- Researching information online;
- Handling sensitive information in virtual ecosystems;
- Using cloud-based collaboration tools such as Google Drive, DropBox or Microsoft Teams;
- Creating and managing spreadsheets and online documents;
- Connecting to the internet or installing software updates;
- Sharing screen during a video call; and,
- Using online calendars and efficiently managing schedules.

Foundational digital skills exist on a continuum from basic skills to advanced skills.

On one end are the elementary skills of how to use information and communications tools, for example, being able to turn on a computer, use a mouse or access the internet.

[67] Arrieta & Montes - Study of the Impact of Digital Literacy in Primary Education Contexts: Diagnosis and Evaluation [12, p.187].

The next level of skills involves using these tools to carry out specific digital tasks such as writing an email or searching for specific information on the internet.

A higher level of foundational digital skills is being able to take the knowledge of how to accomplish specific digital tasks and apply it to new circumstances, contexts, or platforms.[68]

Foundational digital skills are in contrast to the hard digital skills required for jobs that are all or mostly digital, such as those listed in Table 32.

3.1.4 Hard Digital Skills

Twenty-four hard digital skills were included in the survey and were identified based on trends in emerging technologies.

Table 32: A Compilation of Hard Digital Skills (not exhaustive)

	Hard Digital Skills	Definition
1	**Agile**	An iterative approach to project management and software development that divides a project or program into short phases of work, in small, but consumable increments which are tested and evaluated continuously throughout the development lifecycle
2	**Analytics**	The systematic approach to transforming data into actionable insights to make data-driven decisions
3	**Artificial Intelligence**	Software that enables computers to reproduce or surpass tasks that would require intelligence if human workers were performing them; the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions
4	**Augmented Reality**	A live view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory inputs
5	**Automation**	Application of machines/computers to tasks in order to increase efficiency and reliability
6	**Behavioural Sciences**	Combines knowledge of sociology, psychology, and anthropology with strong observation, research, and communication skills to examine human behaviour and

[68] Ian Hecker and Pamela Loprest - Foundational Digital Skills for Career Progress (2019) - https://www.urban.org/sites/default/files/publication/100843/foundational_digital_skills_for_career_progress_2.pdf

		decision-making
7	**Big Data**	Technology that enables the handling of massive amounts of structured and unstructured data (that cannot be handled by traditional database technologies) as well as their storage and analysis for better insights and decision-making
8	**Cloud Computing**	The practice of using a network of remote servers hosted on the internet to store, manage, and process data rather than a local server or a personal computer
9	**Community Management**	The process of creating or altering an existing social media community through content, messaging, interaction, moderating, etc. in an effort to make the community stronger
10	**Cybersecurity**	The protection of information systems from theft of/damage to the hardware, the software, or the information they contain
11	**Data Science**	Field which employs statistics and computation to derive meaningful algorithms and business insights from data
12	**Digital Manufacturing**	The use of an integrated, computer-based system comprised of simulation, three-dimensional (3D) visualization, analytics, and various collaboration tools to create product and manufacturing processes simultaneously
13	**Search Engine Optimization (SEO)**	The process of maximizing the number of visitors to a website by ensuring that the site figures high on the list of results returned by a search engine
14	**Innovation Strategy**	Creating new products, services, and customer experiences in an effort to drive sustainable growth
15	**Master Data Management**	Ensuring the uniformity, accuracy, stewardship, consistency, and accountability of the enterprise's official shared master data assets
16	**Mobile Application Design and Development**	The ability to create experiences end-to-end (conceptualize, design, build, test, run) for any device

17	**Robotics**	Technology dealing with the design and development of robots and the computer systems for their processing
18	**Robotic Process Automation**	Automation in which a software robot is configured to manipulate existing application software in the same way a person works with those systems and the presentation layer to perform a specific task
19	**Internet of Things (IoT)**	A network of physical objects (e.g., devices, vehicles, buildings) embedded with electronics, software, sensors and network connectivity that enable these objects to collect and exchange data
20	**User Experience Design**	The process of development and improvement of quality interaction between a user and all facets of a company across research, testing, development, content, and prototyping
21	**User Interface Design**	The practice of transferring a brand's strengths and visual assets to a product's interface to enhance the user's experience and visually guide the user through an interface via interactive elements across platforms
22	**Virtual Reality**	A computer technology that replicates an environment, real or imagined, and simulates a user's physical presence and environment in a way that allows the user to interact with it artificially creating a sensory experience
23	**Video Content Marketing**	The marketing technique of creating and distributing valuable, relevant, and consistent video content to attract and acquire a clearly defined audience
24	**Web Development**	Coding or programming that enables website functionality as per the owner's requirements and mainly deals with the non-design aspect of building websites

3.1.5 Soft Digital Skills

There are eight essential elements of digital literacy – the 8C's – cultural, cognitive, constructive, communicative, confident, creative, critical and civic.[69]. They constitute the soft skills that are sought after in all professions. They are essential skills for success both in the workplace and in daily life. They consist of an admixture of people, social, and communication skills, character traits, attitudes, and mindsets, as well as social and emotional characteristics.

1. Cultural: How To Behave

This means understanding the culture (history, language, customs and values etc.) of the internet and digital environments by:

- Knowing how to behave online; from netiquette to protection and privacy and recognising the difference between personal and professional use;
- Understanding how internet culture is expressed and transmitted through phenomena such as memes, emojis and animated gifs;
- Being able to seamlessly adjust to the different social environments of various applications; and
- Understanding how online environments have changed the meaning of several words.

2. Cognitive: How To Do

The Cognitive element incorporates computer literacy or IT skills with an understanding of the key concepts including:

- Having the ability to use a range of devices, software platforms and interfaces;
- Recognising common features across digital tools such as navigation menus, settings, and profiles; and
- Understanding concepts such as tagging, hashtags, and sharing.

[69] Doug Belshaw - The Essential Elements of Digital Literacies

3. Constructive: How To Use

The Constructive element involves knowing what it means to 'construct' something in a digital environment and how content can be appropriated, reused and remixed involving:

- Knowing how to responsibly use and build upon someone else's work;
- Respecting copyright and understanding the concepts of remix and reuse; and
- Being familiar with the various Creative Commons licences.

4. Communicative: How To Communicate

The Communicative element is, as the name suggests, how to communicate in digital environments. For example:

- Knowing the purpose of various online tools and how they are different or similar to each other;
- Being familiar with the communication norms and expectations of various online tools; and
- Understanding what identity, sharing, influence and trust mean in digital spaces.

5. Confident: How To Belong

To participate confidently online involves:

- Understanding and capitalising upon the ways in which the online world differs from the offline world;
- Reflecting on one's learning in digital spaces; and
- Being part of an online community.

6. Creative: How To Make

The Creative element refers to creating new things which add value where the focus is more on the value created than the act of creating something new. Being able to weigh up opportunities in an entrepreneurial manner and ask the right

questions to generate new ideas. For example:

- Learning how to do things in new ways using online tools and environments;
- Imaginatively and critically thinking about how to create and share knowledge using digital technologies, and
- Knowing how to curate digital content to create value for readers.

7. Critical: How To Evaluate

Being able to evaluate information and arguments, identify patterns and connections, construct meaningful knowledge and apply it in the real world. This entails:

- Using reasoning skills to question, analyse, scrutinise and evaluate digital content, tools and applications;
- Knowing how to search effectively; and
- Being able to distinguish credible sources from less credible ones.

8. Civic: How To Participate

The Civic element refers to having the knowledge and ability to use digital environments to self-organise; the ability to consider issues and solve complex problems based on a deep understanding of diverse values and a worldview. For example:

- Understanding one's digital rights and responsibilities;
- Participating in social movements or the democratic process online and preparing oneself and others to participate fully in society.[70]

[70] Tag: Essential Elements Of Digital Literacy - https://findingheroes.co.nz/2015/06/11/digital-literacy-has-8-essential-elements/

Table 33: A Compilation of Soft Digital Skills (not exhaustive)

	Soft Digital Skills	Definition
1	Change Management	Helping an organization transform itself by focusing on organizational effectiveness, improvement, and development.
2	Collaboration	Processes that help multiple people or groups interact and share information to achieve common goals.
3	Comfort with Ambiguity	Feeling comfortable and confident in acting within an environment of uncertainty or constant change and having higher risk tolerance.
4	Customer-Centricity	Committing to a top-tier level of service to the customer and considering the customer experience above all.
5	Entrepreneurial Mindset	State of mind which orientates human conduct towards entrepreneurial activities and outcomes; drawn to opportunities, innovation, and new value creation able to take calculated risks and accept the realities of change and uncertainty.
6	Data-Driven Decision Making	Using data and insights to develop a theory, testing the theory in practice to determine its validity, and making business decisions.
7	Organizational Dexterity	Flexibility to perform varied roles, actions, or activities with skill and grace and the ability to transition between roles, actions, and activities quickly and effectively
8	Passion for Learning	A deeply ingrained enthusiasm for seeking out and acquiring new information and knowledge, often across a variety of fields and topics.

3.1.6 Digital Roles

Represent roles that have been created as a result of digital transformation within an organization or the emergence of disruptive technologies.

Table 34: Compilation of Digital Role (not exhaustive)

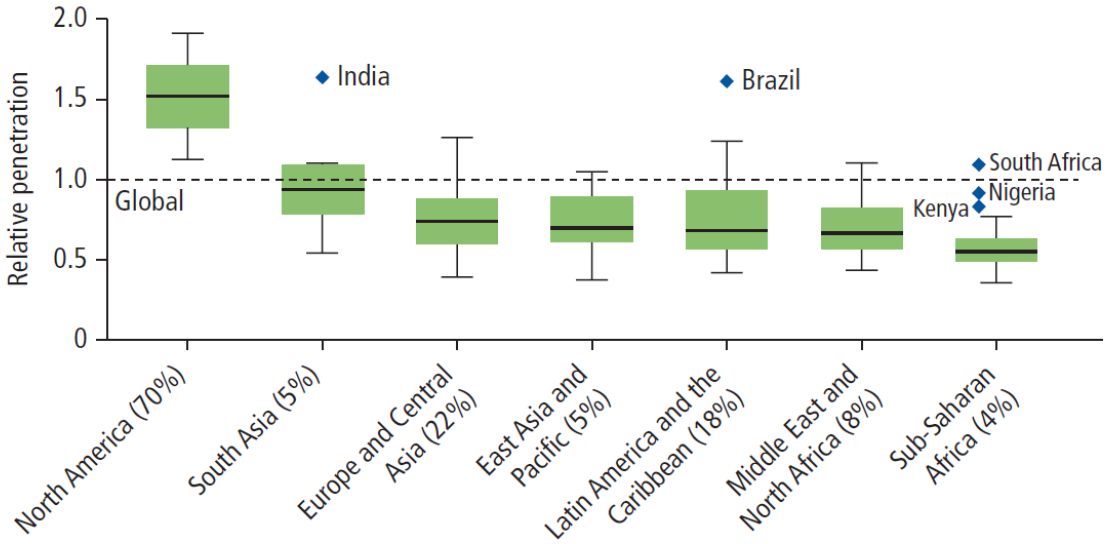
Digital Role	Definition
Automation/Robotics Engineer	Researches, designs, develop or tests robotic applications.
Behavioural Scientist	Studies how the actions of people affect their development, their relationship with others, and their future behaviours.
Chief Analytics Officer/ Chief Data Officer	Executive overseeing the data function/capability.
Chief Customer Officer	Executive responsible for the customer relationship to provide a single vision across all customer interaction points.
Chief Digital Officer/Chief Digital Information Officer	Executive charged with helping a business transform its traditional information technology policies and practices.
Chief Internet of Things Officer	Executive overseeing the IoT function/capability.
Crowd Funding Specialist	Designs, launches, runs, and promotes campaigns for gathering small amounts of capital from a large number of individuals to finance a business venture.
Data Architect	Designs, creates, deploys, and manages an organization's data architecture (e.g., defines how the data will be stored, consumed, integrated, and managed by different data entities and IT systems).
Data Engineer	Gathers and collects data, stores and processes it, and provides it in a ready-to-use format to data scientists and analysts.

Data Scientist	Performs statistical analysis, data mining, and retrieval processes on a large amount of data to identify trends, figures, and other relevant information.
Digital Project Manager	Responsible for managing online/digital projects from concept to completion within budget; involves, planning, delegating, tracking, reviewing, and measuring results using online project management, collaboration, and cloud storage software.
Digital Solution Architect	Develops solutions based on predefined processes, guidelines, and best practices with the objective that the developed solution fit within the enterprise architecture in terms of information architecture, system portfolios, and integration requirements.
Drone Designers	Uses engineering and technical skills to design and build unmanned aerial systems (UAS).
Drone Operators	Uses engineering and technical skills to operate UASs.
Enterprise Architect	Works closely with stakeholders, including management and subject matter experts, to develop a view of an organization's strategy, information, processes, and IT assets and is responsible for using this knowledge to ensure IT and business alignment.
Full Stack Developer	Leverages IoT and hardware-engineering skills to work on front-end and back-end software and hardware technologies.
Growth Hacker	Merges the principles of marketing and engineering to create more accurate marketing strategies; Note, the term hacking indicates the use of logic processes and technology toward a specific goal (e.g. customer retention and sales) rather than illegal or aggressive behaviour toward networks and IT systems.
Head of Automation	Leadership position overseeing the automation function.
Head of Robotics	Leadership position overseeing the robotics function.

Information Security/Privacy Consultant	Understands key security and privacy issues, risks, exposures, and vulnerabilities to manage and safeguard digital information.
Integration Architect	Responsible for "breaking down silos" and helping different software programs communicate and for using application programming interfaces (APIs), middleware, and cloud to cobble together workable architectures that successfully integrate their many parts.
Personal Web Manager	Creates and manages online personas and protects clients' privacy and reputation.
Technology Architect	Plans and designs information technology solutions and services (e.g. architect software, hardware, network) that give the best results to the business.

Kenya, Nigeria, and South Africa are often referred to as the Sub-Saharan African countries with greater relative demand for technical skills and established tech hubs and communities. Other African countries, in contrast, have digital skills at roughly 50% of the average global adoption level (denoted by 1.0 in Table 35).

Table 35: Digital Skills in Sub-Saharan Africa Relative to Other Regions



Source: World Bank calculations using LinkedIn data.

3.1.7 Current Demand

There is a large increase in jobs requiring digital skills. This increase cuts across many sectors and occupations. Jobs that traditionally were middle-level digital content, such as teachers, nurses, human resource specialists and secretaries have all become more digital; receptionists aside from answering the phone, need competency in using email, and online scheduling as well as being able to work with spreadsheets and word processing software. Even among occupations with traditionally low digital content, the digital components have increased significantly.

Many occupations that were previously technology-free, such as taxi driving, shop-keeping, despatch riding etc. now require technology for their basic tasks. The number of jobs requiring digital skills is predicted to increase by 12% by 2024.[71]

The importance of digital skills goes beyond rising demand in the workplace. Digital skills are increasingly used in primary and secondary school classrooms, for banking and shopping, for interactions with the Government, for entertainment, and for social connection.

Digital skills are progressively important in searching for jobs. This includes formatting a CV in Microsoft Word, converting it to an Adobe PDF and posting it online, searching for job openings, reaching out or responding to employers via email, or applying via online interfaces. The increased use of electronic job applications makes it difficult for those with low or no literacy skills to get a job.[72]

Digital literacy plays an important role in other aspects of life, such as broadening social networks, accessing news and information, and connecting with the community.[73]

[71] World Economic Forum Report (2020)
[72] Amanda Bergson-Shilcock - The New Landscape of Digital Literacy How Workers' Uneven Digital Skills Affect Economic Mobility and Business Competitiveness, and What Policymakers Can Do about It
[73] D Robinson et al. - 5igital inequalities and Why They Matter (2015)

3.1.8 Future Demand

The workforce is automating faster than expected, displacing 85 million jobs in the next five years. The automation revolution will create 97 million new jobs. In 2025, analytical thinking, creativity and flexibility are among the top skills needed; with data and artificial intelligence, content creation and cloud computing as the top emerging professions. The most competitive businesses will be those that choose to reskill and upskill their current workforce.[74]

By 2025, automation and a new division of labour between humans and machines will disrupt 85 million jobs globally in medium and large businesses across 15 industries. Roles in areas such as data entry, accounting and administrative support are decreasing in demand as automation and digitization in the workplace increase.

More than 80% of business executives are accelerating plans to digitize work processes and deploy new technologies, and 50% of employers are expecting to accelerate the automation of some roles in their companies. By 2025, employers will divide work between humans and machines equally. Roles that leverage human skills will rise in demand.[75] Machines will be primarily focused on information and data processing, administrative tasks and routine manual jobs for white and blue-collar positions.

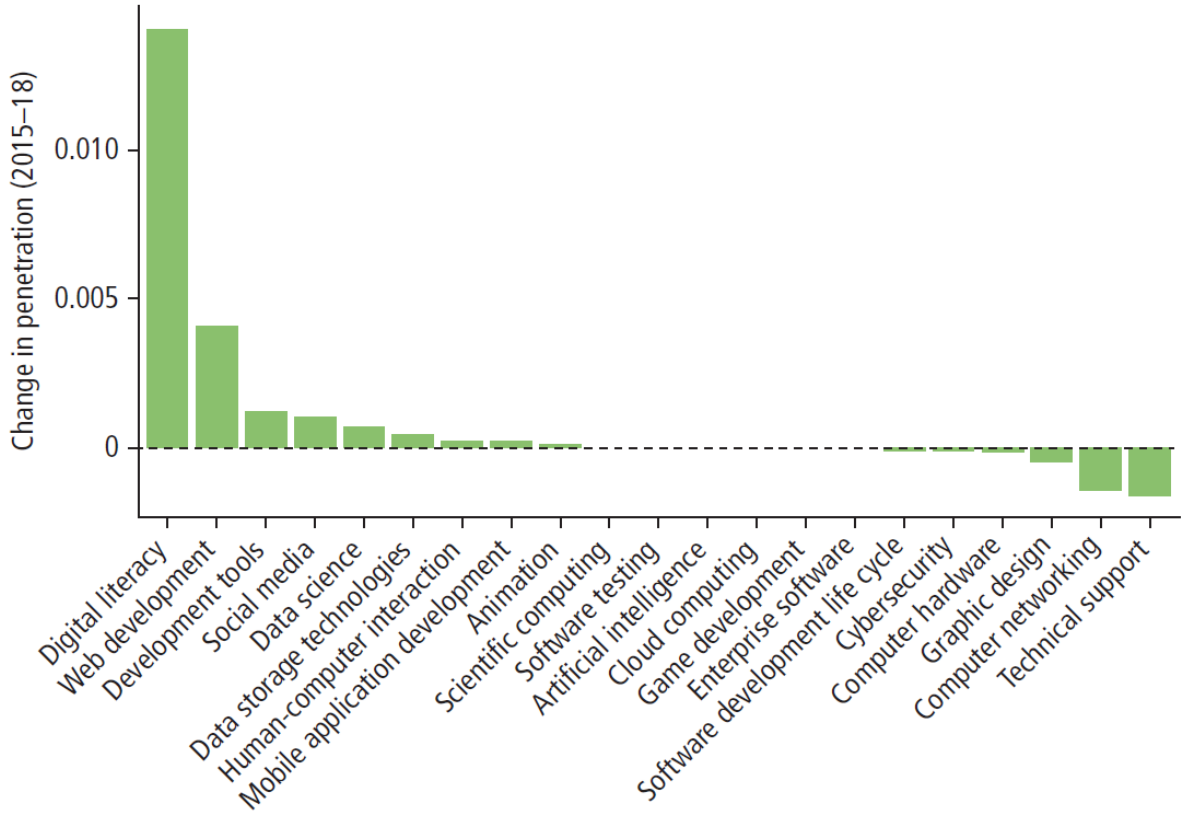
There ought to be a sense of urgency for reskilling for the revolution. As the economy and job markets evolve, millions of new roles will emerge across the entire economy in the 4th Industrial Revolution technology industries such as Artificial Intelligence and in content creation fields.

