ADOPTING A NATIONAL DIGITAL LITERACY FRAMEWORK & ASSESSMENT FOR NIGERIA

IMPORTANCE, CHALLENGES AND RECOMMENDATIONS

Stanley Muoneke

07/2024

WORLD BANK GROUP

FOR WORLD BANK USE

Important Notice & Disclaimer

1. This work is prepared for the World Bank as an external consultant . The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent. The World Bank does not guarantee the accuracy of the data included in this work. The author has made every effort to correctly attribute data and information to all original reference works owners and sources . The boundaries, colours, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries. Nothing herein shall constitute or be considered to be a limitation upon or waiver of the privileges and immunities of The World Bank, all of which are specifically reserve.

2. This document is intended for the sole use of the World Bank Group as detailed on the front page of this document, who has entered into a written agreement with Stanley Muoneke .This document may contain detailed technical data which is intended for use only by persons possessing requisite expertise in its subject matter.

3. This document has been produced from information relating to dates and periods referred to in this document. This document does not imply that any information is not subject to change. Except and to the extent that checking or verification of information or data is expressly agreed within the written scope of its services, the author or its representative shall not be responsible in any way in connection with erroneous information or data provided to it by the World Bank Group to any third party, or for the effects of any such erroneous information or data whether or not contained or referred to in this document.

Contents

ABBREVIATIONS

ACE	Africa Coast to Europe
CPE	Customer Premise Equipment
DIGICOMP	Digital Competence Framework for Citizens
DL	Digital Literacy
DLC	Digital Literacy Council
DGLF	Digital Literacy Global Framework
DLI	Digital Literacy Institute
DLMO	Digital Literacy Management Office
ICDL	International Certification of Digital Literacy
ICT	Information & Communication Technology
ISP	Internet Service Providers
NBS	Nigeria Bureau of Statistics
NCC	Nigeria Communications Commission
NCPS	National Cybersecurity Policy & Strategy
NCSCS	Nigeria-Cameroon Submarine Cable System
NCSCS	Nigeria Cameroon Submarine Cable System
NDEPS	National Digital Economy Policy and Strategy
NDLF	National Digital Literacy Framework
NDLP	National Digital Learning Policy
NDPA	Nigeria Data Protection Act
NDPR	Nigerian Data Protection Regulations
NNBP	Nigeria National Broadband Policy
OECD	Organisation for Economic Co-operation and Development
ROW	Right of Way
SAT-3	South Atlantic 3
SDG	Sustainable Development Goals
UNESCO	United Nations Educational, Scientific and Cultural Organization
WACS	West Africa Cable System

1.0 INTRODUCTION

In the contemporary era, digital literacy stands as an indispensable skill set essential for thriving in a rapidly evolving global landscape. This is evidenced by the numerous digital literacy programs being developed globally in many countries around the world. Some of these countries seek to use it as a tool for helping public officials to increase their efficiency, transparency and delivery of services to citizens while other countries seek to use it as tool to help bridge the digital divide, grow its ICT industry and develop the employability of young citizens. (Nancy et al 2018) .

In the same vein the definitions of Digital Literacy vary widely .However , its generally accepted as the ''ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. Competences such as ICT literacy , information literacy, computer literacy and media literacy are all typically included as part of digital literacy (Ibid)

Irrespective of the adopted definitions for digital literacy , studies around the world , suggest that digital literacy plays a positive role in shaping individuals, communities and nations alike. (Hufad et al. 2019, Hanushek et al, 2013, Promrub , 2022)

This ability of Digital literacy to empower individuals by providing them with access to information, resources, and opportunities previously unimaginable serves as a catalyst for social inclusion, breaking down barriers of geography, socioeconomic status, and physical ability. This is especially true in developing countries where women are typically at a disadvantage in the digital divide. (Anzak et al , 2020).

In the digital age, economic success is intricately linked to digital literacy. Proficiency in navigating digital tools and platforms opens doors to employment, entrepreneurship, and economic mobility. Digital literacy enables individuals to adapt to changing job markets, acquire new skills, and harness technology to innovate and create value. Nations with a digitally literate workforce are better positioned to compete in the global economy and drive sustainable growth (Bejaković & Mrnjavac, 2020). As such , in a rapidly changing world landscape that we live today , digital literacy serves as a cornerstone for personal and professional development, enabling individuals to thrive in the face of uncertainty. Cultivating these critical thinking and problem-solving skills are essential for navigating the complexities of the new digital world. These skills have directly contributed to driving overall national economic development and competitiveness and the lack of DL skills is a significant contributor for why many developing countries are disadvantaged (Hanushek & Wößmann,2012b).

However , implementing a national level digital skills agenda and programs at scale in a country is often a complex and massive operation. Digital literacy frameworks and assessments are critical tools in assisting countries do this; because these frameworks

provide a globally shared baseline understanding of digital literacy and standards to enable learning, monitoring and reporting such that countries can more effectively and strategically allocate resources to identify and bridge digital skills gaps. (IEEE SA, 2020)[1]

1.1 Objectives

- Examine the Nigeria digital literacy landscape and the important socio-economic context of digital literacy to its digital economy.
- Explore the challenges faced in adopting a digital literacy framework & assessment .
- Identify key policy drivers and their relevance in helping drive the digital economy.
- Review the Nigeria Digital Literacy Framework and Assessment and make suggestions to aid effective implementation .
- Make relevant recommendations based the findings.

2.0 CONTEXT

The Nigeria Government understands the critical role that digital literacy plays in helping develop its citizens as well as drive national economic growth and competitiveness. The following provide the background context :

1. **Large Population Growth .** The country is the most populated country in Africa estimated at 219 million in 2022 , its population is forecast to grow to about 377milion by 2050. (Doris ,2023) This rapid growth in population exacerbated by unemployment puts a strain on the governments resources and means that it needs to plan for how to ensure that the majority of its young citizens leaving secondary schools can acquire cognitive skills needed for them to contribute and live meaningfully in a digital world.