The tasks where humans are set to retain their comparative advantage include managing, advising, decision-making, reasoning, communicating and interacting. There will be a surge in demand for workers who can fill green economy jobs, roles at the forefront of the data and artificial intelligence economy, as well as new roles in engineering, cloud computing and product development. For those workers set to remain in their roles in the next five years, nearly 50% will need reskilling for their core skills.[76]

[74] The International Monetary Fund (IMF) Report (2021)
[75] Ibid
[76] World Economic Forum – The Future of Jobs Report (2021)

Projected Top Digital Roles in the Next 2–3 Years
1. Information Security/Privacy Consultant
2. Chief Digital Officer/Chief Digital Information Officer
3. Data Architect
4. Digital Project Manager
5. Data Engineer
6. Chief Customer Officer
7. Personal Web Manager
8. Chief Internet of Things Officer
9. Data Scientist
10. Chief Analytics Officer/Chief Data Officer

Table 36: Growth of Digital Skills in Sub-Saharan Africa



Source: World Bank

Sub-Saharan African countries have shown higher growth in more transferable digital skills, such as digital literacy, web development, development tools, and data science, than in more traditional digital skills, such as technical support and computer networking, which are declining. This tendency is in line with global trends and the increasing availability of digital infrastructure.

3.2 Objective Two – Level of Digital Skills Gap

To Determine the Level of Digital Skills Gap among Women, Youth and the Physically Challenged

3.2.0 Findings

Digital divide describes the gap existing among and between demographics with regards to access to information and communication technologies. In a broader concept of the digital divide is the discrepancy between people who have access to and the resources to use new information and communication tools, such as the internet and people who do not have the resources and access to the technology, the discrepancy between those who have the skills, knowledge and abilities to use the technologies and those who do not have.[77]

The digital divide can exist between those living in rural areas and those living in urban areas; between men and women; between the aged and the youth; between able-bodied people and the physically challenged; between the educated and uneducated; between economic classes; and, on a global scale between less industrially countries and the more developed nations.

The study's findings reveal that people without digital skills are not necessarily less educated or without other skills. Workers who get laid off and need to transfer to new occupations sometimes struggle with the digital skill dimension of new jobs, despite years of work experience.

Another point worthy of note is that the fluid use of a smartphone does not always translate to broader possession of digital skills. Youth who may be experts with smartphones may not be able to easily transfer their knowledge into a work setting where they may need to use computers and office software to perform tasks.

3.2.1 Forms and Types of Digital Gap

There are more than a dozen categories or forms that a digital gap can take.[78] Some of these categories identified include:

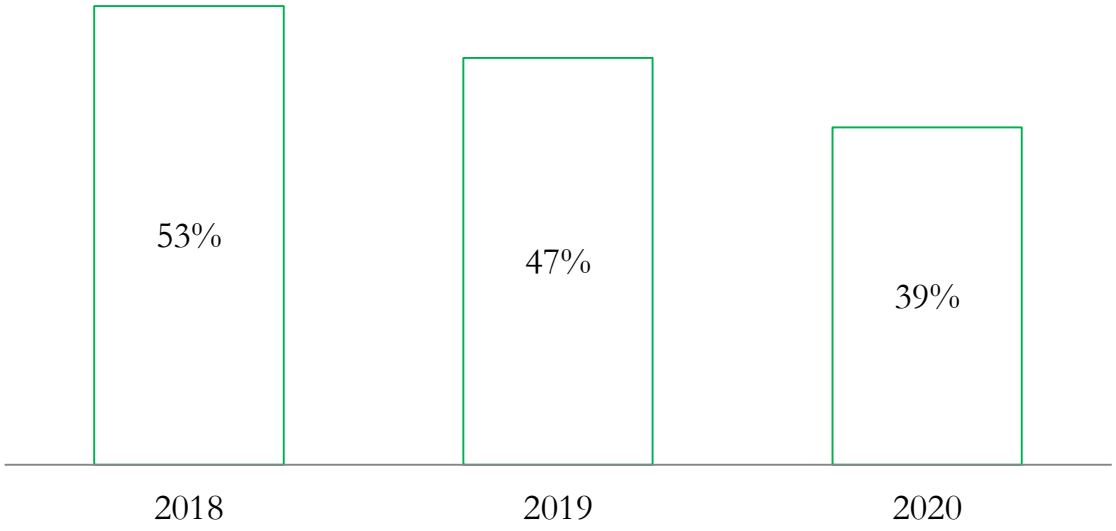
[77] Webpodia - What is Digital Divide - https://www.webopedia.com/definitions/digital-divide/
[78] Raj Reddy et al., Sustainable ICT for Emerging Economies - Mythology and Reality of the Digital Divide Problem

3.2.1.1 The Rural-Urban Gap

Geography creates natural barriers that impede internet access in rural and remote areas. The rural-urban gap refers to how much less likely a person living in a rural area is to use mobile internet than a person living in an urban area.[79]

The rural-urban gap in Nigeria is significant in terms of access to technology devices and infrastructure. While 81.7% of the urban population has access to electricity, only 37.1% of the rural population has access to electricity. About 95% of urban households and 82% of rural households own mobile phones.[80] In 2020, there was a 39% rural-urban gap in mobile internet use.[81] The gap has steadily narrowed since 2018 when it was 53% and fell to 47% in 2019.[82]

Table 37: Rural-Urban mobile internet gap



Through higher service costs, lower average demand, and other challenges, rural areas tend to have slower, more expensive and less reliable internet services than their urban peers. Urban areas have the propensity to have better access to both digital technology infrastructure and devices than rural areas. This amounts to a connectivity gap between urban and rural areas as those living in urban areas are nearly three times more likely to have meaningful connectivity[83] than those living in rural areas.

[79] GSMA 2021- Rural-urban gap is calculated using the following formula: (percent of urban users) – (percent of rural users) / (percent of urban users.
[80] Nigeria - DHS 2018
[81] Rural-urban gap is calculated using the following formula: (percent of urban users) – (percent of rural users) / (percent of urban users) (Source: GSMA 2021)
[82] GSMA 2021
[83] Meaningful Connectivity is an ITU proposed framework for measuring qualities of internet access in an area

Among Nigeria's estimated 122 million Internet users,[84] many have to limit their usage because connectivity is unreliable, too slow or too expensive; or they share a device or a lack of digital skills prevents them from getting the most out of their devices and services.

Access to the internet varies according to location. Urban areas tend to have higher rates of computer use and internet adoption than rural areas, though there is much within-city variation where disparities still exist between highbrow or business districts and satellite towns.

The International Telecommunication Union (ITU) recently announced a new set of UN targets for universal and meaningful digital connectivity to be achieved by 2030. The aspirational targets prioritize universality, technology and affordability to ensure that everyone can fully benefit from internet connectivity. The Roadmap calls for establishing targets and a connectivity baseline to aid in advancing a safer, more equitable digital world and a brighter and more prosperous future for all.[85]

It suggests replacing the existing top-level measure of internet use – defined as access on any device at least once in the past three months.[86] The Roadmap has four pillars focusing on Speed; Smartphone Ownership; Unlimited Broadband Connection; and, Daily Use.

Table 38: Meaningful Connectivity Baseline

	Current ITU Definition of Internet Use	Proposed Meaningful Connectivity Baseline
Speed	No minimum speed	4G-minimum speed
Device	Any device	Smartphone ownership
Data Allowance	No minimum	An unlimited broadband connection at home, work, or place of study
Frequency	At least once in the past three months	Daily use

Source: Based on data culled from Alliance for Affordable Internet

[84] The Nigerian Communications Commission - NCC Hinges Nigeria's 122 million Internet users' protection - https://ncc.gov.ng/accessible/stakeholder/media-public/news-headlines/614-ncc-hinges-nigeria-s-122-million-internet-users-protection-on-effectivegovernance

[85] UN - Secretary-General's Roadmap for Digital Cooperation - https://www.un.org/en/content/digital-cooperation-roadmap/

[86] ITU - Manual for Measuring ICT Access and Use by Households and Individuals, 2020 Edition - https://www.itu.int/en/ITU-D/Statistics/Pages/publications/manual.aspx

The stark disparities in internet use between rural dwellers and urban dwellers are thrown up in bold relief by the results of the recent survey by the Alliance for Affordable Internet measuring meaningful connectivity in selected countries as illustrated in Table 39.

Table 39: Meaningful Connectivity Estimates for Selected Peer Countries

Country	Population with Meaningful Connectivity %	Urban Population with Meaningful Connectivity %	Rural Population with Meaningful Connectivity %	Meaningful Connectivity Gap %
Ghana	6.5%	9.0%	2.8%	95.4%
Kenya	10.9%	20.7%	6.5%	130.3%
India	6.8%	9.0%	5.3%	54.4%
Rwanda	0.6%	1.9%	0.3%	266.7%
Nigeria	12.1%	16.4%	6.6%	81.0%
South Africa	12.8%	15.9%	5.7%	79.7%
Mozambique	3.6%	6.7%	1.5%	144.4%

Source: Alliance for Affordable Internet

Figures for Nigeria show a meaningful connectivity gap of 81% among internet users in the country. An average of 16.4% of the urban dwellers in Nigeria enjoys meaningful connectivity while only 6.6% of their rural-dweller peers enjoy the same.

The digital divide the gap portends manifests in the digital exclusion that has kept millions of people in Nigeria offline and under-connected – particularly in the rural and peri-urban areas.

Poverty, geography, and connectivity have a closely interlinked relationship. Those in rural areas are more likely to be poorer and offline, while those in urban areas are more likely to have higher incomes and use the internet. Extreme poverty continues to be a problem concentrated in rural areas. According to a UN report, more than 50% of the rural population in several sub-Saharan African countries live in extreme poverty.[87]

The rural-urban gap in Nigeria is significant (39%) in terms of access to technology devices and infrastructure. Only 81.7% of the urban population has access to electricity, while only 37.1% of the rural population has access to electricity; 95% of urban households and 82% of rural households own a mobile phone.[88] If the

[87] UN DESA, 2021 - Reducing poverty and inequality in rural areas: key to inclusive development - https://www.un.org/development/desa/dspd/2021/05/reducing-poverty/
[88] DHS 2018

internet is to be the transformational technology that it has the potential to be, this correlation between poverty, geography and connectivity must be broken.

Even among demographics, deep divides do exist. In addition to the rural-urban gap, the elderly rural dwellers are often the least likely to benefit from information communication technologies and the inherent possibilities. The elderly may incur digital exclusion on account of culture, religion or spousal disinclinations.

These findings stress the importance of advancing meaningful connectivity in both rural and urban areas. Meaningful connectivity reliably correlates with increases in the internet being used for essential activities such as looking for work, taking a class, or learning more about government services. In addition, the gaps between urban and rural communities narrow where meaningful connectivity is available.

Meeting the UN Sustainable Development Goals (SDGs) target for universal access will require embedding the meaningful connectivity framework within key ICT statistical indicators and policies to measure progress; bringing together the experiences and learned the wisdom of other peer countries to accelerate affordable and meaningful access to rural communities; and, leveraging and expanding public access solutions to offer greater access to desktops, laptops, and tablet devices where affordability remains a persistent challenge.

3.2.1.2 The Gender Gap

The gender gap is the difference between how many men and how many women are online, as a proportion of how many women are online. The lower the percentage of women online, the larger the digital gender gap will be.[89]

Data from the 2018 Nigeria Demographic and Health Survey by the National Population Commission in collaboration with the National Bureau of Statistics reveal that 31% of urban women compared to just 6% of rural women use the Internet, while 55% of urban men compared to 25% of rural men use the Internet.[90] According to calculations based on the Economist Intelligence Unit country-disaggregated data, men remain 21% more likely to be online than women, rising to 52% in the world's least developed countries.[91]

[89] Carlos Iglesias - The Gender Gap in Internet Access: Using a Women-Centred Method - https://webfoundation.org/2020/03/the-gender-gap-in-internet-access-using-a-women-centred-method/
[90] National Population Commission - NPC/Nigeria and ICF 2019 - Nigeria Demographic and Health Survey 2018
[91] Economist Impact – The Inclusive Internet Index - https://impact.economist.com/projects/inclusive-internet-index/

In general, the gender gap in mobile phone ownership is smaller than the gender gap in mobile internet use across almost all regions in the world as illustrated in Table 40.

Table 40: The Gender Gap across all Regions of the World

Region	Women's Internet Use	Men's Internet Use	Use Gap
North America	94%	95%	1%
Latin America	60%	64%	12%
Europe	77%	81%	5%
Middle-East and North Africa	77%	79%	9%
Sub-Saharan Africa	**28%**	**38%**	**43%**
Central Asia	57%	64%	15%
East Asia	83%	86%	2%
Southeast Asia-Pacific	60%	67%	11%
South Asia	18%	37%	137%

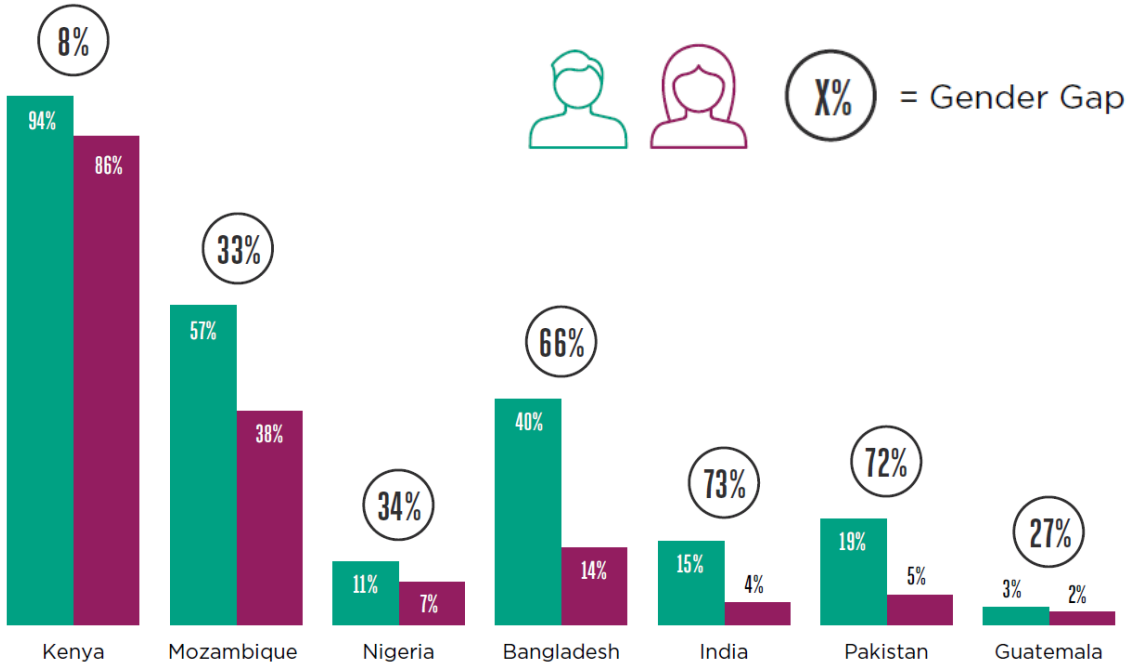
The gender gap in mobile phone ownership in Nigeria is 4%, while the gender gap in mobile internet use is 29%.[92]

Many people have limited access to locally generated entertainment. Local events, cultures, festivals, and traditions are not given enough prominence, often because of the pressure of globalization or being competitive. This is an extension of the knowledge divide, which results in much of the content being generated in developed countries, or, at best, in (and for) urban areas.

[92] GSMA 2018 – Calculated using the formula: [(% of men using the internet – % of women using the internet)/% of women using the internet]

Since digital skills are not so easy to measure without testing actual proficiencies, proxy measures are often used including analysis of data from self-reported information. As a step towards addressing this gap, this study looked at the share of women that own and operate mobile money accounts as it would require an appreciable level of digital skills to actively engage in a mobile money account.

Table 41: Share of population that owns a mobile money account



Source: GSMA Consumer Survey, 2020

From the data on Table 41 it can be deduced that Nigeria has a narrow gender gap (34%) in the population of women who own and operate mobile money accounts. This is indicative of active participation in digital banking by women in Nigeria. Although to put in context, the other African countries in focus, Kenya (8%) and Mozambique (33%) had narrower gaps than Nigeria. Nigerian women fared better in the survey than their counterparts in Bangladesh (66%), India (73%) and Pakistan (72%).

3.2.1.3 Other Forms of Digital Gap

Social Divide[93]	This may be seen through cultural factors that result in disparities in access to and effective use of various digital technologies between the regions and religions in Nigeria.
Economic Divide	This relates to factors such as poverty and monetary constraints that make it more possible for some people than others to have access to make effective use of digital technologies
Linguistic Divide	This arises when the language of digital technology or the content within the technology is foreign to certain communities, while it is familiar to other communities
Content Divide	This refers to gaps that exist between communities on account of inappropriate knowledge contained or flowing through digital technologies that certain communities cannot use because it is created without their needs being taken into consideration.[94]
Literacy Divide	The lack of education in general and the lack of digital knowledge, in particular, is another major barrier that prevents people from accessing the internet. Invariably always, computers and digital devices in use in Nigeria are run on operating systems coded in a foreign language. So only those literate enough to read and understand those languages can use the devices. Thus for those with reading difficulties, there are limited options to improve digital skills without first addressing the problem of language illiteracy.
Information and Knowledge Divide	Beyond the language literacy divide, there is also the e-literacy divide, which separates the multitudes of passive users of ICT from those who use ICT for private and/or, commercial purposes as most data on the internet are broadly of overseas origin and seldom reflect the local nuances most users would want.
Jobs Divide	Typically those in employment may have more opportunities in using digital technology as provided by their employers or as required by the businesses they do than those without jobs. High-income households tend to have greater internet access than low-income households.

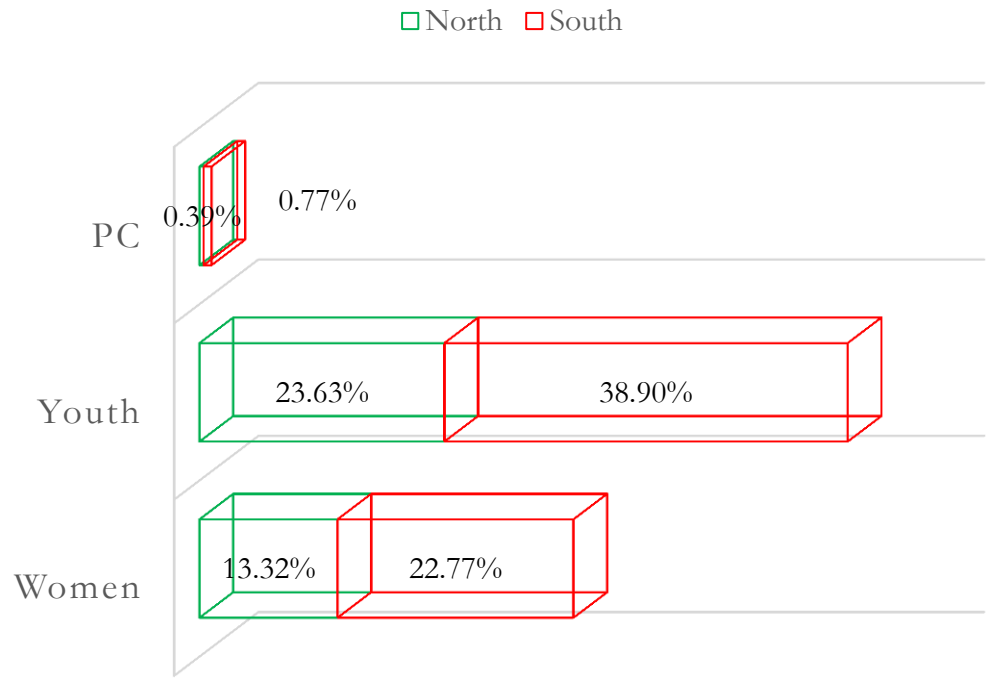
[93] Stephen M. Mutula - Digital divide and economic development: Case Study of Sub-Saharan Africa
[94] Margaret U. Ugboma Ph.D - Bridging The Digital Divide: With Special Reference To Nigeria

Healthcare Divide	While a lot of innovation has been made to make ICT easily available for those that are physically challenged and the infirm, especially the elderly, a lot of work still remains to be done to democratize this aspect of ICT and bridge the widening digital gap between those with disabilities and those without

According to the World Bank, access to telecommunications and information services and to ICTs in general, provide crucial knowledge inputs into the productive activities of rural and poor households. It makes large regional, national and even global markets accessible to small enterprises and increases the reach and efficiency of the delivery of Government and social services, thus giving the poor a voice, with which they can influence the decisions of policymakers and allowing them to participate in the decision-making process.[95]

Gaps exist among women, youth and the physically challenged in terms of access to and use of smartphones. While the gender gap is evident across subnational boundaries and education levels, it is wider for women and the physically challenged in rural areas.