2. **Unemployment and Job creation.** 46% of Nigeria's population are under the age of 15yrs. Youth underemployment is at 18% while youth unemployment is at 8.6%. is higher than the overall 5% country unemployment rate. (NBS, 2024) which represents a 0.8% growth compared to 2023. With the rising unemployment and the rising youth population , Nigeria needs to find solutions to address the rise in unemployment and automation of jobs. [2] Driving digital literacy

---

[1] IEEE Standards Association, (2020). Beyond Standards: Building a Framework for National-Level Digital Literacy and Skills

[2] In February 2023 , the Nigeria Government , through the Federal Ministry of Budget and National Planning inaugurated a Technical Working Group in collaboration with the World Bank, to tackle Increasing Youth Unemployment, https://nationalplanning.gov.ng/fg-inaugurates-committee-to-tackle-increasing-youth-unemployment-in-nigeria/

and promoting the digital economy represent critical approaches for helping the government drive job creation and economic development[3](World Bank 2021).

3. **Digital Infrastructure Issues.** Nigeria still has some digital infrastructure challenges even though it has made significant progress in terms of developing its broadband infrastructure. Investment in recent years have seen a massive growth in the number of undersea data cable infrastructure supply into Nigeria with about eight subsea cables landed in Nigeria . These include the ntel's SAT-3[4] with 800gbits; ACE with a capacity of 5.5tbps[5] ; Globacom's GLO-2 12Tbits[6]; MainOne cable with a capacity of 10tbits;WACS (14.5tbits)[7]; Equiano[8] (144tbits); NCSCS[9] with capacity of 12.8tbps; and 2Africa[10] (180tbits).However last mile supply remains a challenge because the country's fixed broadband infrastructure is not fully developed leading to a broadband penetration of about 48% . [11] **Fig 1** shows the Nigeria broadband subscription /penetration data between July -June 2023. Regulations across the country have been ineffective. In several states; the state Governments charge service operators exorbitant right of way fees (ROW)[12]. Even though in 2017 the Nigeria Government released a reduced , harmonized ROW fee agreement (in collaboration with state Governments) only about 7 of the 36 states[13] are implementing the agreement.

---

[3] World Bank (2021) report 'Demand for Digital Skills in Sub-Saharan Africa, indicates that by 2030, the labour force in Nigeria will require about 28 million workers trained in digital skills. As such about 45% of all jobs are expected to require digital skills.

[4] SAT-3 is the South Atlantic 3, which is a fibre optic submarine cable that connects Portugal and Spain to South Africa and has connections to several West African countries.

[5] ACE is the Africa Coast to Europe submarine cable that connects 23 countries in Europe, Africa, and Asia. Its runs from France and Portugal, and to South Africa with connections to landlocked countries through land links

[6] Globacom Limited, also known as Glo is a Nigerian telecommunications company. Ntel is a Nigerian telecommunications company offering 2G, 3G, 4G, and 5G mobile broadband networks. MainOne, is digital infrastructure service provider company with operations in Nigeria, Côte d'Ivoire and Ghana. The MainOne submarine cable system runs from Portugal to South Africa, with connections to Nigeria and Ghana

[7] WACS is the West Africa Cable System submarine cable system connecting 15 countries in the west coast of Africa, from South Africa to London

[8] Equiano is submarine cable system with significant investment from Google. It connects western Europe through Portugal to South Africa with branch off to connect Togo, Nigeria, the island of St. Helena and Namibia

[9] NCSCS -the Nigeria-Cameroon Submarine Cable System connects Lagos, Nigeria with Kribi, Cameroon.

[10] 2Africa this is one of the longest submarine cables globally connecting 33 countries in Europe, Africa, Asia with a cable length of 45,000km.

[11] Micheal Akuchie(2023) Technext , 'Despite all efforts, Nigeria is yet to achieve a broadband penetration rate higher than 48%,retrieved https://technext24.com/2023/08/08/nigeria-internet-broadband-june/

[12] Right-of-way (Row) fees is a levy that Nigeria state governments charge, which telecom companies must pay to allow these companies to dig up roads and install hardware like fibre optic cables to carry internet traffic

[13] Olumuyiwa Olowogboyega (2021) Only seven states in Nigeria are implementing reduced Right of Way fees, Techcabal retrieved https://techcabal.com/2021/05/19/right-of-way-telecoms/

Fig 1 : Broadband subscription /Penetration data July -June 2023

BROADBAND SUBSCRIPTION/PENETRATION DATA
July 2022 - June 2023
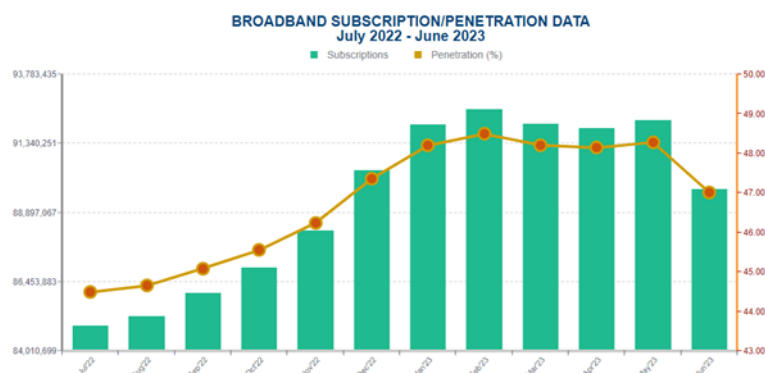
In addition to this situation , Nigeria's lack of an open-access national backbone network that can help operators affordably share and transmit high-speed Internet connectivity across the country limits operators . Most telecommunications operators in Nigeria provide their own infrastructure making their operation expensive and duplicative with some cities and locations having multiple fiber links while others do not have at all. This is not the case in neighboring countries like Ghana and Senegal

The impact of these inconsistencies has been high broadband fees which can range from $20 to $300 per month depending on location in the country. When you factor in the high cost of customer premise equipment(CPE)[14] like computers and data enabled phones , the result is a low rate of household internet access of about 8% as many households cannot afford internet subscriptions. This also fuels the unequal distribution of access across the country with approximately 61% of Nigerians in rural areas unconnected, compared to 40% in urban areas; with Southeast region of Nigeria having the least internet penetration [15] at 13.7milion in 2021 compared to the Southwest region at 41.7 million, North Central with 26.6, Northwest with 25.4m , the South-South with 20.8 million and the Northeast with 13.8 million. Overall, these challenges have led to poor quality of services and negative impact on small and Microbusiness affecting economic growth and productivity. (Houngbonon et al 2022) Against this backdrop, the recent announcements[16] of the Nigeria Governments plans to build

---

[14] CPE customer premise equipment is hardware like data enabled phones, laptops, routers etc which are available at customer's location and help them connects to a telecom company's service.

[15] Juliet Umeh.2022, Punch Newspapers , Internet penetration: Why South East remains lowest at 13.7 million users, retrieved https://www.vanguardngr.com/2022/03/internet-penetration-why-south-east-remains-lowest-at-13-7-million-users/,accessed

[16] Ministry Receives Presidential Approval Towards Increasing Nigeria's Connectivity Backbone by 90,000km. https://fmcide.gov.ng/ministry-receives-presidential-approval-towards-increasing-nigerias-connectivity-backbone-by-90000km/

a 90,000km fiber optic cable for universal access and discussions with key stakeholders[17] is good news.

4. **Improvements In legal and Regulatory Framework .** This helps drive investment as trust is built in the digital economy and ecosystem. The country has made progress in driving and enacting privacy and data protection laws in Nigeria. For instance, the Nigeria Cybercrime (Prohibition and Prevention) Act of 2015 criminalizes offenses involving computers, cyberspace, and other electronic information storage devices and covers areas like Data interference, Illegal interception , Illegal access , Misuse of devices, Identity theft and impersonation, Child pornography, grooming, and cyberstalking, Cybersquatting and cyber-terrorism. In addition, it has enacted the Nigeria Data Protection Act (NDPA) of 2023 which regulates privacy and the processing of personal data, including automated data and replaced the Nigerian Data Protection Regulations (NDPR) 2019 bringing these laws in alignment with international best practice. It also set up the Nigeria Data protection commission responsible for administering data protection and security in Nigeria. The body has been aggressive in regulating and penalizing data breaches.[18] These developments demonstrate the Governments seriousness to promote individual privacy and security as well as drive trust in the digital economy.

5. **Digital Skills & Education :** Digital literacy levels in Nigeria is low even though significant progress has been made by the country[19]. This situation correlates with the low levels of literacy and challenges in the formal education system . With Nigeria's reported literacy rates in 2022, at 31%, which is down from 38% in September 2021, the results mean that only about 76 million adults are literate, out of a population of 200 million.[20] The Government has worked hard to try to improve primary school enrollments , however only about 61 percent of 6–11-year-olds regularly attend primary school with this number varying downwards in the Northern parts of the country. A recent digital skills baseline assessment (NCC, 2022) indicates that majority of participants have moderate skills in the use of smartphones (68%), laptops and tablets (39%), and desktop computers (31%).

---

[17] Full Week Recap of Activities of the Honourable Minister, Dr. 'Bosun Tijani. https://fmcide.gov.ng/weekinreview-full-week-recap-of-activities-of-the-honourable-minister-dr-bosun-tijani-14

[18] The Nigeria Data Protection Commission (NDPC) is reported to have launched more than 400 investigation cases related to privacy breaches involving digital lenders, (who operate loan apps). This is in reaction to a rise in concerns related to their handling of user data. https://www.nigeriacommunicationsweek.com.ng/ndpc-investigating-over-400-cases-of-loan-app-privacy-breaches/#:~:text=Nigeria%20Data%20Protection%20Commission%20(NDPC,their%20handling%20of%20user%20data.

[19] 2021 World Bank Development report indicates that 50 percent of Nigeria's over 200 million population do not have digital skills https://businessday.ng/technology/article/over-50-of-nigerias-population-lack-digital-skills-world-bank/#:~:text=More%20than%2050%20percent%20of%20Nigeria's%20over,also%20unable%20to%20accurately%20track%20public%20finances%2C

[20] Global Data (2021) Literacy Rate in Nigeria (2010 - 2021, %), retrieved https://www.globaldata.com/data-insights/macroeconomic/literacy-rate-in-nigeria/

In addition, youths tend to possess better digital literacy than women and the physically challenged; and there is a higher level of digital literacy among the study populations in the Southern than in the Northern parts of Nigeria. As such a huge gap exists between available digital talent and labour market demands. This creates a major problem for a country with a fast-growing population. The Government must seek ways to ensure its citizens acquire digital skills in a world that is increasingly marching towards advanced digital economy and innovation with new forms of work like the gig economy. While it seeks to do this , it must also build a better education system with better training of teachers , enrollment of children , especially women into schools, better school infrastructure and increased funding for education. **Fig 2** shows the Annual Change in Education Spending from 2010 to 2021

Fig 2 : Annual Change in Education Spending from 2010 to 2021
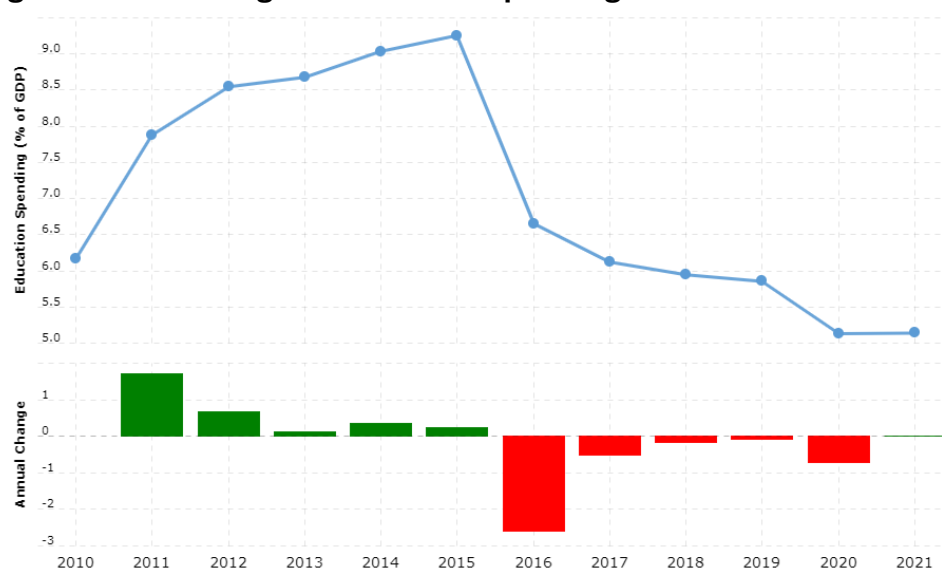
Source: The World Bank