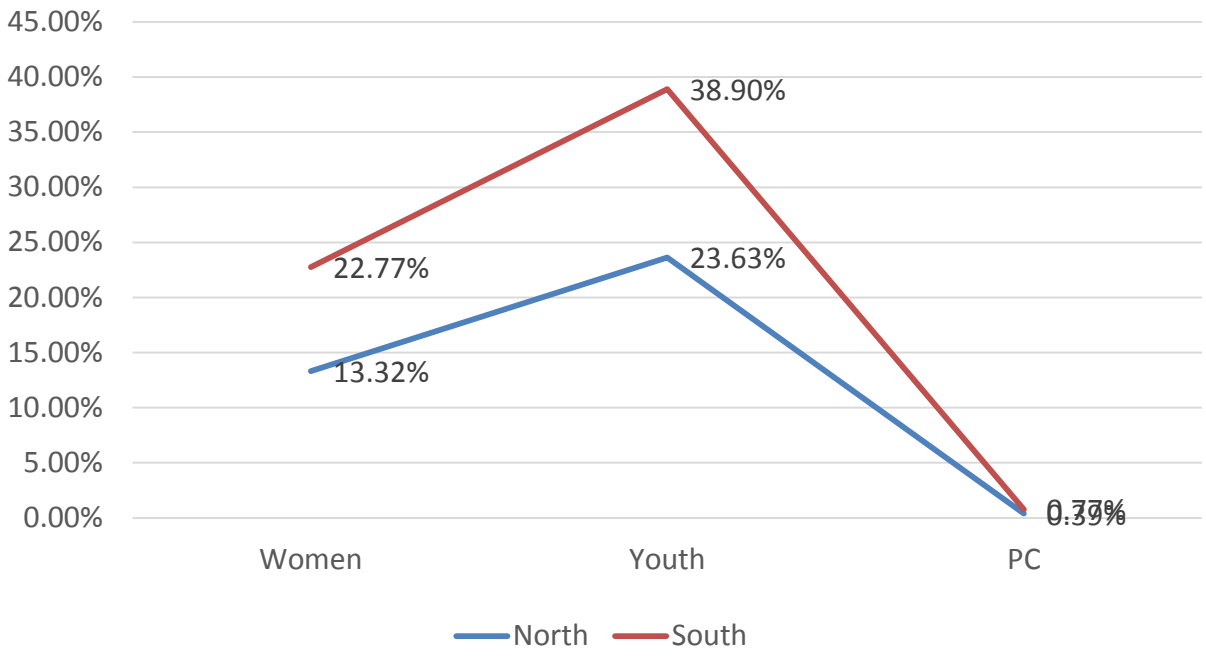
Table 42: Use of ICT gadgets between North and South



[95] World Bank - Telecommunications and Information Services for the Poor : Toward a Strategy for Universal Access - https://openknowledge.worldbank.org/handle/10986/14007

Of particular concern is the gender and age dimension to the digital divide in Nigeria with a huge difference between men and women, adults and youth in terms of access and use of the internet.[96] While the gender gap in digital skills is evident across subnational boundaries and income levels, it is severe for women who are older, less educated, poor or living in rural areas. It is even more severe for people who are physically challenged.

Table 43: IT Gadgets Use among the study domains



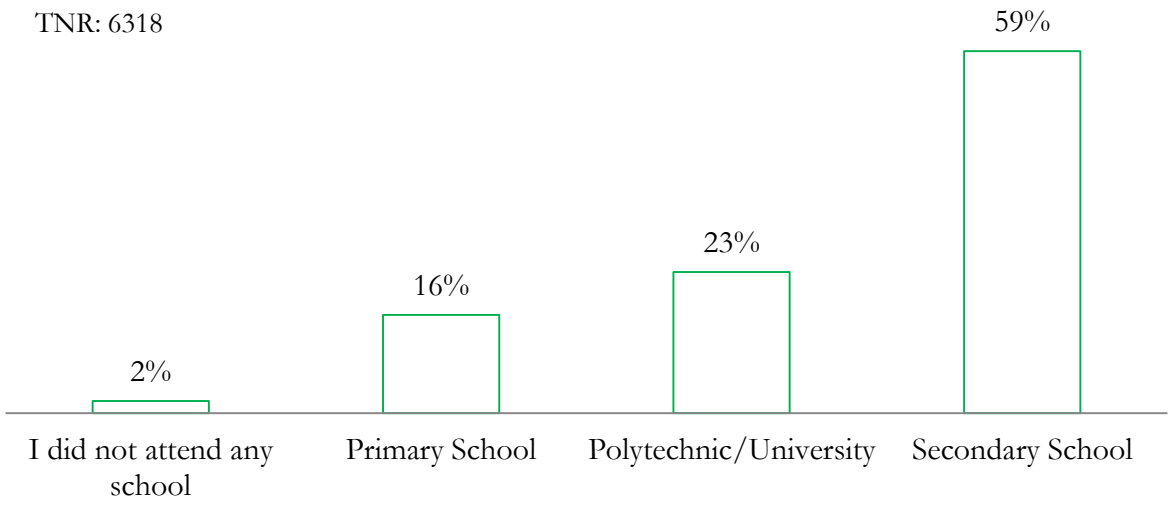
The digital skills gap has many facets. There are gaps in coverage, speed and affordability; gaps between dwellers in the North and South, gaps between cities and villages, and even among women, there are gaps between younger women and those of a certain age. This digital gap is also observed in the dissociation that exists between women who use ICT as part of their work and those who do not have access to it and who, even if they do, do not know how to use it.

The study findings show that the youth have higher digital literacy than women and the physically challenged; and that there is a higher level of digital literacy among the study population in the South than in the North.

[96] CITAD – Overcoming Gender-based Digital Exclusion in Nigeria – A Strategy Document

The disparities in the way women participate in the digital ecosystem can be seen through the use of the internet and ICT. Their low presence in Science, Technology, Engineering and Mathematics (STEM) professions and other related disciplines presents a glaring red flag. While the statistics are lower for women, they are even dire for people living with disabilities who suffer from discrimination on many fronts.

Table 44: Survey Question #6 – What is your level of education**?**



Asked about the level of their education, survey participants that did not attend any school were 126 or 2% of the survey population. At the other end of the ladder, 3728 (59%) possess secondary school level education and 1453 (23%) received education at the tertiary level. These figures point to a citizenry that already has the basic grounding on which to bolt digital skills.

With respect to the level of literacy in Nigeria, the rates vary widely by region, poverty level, gender and age. Overall, Nigeria's literacy rate in 2018 was 62%, an 11% increase from 2008.[97]

The highest literacy rates are in the southern regions; this area also has the lowest percentage difference between male and female literacy rates. In 2018, the male urban literacy rate was 86.4%; the rural rate was 59.5%. The female urban rate was 74%; the female rural rate was 35.4%.[98]

Geography, as much as education, plays a part in creating the digital skills gap as empirical findings suggest that the gulf differs and widens between regions. For instance, a recent report showed that about 60% of the female population in the

[97] https://www.macrotrends.net/countries/NGA/nigeria/literacy-rate
[98] UNESCO - uis.unesco.org

North does not have access to the internet and that 55% of men in the North repudiate their female family members using the internet, while 61% of fathers discourage their daughters' internet use.[99] Patriarchy and the deeply entrenched socio-cultural practice of gender role differentiation may be responsible for that stance.

Apropos of gender, the female literacy rate in Nigeria is among the highest in West Africa. The difference between male and female literacy rates is substantial in both urban and rural areas. In total, the literacy rate of people older than 15 is 62%, with males at 70% and females at 53%. However, in the over-65 population, the total literacy rate is 28%, with males at 40% and females at 18%.[100]

Put in context, in terms of literacy, Nigeria ranks 161 out of 189 countries in the UN's Human Development Index which puts Nigeria below the average for countries in Sub-Saharan Africa. Study respondents discoursed that improving the general literacy levels should be the first priority as that forms the cornerstone for digital literacy.

Across Nigeria, limitations to women's use of ICT can also arise from the lack of electricity, particularly in rural areas. So, while men can carefreely go to any nearby commercial charging venue or internet cafe to recharge their digital devices and attend to their internet browsing needs, most women seldom want to patronize such public places. Women's reluctance to patronise those public places is further exacerbated by the heightened levels of insecurity.

Hurdles to digital access including affordability, education (or lack thereof), phobia of new technology, inherent gender biases and socio-cultural norms are at the root of the digital skills gap among women, youth and particularly the physically challenged.

While the global digital gender divide in internet usage remained almost unchanged between 2013 and 2017, at about 11%, women are on average 26% less likely than men to have a smartphone. In some places, these proportions stand at 70% and 34%, respectively.[101]

Whereas going digital can be enabling for everyone, women have much to gain from boosting their use of digital tools. Female users currently tend to use fewer

[99] The study by the Centre for Information Technology and Development (CITAD), 2016
[100] Ibid
[101] Organisation for Economic Co-operation and Development – Bridging the Digital Gender Divide (2018)

services than men and are less confident in using the Internet. For instance, although mobile money accounts offer an effective way to boost financial inclusion, it remains the case that fewer women are likely to own and use such accounts.

The gender gap in entrepreneurship is striking and persistent. Men are nearly twice as likely as women to be self-employed, and 90% of innovative startups seeking Venture Capital investments have been founded by men. Women-owned startups receive 23% less funding and are 30% less likely to have a positive exit – i.e. be acquired or to issue an initial public offering – compared to men-owned businesses.[102]

The Industry Stakeholders interviewed said that a huge gap exists between available digital talent and labour market demand. The gaps exist in both hard skills and soft skills.

3.2.2 The Benefits of Bridging the Digital Gap

The following benefits are derivable from bridging the digital gap:

Governance and Empowerment
Universal digital literacy would engender increased transparency of Government functioning through:

- **Free flow of information**
  - Supports democratization of information;
  - Increases inclusiveness, participation, and feedback;
  - Enables easier implementation of the Freedom of Information Act.
- **Cashless Policy**
  - Bridging the digital gap will underpin and make good the Government's cashless policy if every citizen has quality access to ICT.

Employment and Economic Growth
Widespread digital literacy offers the potential for commercial use by local entrepreneurs which could generate employment and economic growth. The entire gamut of the ICT sector can provide better-paid skilled employment.

[102] Ibid

- **Access to markets and jobs**
    - Discovery of opportunities globally and locally;
    - Marketing assistance;
    - Employment opportunities through online job searches.

e-Governance and e-Commerce

The effective integration of ICT into society is capable of promoting e-governance with its associated benefits of timeliness. The integration of ICT in the financial sector (FinTech) has already revolutionised financial services in Nigeria and has become a key factor for economic sustainability and improved social conditions. Benefits here include:

- Access to finance, credit, payments etcetera;
    - ICT can help spread the availability of finance, insurance, etc. to those who lack such facilities today;
    - Utility payments (electricity, gas, telecom, DSTV, etc.);
        - No queues, delays, extra charges;
        - Higher efficiency;
        - Reduced theft of services (coupled with integrated advanced metering and monitoring).

Household Shopping

- Online purchasing to gain:
    - Rapid delivery;
    - Efficiency and lower prices;
    - Reduced inventory requirements;
    - Reduced commuting;
- Personalized ads and targeted marketing/discounting;
- Online booking of tickets from home etc.

Education

The application of ICT-based platforms such as e-learning can go a long way in solving some of the problems of shortage of teachers and the physical infrastructure at all levels of the education spectrum in Nigeria because ICTs can reach many people spread across vast geographical areas.

- Promote academic excellence

- Access to technology-driven instructional resources offers access to a wide range of information and the effective use of the knowledge gained through such use increases improvement at all levels.

Health

Pervasive digital literacy would enhance ICT-based health delivery systems. Public health campaigns and basic hygiene can be more effectively delivered and accessed by all Nigerians including those in rural areas covering:

- Access to medical information for small problems and for emergency needs;
- Information about hygiene and nutrition;
- Link to doctors and treatment using telemedicine;
- Access to health education.

Eradication of Extreme Poverty

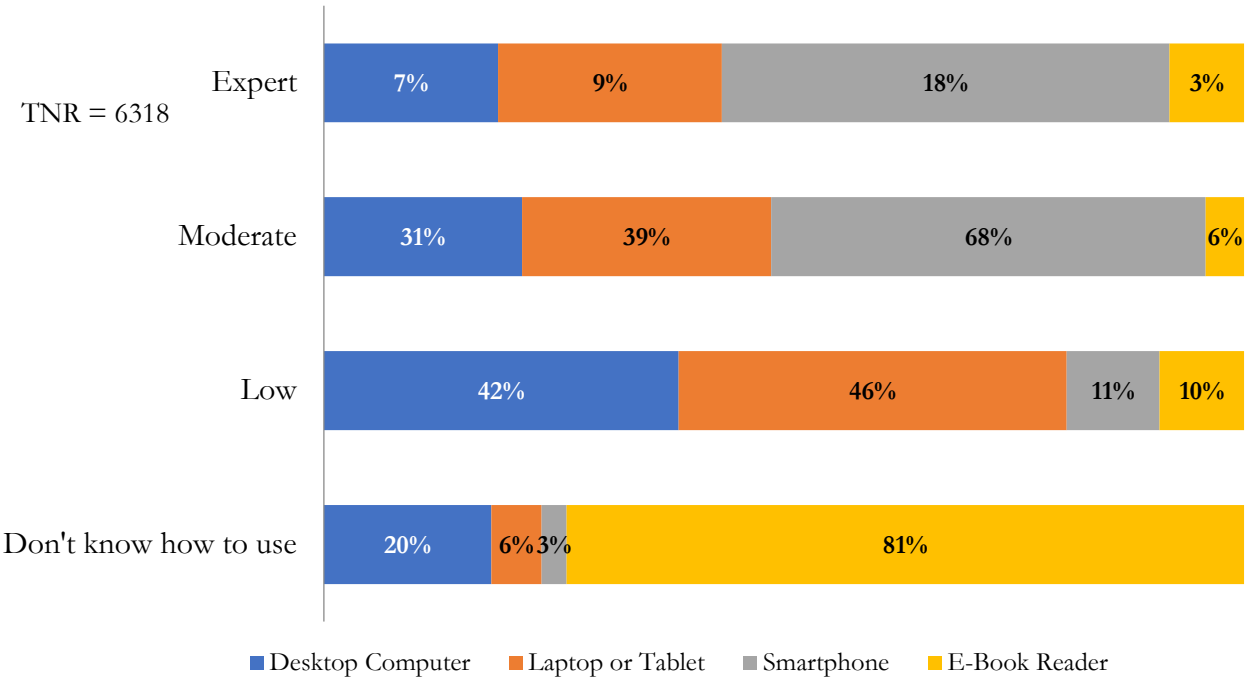
The provision of telephony services (both fixed and mobile), as well as internet services, would create new opportunities for employment for many households. It is a known fact that the introduction of mobile telephony has had a positive impact on the economy by creating numerous employment opportunities and boosting micro, small and medium-scale enterprises (MSMEs).

Agriculture

Bridging the digital gap will fight against poverty in the agricultural sector by providing timely information to peasant farmers in areas such as:

- Price discovery for food products to increase farmers' share of the retail price;
- Diagnosis and treatment for crop diseases;
- Forecasts and prediction;
  - Weather;
  - Disaster;
  - Demand; and,
- Access to best practices to improve productivity.

Table 45: Survey Question #14 – Personal rating of skills using digital devices



The survey findings show that the majority of participants have moderate skills (68%) in the use of smartphones than the use of desktop computers (31%) or laptops and tablets (39%). Smartphone usage also has the highest number of respondents who rated themselves as experts (18%) with desktop computers having the second lowest usage (41%) among respondents.

E-book Reader brought up the rear at 81% as not so many of the survey participants were aware of it and so registered as don't know how to use it.

3.3 Objective Three – Improving Digital Literacy

To Suggest Ways of Improving Digital Literacy and Skills among Women, Youth and the Physically Challenged in Nigeria

3.3.0 Findings

Nigeria has set two targets of achieving 60% digital literacy for youth and adults in Nigeria by 2025[103] and 95% digital literacy levels across States and Local Governments by 2030.[104]

Study respondents considered these targets to be a tad too ambitious considering the overall literacy rate in Nigeria. They opined that the government should first sort out problems around insufficient funding, poor infrastructure, epileptic electricity, poverty, capacity issues and insecurity among others before reeling out highfalutin figures about digital literacy. Many of the respondents were of the opinion that a nation with a high illiteracy level and battling protracted insurgency could not be promising digital literacy numbers in the high 90s in less than seven years if the aforementioned headwinds were not addressed first.

As such a lofty ambition will require multistakeholder and inter-agency efforts to actualise, the round table discussants posed some pertinent questions: When will the agencies and stakeholders be galvanised and mobilised? Who and where are the trainers? Are the trainers themselves trained? Market women, how are they to be persuaded to start advertising their businesses online, to start using digital technologies to manage their products when most of them still prefer cash for payments not trusting electronic transactions that much?

Study respondents reflected that rather than adopting aspirational digital literacy and education targets, which have been missed in the past and are unlikely to be met in the timeline projected, Nigeria can focus on three vital areas where substantial progress can be made: improving school quality, getting more children into school and ameliorating socio-political issues that disrupt education such as constant industrial action by teachers that result in prolonged closure of schools.

[103] The Nigerian National Broadband Plan (NNBP) 2020-2025
[104] The National Digital Economy Policy and Strategy (NDEPS) 2020-2030

3.3.1 What Other Countries Are Doing (Case Studies)

Country	Scheme	Description
South Africa	Zenzeleni Community Networks	An initiative offering quality, high-speed internet comparable to the country's most developed urban centres anchored by South Africa's First Cooperative-owned ISP Telecommunications Network. They deploy the infrastructure so that citizens can either request a dedicated internet link to their home, business, or organisation or collaborate with the cooperative to get a hotspot in the village or community.
Rwanda	Smart Classrooms Initiative	In 2014, the Rwandan Ministry of Education signed a partnership agreement with Microsoft for the use of new digital technologies and the acquisition of new competencies in the new technologies domain to transform the national educational field. The program aims to furnish more than a thousand classes with an Internet connection. The project is part of Rwanda's national evolution strategy towards an economy in which ICTs take centre stage.
Côte d'Ivoire	KALAAN	A private sector scheme bound by a signed Memorandum of Understanding (MoU) with the Association Development of Education in Africa (ADEA) to promote digital literacy in Côte d'Ivoire. It sensitises civil society organizations, citizens, and development partners to prioritize digital literacy in their projects. Using new information technology, including smartphones, the project has ambitious plans to promote the digital skills of more than 10 million people with a special focus on women and rural communities across the African continent over a 5-year period.

Ethiopia	ETAE	An Agreement between Microsoft and the Ethiopian Ministry of Education. The project targets the transformation of competencies related to ICT's mode of presence within the Ethiopian educational system. Microsoft puts its technological tools as well as its expertise through this program to improve the youth's digital literacy. The project promotes digital inclusion; stimulates creativity and innovation; develops the SDG strategic competencies; and, improves instructors' competencies.