6. **Driving Change :** In recognition of the crucial nature of Digital literacy skills and its potential for driving significant growth for Nigeria , the Nigeria Government published in 2019 the ten-year National Digital Economy Policy and Strategy (NDEPS) 2020-2030 and the Nigeria National Broadband Plan (NNBP) 2020-2025 to assist the Government in leapfrogging its development agenda. The NNBP specifies ambitious targets to be achieved by 2025, including a 70% penetration rate for the population over 15 years old, 90 % 4G/5G population coverage, 60 % digital literacy, and reducing the gender gap from 15% to 10% for mobile internet users. This is anchored on an estimated 54 % data penetration rate for unique individual data users over 15 years of age, while meeting these targets by 2025 present a substantial challenge to the Government of Nigeria; meeting these

goals would help transform the economy, improve productivity and efficiency in the country and make it more competitive.[21]

7. **Financial inclusion & Digital Entrepreneurship** Access to finance and digital services are still low in Nigeria, however the percentage of Nigerians with formal bank accounts at a financial Nigerian financial Institution grew from 45% to 51% in 2023, with updated estimates for national financial inclusion number at 64%[22] . However, these figures are still considered to be low , David-West et al. (2016) reports that "the under-banked and unbanked citizens of Nigeria are predominantly women and youths between the ages of 18 and 35 with minimal education and either unemployed or in the low-income earning jobs". Women constitute 50.1 per cent of the adult population, and 56.0 per cent (21 million) of the unbanked (Chioma , 2022). Digital financial inclusion continues to present the biggest opportunity for Nigeria to drive financial inclusion because 61% of financially excluded Nigerians use a mobile phone, mostly a feature phone. Even though Mobile money penetration in Nigeria is between 7 and 9% ,the Government has worked hard with a mixture of regulation and private sector investment to expand access to financial services through agent banking in rural areas as well as fintech[23] growth. In 2023, there were about 217 fintech startups in Nigeria which represents about 40% of all startups (and securing 42% of Nigeria's total tech venture funds).Fig 3 shows that these Nigeria fintech startups also cumulatively attracted 49% of fintech startup funding in Africa between 2019 and 2023. With 33.5% of these firms focused on providing payments services , the sector has experience rapid developments that can improve financial inclusion in Nigeria (Fintechnews Africa ,2023).

Even though Nigeria must deal with the issues and risks associated with digitizing financial services; it remains a significant opportunity for the country and can propel it into one of the largest economies globally. Nigeria has been ranked 79 out of 138 countries for business dynamism and 94 for innovation capacity[24](World Bank,2021b) , indicating the potential of the country's young entrepreneurs. Growth in digital skills and financial inclusion will propel the

---

[21] The Executive Vice-Chairman and Chief Executive Officer of the Nigerian Communications Commission (NCC), Prof. Umar Garba Danbatta, identifies major benefits in promoting digital literacy retrieved https://ncc.gov.ng/media-centre/news-headlines/1044-news-release-danbatta-lists-benefits-of-digital-literacy-to-socio-economic-devt

[22] access to Financial services in Nigeria : Efina 2023 Survey (Key Highlight) https://efina.org.ng/wp-content/uploads/2024/03/A2F-2023-Event-Day-Presentation-Version4-1.pdf

[23] Fintech, or financial technology, refers to the improvement or automation of automate financial services or processes with the use of technology. Fintech Companies typically use technology to compete with traditional financial institutions.

[24] World Bank(2021b) Nigeria Business Development Update : Business Unusual, retrieved https://documents1.worldbank.org/curated/en/099545011232116970/pdf/P1778200813d1605e0b361074dc50d90cd3.pdf

country significantly forward as this is the case for both developing countries and developed ones (Atkinson et al 2007). However, the Government must deal with numerous issues through appropriate regulation and supervisory frameworks, cybersecurity , consumer protection and build an environment of trust that enables digital entrepreneurship.

This is especially urgent for Nigeria in the rapidly developing era of gig economy [25]where knowledge exchange and globalization of skills is the main currency ; therefore, digital literacy skills are critical. Nigeria must tackle a deficit in digital skills to support growth of the gig economy for its teaming youths.

Torsten et al (2023)[26] also point out that Nigeria can drive greater economic growth with improved financial inclusion through the improved uptake of digital financial services, however achieving this would require improving digital financial literacy, upgrading digital infrastructure, and promoting incubation and sound practices of fintech firms. With financial services increasingly reliant on digital platforms, it's also clear that possessing a basic level of digital literacy becomes essential for understanding and effectively using digital financial services to make informed financial decisions (Demirgüç-Kunt et , al., 2018; Gomber et al., 2017) , as well as be more sensitive to the potential risks that may arise when using DFS, such as cyber security risks and online fraud.

Fig 3: Cumulative funding for Fintech startups in Africa (2019-H1 2023)[27]

---
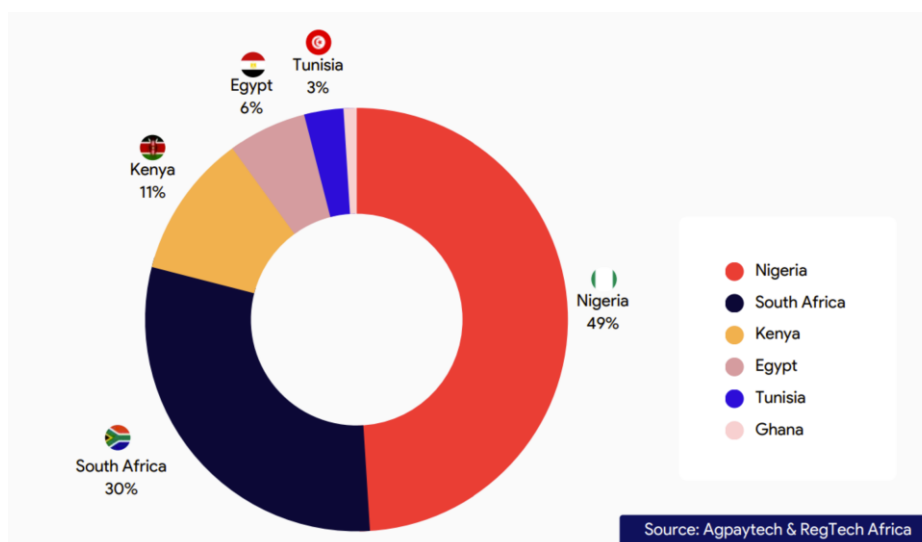
[25] The gig economy is a free and global market where businesses and individuals set short-term and on-demand flexible and skilled professional relationships often based on temporary and part-time work, completed by independent contractors, freelancers, and temporary workers

[26] Torsten Wezel & Jack Ree; Nigeria—Fostering Financial Inclusion through Digital Financial Services: Nigeria, IMF Selected Issues Papers for periodic consultations with member countries.