Kenya

Kenya runs the Digital Literacy Program with the objectives to integrate technology in teaching and learning in the country's basic primary education system under the auspices of various Government of Kenya agencies[105] viz:

Government Agency	Contribution to the Project
Ministry of Education, Science, and Technology	Provides policy guidelines for the project
Kenya Institute of Curriculum Development	Develops curriculum content to grow in-country know-how
Teacher Service Commission	Trains teachers in ICT
Kenya Power and REA	Electrifies schools
Ministry of Industrialization	Sets up local plants to assemble devices
ICT Authority	Provides learning devices to schools and coordinates implementation

The program provided teachers with digital devices (laptops, scanners, and printers); learner digital devices (laptops and tablets); projectors; servers for program content; digital wireless routers; grid or solar power; device storage and charging stations; and assistive and specialized technology for students with special needs. To strengthen local manufacturing, the Government of Kenya chose Jomo Kenyatta University of Agriculture and Technology and Moi University to oversee the production and supply of most digital devices. The Jomo Kenyatta University of Agriculture and Technology collaborated with Inspur, Intel, and Microsoft to launch its locally assembled laptops.

[105] DigiSchool 2021 - https://www.digischool.go.ke/

While primary schools have the Digital Literacy Program to support their ICT needs, secondary schools in Kenya rely on the Secondary Education Quality Improvement Project (SEQIP). This project is funded by the World Bank and seeks to improve student learning in secondary education and the transition from primary to secondary education. The project has sub-components that focus on improving school infrastructure and enhancing teacher professional development for select schools. The project provides ICT equipment and IT laboratories to schools and facilitates a mobile phone-based teachers' peer learning group strategy for building the capacity of teachers.[106]

South Africa

The South African ICT Chamber of Disability, under the National ICT Forum, is a permanent multistakeholder body with a mandate that includes supporting the mainstreaming of disability inclusion into all ICT policy, as well as ongoing monitoring, informal evaluation and updating of existing policy.

South Africa has several long-standing multistakeholder forums involved in the design and implementation of digital inclusion policy. The Chamber of Disability, a permanent multistakeholder body, includes specialists from the disability community.

In parallel, the National Economic and Labour Council provides a standing multistakeholder forum to review all policy that includes the disability community.

The Independent Communications Authority of South Africa (ICASA), which regulates the telecoms sector, has a standing consumer working group of representatives from a range of persons with disabilities, and the technical committee of the South African Bureau of Standards also includes members of the disability community to ensure inclusive co-design of standards.

One example of an inclusive approach was the Disability Consultative Forum in 2015 and 2016, during which ICASA brought together leading mobile operators to provide inputs to the draft of the updated Code for Persons with Disabilities, to ensure persons with disabilities have access to information communication technology services in South Africa.

[106] World Bank 2022 - The Secondary Education Quality Improvement Project - https://documents1.worldbank.org/curated/en/806781513805053211/pdf/Disclosable-Version-of-the-ISR-Kenya-Secondary-Education-Quality-Improvement-Project-P160083-Sequence-No-01.pdf

Study respondents ruminated that basic literacy is the foundational issue to resolve ahead of other literacies. Beyond its conventional concept as a set of reading, writing and counting skills, literacy is now understood as a means of identification, understanding, interpretation, creation, and communication in an increasingly digital, text-mediated, information-rich and fast-changing world.[107]

The functional skills to make basic use of digital devices and online applications form a crucial part of the new set of literacy competencies required to function in this digital era. It is widely accepted that digital literacy has become a must-have for the development of indigenous capacity for active participation in the digital economy. Digital skills, therefore, are no longer optional in today's world they have become as essential as the ability to read and write.

3.3.1 Stratified Implementation Approach

While this study discusses some of the ways in which women, youth and the physically challenged can be empowered, gaps narrowed and hurdles leapfrogged, narrowing the digital divide and bridging the digital skills gap is not about perpetuating existing roles with the aid of staccato, short and quick training courses hither and thither. Rather, the focus should be placed on putting concrete policy actions to foster women's, youth and physically challenged persons' full participation and inclusion in the digital economy, while at the same time addressing ingrained stereotypes and social norms that lead to discrimination.

Policy, especially in the form of coordinated and complementary actions, may reverse these trends and trigger a more inclusive path for this demographic. For instance, a policy prescribing compulsory digital education may help to bridge the digital skills gap and ensure that the youth, women, and most especially the physically challenged gain the basic digital skills and competencies needed for their full participation in both the labour market and society at large.

Evidence-based policymaking requires the systematic collection of data, aimed at identifying priorities and defining and monitoring key lines of action. Fostering the addition of demographic-related dimensions in official statistics is important in this respect.

Twice as many boys as girls expect to become engineers, scientists or architects by the time they are 30. On average only 0.5% of girls wish to become ICT

[107] UNESCO - https://en.unesco.org/themes/literacy

professionals, compared to 5% of boys.[108] Changing gender-specific expectations about professions is the key, including fostering female role models in STEM. Lower proportions of women graduate in engineering, manufacturing and construction, or ICTs. While more women than men completed tertiary education in 2015, only 24% of graduates in engineering, manufacturing and construction were women; the share in ICTs was just 25%.[109]

Addressing the digital skills gap among women, youth and the physically challenged requires raising awareness and tackling stereotypes, while at the same time enabling enhanced, safer and more affordable access to digital tools and fostering strong cooperation across stakeholders to remove the barriers. Raising awareness about training opportunities is important, particularly for the physically challenged and would encourage wider participation as they are less likely than able-bodied persons to participate in government-sponsored training courses, even though those training schemes are free of charge.

For women, youth and the physically challenged to benefit from the work opportunities offered by digital technologies, efforts need to be made to ensure that participation does not occur at the cost of flexibility, in terms of their job security and other social protection, especially with the physically challenged.

Women spend 2.6 times more time than men on unpaid care and domestic work and this can restrict the time they have available to spend on paid work or to upskill themselves. Schemes that foster gender-neutral parental leave-taking and childcare services would enable greater female participation in the digital labour markets and training.

Coordination among different initiatives, scaling up, learning from successful and unsuccessful programmes and building on lessons learned may go a long way in improving the equitable sharing of the benefits of digitalisation. Narrowing the digital gap calls for actions addressing the structural root causes of the divide such as increasing the number of females studying STEM

In addition to being tech-savvy, trainers need to be knowledgeable about the special needs of this segment of the population and be aware of their conscious and unconscious biases. In particular, instructors require awareness training that equips them to make interventions that encourage the physically challenged who may lack self-confidence – or those who may feel embarrassed or threatened by

[108] UNICEF – Reimagine the Future - https://www.unicef.org/rosa/media/14176/file
[109] National Bureau of Statistics (NBS)

classroom dynamics. Trainers need to comprehend what is meant by accessible ICTs for persons with disabilities. The physical space and equipment used for programmes need to be carefully selected or sensitively modified as appropriate for accessibility.

Training materials need to be assessed to ensure that they teach relevant skills and competencies and address barriers faced by the physically challenged. Accessible technologies and skill development programmes can enable the physically challenged to become entrepreneurs, gain employment in conventional job sectors, and find work in the burgeoning tech sector. Unfortunately, people with sensory and physical disabilities are too often excluded from digital technologies and the opportunities they afford.

There is a need for university computer science courses and other ICT design and development courses to teach students how to develop accessible ICTs. The web accessibility training programme developed by ITU which provides for the training of university professors so that they can continue to train more web accessibility experts should be made compulsory in all Nigerian universities.[110]

The physically challenged can benefit from greater access to training opportunities, whether the goals of the programmes are related to digital inclusion or employment. More advanced training can support their employment in fields such as web design, content development, and checking websites for accessibility. Complementary instruction focused on soft-skill development and job placement will also prove to be beneficial.

Many senior citizens, especially women, in Nigeria missed the digital revolution and now lack the basic digital skills that others acquired in school or the workforce. Even those who own a computer or mobile phone may be uncomfortable using it. Seniors benefit greatly when they can develop the type of interactive digital skills that allows them to keep in touch with friends and family, access social services, and search for information.

The kinds of digital skills required to succeed in the digital economy are dramatically different today from those required even just five years ago. Training programs typically cover topics like basic hardware and software operations, email and search. Today, new technologies and innovations such as Artificial

[110] Web Accessibility - the Cornerstone of an Inclusive Digital Society - https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Web-Accessibility-Cornerstone-Training.aspx

Intelligence, Big Data, Blockchain, Cloud Computing, Internet of Things (IoT), Machine Learning and mobile applications require a whole new suite of skills. This fast-changing backdrop makes it important that existing digital skills training programmes are updated regularly.

More people are connected to the Internet than ever before, using digital devices and services for work and for all aspects of their life. In part, this has been fuelled by the rise of mobile broadband, which every day ensures the participation of more people in the digital economy. New technologies have also proliferated over the past decade. These will drive profound change both in people's daily lives over the coming decade and in radically altering how training is developed and delivered. And, as with all transformational changes, they present a great opportunity – and a significant challenge too to identify a distinct set of digital skills and have confidence that the training programmes would equip citizens with those skills.

The use of ICTs has been determined indispensable for the development of the economy. Therefore, it is essential to include and develop ICT in all educational establishments in a creative and culturally consistent way.

However, in Nigeria, there are challenges and equity gaps in terms of access, connectivity and especially in the development of digital literacy competencies. It is here that the Nigerian education system must play a relevant role by innovating instructional methods. Numerous studies show how digital technology is changing the way youth learn, play, socialize and participate civically. Now those ideas could be used to improve education.

Connected Learning emerges as a powerful new framework for designing learning that is engaging and relevant, and prepares the youth for a highly connected and technology-enabled 21st century where the most powerful learning occurs when it is connected to the interests of people. Connected learning combines personal interests, supportive relationships, and opportunities. It is learning in an age of abundant access to information and social connection that embraces the diverse backgrounds and interests of all young people.[111]

[111] TeachThought University - The Learning and Design Principles of Connected Learning - https://www.teachthought.com/the-future-of-learning/connected-learning/

Reducing gaps in access to technologies, developing skills such as critical thinking in addition to digital skills, and working to inject ICT into the curricula both at secondary and tertiary levels of education are some of the urgent tasks to improve the quality of learning and advance the digital literacy of women and youth for development.

Two possible solutions for training and retaining world-class industry-ready digitally skilled people are:

1. To initiate vocational apprenticeships and require establishments to engage apprentices; and,
2. Increase funding of universities for market-applicable research outputs

- **Teach Skills in Context**
  Like other types of foundational skills learning, training providers opine that digital skills work better for participants when taught in the context where they would be used. Even at the most basic level of digital skills, learning how to use a tool or do a specific digital task is easier if done as part of a real work task.

- **In-person Teaching is Important**
  The findings of this study show that many online classes, modules, and assessments are available for teaching digital skills (e.g., Google Digital Training and Northstar Digital Literacy), and many ICT training providers serving adult learners use these online tools. Some are meant to be self-guided, but some providers emphasized the importance of having an in-person component of training or in-person assistance available, especially for older people with low digital skills and the physically challenged. These training participants may lack confidence or fear working in the digital space and therefore, need encouragement to get started or follow through.

- **Access to Digital Tools is Connected to Digital Literacy**
  Training providers noted the connection between access to digital tools and digital skills themselves. If digital literacy depends in part on familiarity, having regular access is key. Some Organisations and State Governments have taken innovative approaches to expand access in conjunction with teaching digital skills. For instance, Sokoto State, Bayelsa State and Rivers State once piloted

the distribution of devices under the now defunct "One Laptop per Child"[112] (OLPC) Programme an initiative established with the goal of transforming education for children around the world by creating and distributing educational devices for them and by creating software and content for those devices.

3.3.2 Need for a Structured Framework or Model

The ever-widening digital literacy gap among women, youth and the physically challenged changes the calculus in the understanding of where to channel resources for skill-building programs and initiatives. The socioeconomic and political implications of escalating economic and social inequalities are huge, requiring immediate scalable and sustainable efforts to address it. Moreover, for groups already at the fringes of the economy, such as youth and the physically challenged, the question of how digital inclusion and upskilling should be addressed cannot be underestimated.

Millions of Naira may have been invested in computer literacy, computer skills, and digital skills programs across many different States by Ministries, Departments and Agencies of Governments in Nigeria. Even across the private sector, every shade of computer appreciation training goes on.

Nevertheless, such efforts have limited coordination and are uneven across covered topics due to the lack of a nationally shared understanding or framework for digital competencies and standards.

Across sectors, for example, digital skills, digital literacy, digital readiness, computer skills, computer literacy and digital competency are used interchangeably. There is no shared national understanding of what the terms mean. This leads to the use of different – but overlapping – terminologies and initiatives across different sectors, organisations and States. Consequently, current efforts lack coordination, scalability, and comprehensive scope. As a result, addressing how to sustain and improve best practices in ICT literacy is difficult, if not impossible. It also makes accurate monitoring and reporting difficult.

[112] One Laptop per Child (OLPC) was a non-profit scheme initially conceptualized by Nicholas Negroponte, Founder/ Chairman, Massachusetts Institute of Technology Media Lab and first announced in The World Economic Forum, Davos, Switzerland in January 2005

The absence of a national framework for digital competencies leaves Nigeria ill-equipped to understand the current progress of digital competency movements in the world today and also leaves Nigeria unable to grapple with what forms of digital competency should be taught and to whom.

For Nigeria to build comprehensive digital competencies with speed, scalability, and sustainability, there is an urgent need for effective coordination and consensus towards building a national framework with a set of definitions, structure and taxonomy.

This study recommends the following framework and model for digital literacy development and governance in Nigeria with the moniker Nigerian National Digital Framework (NNDF).

This NNDF model leans heavily on the framework proposed by the Coalition for Digital Intelligence (CDI), composed of the Organisation for Economic Co-operation and Development (OECD), the Institute of Electrical and Electronics Engineers Standards Association (IEEE), and the DQ Institute in association with the World Economic Forum (WEF), and a cooperative network of Organisations around the world aiming to improve digital intelligence by defining global standards of digital literacy, skills, and readiness.

The Nigerian National Digital Framework is recommended for use to coordinate national efforts across the Nigerian digital technology ecosystem through multistakeholder collaborations.

The NNDF will form a comprehensive set of technical, cognitive, meta-cognitive, and socio-emotional competencies that are grounded in universal moral values that will enable policymakers, organisations and individuals to face the challenges and harness the opportunities of digital life.

The framework has three levels, eight areas, and 24 competencies composed of knowledge, skills, attitudes, and values.

Three key characteristics of the NNDF are:

- **All-Embracing Concept**

  The NNDF is conceptualized as an umbrella term for organizing digital skills, digital literacy, and digital readiness across all sectors and demographic groups in Nigeria. This allows the concept to bring together the educational agenda of

digital literacy with industry efforts to develop digital skills that encompass a broad range of competencies such as digital citizenship, digital resilience, media and information literacy, job readiness, entrepreneurship, and more.

With this overarching concept, the NNDF model aggregates 30 world-leading frameworks on digital literacy and skills from around the globe. The identified competencies were mapped against the existing Frameworks and Guidelines including the Framework and Guidelines for Information and Communication Technology; ICT Adoption in Tertiary Institutions; ICT Competency Framework for Teachers in Nigeria; National Information and Communication Technology Policy; the National Implementation Guidelines for ICT in Education (2019) by the Federal Ministry of Education; and, the National Digital Literacy Framework (NDLF) 2021 by NITDA.

- **Adaptable Framework**

The Nigerian National Digital Framework offers a holistic set of digital competencies with a systematic structure as a reference framework. The aim is to enable any organization to adopt the Framework, and to be able to practically tailor the framework to meet its needs. Any arm or cadre of government, company, or school can easily adopt the NNDF and customize it to their own needs based on their skilling-up targets and strategies.

- **Agile Evolution**

The NNDF is designed to continuously update and evolve through further knowledge aggregation and feedback. It will continuously aggregate knowledge and best practices on digital literacy, skills education, training and policies from around the world to ensure that the framework remains pedagogically and technically up-to-date.

Moreover, the NNDF will have online tools to serve as a living document that enables the Framework to evolve with real-time feedback and early detection of new competencies. The tool will proactively map existing and new digital literacy and skills frameworks, educational and training programs, and policies against the NNDF.

The NNDF identifies eight broad areas of digital life as illustrated in Table 46.

Table 46: The Eight Broad Areas of Digital Life

1	Digital Identity	The ability to build a wholesome online and offline identity.
2	Digital Use	The ability to use technology in a balanced, healthy, and civic way.
3	Digital Safety	The ability to understand, mitigate and manage various cyber-risks through the safe, responsible, and ethical use of technology.
4	Digital Security	The ability to detect, avoid, and manage different levels of cyber threats to protect data, devices, networks, and systems.
5	Digital Emotional Intelligence	The ability to recognize, navigate, and express emotions in one's digital intrapersonal and interpersonal interactions.
6	Digital Communication	The ability to communicate and collaborate with others using technology.
7	Digital Literacy	The ability to find, read, evaluate, synthesize, create, adapt, and share information, media, and technology.
8	Digital Rights	The ability to understand and uphold human rights and legal rights when using technology.

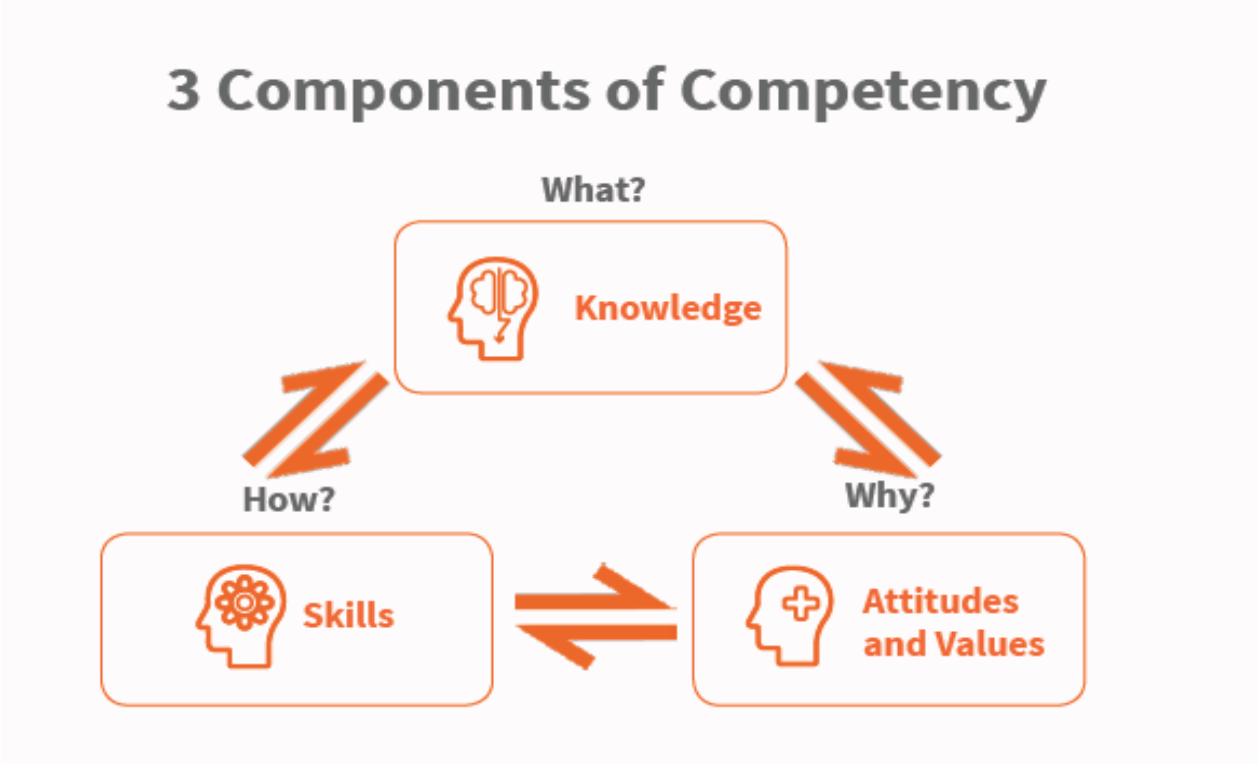
The eight areas of digital life are further differentiated by three different levels of digital maturity viz:

Table 47: The Three Levels of Digital Maturity

1	Digital Citizenship	The ability to use digital technology and media in safe, responsible, and ethical ways.
2	Digital Creativity	The ability to become a part of the digital ecosystem, and to create new knowledge, technologies, and content to turn ideas into reality.
3	Digital Competitiveness	The ability to solve global challenges, innovate, and create new opportunities in the digital economy by driving entrepreneurship, jobs, growth and impact.

The eight areas of digital life and the three levels of maturity are platformed on three components of competency:

Table 48: The three components of competency



i) **Knowledge (what)**
- Disciplinary, understanding, and procedural;

ii) **Skills (how)**
- A broad range of skills – cognitive, social, emotional, practical, physical – To apply in unknown and evolving circumstances;

iii) **Attitudes and Values (why)**
- That guide how knowledge and skills are used at personal, local, societal, and global levels to meet challenges and opportunities.

The three levels of maturity across eight areas of digital life are actualised through the following 24 competencies which have been identified based on the aggregation of extant frameworks.

Table 49: The 24 Competencies

	Competency	Description
1	Digital Citizen Identity	The ability to build and manage a healthy identity as a digital citizen with integrity.
2	Balanced Use of Technology	The ability to manage one's life both online and offline in a balanced way by exercising self-control to manage screen time, multitasking, and one's engagement with digital media and devices.
3	Behavioural Cyberrisk Management	The ability to identify, mitigate, and manage cyber-risks (e.g., cyberbullying, harassment, and stalking) that relate to personal online behaviours.
4	Personal Cyber Security Management	The ability to detect cyber threats (e.g., hacking, scams, and malware) against personal data and device, and to use suitable security strategies and protection tools.
5	Digital Empathy	The ability to be aware of, be sensitive to, and be supportive of one's own and other's feelings, needs and concerns online.
6	Digital Footprint Management	The ability to understand the nature of digital footprints and their real-life consequences, manage them responsibly, and actively build a positive digital reputation.

7	 Media and Information Literacy	The ability to find, organise, analyse, and evaluate media and information with critical reasoning.
8	 Privacy Management	The ability to handle with discretion all personal information shared online to protect one's and others' privacy.
9	 Digital Co-Creator Identity	The ability to identify and develop oneself as a co-creator of the digital ecosystem.
10	 Healthy Use of Technology	The ability to understand the benefits and harms of technology on one's mental and physical health and to use technology use while prioritizing health and well-being.
11	 Content Cyber-Risk Management	The ability to identify, mitigate, and manage content cyber-risks online (e.g., harmful user-generated content, racist/hateful content, image-based abuse).
12	 Network Security Management	The ability to detect, avoid, and manage cyber threats to cloud-based collaborative digital environments.
13	 Self-Awareness and Management	The ability to recognize and manage how one's value system and digital competencies fit with one's digital environment.
14	Online Communication and Collaboration	The ability to use technology effectively to communicate and collaborate collectively, including at a distance.
15	Content Creation and Computational Literacy	The ability to synthesize, create, and produce information, media, and technology in an innovative and creative manner.
16	Intellectual Property Rights Management	The ability to understand and manage intellectual property rights (e.g., copyrights, trademarks, and patents) when using and creating content and technology.

17	 Digital Changemaker Identity	The ability to identify and develop oneself as a competent changemaker in the digital economy.
18	 Civic Use of Technology	The ability to engage in civic participation for the well-being and growth of local, national, and global communities using technology.
19	 Commercial and Community Cyberrisk Management	The ability to identify, mitigate, and manage commercial or community cyber-risks online, such as organizational attempts to exploit individuals financially or through ideological persuasion (e.g., embedded marketing, online propaganda, and gambling).
20	 Organizational Cyber Security Management	The ability to recognize, plan, and implement organizational cyber security defences.
21	 Relationship Management	The ability to skilfully manage one's online relationships through cooperation, conflict management, and persuasion.
22	Public and Mass Communication	The ability to communicate with an online audience effectively to exchange messages, ideas, and opinions reflecting wider business or societal discourses.
23	Data and AI Literacy	The ability to generate, process, analyse, and present meaningful information from data and develop, use, and apply artificial intelligence (AI) and related algorithmic tools and strategies in order to guide informed, optimized and contextually relevant decision-making processes.
24	Participatory Rights Management	The ability to understand and exercise one's powers and right to online participation (e.g., one's rights to personal data protection, freedom of expression, or to be forgotten).

3.3.3 The Structure and Taxonomy of the NNDF

The proposed Nigerian National Digital Framework maps out how digital skills take their place within a wider framework of soft 21st-century skills in Nigeria's digital economy.

The NNDF aims to cover all areas of individuals' digital lives that range from the personal and social identities of individuals to their use of technology including devices and media, their online communication and collaboration at work or at leisure, their practical, operational and technical capabilities that are critical for daily digital lives and professional careers. The Framework also covers potential safety and security issues related to technology, emotional and relational aspects and human rights in the digital age.

The one key benefit of embedding the suggested Nigerian National Digital Framework into Nigeria's digitalisation strategy is that it lends itself to being a conventional framework with a commonality of language, structure, and taxonomy as a point of reference and template to develop bespoke skills acquisition training plans as companies or organisations require.

This will allow learning to proceed based on what may be most relevant to an individual's life at the moment. In total, the NNDF proposes an eight-by-three matrix of 24 competencies guided by the structure of the OECD Education 2030 Learning Framework.

These competencies are learnable, and once learned can help to maximize the benefits of technologies while minimizing the harms, both in people's personal lives and work obligations. Essentially, the goal is to inculcate digital intelligence in individuals, enabling them to move beyond just hard skills and harness the power of the digital world to shape their lives.

Each of the 24 competencies is differentiated by a continuum of Knowledge, Skills, Attitudes and Values as encapsulated in Table 50.

Table 50: The Continuum of Competencies

		Knowledge	Skills	Attitudes and Values
1	**Digital Citizen Identity**	Individuals understand the basic vocabulary needed for discussing the media landscapes in which they are embedded; the social and multicultural nature of digital media; the construction of their self-image and persona in the digital environment, and how personal use of digital media may have professional implications.	Individuals are able to demonstrate ethical and considerate behaviour and netiquette when using technology across different audiences and possessing global awareness in a way that demonstrates non-discriminatory and culturally sensitive behaviour.	Individuals exhibit coherency and integrity across online and offline behaviours, honesty when using technology, and demonstrate self-efficacy by finding ways to take advantage of the opportunities afforded to them online.

2	**Balanced Use of Technology**	Individuals understand the nature and impact of technology use (e.g., excessive screen time, multi-tasking) on their health, work productivity, well-being, and lifestyles, and have appropriate knowledge to deal with these impacts.	Individuals are able to assess health risks and reduce technology-related issues to self-regulate their technology usage; in doing so, they become able to develop time and resource management skills to more successfully perform tasks and enjoy entertainment safely.	By using technology with purpose-driven intentions, individuals exhibit integrity by adhering to goals in terms of screen time and technology usage and develop positive relationships with others through the self-regulated use of technology.
3	**Behavioural Cyberrisk Management**	Individual understand the different types of behavioural cyberrisks (e.g., cyberbullying, harassment, and stalking), how they might encounter these risks, how these risks might affect them, and how they can formulate strategies for dealing with them.	Individuals are able to develop the appropriate technical, socio-cognitive, communicative, and decision-making skills to address behavioural cyber-risk incidents as they occur, whether as a bystander or victim and gain valuable coping tools to address these negative online experiences.	Individuals exhibit kindness when online, know the supportive framework in place to address risks, and are able to manage their online behaviour as part of contributing to positive and supportive online communities.

4	**Personal Cyber Security Management**	Individuals understand their personal online risk profiles and how to identify different types of cyber threats (e.g., hacking, scams, and malware), and also identify available strategies and tools they can use to avoid such threats.	Individuals are able to identify cyber threats, use relevant cybersecurity practices (e.g., secure passwords, firewalls, and anti-malware applications), and use technology without compromising their data and devices.	Individuals exhibit resilience and vigilance against careless or negligent behaviours that may compromise their own or others' data and device security, and have confidence about what to do when there is a problem.
5	**Digital Empathy**	Individuals understand how their online interactions might affect others' feelings and recognize how others may be influenced by their online interactions	Individuals develop socio-emotional skills by becoming sensitive to and respecting others' perspectives and emotions through interactions online	Individuals demonstrate an awareness and compassion for the feelings, needs, and concerns of others online
6	**Digital Footprint Management**	Individuals understand the concept of digital footprints, the consequences that such trails of information and corresponding metadata may have on their reputation	Individuals are able to manage their digital footprints and use technology in a manner that contributes to a positive reputation for themselves	Individuals exhibit care, prudence and responsibility online, with the goal of actively managing the types of information that may be

7	**Media and Information Literacy**	Individuals understand the basic structure of the digital media, how the use of digital media influences knowledge and information acquisition	Individuals have proficient computer operation skills and are able to use productivity software or applications that enable them to gather and organize digital content	Individuals are careful and critical of the information that they encounter when online, exhibiting discernment in their evaluation
8	**Privacy Management**	Individuals understand privacy as a human right, what personal information is, and how it can be used, stored, processed, and shared in digital platforms	Individuals are able to develop behavioural and technical strategies to limit privacy violations, and are able to make good decisions around creating and	Individuals show respect for their own and other's privacy and personal information, treating these as valuable and personal assets worth protecting
9	**Digital Co-Creator Identity**	Individuals understand how to keep up with advancements in ICT; integrate digital technologies into their everyday lives in a way that is complementary and productive rather than disruptive; learn to be open to experimenting with new technology	With a healthy identity as a co-creator of the digital ecosystem, individuals are able to explore and identify present-day problems and issues; develop and build higher-order thinking and reasoning skills	Individuals express self-motivation and resourcefulness when using technology whether by taking initiative or by knowing when and how to deploy and allocate their time, efforts, and resources.

10	**Healthy Use of Technology**	Individuals understand the contexts that shape discourses about the impact of technology on their well-being and are able to discern how to effectively use technology for their own benefit.	Individuals are able to use technology ergonomically. Physiological awareness helps users identify safe, comfortable practices and equipment for mentally and physically beneficial work processes.	Individuals value mental and physical health and actively self-regulate their use of technology in a healthy way.
11	**Content Cyberrisk Management**	Individuals understand content cyberrisks that they face online (e.g., harmful user-generated content such as racist, hateful, discriminatory content/images, or image-based abuse), and the strategies involved in dealing with them.	Individuals become better equipped to develop and use conflict management techniques to mitigate such risks whether through avoiding or confronting individuals or groups involved in the creation of such content, reporting incidents to platform administrators or other appropriate processes.	Individuals exhibit resilience and fortify themselves against content that may be hurtful or derogatory while proactively contributing to a healthy, open, and supportive online community.

12	**Network Security Management**	Individuals understand cyber threats specific to cloud networks and collaborative digital environments that may compromise their data, devices, and systems, and the options available to them for ensuring appropriate levels of protection.	Individuals are able to predict and identify weaknesses and risks in their networks; evaluate vulnerabilities, quantify associated risks; employ tools, strategies, and protocols to ensure and improve the confidentiality and security of their networks and systems and implement support systems to allow for optimum productivity and performance.	Individuals continuously take the initiative to stay up-to-date about evolving cyber threats, risk profiles, and network vulnerabilities when using technology.
13	**Self-Awareness and Management**	Individuals understand how their own value systems influence and are influenced by their digital environments, and become equipped to explain how one's mood can affect others.	Individuals are able to identify and explain their emotions, reflect on how their feelings may be influenced by their digital experiences, and manage their moods and impulses accordingly with active self-regulation.	Individuals exhibit an awareness of their own moods and are actively able to manage their impulses accordingly, thereby respecting others during online communication.

14	**Online Communication and Collaboration**	Individuals understand different types of peer-to-peer communication and collaboration strategies, tools, and formats, and decide which methods are most effective for individual or collaborative goals.	Individuals are able to develop socio-emotional, interpersonal, and cognitive skills that support their communication and collaborative efforts; capacity to interact and collaborate with an online community of peers and experts.	Individuals exhibit initiative and positive attitudes towards technology use that enable support, collaboration and productivity; exhibit an inclusive attitude that fosters positive collaboration culture and teamwork.
15	**Content Creation and Computational Literacy**	Individuals understand the theory of digital content creation and computational thinking and possess algorithmic literacy such as programming and digital modelling.	Individuals are able to conceptualize, build on, organize, create, adapt, and share knowledge, digital content, and technology. They access needs and synthesise knowledge and ideas.	Individuals exhibit an active and constant willingness to engage with evolving and advancing digital technology, becoming motivated to adopt such advances and learn the skills required for lifelong learning.

16	**Intellectual Property Rights Management**	Individuals understand legislation and rights around ownership and remixing of digital creations (e.g., digital rights management technologies, plagiarism, copyright, fair use, licensing).	Individuals distinguish between digital creations that can be legally downloaded and that must be paid for. They utilize strategies for protecting their own and others' digital creations through a variety of tools and legislation.	Individuals build trust and exhibit responsibility, self-respect, and respect for others by protecting their own digital creations and crediting others' creations when appropriate.
17	**Digital Changemaker Identity**	Individuals understand general and emerging trends within digital environments, how the use of technology shapes and is shaped by globalization and interdependent networks, and the need to recognize emerging problems that technology can create and address.	Individuals develop higher-order thinking skills by extending their thinking beyond the individual scale to integrate digital networks and tools in response to broader social and economic issues; monitoring and integrating emerging technology trends and developments for the identification of new and emerging technology.	Individuals exhibit professionalism and self-worth, curiosity, and awareness of existing apps in their digital competencies with evolving tech-nology and are comfortable in exploring and exploiting technology for self-development and further business growth.

18	**Civic Use of Technology**	Individuals understand the importance of community engagement and civic participation that meet the quality expectations and standards that are aligned with the individuals' and/or organizational values and business objectives.	Individuals are able to organize and rally a group online for effecting the change that they aim to create; better equipped to engage with individuals or groups through various digital media, to develop and review procedures.	Individuals exhibit a belief in and respect for civic engagement and are willing to become involved in their communities for the betterment of their own Organisations and/or society.
19	**Commercial and Community Cyberrisk Management**	Individuals understand different types of commercial or community cyberrisks; contextual exposure to such risks as members of specific communities and groups, and demonstrate depth.	Individuals become familiar with the strategies involved in dealing with risks; able to identify and develop strategies and tools to mitigate and manage exposure to risks.	Individuals exhibit caution and vigilance when online; understand where and when strategies for dealing with risks may be available to them, and devise creative ways to handle and avoid the dangers associated with these risks.

20	**Organizational Cyber Security Management**	Individuals understand support architectures, policies, practices, and procedures that enable Organisations to manage threats, including anti-malware; have knowledge about proper handling, usage, and storage of an organization's IT assets to limit potential business or legal risks.	Individuals develop cognitive and technical skills for improving their organization's cybersecurity systems; forecast and assess existing and potential security risks, develop and implement intervention strategies to proac-tively protect and optimize ICT assets.	Individuals value cybersecurity and advocate it in their organization by providing advice and guidance on potential risks, mitigation strategies, and best practices: development of communication strategies for Organisations and communities to ensure adoption and adherence to security policies and standards.
21	**Relationship Management**	Individuals understand and manage different contexts of social interaction in online communities to achieve mutual consensus and outcomes; understand how different behavioural norms and emotional reactions may vary depending on the platform and context.	Individuals develop interpersonal skills to engage, communicate, negotiate with and influence stakeholders in intercultural online dialogue; build cooperative partnerships with inter-organisational and external stakeholders.	Individuals exhibit self-motivation and a commitment to provide an inclusive culture that cultivates tolerance and teamwork; build and grow positive communities online; and demonstrate diplomacy.

22	**Public and Mass Communication**	Individuals understand how different online platforms, digital environments, cultures, and policies may aid or restrict the dissemination of ideas and messages and how ethical and legal underpinnings shape the spread of ideas and messages online.	Individuals communicate their ideas and messages through digital media and technology that are available to them They conceptualize digital storyboards, optimize content delivery and their messages, develop dissemination strategies on and across various channels and platforms, and track audience response and communication effectiveness. They engage audiences in a dialogue utilizing various digital tools including search engine optimization and/or marketing strategies, and monitoring data analytics to strategically boost engagement online. They co-create an organization's projected brand and reputation by developing and implementing branding campaigns, public relations, and reputation management strategies.	Individuals exhibit an attitude towards collaborative technology use that is ethical, purposeful, and principled to engage in a productive discourse with their digital communities.

23	**Data and AI Literacy**	Individuals understand the theory of data analysis, statistics, and AI-related mathematical concepts and computer programming; understand how data are generated, process data based on statistical understanding, and create and/or use AI. They understand concepts across multiple disciplines and identify the benefits, limits, and risks brought about by big data, AI, and related technology.	Individuals develop efficient and stable processes to collect, store, extract, transform, load, and integrate data at various stages in the data pipeline. They read, manage, analyse, and process data from a variety of sources, and prepare data in a structure that is easily accessed and analysed according to specific requirements. They create and build knowledge by analysing data, communicate its meaning to others with various data visualization tools and present patterns, trends and analytical insights from data or new concepts in a strategic manner for the intended audience. In turn, they communicate the limitations of data by telling when data is being manipulated to support a limited or false narrative.	Individuals are confident in pursuing innovative and analytical careers. They are also proactive in applying their knowledge of data and AI into evaluating whether broader systems are acting in ways aligned with community values that promote well-being. Individuals are also able to leverage AI to augment their own intelligence while remaining aware of how human value judgements play into the applications of big data and AI in society.

24	**Participatory Rights Management**	Individuals understand their rights as digital citizens and consumers (e.g., their rights to personal data protection, freedom of expression, or to be forgotten), and why risks and opportunities for online participation are unevenly distributed across social groups.	Individuals become equipped to develop cognitive and meta-cognitive skills for synthesizing existing legislation with their own practices to ensure that digital rights are upheld and respected online; they also develop complex system-level thinking for upholding individual and community rights to online participation as they monitor and improve systems and hold contradictory ideas and ideals in tension.	Individuals exhibit proactive thinking, grounded in respect for democratic ideals, the rule of law and human rights. They take responsibility for managing technology to promote the public good of society and the environment.

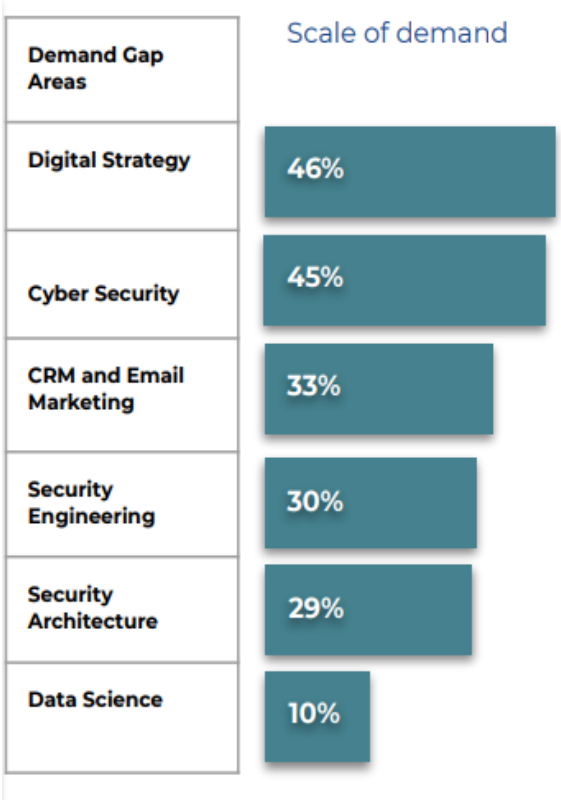
To Engage stakeholders in order to obtain industry perspective on the issue of Digital Skill and how it impacts the growth and development of telecom industry

The interviews were conducted with HR Professionals, Learning and Development Practitioners, ICT Managers and Digital Experts provided further context around some of the evidence gathered from the survey and shared valuable insights on the existing digital skills demand and supply gap.