[27] The State of Fintech and Regtech Report: Nigeria in Perspective, Regtech Africa and Agpaytech, Oct 2023

3.0 ADOPTING DIGITAL LITERACY FRAMEWORK AND DIGITAL ASSESSMENT FRAMEWORK

3.0.1 Digital Literacy Frameworks

Developing digital literacy skills in most countries is not an easy task. It requires painstaking planning , investment and policy interventions as well as a framework to drive adoption. Countries must find a way to facilitate the democratization of digital knowledge and access to technology as a pillar of digital education policy.

Digital literacy(or competency) frameworks help in drawing together the digital elements of ICT, and other digitally relevant literacies; curating them and helping learners access them , by organizing perspective of specific processes, where sequential functions can be learnt with digital tools or digital resources of any type, within the context of a specific task or problem(Martin ,2006) . When competence frameworks are provided as   policy documents, they help provide a country with a shared baseline understanding and standards to enable digital literacy learning , monitoring and reporting. Digital literacy frameworks represent an important foundational tool for helping countries meet sustainable development goals (SDG) thematic indicator 4.4.2 '' percentage of youth /adults who have achieved at least a minimum level of proficiency in digital literacy skills ''

This is especially important because the meaning and content of what constitutes digital literacy in the modern economy is constantly changing (with evolving new technologies , the advanced digital skills of today may become basic digital skills tomorrow) , frameworks become critical with implications for skills that may involve complex cognitive, sociological, and emotional learning needs (Eshet-Alkalai, 2004)

3.0.2 Digital Literacy Assessment

However , beyond adopting a digital literacy framework to guide development of digital literacy skills at scale , most countries , including Nigeria must also think about how to leverage their current digital infrastructure such that it has representative data that is   accurate and relevant to help policy makers make sense of digital literacy training and progress of citizens; so as to determine if the results are meeting the needs of its economy.

This is because measurements or assessments provide policy makers and stakeholders a way to determine and monitor the current skills as well as progress with respect to skills being acquired. As such when policymakers create or adapt a digital literacy assessment standard (or framework) ; they would have an important tool in addition to the digital literacy framework .This tool additionally helps countries to benchmark against other countries to help meet international standards

Without this type of consistent and comparative measurement of agreed indicators , it is difficult to determine where the digitally illiterate sectors exist in the population, which can hamper digital literacy transformation objectives and prevent the transparent development of skills that help drive the needs of labour and the digital economy.

Without a robust measurement or assessment standards it might be difficult for countries to meet SDG goal 4.4.1''proportion of youth and adults with information and communications technology (ICT) skills, by type of skill and SDG goal 4.4.3 ''Youth/adult educational attainment rates by age group, economic activity status, levels of education and program orientation''

3.0.3 Global Reference Frameworks

Globally numerous digital literacy competency frameworks have been developed and are available for adoption or adaptation by countries . Some of these include

- UNESCO Global Framework of Reference on Digital Literacy Skills,
- European Commission DigComp framework,
- Information Literacy (MIL) framework
- Digital Citizenship Education framework
- OECD Skills Research framework

Annexes 1 and 2 provide samples of Digicomp and UNESCO digital literacy global framework(DLGF)

Numerous frameworks are available from the private sector and NGO's or made available for use in national and subnational settings for example

- Internet and Computing Core Certification (IC3)
- International Computer Driving License (ICDL)
- Microsoft Digital Literacy Standard Curriculum
- British Columbia Digital Literacy Curriculum

Some of the providers of these secondary competency frameworks also provide certifications and training platforms which are active in many countries and are equally important in providing access to basic and intermediate digital skills especially outside formal education systems. Indeed, there are also lots of advanced digital skills training available by many providers (outside of the formal education system) often driven by government in collaboration with the private

sector providers and universities(Bashir et al 2020) [28] with the aim of helping drive rapid advanced skills training , often to meet shortages or respond to advanced skill needs for the labour market. [29] **Annex 3** provides some good examples of these advanced digital skills programs across the globe while **Annex 4** gives an example of this in Nigeria.

In adopting a digital literacy framework and digital assessment framework , there no one-size-fits-approach to it and countries typically have adopted frameworks that deal with indicators relevant to it development needs. For instance, many European countries have adopted the DigComp competence framework which addresses contexts in European countries, as these countries are typically technologically developed with a higher income base compared to many developing countries who have favored the UNESCO DLGF

4.0 POLICY ENVIRONMENT

Nigeria has developed several key policies to help drive Digital literacy skills of its citizens as part of the overall drive to growth digital skills as a as a critical tool for national development and competitiveness.

There is a rich mix of these policy document available for review ,however our focus in this report will be on the more recent updates and developments from 2019 with the release of the National Digital Economy Policy and Strategy (NDEPS) 2020-2030, which marks significant milestone in Nigeria's plans towards the development of a vibrant digital economy. **Table 1** provides information on some of the main regulatory policies in Nigeria before 2019 as well as some more current legal frameworks that the Nigeria Government has produced to drive its digital economy agenda.

Table 1 : Key Policies driving digital economy in Nigeria

1	National IT Policy	2012
2	National Information Technology Education Framework	2010
3	National Policy on Education	2013
4	ICT in Education Policy	2019
5	The Nigeria Cloud Policy	2019

---

[28] Bashir Sajitha & Miyamoto Koji, World Bank paper, part of the background work on the Digital Economy for Africa (DE4A) initiative
[29] A good example of this in the 3MTT program driven by the Nigeria Federal Ministry of Communications, Innovation & Digital Economy, https://3mtt.nitda.gov.ng/

6	National Digital Economy Policy and Strategy (NDEPS) 2020-2030	2019
7	The Nigerian National Broadband Plan (2020-2025)	2020
8	The National Cybersecurity Policy & Strategy	2021
9	National Digital Learning Policy	2023
10	The Nigeria Data Protection Act 2023 (NDPA)	2023
11	National Digital Literacy Framework	2023

1. **National Digital Economy Policy and Strategy (NDEPS) 2020-2030** . The National Digital Economy Policy and Strategy (NDEPS) 2020-2030 is a comprehensive policy aimed at using digital technologies to drive economic growth, create jobs, and improve government services. NDEPS replaced the Nigerian National IT Policy and is the current operational government policy document. With all implementing federal public institutions expected to develop their own implementation frameworks from the NDEPS policy/strategy. (NDEPS ,2019)[30] Key targets of this policy include a 70% broadband penetration in 4 years; acceleration of the digitalization of government processes and improve of service delivery, transparency, accountability and the achievement of 95% Digital Literacy Level in Nigeria within the next 10 years

2. **Nigeria National Broadband Plan (NNBP) 2020-2025 .**This Policy focuses on helping increase broadband penetration from to 70% by 2025. In addition, it plans to help provide minimum data download speeds of 10 Mbps in rural areas and 25 Mbps in urban areas, with access provided for 90% of the Nigeria population by 2025. A key target area is 4G/5G services for 90% of the population by 2025 with aggressive data pricing targets of ₦390 for each 1GB of data (NNBP, 2020)[31]

3. **The National Cybersecurity Policy & Strategy(NCPS) .** This Policy has the objective of creating a legal framework and governance mechanism for Nigeria's cybersecurity ecosystem. Other objectives include the development of an information security and control mechanism to protect the country's critical information infrastructure and economic infrastructures operating in

---

[30] NDEPS (2019), National Digital Economy Policy 2020-2030, Federal Government of Nigeria Policy Document
[31] NNBP (2020), Nigeria National Broadband Plan 2020-2025, Federal Republic of Nigeria Policy

cyberspace. The origins of this policy date back to 2014 , with the current policy being an extension on the Cybercrimes Prohibition , prevention) Act 2015 which empowered Government with the legal framework for tackling cybercrime and improving National security. (NCPS , 2021)[32] The policy strategically focuses on pillars which include strengthening cybersecurity Governance and coordination , Fostering protection of critical national Information infrastructure and enhancing cyber defense capability.

4. **National Digital Learning Policy (NDLP).** This Policy builds upon existing policy and strategy documents , sponsored through the Federal Ministry Of Education . It focuses on four key areas. First , It seeks to bridge the digital divide and reach underserved communities, secondly it seeks to create an innovative digital learning ecosystem to help foster local skills development and sustainable systems deployment. In addition, it emphasizes the availability and production of quality digital content as a cornerstone of digital learning sustainability. Finally, the policy recognizes the critical role of teachers and aims to develop clear pathways for their capacity building.(NDLP 2023)[33]

5. **National Digital Literacy Framework (NDLF)** The framework launched in July 2023 aims to ''set a digital literacy and skills agenda for Nigeria by providing a clear and consistent definition of digital literacy, its competence areas, and specific competencies for the purpose of offering policymakers a means to frame digital literacy policies, as well as monitor and support their implementation, building digital literacy curricula, modules, and programs to afford proper planning, coordination and standardization of digital literacy training and skills development in Nigeria and enabling assessment and certification, data collection, analyses, and measurement of the number and/or percentage of digitally literate Nigerians and their level of digital skills'' (NDLF 2023)[34]

The seriousness of the Nigeria Government in driving its digital economy agenda can be seen in the volume and scope of the legal and regulatory policies that it has produced in the last six years and the level of focus it has shown. **Annex 5** contains the summary of objectives extracted from the policy documents reviewed earlier.

---

[32] NCPS (2021), National Cybersecurity Policy Strategy
[33] NDLP (2023) National Digital Learning Policy
[34] NDLF 2023, National Digital Literacy Framework 2023

5.0 THE NIGERIA DIGITAL LITERACY FRAMEWORK

One of the main targets of NDLF is to drive 60% digital literacy for youths and adults in Nigeria by 2025 built on the core objective of NDEPS which seeks to drive 95% digital literacy across states and local Governments in Nigeria by 2030.

5.0.1 Scope & Applicability

The document applies to all Nigerians and seeks to help create a digitally literate Nigeria where all citizens can contribute meaningfully to national development as well as live meaningful lives. It is   a reference document for developing national level digital literacy/ skills agenda.

5.0.2 Adaptations & Structure

One of the key considerations in deciding the NDLF is the unique Nigeria situation as a mobile first country [35] and as such a bit different from a PC centric environment in everyday digital literacy scenarios for which such device considerations are a primary driver in the frameworks adopted. Fig 4 shows how the NDLF is created from the adaptation of the European Digital competency Framework Digicomp 2.2 , (with incorporation of required elements of Mobile Information Literacy (MIL)) and elements of the UNESCO DLGF

Fig 4 : Competency Adoption from DigComp and UNESCO DLGF into NDLF

Source : NDLF 2023

The NDLF incorporates the DGLF competencies area for Devices and Software Operation Competence Area (0) and competencies i. Physical operations of digital

---

[35] Statistics indicate that the Nigeria market is predominantly mobile at 87.5% vs PC at 13.8% https://gs.statcounter.com/platform-market-share/desktop-mobile-tablet/nigeria

devices; and ii. Software operations of digital devices while also including from Digicomp i. Dimension 1 (6 Competence Areas);ii. Dimension 2 (23 Competences); and

iii. Dimension 3 (8 Proficiency Levels),

It then adopts the definition of proficiency levels which describe the specific skill in each of the competencies from DigComp , e.g. . i. Dimension 4 (Examples of Knowledge, Skills and Attitudes); and ii. Dimension 5 (Use Cases) are also adopted from DigComp for the purpose of both learning and employment uses. **Fig 5** shows the NDLF competence areas , competences and proficiency levels.