The stakeholders were asked to identify key roles they deem to be in demand and to advance an appreciation of where the skills mismatch may lie.

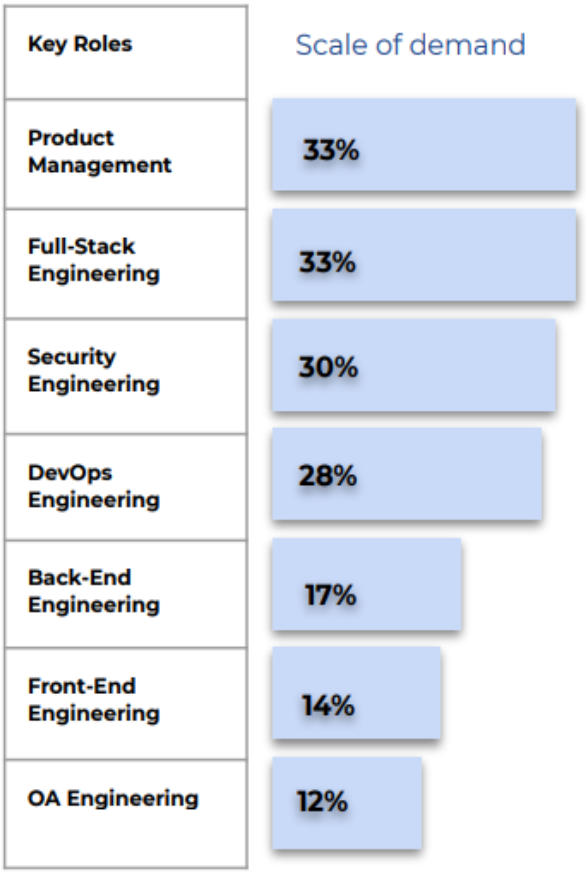
There was near unanimity that a huge gap exists between available digital talent and labour market demand. The gaps exist in both hard skills and soft skills as highlighted in the following tables.

Table 51: Hard Skills Demand Gap Areas



Source: LinkedIn

Table 52: Key Roles in Demand



Source: LinkedIn

Table 53: Other Digital Skills in Demand

Other Digital Skills in Demand					
1	Change Management	**12**	Behavioural Sciences	**23**	Augmented Reality
2	Collaboration	**13**	Big Data	**24**	Automation
3	Comfort with Ambiguity	**14**	Cloud Computing	**25**	Internet of Things (IoT)
4	Customer-Centricity	**15**	Community Management	**26**	User Experience Design
5	Entrepreneurial Mindset	**16**	Cybersecurity	**27**	User Interface Design
6	Data-Driven Decision Making	**17**	Data Science	**28**	Virtual Reality
7	Organizational Dexterity	**18**	Digital Manufacturing	**29**	Machine Learning
8	Hard Digital Skills	**19**	Search Engine Optimization (SEO)	**30**	Penetration Testing
9	Agile	**20**	Innovation Strategy	**31**	UI/UX
10	Analytics	**21**	Master Data Management	**32**	IOS/Android
11	Artificial Intelligence	**22**	Mobile Application Design and Development	**33**	Computer Programming

3.4 Objective Four – Digital Skills Enhancement

Advice the Commission appropriately on all matters related to the consultancy or deemed appropriate and necessary to enhance digital skills among women, youth and the physically challenged in Nigeria.

3.4.0 Findings

In an increasingly technology-oriented society, competencies such as digital literacy, digital skills, and digital readiness have become core requirements for the future of individuals. The Organisation for Economic Co-operation and Development, the World Economic Forum, the World Bank, and the United Nations have all variously identified these competencies as fundamental for the changing world.

Published research shows that there will be tens of millions of jobs for people with advanced digital skills in the coming years[113] as the digital economy has created a huge shortage of people with the necessary competencies.

Emerging and specialized skills represent the direction of travel in which digital skills programmes are heading and thus offer future-oriented opportunities for individuals to consider. Thus if Nigeria is to ever achieve her ambitious 95% digital literacy rate by 2030, she needs to scale on developing intermediate and advanced digital skills. These skills need to be integrated into the schools' curricula at the primary, secondary and tertiary levels.

The trending topics in the emerging skills category include computational thinking, data literacy, mobile literacy and many more.

3.4.1 Computational Thinking and Coding

Computational thinking is essential to the development of computer applications, but it can also be used to support problem-solving across all disciplines, including the Humanities, Maths, and Science.[114] Computational thinking is a problem-solving process that includes several characteristics and dispositions.

[113] ITU and ILO: Digital Skills Thematic Priority of the Global Initiative on Decent Jobs for Youth; https://www.decentjobsforyouth. org/wordpress/wp-content/uploads/2017/11/Thematic-Plan-1-Digital-Skills.pdf

[114] Harabus K. Et Al., Computational Thinking in Secondary and Higher Education 13th International Conference Interdisciplinarity in Engineering (INTER-ENG 2019) - www.sciencedirect.com

Recent years have witnessed a burgeoning interest in the teaching of computational thinking as basic literacy, on par with reading and writing. Computational thinking has also been described as a way of designing systems and understanding human behaviour that draws on concepts fundamental to computer science.

To flourish in today's digital world, computational thinking has to be a fundamental part of the way people think and understand the world. In terms of content, computational thinking involves examining data patterns, decomposing problems, using algorithms and procedures, making simulations, computer modelling, and reasoning about abstract objects.

In practice, teaching computational thinking can begin when children are of primary school age. Thus, computational thinking should start at a basic level, and rise through to advanced topics. Teaching computational thinking can be introduced with exercises that require no technology and which then gradually add the use of computers and other devices.

3.4.2 Mobile Literacy

Of the five billion people in the world with mobile phones, nearly half (47%) mainly use their devices to place a voice call or send a text message.[115] The percentage in the usage of mobile phones will not be that much different among Nigeria's 204 million active SIMs.[116]

As increasing numbers of people move from feature phones to smartphones and as the next million users come online, many will skip the stage of using personal computers and feature phones entirely, moving directly to powerful handheld computers, i.e. smartphones.

There is, therefore, a critical need to bridge the gap between using a phone for basic functions and using sophisticated smartphones. Mobile literacy has emerged to meet this need by identifying the necessary digital skills smartphone users need to optimize their mobile internet experience.

Two forces are driving mobile literacy efforts. Firstly, people everywhere are using their smartphones to learn, conduct business, use financial and government services and engage in other productive activities as indeed, the smartphone's mobility and its ease of use through Apps are fuelling countless opportunities.

[115] ITU - https://www.itu.int/en/ITU-D/Digital-Inclusion/Documents/ITU%20Digital%20Skills%20Toolkit.pdf
[116] NCC - https://www.ncc.gov.ng/statistics-reports/subscriber-data

Secondly, there is a tendency for smartphone users to consume more information than they produce, and engage in more social than serious activity compared to PC users.

Although the development of a mobile literacy curriculum is still in its infancy, three examples exist and will suffice for this study.

The three examples are:

1. The University Of Washington Technology & Social Change Group's Mobile Information Literacy curriculum (TASCHA);
2. GSMA's Mobile Internet Skills Training Toolkit; and,
3. Mozilla's Digital Skills Observatory curriculum;

Topics covered by the three mobile literacy curricula include the following.

1. TASCHA	2. GSMA	3. Mozilla
1: The Mobile Internet Smartphone and Internet Basics, connecting to the internet and downloading apps.	1: **Introduction to the Internet** Simple explanations to help answer some of the most common questions about the internet.	**1: The Smartphone Ecosystem** Learn the basics of how smartphones and the internet work together to deliver apps, information, and messages to and from your smartphone.
2: Getting Started with Apps and Security How to set up accounts, create strong passwords, and avoid online scams	**2: WhatsApp Uses** WhatsApp as an entry point to build on what people know, whilst introducing the benefits of communication via the internet and the skills needed for this.	**2: All About Accounts** Learn how to set up new accounts and create passwords that keep them safe and secure from people who want to impersonate you or steal your data.
3: Searching, Evaluating and Using Content How to use search engines, recognize different types of web content, and identify trustworthy sources.	**3: YouTube** Builds on the positive regard that people have for audio-visual channels whilst introducing the skills necessary to use the mobile internet.	**3: Exploring, Searching and Downloading** Learn what is possible online by exploring, searching, downloading and using the web and mobile applications.

4: Working Online with Others Online etiquette, such as working in collaborative online environments.	**4: Google Search** Allows people to find content that is relevant to them on the internet.	**4: Solving Problems with your Phone** Use your phone to be more creative, solve problems and be more productive.
5: Making mobile phones and mobile Internet work for you How mobile Internet can help solve everyday problems, how to use locally relevant, secure apps.	**5: Safety & Cost** Staying safe and the cost of using the mobile internet are covered within each of the WhatsApp, YouTube and Google modules.	
6: Using Library Resources on Mobile Phones Library resources and how to use them on a smartphone.		

3.4.3 Data Literacy

People who can derive meaningful information from data are in high demand in every sector, a trend driven by the global explosion in Big Data and the proliferation of sophisticated tools to manage, analyse, and visualize data.

Some observers suggest that in 10 years, data experts will have replaced computer experts as being a desirable profession.[117] As such, people with data literacy skills will be needed in every industry – from SMEs to large corporations – just as people with computer skills are now needed across all job sectors.

While data scientists with advanced mathematical and statistical expertise represent the top tier, many Organisations are demanding data-based literacy and specific skills from employees.

[117] Dave Fowler, Road to the Future Paved With Data Literacy, Wired, August 2013

The elements of data literacy include:

- Knowing what data is appropriate for a particular purpose;
- Interpreting data visualizations, such as graphs and charts;
- Thinking critically about information yielded by data analysis;
- Understanding data analytic tools and methods, and when and where to use them;
- Recognizing when data is being misrepresented or used misleadingly; and
- Communicating information about data to people lacking data literacy – a talent sometimes referred to as data storytelling.

3.4.4 21st-Century Skills

Digital skills take their place within a broader framework, often referred to as 21st-century skills. According to a World Economic Forum report, 21st-century skills are comprised of three pillars: foundational skills, competencies, and character qualities.

Table 54: Map of 21st-Century Skills (not exhaustive)

Source: World Economic Forum

Sometimes 21st-century skills are called soft skills.[118] As illustrated in Figure 1, digital skills referred to in the graphic as ICT literacy falls under the foundational category. This underlines the great importance of the connection between digital

[118] Youth Employment Funders Group: What Works in Soft Skills Development for Youth Employment? http://www.mastercardfdn.org/wp-content/uploads/2017/09/soft-skillsyouth-employment.pdf

skills and other competencies and character qualities – all within an overall system of lifelong learning.

Digital skills exist on a spectrum, from basic to more advanced, and encompass a combination of behaviours, expertise, know-how, work habits, character traits, dispositions and critical understandings.[119] As mentioned, digital skills develop across a continuum, and they are constantly being updated in line with changes in technology.

3.4.5 Basic Digital Skills

Basic digital skills enable users to function at a minimum level in society. They are foundational skills for performing basic tasks, and there is growing consensus that basic digital functioning corresponds to foundational literacy, taking its place alongside traditional literacy and numeracy.

Basic skills cover hardware (for example using a keyboard and operating touch-screen technology); software (for example word processing, managing files on laptops, managing privacy settings on mobile phones); and, basic online operations (for example email, search, or completing an online form). Basic skills enrich lives, enabling users to interact with others and access government, commercial and financial services.

3.4.6 The Challenges

This study's discourses and discussions with ICT training providers unearthed common challenges in teaching foundational digital skills that women, youth and the physically challenged encounter in accessing digital skills training. These challenges are legion and include:

- **Affordability of Training**
  Oftentimes the training programmes are provided through models that make training unaffordable for trainees. The cost of attending can prove prohibitive, particularly for the youth and the physically challenged.

- **Scaling and Sustainability**
  Many training programmes achieve only small-scale results while the trainees receive an impartation of outdated digital skills or at worst, none at all. Even the little gains made in some training programmes usually fade away quickly

[119] World Economic Forum - The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution, January 2016. http://reports.weforum.org/future-of-jobs-2016/

because there is usually no sustainability effort to ensure associated programmes and initiatives continue evolving.

- **Qualified Instructors**
  Oftentimes, many of the trainers and other instructors have expired skills themselves requiring updating. Most of them require training to bolster their technical skills and learn new nuances of digital skills and how they can be applied to address the skills mismatch between what institutions of learning provide and what employers and citizens need for work.

- **Infrastructure**
  Perennial lack of essential physical resources such as space, electricity, connectivity and equipment frustrates capacity-building efforts. Most often, digital skills programmes require physical venues with functional facilities.

- **Relevant Curriculum**
  Curricula in most cases are grossly out of date with training materials that are not critically assessed to ensure they cover needed and appropriate skills, competencies, and tasks – required not only for now but further into the future.

- **Adapting and Innovating**
  Programs and curricula need to be updated as technology and the workforce change, but most often this is not the case with most training institutions. Most training centres do not have structured plans for updating the curriculum.

- **Gender Divides and Inequalities in Skills Development**
  Persistent gender, age, and other divides around ICT usage have led to fewer opportunities for women, youth, the physically challenged, the elderly and other marginalized populations. Most digital skills training programmes are not tailored to the needs of these groups.

The study suggests the following solutions to mitigate these challenges:

- **Integrating Soft Skills**
  To succeed in the digital economy, people will need basic digital skills related to the effective use of technology, as well as soft skills necessary to ensure

collaborative and effective work. It is necessary, therefore, to introduce entrepreneurial business skills development into digital skills education and training programmes. This is important to imbue students and trainees with the right knowledge, skills, and entrepreneurial mindset to set them up for opportunities in digital entrepreneurship. By building these skill sets in a complementary way, learners will be more effective when applying their skills in the real world.

- **Incorporating Basic Digital Skills**
  Instruction in basic ICT skills, coding and computational thinking should be a part of the school curriculum at all grade levels. These foundational skills will enable young people not just to use their skills, but also to write programmes and create new technologies that drive the digital economy.

- **Extension of Training**
  Extending basic, intermediate and advanced digital skills beyond schools onto job training programmes and other initiatives that target out-of-school youth and the physically challenged will allow participants to learn a range of digital skills – such as new coding languages – to keep up with technological progress.

- **Instituting Dynamic, Peer-Learning Instruction**
  Interactive and peer-driven instructional approaches foster confident problem-solving and the creative, collaborative mindset valued in the digital economy. Trainers can incorporate resources for learning to code that allows learners to create their own games and apps. These models can be used both in school programmes as well as in programmes for out-of-school youth and in lifelong learning programmes for adults through

- **Forming Cross-Sector Partnerships**
  Most digital skills strategies involve a range of partners who can leverage their unique strengths in achieving the goals of the national strategy. For instance, infrastructure can be leveraged through partnerships with tech hubs, universities, polytechnics and non-governmental organisations (NGOs) in arrangements that are geared to involve Organisations from the government sector, the private sector, NGOs, academia and non-formal training providers.

- **Developing Sustainable, Affordable Cost Structures**
  One effective way to implement this approach is to integrate digital skills into national education programmes. Organisations and companies can include upskilling and reskilling as a job benefit, to encourage workers who otherwise may not have afforded it to embark on this training. Private sector training companies can employ strategies such as charging employers a placement fee – or can set up systems where trainees repay their training fees over time once they secure a job. Governments – Federal and State – can also consider funding the provision of job-ready digital skills through government social benefit schemes.

- **Upskilling of Trainers**
  Steps should be taken to equip teachers and other instructors with the requisite skills to use technology and to teach digital skills in new, engaging and hands-on ways that new technologies make possible. Strategies for doing this include putting teachers through short-term training courses, team teaching, pairing trainers from non-formal training providers with qualified teachers – as well as using train-the-trainer models. Trainers should be allowed enough time to learn new skills outside working hours, providing them with the support needed during and after the training to ensure a smooth transition.

- **Upgrading Infrastructure**
  The Universal Service Provision Fund (USPF) which was established to facilitate the achievement of universal access and universal service to information and communication technologies in rural, un-served and under-served areas in Nigeria should up its game by fitting out more local schools and community centres and have them connected to the internet and equipped with computers or other digital devices so they can be leveraged to provide digital skills training to a wider audience.

- **Adapting Programmes to Meet Changing Needs**
  Digital skills training programmes will need to adapt to changes in technology. This requires regular monitoring and refreshing. In the near future, Big Data is likely to play a role in anticipating new digital skills needs.

- **Obtaining Input from Industry Stakeholders**
  It is very important to close the gap between the needs of the industry and what

students learn either in school or in other skills training programmes. The industry can provide critical guidance to enhance the vibrancy and relevance of digital skills strategies. Programmes and program designers should stay current on which ICT skills are needed both now and into the future. E-government service providers can similarly provide feedback on whether citizens taking basic digital skills training are well equipped to complete online forms or conduct other e-government activities.

- **Leveraging Existing Education, Training Curricula and Tools**
  Equipping schools with computers and upskilling teachers will be the mainstay of ICT and education programmes for many years. Schools and teachers should play a vital role in digital skills development, not just through providing early exposure to computers, software, and the internet, but also by instilling the kind of thinking skills that shape students into curious and adaptable lifelong learners. Additionally, education systems have the ability to make widespread changes at the national level given the breadth of the territory they cover and the number of young people they reach.

- **Non-formal Education**
  Given the rapidity of technology change, non-formal education channels should form a critical part of the digital skills impartation strategies because they create opportunities for learners of any age to acquire new skills throughout their lives. Non-formal education can be offered at a variety of locations including community halls as well as other community spaces. Non-formal models of training also need to be devised to allow for greater innovation and currency in line with formal educational systems. The non-formal learning model will target job-seekers, out-of-school youth, women and the physically challenged to develop their skills along with the mainstream.

3.4.7 Intermediate Skills

Intermediate skills enable users to use digital technologies in even more meaningful and beneficial ways, including the ability to critically evaluate technology or create content.[120] These are effectively job-ready skills since they encompass those skills

[120] ITU and ILO: - Digital Skills Thematic Priority of the Global Initiative on Decent Jobs for Youth - https://www.decentjobsforyouth. org/wordpress/wp-content/uploads/2017/11/Thematic-Plan-1-Digital-Skills.pdf

needed to perform work-related functions such as desktop publishing, digital graphic design and digital marketing.

For the most part, these skills are generic, meaning their mastery prepares individuals for a wide range of digital tasks needed to participate as engaged citizens and productive workers. However, such skills are not set in stone. Indeed, one of the characteristics of intermediate skills, in particular, is that they expand to account for changes in technology.

For instance, data skills feature more prominently as the data revolution gains further momentum, generating demand for skills needed to produce, analyse, interpret, and visualize large amounts of data.

3.4.8 Advanced Skills

Advanced skills are needed by specialists in ICT professions such as computer programming and network management. Globally, there will be tens of millions of jobs requiring advanced digital skills in the coming years. These include Artificial Intelligence, Big Data, coding, cybersecurity, Internet of Things, and Mobile App Development.

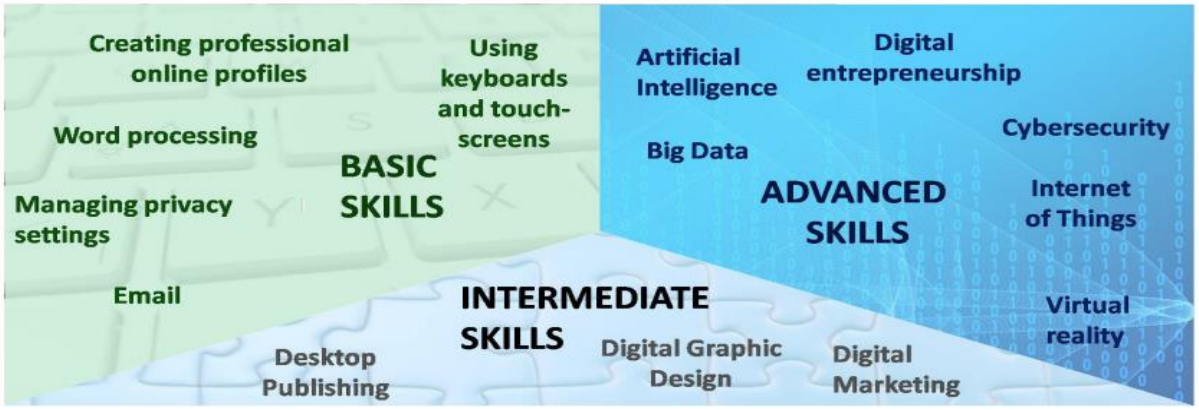
Some economies are already experiencing a talent gap for workers with these advanced digital skills and others, ranking ICT specialists among their fastest-growing roles.[121] Jobs requiring advanced digital skills also generally pay much more than jobs requiring basic or intermediate digital skills or none at all. Advanced skills are typically acquired through attending formal education, often at the tertiary level though there are other viable learning options to acquire the skills.