Fig 5 : NDLF competence areas , competences and proficiency levels
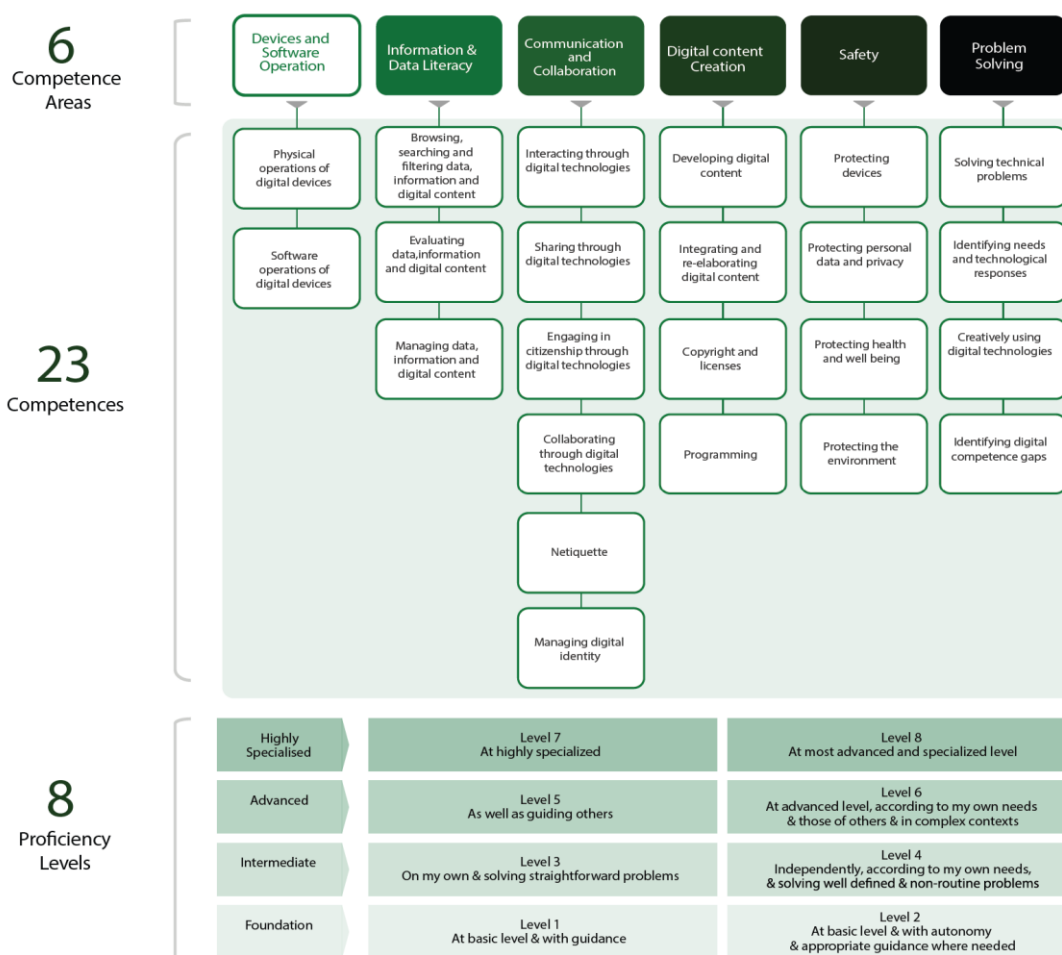
Source : NDLF 2023

5.0.3 NDLF potential Implementation challenges

The NDLF document provides a detailed set of strategic initiatives in section 4.1 that could help deliver significant improvements in digital literacy for the country if it's implemented as indicated. Successful execution of these strategic initiatives hinges the ability to solve existing core issues that face the education sector as it concerns digital skills development.

Teacher Readiness

The Universal Basic Education Commission (UBEC) recently reported that over 60% of teachers in Nigeria's public schools lack digital literacy.[36] This deficit raises questions about who will impart digital literacy to students and concerns regarding how the country can bridge this deficit , especially in the light of the ambitious NDLF timelines set to train and certify teachers in Nigeria by 2025. In the past few years many studies have drawn attention to the fact Nigeria faces a lack of adequate government support, lack of competency among teachers, lack of access to computer and other internet facilities in the school for both staff and students, inadequate power supply, poor staff development in ICT, and poor infrastructure (inadequate classrooms) as key challenges causing adequate utilization of digital technologies among technical education teachers, Bamidele et al (2019), Oguniran. O et al (2016), as such ICT is often not used effectively in lesson preparation, instructional delivery, individualized learning in many public schools, Samuel . O et al (2019). While we have seen some progress there is still low utilization of computers and internet in lesson delivery amongst teachers Chiukpai, A. I. et al (2023)

Device Access & Infrastructure in Schools

The NDLF makes the point that Nigeria is a mobile first market with a PC to Mobile market share in Nigeria was 15.76% to 83.55% as at November 2016 . It thus correctly makes the distinction between computer literacy and digital literacy, however while the NDLF has taken cognisance of this mobile first reality , it has made minimal adaptation at the level of specific competences in existing frameworks it adapted, thus ensuring that it also addresses the usage of laptops , desktops etc. This is important to note because while 93% of adults 18 and above have access to mobile phones in Nigeria [37] over half or about 57% of those mobile phones are 2G enabled phones[38]. These are not smartphones and thus have limitations in terms of access to the internet and scope of

[36] 60 percent of Nigeria teachers lack functional digital literacy – UBEC, https://dailypost.ng/2021/02/05/60-percent-of-nigeria-teachers-lack-functional-digital-literacy-ubec/
[37] EFInA Access to Finance (A2F) Survey report pg 8 , https://efina.org.ng/wp-content/uploads/2024/03/A2F-2023-Event-Day-Presentation-Version4-1.pdf
[38] Nigeria communication Commission, Percentage (%) Market Share by Generation, March 2024 https://ncc.gov.ng/statistics-reports/industry-overview

usage for digital literacy. In addition , the World Bank reports that less than 20 % of Nigeria's households own a computer[39]. This means that the existing installed base of mobile phones and laptop/desktops may not fully provide access to adults and children of school age. Therefore, accessibility remains a major challenge for lower income groups and provisions also must be made for some form of shared access computing model to provide devices and connectivity access to schools , especially public schools This presents a significant infrastructure funding challenge for the government.

Digital Literacy Assessment

Digital skills assessment is critical success factor for the implementation plan for NDLF . However, the NDLF is yet to clarify a digital literacy assessment framework . This is important because it helps provide standardised way or approach for benchmarking what it means to be digitally literate in the country. This is addressed further section 5.0.4 of this report.

Stakeholder Alignment

A massive project of this nature requires the collaboration and alignment of multiple stakeholders at Federal , state and local levels as well as external parties. The NDLF makes provisions at the federal level for a Digital Literacy Institute(DLI) , a digital Literacy council (DLC)and a Digital Literacy Management office (DLMO)and has provided an impressive list of these stakeholder(see **annex 6**). However, the 36 states of the Federation which play a crucial role in the success of the NDLF are not expressly mentioned in the document with clear roles. It is noteworthy that the Nigeria Governors Forum are included as implementation stakeholders , the point must be made that a state Governments led approach provides a better institutionalised approach. Whilst the Nigeria's constitution confers on the federal government the powers to formulate educational policies and programmes for implementation by sub-national levels of government, it also provides that both the National Assembly and State House of Assembly have powers to make laws (and establish institutions for the purpose or) with respect to university education, technological education, or such professional education as deemed necessary. As such it is important that the National Council on Education (NCE)[40] and the Joint Consultative Committee on Education (JCCE) [41] be included as critical stakeholders. It is also important to see a replication of the DLMO ,

---

[39] Digital Progress and Trends Report 2023, World Bank , https://openknowledge.worldbank.org/server/api/core/bitstreams/95fe55e9-f110-4ba8-933f-e65572e05395/content

[40] The NCE's membership includes the Minister of Education, the Hon. Minister of State for Education, State Commissioners of Education, and the FCT Education Secretary. It is the   highest body for formulating education policies in Nigeria

[41] The JCCE provides the NCE with recommendations and frameworks for considerations, with membership made up of the professional officers of the Federal and State Ministries of Education and FCT Education Secretariat, and their Parastatals.