Another skill set in the advanced category is that of digital entrepreneurship, which combines traditional entrepreneurship with new digital technologies. Digital enterprises are characterised by a high intensity of utilization of novel digital technologies – particularly social media, Big Data analytics, and mobile and cloud solutions – to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders.[122]

In addition to ensuring adequate opportunities for everyone to develop basic digital skills, pathways to develop more advanced and specialized digital skills should be provided to as many people as possible as those more advanced skills are needed to sustain Nigeria's bourgeoning digital economy.

[121] WEF - The Future of Jobs - http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf
[122] European Commission, Strategic Policy Forum on Digital Entrepreneurship, Fuelling Digital Entrepreneurship in Europe – Background Paper

Table 55: Continuum of Digital Skills



Source: ITU

Both the Federal and State Governments have a key role in cultivating talent to fill emerging jobs in the burgeoning tech industry, and in doing so spur future industry growth and job creation.

Reskilling and retraining individuals with more advanced digital skills is a critical piece of this endeavour, to ensure the existing workforce remains abreast of technological changes and does not fall behind with an obsolete skill set.

Traditionally, Nigerians seeking advanced and specialized technical skills training obtain it from higher education, technical and vocational schools, and employers with training programs.

Increasingly, commercial training programs have become popular channels for building advanced technical expertise more closely aligned with the needs of the industry.

But this comes with its own challenges including:

- **Cost**
  The coursework required to obtain advanced diplomas and specialization certificates is typically expensive and time-consuming. Specialized and advanced skills programs are often faced with higher costs arising from expert trainers, up-to-date equipment, software licenses, and administrative costs

- **Relevant Curriculum**
  Higher education and vocational programs struggle to keep up with the pace of technological change common in the industry. Digital skills curricula are not as forward-facing as they could be and are not revised often. Additionally, higher

education and vocational programs typically do not teach problem-solving or collaborative team-based approaches and new models of rapid skills training are generally taught to small cohorts, limiting their ability to scale.

- **Adapting and Innovating**
  The needs of the industry evolve rapidly as new technologies come to the fore, new businesses emerge, and entrepreneurs start new ventures. This dynamic environment requires stakeholders to respond proactively – with new partnerships, programs, and initiatives that involve innovative approaches for linking learning and workforce opportunities. An enabling business environment is necessary to promote digital transformation, digital entrepreneurship, and other opportunities arising from new digital technologies.

To moderate these aforementioned challenges, the study makes the following suggestions:

- **Sustainable Models**
  The introduction of sustainable models that lower upfront costs for learners instead of relying on student fees upfront will keep the costs of advanced training more manageable for learners. For instance, arrangements can be put in place backed with biometric credentials to have students pay for their program only after they have found work or if in work when the new training has yielded returns in the shape of increased emoluments.

  On the employees' side, employers may opt to motivate and upskill their staff by reimbursing them for the costs of completed coursework and the new qualifications.

- **Multistakeholder Partnerships**
  Insofar as multi-sector partnerships enhance digital skills programs, they are especially critical to advanced skills training efforts. These would be partnerships comprising IT industries, primary, secondary and tertiary schools, public sector agencies, and community organisations coming together to bridge the gap between the supply of talent with the right skills and the industry demands for specialised technical skills. The multistakeholder synergy will entail frequent parleys to update curricula, tailor programs and connect learners with industry mentors and on-the-job opportunities.

Within the umbrella of these partnerships, private-sector training providers can share teaching practices with public training institutions on how they teach problem-solving and creative, collaborative approaches to learning. The partnership will achieve scale by integrating rapid learning methodologies in formal education.

- **Incentivise for Action**

  The private sector tech companies encompassing Internet Service Providers (ISPs), FinTechs, Mobile Network Operators (MNOs), Original Equipment Manufacturers (OEMS) and other private sector Organisations can be incentivised – for example, through tax incentives and other forms of rebates – to participate in the development and implementation of digital skills training.

  The incentives can be extended as appropriate to tech federations and associations, small businesses and StartUps in ways that allow new IT specialists to gain traction as entrepreneurs and even find synergies with other StartUps.

  Because certifications in advanced digital skills can be too expensive for talented young people with no resources, tech companies could be incentivised to offer discounts and vouchers that allow as many disadvantaged people as possible to gain advanced digital skills.

- **Pathway from Training to Earning**

  Providers of advanced ICT training should create pathways from training and education programs to the workforce by offering job-placement services to help their graduates enter the job market to demonstrate the effectiveness of their programs.

  The training programs, on the other hand, can be restructured to lean more towards equipping trainees to market themselves by having them build a portfolio of their digital skills and enhance the business and entrepreneurship skills needed for graduates to create their own paths.

  Further pathways into earning for students can be paved by subsidised membership of professional associations and networks. Such pathways are especially needed for youth and the physically challenged when they complete undergraduate courses or graduate from advanced digital skills training as they usually do not have usable contacts or connections with the industry.

- **Review Accreditation Requirements**

  Given the emergence of new training needs and new skills specializations, instructional methods that are new, dynamic and peer-driven, as well as new online platforms, standard approaches for accreditation may need to be reassessed. Trainers need to be vigilant enough to monitor emerging requirements across disparate modules while remaining adaptable enough to make space for innovative approaches to credentialing. This may involve increased awareness of credentials obtained in other countries or allowing credits earned in non-formal education to count toward credit in formal education institutions

- **Bespoke Opportunities for the Physically Challenged**

  The Government and the private sector should be deliberate in creating bespoke opportunities for the physically challenged.

  Most often than not, this demographic has fewer opportunities to use digital technologies and develop digital skills for any number of reasons, such as cost, age, social norms and expectations, physical challenges, lack of awareness, geography, level of education or language barrier. This gap, both in basic skills and in digital literacy, reduces their job opportunities and weakens their competitiveness.

  In addition to the challenges earlier mentioned, the physically challenged are mostly unaware of the importance of digital skills development or the career opportunities that exist for people with advanced digital skills.

  Due to cultural stereotypes, the physically challenged may not be encouraged by their parents, teachers and peers to develop these digital skills, and may even be discouraged from doing so.

  On occasion, employers and persons with disabilities themselves may not be aware that accessible ICT solutions could facilitate their participation in digital life and work.

4.0 CHAPTER FOUR

SUGGESTIONS, RECOMMENDATIONS AND CONCLUSION

4.1 Women

NCC is recommended to:

- Construct policy position that prescribes compulsory digital education, particularly for women;
- Couch the policy to make provisions for tailored data plans and digital skills programs for women.

4.2 Youth

Leveraging its regulatory powers, NCC is recommended to galvanise multistakeholder action to:

- Invest in human capital development to scale digital skills for the youth;
- Create an enabling environment for tech StartUps;
- Mobilise aggressive youth participation in the innovation ecosystem;
- Create remote opportunities for local talent beyond our ecosystem e.g. exchange programs with other countries for the youth.

4.3 Physically Challenged

NCC is recommended to exercise the latitude of its regulatory mandate to make it a requirement that all licensees abide by the provisions of the Discrimination against Persons with Disabilities (Prohibition) Act by:

- Incentivising the employment of suitably qualified persons with disabilities by the licensees;
- Improving coordination and mobilization of resources towards Assistive Technology (AT);
- Participating in the creation of curriculum and content to impart digital skills in context and expand instructors awareness of AT.

The study makes the suggestion for one unified umbrella framework for organizing digital skills and digital literacy across all sectors and demographics in Nigeria.

- Suggested moniker for the framework is: the **Nigerian National Digital Literacy Framework (NNDLF).**
- Domiciled with the NCC (perhaps Digital Bridge Institute) the NNDLF will coordinate national efforts across the Nigerian digital technology ecosystem through multistakeholder collaborations to pull all extant guidelines and frameworks together into one National Framework.
- With this overarching concept, the NNDLF would aggregate extant Frameworks and Guidelines and collapse them into one national framework.

In recognition of the opportunities that digital literacy can provide for the economic empowerment of all and ensuring that the benefits of the digital transformation are equitably shared by all the people including women, youth and the physically challenged, the need to train, re-train and generally skill up Nigerians who are in these demographics cannot be over-emphasised.

Compared to the exponential speed of connectivity and technology advances, implementation of effective digital competency education, training programs, and policies occur at a far slower pace, and this speed gap is increasingly growing. Such gaps have yielded serious, unintended negative consequences for individuals as well as organisations in the Nigerian digital economy.

The World Economic Forum's 2018 Future of Jobs report stressed an upskilling imperative for the workforce in an increasingly digitized world.[123] Undoubtedly, a workforce sufficiently equipped with a comprehensive set of digital competencies would have a greater chance of standing to gain from new job opportunities arising from technological advances.

This study surmises that digital competencies should include not only the technical skills one might expect but also comprehensive competencies that include digital safety, digital rights, and digital emotional intelligence.

[123] World Economic Forum (WEF): The Future of Jobs Report - http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf

These are competencies that allow people to not just use a computer or smartphone, but to deal with the modern social and economic challenges and demands resulting from technological advances.

The study's findings show that currently, not all educational institutions in Nigeria have the necessary technological infrastructure and digital literacies to offer the essential learning that would allow students to connect with the ecosphere of ICT. Consequently, upon graduation students from institutions in Nigeria find it difficult to insert seamlessly into the labour force of the bourgeoning digital economy. The digital skills gap, it can be argued, begins to develop at the juncture of primary and secondary education.

The lack of incorporation of the necessary technological implements and competencies in Nigeria's education system manifests in graduates without the necessary basic digital skills to perform in front of a computer.

For 21st-century Nigeria, it is of real importance to integrate into the education curricula, the knowledge and skills for the teaching of ICTs. This would make it possible to have graduates with the essential skills to perform safely and creatively with ICTs and bring about a decrease in terms of technological gaps and digital literacy in the country, especially for women, youth and the physically challenged.

The study finds that hurdles to access, affordance, insufficient education as well as inherent biases and sociocultural norms curtail women's and physically challenged people's ability to benefit from the opportunities offered by the digital transformation of the economy. In addition, women's and physically challenged persons' relatively lower educational enrolment in disciplines that would allow them to perform well in a digital world – such as science, technology, engineering and mathematics, as well as information and communication technologies – coupled with their limited use of digital tools could lead to widening gaps and greater inequality.

The study finds that greater inclusion of women in the digital economy brings value and increased diversity both socially and economically.

Digital skills underpin nearly every aspect of work and life. From filling in a government form to communicating for work, it is difficult to find a job or life task that does not require a basic level of digital functioning. With new

technologies emerging every day, people need lifelong opportunities to learn the required skills that will allow them to succeed in an era of relentless digital transformation.

Digital literacies are essential in opening the doors to a wide range of opportunities in the 21st century. It behoves the Government to implement comprehensive digital skills strategies to ensure that the population has the skills needed to be more employable, productive, creative, and successful while ensuring that people remain safe, secure and healthy online.

Critically, the digital skills strategies need to be updated regularly to respond to the emergence of new technologies and their impact on the digital economy and digital society.

Another strategy worth exploring is the idea of free information highways provided by the Government, just as the Government provides roads. This will require a significant change in the mindset of the political leadership and the current system of incumbents in the telecommunications sector. This could be one way to quickly achieve near-universal utilization of information technology.

Just like the Government provides roads and individuals pay for cycles, vehicles, petrol and diesel, the same analogy could apply to creating a sustainable ICT infrastructure where the Government, with appropriate public-private partnership (PPP), provides ubiquitous and free internet infrastructure (both wired and wireless), while individuals pay for computers and usage charges.

Similarly, as the existence of the road system creates the demand for cars, mechanics, auto supplies, repair shops etc. (all of which generate economic growth and jobs and, indirectly, government revenue from taxes), the existence of a free information highway will generate economic growth and value-added taxes as customers buy PCs, laptops, smartphones or other devices to use the information highway while ancillary support services such as helpdesk support, user training, device repairs and maintenance would blossom.

With the information highway in place, the value of a computer may become at par with that of the television set or refrigerator, and then the Government would have succeeded in creating a society that values ubiquitous access to ICT and point a clear pathway to the enhancement of universal digital literacy of Nigerians.

Although it is not always necessary to own a computer to be able to access one, as demonstrated by the emergence of cybercafés around the country and the activities of the Universal Service Provision Fund, it is crucial that more effort is invested in the propagation of ICT to rural underserved areas. The USPF was established by the Federal Government to facilitate the achievement of national policy goals for universal access and universal service to information and communication technologies in rural, unserved and underserved areas in Nigeria.[124]

Affordability is another necessary condition for sustainable and pervasive ICT. If ICT is to achieve extensive presence in Nigeria, it has to be made affordable to the generality of the population through subsidising the cost of hardware acquisition or by reinventing such schemes as the One Laptop per Child Initiative perhaps with a new twist to give it the One Laptop per Household (OLPH) moniker.

Organisations can collaborate with educational institutions to develop the talent pipeline and recruit new digital talent. Such collaborations would help companies gain early access to talent and shape curricula for the skills they really need.

Organisations can leverage social media and other digital channels to identify and engage with digital talent. Looking internally is certainly an option as well. For instance, British Airways was struggling to find digital talent externally. It conducted a study to understand the digital interests and capabilities of its existing workforce. This study revealed that some employees were running websites in their spare time and were keen to do the same at work. This knowledge helped British Airways to develop home-grown talent and create a "talent scout" recommendation program that leverages their employees' digital expertise and sources new digital talent.[125]

Organisations can loan out Wi-Fi hot spots through their Corporate Social Responsibility (CSR) obligations in the rural communities so people can access the internet from anywhere.

A deliberate program teaching digital skills to women, youth and the physically challenged can also be a step further worth considering by organisations in executing their CSR strategies.

[124] https://www.uspf.gov.ng/projects/crc

[125] How to Narrow the Digital Skills Gap in Your Organization - https://digitalmarketinginstitute.com/blog/how-to-narrow-the-digital-skills-gap-in-your-organization

The program can loan participants laptops (and wireless internet routers) they can keep if they complete the program as an incentive for completing the training. This would allow for greater and more flexible use of the computer and increase digital skills.

It has the additional benefit of alleviating related barriers, such as eliminating the need for people to depend on public internet cafes for their computer use. It would also allow participants' children to gain digital familiarity as well.

The synergy should manifest in provisioning adequate training programs and opportunities that will equip women, youth and the physically challenged with the digital skills required to partake in Nigeria's increasingly digitalised economy.

Evidently, smartphones will remain an integral part of the Nigerian digital economy landscape perhaps mainly due to poor network infrastructure across large parts of the country that may make use of fixed desktop computers not so feasible or popular, particularly in rural areas, and perhaps because of the ease of use of smartphone devices.

Being excluded from information and communication opportunities is another form of poverty. The cost of digital means and mobile services are among the biggest barriers to digital literacy. Although, because there is an urgent demand for digital skills, schools with access to digital infrastructures should teach them as a transversal subject. In addition, learning of ICTs should be spread at all educational levels: primary, secondary, vocational training, and university. More digital skills improvement initiatives as well as affordable digital infrastructures should be put in place and made available to people in Nigeria.

4.4 Conclusion

Clear digital divides exist in gender, geography, education levels, income levels, and disability status. The gender gap in mobile phone ownership is smaller than the gender gap in mobile Internet use across all three domains studied. While the gender gap in phone ownership has steadily decreased in the last few years, the economic challenges it brought may affect and increase the gap in the foreseeable future.

The study finds that mobile phone ownership is higher among people with more education and higher income and that there is a disability gap in mobile phone ownership between people with and without disabilities. Interestingly, persons with disabilities use mobile Internet with similar frequency to non-disabled persons, and among smartphone users, persons with disabilities may have a higher daily mobile Internet usage.

The study finds that greater inclusion of women, youth and the physically challenged in the Nigerian digital economy will bring value, both social and economic.

The study also finds that hurdles to access, affordance, insufficient education as well as inherent biases and sociocultural norms curtail women and the physically challenged from benefitting from the opportunities offered by the digital transformation of the economy.

The study highlights the central role NCC can play to alleviate these gaps by the intentional use of Policy and Regulation to mobilise multistakeholder collaborations and partnerships to galvanise mass digital skills acquisition schemes for women, youth and the physically challenged.

REFERENCES

1. AIT - Nigeria Illiteracy Rate Drops To 31% - https://ait.live/nigeria-illeteracy-rate-drops-to-31/
2. The National Population Commission (NPC) - https://nationalpopulation.gov.ng/
3. Cornell University - https://guides.library.cornell.edu/home
4. UNESCO - Media and Information literacy: Policy and strategy guidelines - 2013
5. UNICEF - https://gdc.unicef.org/resource/digital-divide-and-digital-literacy
6. Maha Bali - Knowing the Difference Between Digital Skills and Digital Literacies, and Teaching Both- https://www.literacyworldwide.org/blog/literacy-now/2016/02/03
7. World Economic Forum (WEF) - The Future of Jobs Report - http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf
8. Skills4Girls - https://www.unicef.org/gender-equality/skills4girls
9. DQInstitute – DQ Global Standards Report 2019 Common Framework for Digital Literacy, Skills and Readiness - https://www.dqinstitute.org/global-standards/
10. WEF Executive Opinion Survey - The Global Competitiveness Index 2017-2018 edition - https://www3.weforum.org/docs/GCR2017-2018/03CountryProfiles/Standalone2- pagerprofiles/ WEF_GCI_2017_2018_Profile_Nigeria.pdf
11. NCC – Internet Subscriber Data - https://ncc.gov.ng/statistics-reports/industry-overview#view-graphs-tables-5
12. GSMA Survey 2021 - The Mobile Gender Gap Report 2021 - https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf
13. Nigeria DHS 2018
14. Pew Research 2018
15. World Journal of Advanced Research and Reviews - Closing ICT usability gaps for Nigerian women and girls: Strategies for reducing gender inequality
    - https://wjarr.com/sites/default/files/WJARR-2022-0665.pdf
16. Geissler, J. Et Al, 1993 - University Students' Computer Knowledge and Commitment to Learning - Journal of Research on Computing in Education, Vol.25, no.3: 347<365.
17. Comber, C. 1997 - The Effects of Age, Gender and Computer Experience Upon Computer Attitudes. Educational Research, Vol. 3, no. 2.
18. Bain, A., Et Al, 1999 - Gender Difference and Computer Competency: The Effects of a High Access Computer Programme on the Computer

Competence of Young Women - International Journal of Educational Technology, Vol. 1, no.1.
19. GSMA (2020) - The Digital Exclusion of Women with Disabilities - https://www.gsma.com/mobilefordevelopment/resources/the-digital-exclusion-of-women-with-disabilities-a-study-of-seven-low-and-middle-income-countries/
20. Jackson, L.A., Et Al - Gender and the Internet: Women Communication and Men Search. Sex Roles: A Journal of Research, Vol. 44, no. 5<6: 362<379.
21. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), 425. https://doi.org/10.2307/30036540
22. IDI Value is computed by summing the weighted values of the indicators included in the respective subgroups comprising ICT readiness (infrastructure, access); ICT Use (intensity) ICT Capacity (skills) and ICT Impact (outcomes)
23. The highest ranking possible on the index is 1.
24. Global Innovation Index 2022 – Nigeria - https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/ng.pdf
25. This assertion was aptly captured in a presentation by Dr. Amina Sambo-Magaji, at a conference organized in Abuja, Nigeria by the Nigerian Women In Information Technology (NIWIIT), under theme: "Promoting Digital Inclusion: Harnessing Opportunities With A Gender Lens
26. Global Innovation Index 2022 – Nigeria - https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/ng.pdf
27. GSMA - The Role of Mobile Technology in Building Nigeria's Digital Economy - https://www.gsma.com/publicpolicy/wp-content/uploads/2019/02/GSMA-Spotlight-on-Nigeria-Report.pdf
28. GSMA Survey 2021 - https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf
29. Global Media Journal - Adoption, Motivation and Patterns of Social Media Use among Women in Nigeria - https://www.globalmediajournal.com/open-access/adoption-motivation-and-patterns-of-social-media-use-among-women-in-nigeria.php?aid=89046
30. NYS 2020 – Federal Ministry of Youth and Sports and association with National Bureau of Statistics (NBS)
31. Ibid
32. Baseline Youth Survey - National Bureau of Statistics - https://www.nigerianstat.gov.ng/pdfuploads /2102%20National%20Baseline%20Youth%20Survey%20Report
33. UN Secretary-General's Report to the General Assembly, A/36/215, 1981
34. Section 1 – African Youth Charter (2006)
35. Section 1, Subsection 1.3 – National Youth Policy (2019)

36. Ibid
37. An act of parliament which sought to reduce the age limit for running for elective office in Nigeria - https://en.wikipedia.org/wiki/Not_Too_Young_To_Run
38. Mission Statement – Federal Ministry of Youth and Sports Development - https://youthandsports.ng/
39. National Youth Council of Nigeria - https://nycn.ng/
40. UNCTAD – Technology and Innovation Report 2021
41. Unemployment rate hits 33.3%, 23.18million Nigerians jobless – NBS - https://punchng.com/unemployment-rate-hits-33-3-23-18million-nigerians-jobless-nbs/
42. GSMA Intelligence - United States Agency for International Development (USAID)
43. Convention on the Rights of Persons with Disabilities - https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-persons-disabilities
44. WHO - International Classification of Functioning, Disability and Health - https://unstats.un.org › unsd › pdfs › ac.81-b4.pdf
45. Nigeria - General Household Survey Panel (GHSP)
46. Disability Inclusion - https://www.worldbank.org/en/topic/disability
47. World Health Organisation - World Report on Disability - https://www.who.int/publications/i/item/9789241564182
48. Grassroots Researchers Association - They Called Us Senseless Beggars - https://www.grassrootresearchers.org/challenges-of-persons-with-disabilities-in-north-eastern-nigeria/
49. Nigeria General Household Survey Panel (GHSP), 2018 - https://disabilitydata.ace.fordham.edu/country-briefs/ng/
50. Ibid
51. Nigeria General Household Survey Panel (GHSP), 2018 - https://disabilitydata.ace.fordham.edu/country-briefs/ng/
52. National Library of Medicine - https://pubmed.ncbi.nlm.nih.gov/19387071/
53. Investigative Ophthalmology & Visual Science - Causes of Blindness and Visual Impairment in Nigeria: The Nigeria National Blindness and Visual Impairment Survey - https://doi.org/10.1167/iovs.09-3507
54. SightSavers: Important Data About Blindness in Nigeria - https://www.sightsavers.net/our_work/around_the_world/west_africa/nigeria/9858.html
55. The Nigeria National Blindness and Visual Impairment Survey: https://pbunion.org/Countriessurveyresults/Nigeria/Nigeria_survey_Summary_report.pdf
56. Zheng Y, Lamoureux E, Chiang PP, et al. Literacy is an independent risk factor for vision impairment and poor visual functioning. Invest

Ophthalmol Vis Sci. 2011;52(10):7634–7639. https://doi.org/10.1167/iovs.11-7725
57. National Bureau of Statistics (NBS) - National Literacy Survey http://nigerianstat.gov.ng/pages/download/43
58. https://spaan.org.ng/8-5m-nigerians-suffering-from-hearing-impairment/
59. WHO – Deafness and Hearing Loss - https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss
60. Ibid
61. Disabled World - Physical and Mobility Impairment Information - https://www.disabled-world.com/disability/types/mobility/
62. Considering Assistive Technology - http://www.parentcenterhub.org/repository/considering-at/
63. Africa Check - https://africacheck.org/fact-checks/reports/nigeria-ranked-15th-world-suicide-lesotho-tops-african-list
64. Association of Psychiatrists in Nigeria (APN)
65. African Polling Institute (API) - https://africapolling.org/2020/01/13/mental-health-in-nigeria-survey-report-2020/
66. Statista - YLDs for mental disorders in Nigeria 2019 - https://www.statista.com/statistics/1172828/ylds-for-mental-disorders-in-nigeria/
67. Arrieta & Montes - Study of the Impact of Digital Literacy in Primary Education Contexts: Diagnosis and Evaluation [12, p.187].
68. Ian Hecker and Pamela Loprest - Foundational Digital Skills for Career Progress (2019) - https://www.urban.org/sites/default/files/publication/100843/foundational_digital_skills_for_career_progress_2.pdf
69. Doug Belshaw - The Essential Elements of Digital Literacies
70. Tag: Essential Elements Of Digital Literacy - https://findingheroes.co.nz/2015/06/11/digital-literacy-has-8-essential-elements/
71. World Economic Forum Report (2020)
72. Amanda Bergson-Shilcock - The New Landscape of Digital Literacy How Workers' Uneven Digital Skills Affect Economic Mobility and Business Competitiveness, and What Policymakers Can Do about It
73. D Robinson et al. - 5igital inequalities and Why They Matter (2015)
74. The International Monetary Fund (IMF) Report (2021)
75. Ibid
76. World Economic Forum – The Future of Jobs Report (2021)
77. Webpodia - What is Digital Divide - https://www.webopedia.com/definitions/digital-divide/
78. Raj Reddy et al., Sustainable ICT for Emerging Economies - Mythology and Reality of the Digital Divide Problem

79. GSMA 2021- Rural-urban gap is calculated using the following formula: (percent of urban users) – (percent of rural users) / (percent of urban users.
80. Nigeria - DHS 2018
81. Rural-urban gap is calculated using the following formula: (percent of urban users) – (percent of rural users) / (percent of urban users) (Source: GSMA 2021)
82. GSMA 2021
83. Meaningful Connectivity is an ITU proposed framework for measuring qualities of internet access in an area
84. The Nigerian Communications Commission - NCC Hinges Nigeria's 122 million Internet users' protection - https://ncc.gov.ng/accessible/stakeholder/media-public/news-headlines/614-ncc-hinges-nigeria-s-122-million-internet-users-protection-on-effectivegovernance
85. UN - Secretary-General's Roadmap for Digital Cooperation - https://www.un.org/en/content/digital-cooperation-roadmap/
86. ITU - Manual for Measuring ICT Access and Use by Households and Individuals, 2020 Edition - https://www.itu.int/en/ITU-D/Statistics/Pages/publications/manual.aspx
87. UN DESA, 2021 - Reducing poverty and inequality in rural areas: key to inclusive development - https://www.un.org/development/desa/dspd/2021/05/reducing-poverty/
88. DHS 2018
89. Carlos Iglesias - The Gender Gap in Internet Access: Using a Women-Centred Method - https://webfoundation.org/2020/03/the-gender-gap-in-internet-access-using-a-women-centred-method/
90. National Population Commission - NPC/Nigeria and ICF 2019 - Nigeria Demographic and Health Survey 2018
91. Economist Impact – The Inclusive Internet Index - https://impact.economist.com/projects/inclusive-internet-index/
92. GSMA 2018 – Calculated using the formula: [(% of men using the internet – % of women using the internet)/% of women using the internet]
93. Stephen M. Mutula - Digital divide and economic development: Case Study of Sub-Saharan Africa
94. Margaret U. Ugboma Ph.D - Bridging The Digital Divide: With Special Reference To Nigeria
95. World Bank - Telecommunications and Information Services for the Poor : Toward a Strategy for Universal Access - https://openknowledge.worldbank.org/handle/10986/14007
96. CITAD – Overcoming Gender-based Digital Exclusion in Nigeria – A Strategy Document
97. https://www.macrotrends.net/countries/NGA/nigeria/literacy-rate
98. UNESCO - uis.unesco.org

99. The study by the Centre for Information Technology and Development (CITAD), 2016
100. Ibid
101. Organisation for Economic Co-operation and Development – Bridging the Digital Gender Divide (2018)
102. Ibid
103. The Nigerian National Broadband Plan (NNBP) 2020-2025
104. The National Digital Economy Policy and Strategy (NDEPS) 2020-2030
105. DigiSchool 2021 - https://www.digischool.go.ke/
106. World Bank 2022 - The Secondary Education Quality Improvement Project https://documents1.worldbank.org/curated/en/806781513805053211/pdf mprovement-Project-P160083-Sequence-No-01.pdf
107. UNESCO - https://en.unesco.org/themes/literacy
108. UNICEF – Reimagine the Future - https://www.unicef.org/rosa/media/14176/file
109. National Bureau of Statistics (NBS)
110. Web Accessibility - the Cornerstone of an Inclusive Digital Society - https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/Web-Accessibility-Cornerstone-Training.aspx
111. TeachThought University - The Learning and Design Principles of Connected Learning -
112. One Laptop per Child (OLPC) was a non-profit scheme initially conceptualized by Nicholas Negroponte, Founder/ Chairman, Massachusetts Institute of Technology Media Lab and first announced in The World Economic Forum, Davos, Switzerland in January 2005
113. ITU and ILO: Digital Skills Thematic Priority of the Global Initiative on Decent Jobs for Youth; https://www.decentjobsforyouth. org/wordpress/wp-content/uploads/2017/11/Thematic-Plan-1-Digital-Skills.pdf
114. Harabus K. Et Al., Computational Thinking in Secondary and Higher Education 13th International Conference Interdisciplinarity in Engineering (INTER-ENG 2019) - www.sciencedirect.com
115. ITU - https://www.itu.int/en/ITU-D/Digital-Inclusion/Documents/ITU%20Digital%20Skills%20Toolkit.pdf https://www.teachthought.com/the-future-of-learning/connected-learning/
116. NCC - https://www.ncc.gov.ng/statistics-reports/subscriber-data
117. Dave Fowler, Road to the Future Paved With Data Literacy, Wired, August 2013
118. Youth Employment Funders Group: What Works in Soft Skills Development for Youth Employment? http://www.mastercardfdn.org/wp-content/uploads/2017/09/soft-skillsyouth-employment.pdf

119. World Economic Forum - The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution, January 2016. http://reports.weforum.org/future-of-jobs-2016/
120. ITU and ILO: - Digital Skills Thematic Priority of the Global Initiative on Decent Jobs for Youth - https://www.decentjobsforyouth.org/wordpress/wp-content/uploads/2017/11/Thematic-Plan-1-Digital-Skills.pdf
121. WEF - The Future of Jobs - http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf
122. European Commission, Strategic Policy Forum on Digital Entrepreneurship, Fuelling Digital Entrepreneurship in Europe – Background Paper
123. World Economic Forum (WEF): The Future of Jobs Report - http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf
124. https://www.uspf.gov.ng/projects/crc
125. How to Narrow the Digital Skills Gap in Your Organization - https://digitalmarketinginstitute.com/blog/how-to-narrow-the-digital-skills-gap-in-your-organization

5.0 APPENDICES

Appendix 1: Work Schedule

STUDY WORK PLAN																				
Phase	**Activity**	**Weeks**																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
One																					
	Project Review																				
	Survey Population Identification and Stratification																				
	Inception Report																				
	Active Field Work																				
Two	Identification of study Stakeholders for Roundtable Consultations																				
	Interim Report																				
	Trend Analysis																				
	Progress Report																				
Three	Monitoring and Evaluation																				
	Survey Data Analysis																				
	Draft Final Report																				
	Final Report																				
	Executive Summary																				

Appendix 2: Definitions

Term	Definition
Access	The right, opportunity, and/or means of finding, using or retrieving information.
Accelerators	For-profit incubators that support start-ups with funding and other services in exchange for equity
Adaptive Technology	Covers items that are specifically designed for disabled people and would seldom be used by a non-disabled person
Airtime	The time during which a cellular phone is in use, including calls made and received.
Apps	Software application developed for a digital device. The term is often associated with the applications that run on mobile phones
Artificial Intelligence	The study of how to produce machines that have some of the qualities that the human mind has, such as the ability to understand language, recognize pictures, solve problems, and learn
Assistive Technology	Assistive technology is an umbrella term for the products, systems and services that help users live with greater independence and choice, by facilitating daily activities they would otherwise be unable to do well, or not at all
Big Data	very large sets of data that are produced by people using the internet, and that can only be stored, understood, and used with the help of special tools and methods
Blog	A Web site on which an individual or group of users record opinions, information, etc. regularly.
Broadband	A transmission capacity with sufficient bandwidth to permit the combined provision of voice, data and video, with no lower limit. Broadband is implemented mainly through ADSL, cable modem or wireless LAN (WLAN) services.
Chatroom	An online discussion forum. Everyone who is logged into a Chatroom sees what everyone else is typing, although two people can decide to break off and have a private chat.
Cloud computing	A paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with on-demand self-service provisioning and administration
Coding	Writing instructions for a computer programme
Computer	Information technology systems and devices.
Cyberbullying	Wilful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices.
Distributed denial of service attack (DDoS)	Aim to disrupt a computer network by flooding the network with superfluous requests to overload the system and prevent legitimate requests being fulfilled.

Digital Behaviour	The process whereby an individual behaves and interacts with other users online and in groups.
Digital Divide	The gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access information and communications technologies.
Digital Literacy	The interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others.
Digital Media	Digitized content that can be transmitted over the internet or computer networks. This can include text, audio, video, and graphics.
DVD	A high-density videodisc that stores large amounts of data, especially high-resolution audio-visual material.
E-mail	Electronic mail – a computer-based form of sending and receiving messages via the Internet.
Feature Phone	An internet-enabled mobile phone with a small screen and basic keypad with several letters per button but does not have the ability to download apps.
Follow	"Following" someone means you will see their updates in your timeline.
Friend	With the popularity of the Facebook concept of *friending,* young participants use the word "friends" to refer to friends from their school, neighbourhoods, or other parts of their offline lives, as well as friends they have met online.
Friending	Adding someone to a list of contacts associated with a social networking Web site.
Incubators	Programmes that support start-ups through business support services and resources
Internet	A linked global network of computers in which users at one computer can get information from other computers in the network.
Internet of Things (IoT)	A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies
Internet Subscribers	People who pay for access to the internet.
MITM	Man-in-the-middle attack is when an attack relays and possibly alters the communication between two parties who believe they are communicating with each other.
Malware	Software that does malicious tasks on a device or network such as corrupting data or taking control of a system.
Massive open online courses	Online courses featuring limitless or large-scale participation and open access.
Microblogging	A broadcast medium in the form of blogging. Content is typically smaller in both actual and aggregated file size.
Mobile Phone	Portable telephone device that does not require the use of landlines.

Mobile Internet	Internet accessed via mobile devices such as mobile phones.
Mobile Internet User	A person who has used the internet on a mobile phone at least once in the last three months.
Mobile Owner	A person who has sole or main use of a SIM card or mobile phone and uses it at least once a month.
Multimedia Messaging Service	A system that enables mobile phones to send and receive pictures and sound clips as well as text messages.
Offline	Not controlled by or directly connected to a computer or external network.
Online	A resource that is available over the Internet or a network.
Online Content	Information that is available online.
Penetration	A measurement of access to telecommunications, normally calculated by dividing the number of subscribers to a particular service by the population and multiplying by 100.
Personal Computers	Self-contained computers designed to be used by a single individual.
Phishing attacks	When a cybercriminal attempts to lure individuals into providing sensitive data such as personally identifiable information (PII).
Population	The number of all residents in a country, regardless of legal status or citizenship.
Post	To publish a message (text, audio, and video) in an online forum, social media platform or newsgroup.
Private Chat	An online discussion between two users via the keyboard on a computer or mobile device such as a phone.
Ransomware	A type of malware that denies access to a computer system or data until a ransom is paid.
SIM (card)	A small printed circuit board inserted into a GSM-based mobile phone. It includes subscriber details, security information and a memory for a personal directory of numbers.
Smartphone	A mobile phone with a touchscreen display, an advanced operating system (Android or iOS) and the ability to download apps from an online platform.

Appendix 3: Approved Questionnaire

Level of Digital Skills Survey

Questionnaire for Women, Youths and the Physically Challenged

This survey is conducted by Brahmah Interbiz Ltd; Powered by NCC

1. What is your age group?

   Mark only one oval.

   - ◯ Under 15
   - ◯ 15-30
   - ◯ 31-49
   - ◯ Over 50

2. Are you?

   Mark only one oval.

   - ◯ Male
   - ◯ Female

3. In which State do you live?

   _____

4. Do you have any disability?

Mark only one oval.

- ◯ Yes
- ◯ No

5. Do you live in a?

Mark only one oval.

- ◯ City (Urban area)
- ◯ Village (Rural area)

6. What is your level of education?

Mark only one oval.

- ◯ Primary School
- ◯ Secondary School
- ◯ Polytechnic/University
- ◯ I did not attend any school

7. Do you have access to a digital device?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Yes, but I'm not sure how to use it

8. Which of the following devices do you use?

Tick all that apply.

- ☐ Laptop or Tablet
- ☐ Desktop Computer
- ☐ Smartphone
- ☐ E-Book Reader
- ☐ Other: _____

9. Do you have an email address? (which you have access to)

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Yes, but I don't know how to use it

10. Have you ever used the Internet?

Mark only one oval.

- ◯ Yes
- ◯ No

11. Have you ever completed a form online?

Mark only one oval.

- ◯ Yes
- ◯ No

12. How often do you go online?

Mark only one oval.

- ◯ Daily
- ◯ Weekly
- ◯ Monthly
- ◯ Never

13. How much time do you spend online each day?

Mark only one oval.

- ◯ Less than 1 hour
- ◯ 1-5 hours
- ◯ 5-10 hours
- ◯ More than 10 hours

14. How do you rate your skills in using any of the following digital devices?

Mark only one oval per row.

	Don't know how to use	Low	Moderate	Expert
Desktop Computer	◯	◯	◯	◯
Laptop or Tablet	◯	◯	◯	◯
Smartphone	◯	◯	◯	◯
E-Book Reader	◯	◯	◯	◯
Other Device	◯	◯	◯	◯

15. 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 for work	◯	◯	◯	◯
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	◯	◯	◯	◯

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

Tick all that apply.

- [ ] Facebook
- [ ] YouTube
- [ ] Instagram
- [ ] WhatsApp
- [ ] Imo
- [ ] SnapChat
- [ ] Online/Offline Games
- [ ] Twitter
- [ ] Messenger
- [ ] Other: _____

17. Please answer Yes or No to the following questions

Mark only one oval per row.

	Yes	No
I can look for information online using a search engine.	◯	◯
I can save or store files or content (e.g. text, pictures, music, videos, web pages) and retrieve them once saved or stored	◯	◯
I can communicate with others using Email, WhatsApp, Messenger and SMS	◯	◯
I can share files and content using simple tools	◯	◯
I can use digital technologies to interact with services such as book tickets or shop online	◯	◯
I can produce simple digital content (e.g. text, tables, images, audio files) in at least one format using digital tools.	◯	◯
I can make basic editing to content produced by others.	◯	◯

18. Which of the following have you used or done before?

Tick all that apply.

- [ ] WiFi
- [ ] Hotspot
- [ ] Copy & Paste
- [ ] Social Media
- [ ] Website
- [ ] Keyboard & Mouse
- [ ] Download
- [ ] Set a Password
- [ ] Upload
- [ ] Install Apps
- [ ] Use a shortcut key

19. What is your employment status?

Mark only one oval.

- ◯ Civil Servant
- ◯ Private Sector Staff
- ◯ Self-employed
- ◯ Unemployed
- ◯ Student
- ◯ Retired
- ◯ Not working due to disability
- ◯ Other: _____

Thank you very much for taking part in this survey.