DLC and DLI or its equivalent bodies at the state level to drive better stakeholder alignment.

Annex 9 shows a multiplicity of digital and ICT literacy programs being executed in the states in Nigeria , with different partners and different approaches. In addition to state led programs , some states are accessing federal led programs and numerous NGOs , multilateral agencies and private sector firms are active . The key challenge is to ensure alignment and management of these stakeholders nationwide towards a common goal. This requires careful balancing of the contributions of all key stakeholders **(mapped in annex 10)** over the various phases of implementation of the framework.

However, beyond the challenge of the alignment of the various implementation stakeholder is an urgent need for a joint review of existing school curriculum in Nigeria between the relevant agencies of the Ministry of Education and The Ministry of Communication and Digital economy to ensure a that Nigeria school curriculum comprehensively incorporates digital skills at all educational levels.[42]

5.0.4 Digital Literacy Assessment review

One of the items indicated as a key purpose of the NDLF is that of ''enabling assessment and certification, data collection, analysis and measurement of the number and percentage of digitally illiterate Nigerians and their levels of digital skills''.

While numerous approaches , standards and recommendations exist that the NDLF may have considered[43]; the NDLF document does not provide specific details nor dwell on a standard methodology or framework for conducting digital skills assessments in Nigeria.

Without this clarity regarding digital literacy assessment standards , it becomes difficult to implement several aspects of the strategic initiatives contained in the NDLF document. For example, the conduct of a baseline assessment to determine the current levels of digital literacy of Nigeria's public servants , the massive training and certification of public workforce on digital literacy , dashboards for display of digital literacy diffusion and the recognition of digital literacy as a life skill for inclusion into job readiness, entrepreneurship & social intervention programs. In all these planned initiatives the standard assessment methodology , framework or tools needs to be adopted to ensure that progress being made by Nigerians exposed to digital literacy

---

[42] Digital Literacy: DG NITDA Calls for Curriculum Overhaul to Meet 21st Century Needs. https://nitda.gov.ng/digital-literacy-dg-nitda-calls-for-curriculum-overhaul-to-meet-21st-century-needs/8248/ July 5 ,2024

[43] Maart Laanpere,2018   Recommendations on Assessment Tools for Monitoring Digital Literacy within UNESCO DLGF

trainings in general ; can be measured and reported in a consistent repeatable way across the country.

However, the NDLF does indicate in strategic initiative 4 about plans to sponsor three important bills in the national assembly. The first is for the establishment of a Digital Literacy Institute (DLI)[44].' The second is for the establishment of the Digital Literacy Council(DLC)[45] and the third bill for establishment of The Digital Literacy Management Office(DLMO)[46] These plans are in the right direction but do not provide clarity with respect to timelines for action. The national assembly 's legislative agenda[47] is not clear regarding the timelines that they plan to enact bills for DLI , DLC and DLMO , even though they indicate that they assembly plans to develop legislation that promotes digital innovation, data protection, e-commerce and digital skills programs , including coding and programming trainings.

Suggestions for assessment planning

The nuanced nature of digital literacy assessment means that its often challenging especially when considering the interconnected nature of the ecosystem of skills being assessed and therefore different countries have approached it differently. **Annex 8** provides an example of how two different countries approached it. With this in mind Gapski H.(2007)provides a useful approach that uses criteria such as , context of usage, level of analysis object of measuring, and perspective method to help drive effectiveness of digital literacy assessments .

The context of assessment speaks to the objective of the digital literacy assessment . This is especially important because the assessment design must be flexible to accommodate the various initiatives in the NDLF for benchmarking , measurement of standards attained in trainings , determining the effectiveness of specific curriculum or exploring student readiness etc.

The level of analysis explores the depth of reporting to be covered by the digital literacy assessment . These could be at the level of the classroom, small groups of participants or students, individual level, employee, company, state or region and helps define who will be assessed.

---

[44] The DLI will be responsible for advancing the digital literacy training, assessment and certification of Nigerians
[45] The DLC will be responsible for the management and supervision of the DLI activities and will be composed of experts from Government, Industry and Academia
[46] The DLMO will provide governance for the DLI and be set up as an office at the presidency.
[47] The Peoples House 2023, Legislative Agenda of the 10th House of Representatives Nigeria 2023-2027

The object of measuring relates to the skills being assessed typically using standards in alignment with the NDLF curriculum. For example, protection oneself from cybercriminals etc. This is straight forward.

The Perspective method relates to the type of assessment at best aligns to the three criteria above. Typically, this could involve self-observation by the participants of their abilities and then discussion with a teacher or supervisor or an external observation by the teacher or supervisor. Another approach is a qualitative one where projects or portfolios are provided to the student and then a summative assessment done. Yet again a quantitative approach can be done whereby a standardized testing approach I taken and specific questions designed to elicit correct or incorrect answers based on a multiple choice provided. These approaches can also be presented as self-assessment , knowledge based and performance-based assessment methodologies and have been widely used across several countries and programs globally[48]

Whatever approach the country eventually takes it must consider how to scale implementation and as such must drive a balance between potentially providing assessment platforms accessible to citizens for free online and paid assessments and certification potentially provided via 3rd party private sector providers and Government.

6.0 Summary of Findings

The following findings are highlighted for attention as challenges faced in effectively adopting national digital literacy framework and assessment in Nigeria:

I. The standards for digital literacy assessment (framework) and key implementation initiatives for the digital literacy framework are pending and await the enactment of supporting bills by the national assembly.

II. While a lot of progress has been made , the access technology infrastructure that enables widespread citizen participation faces limitations nationwide in terms of insufficient access to 3G enabled mobile devices and computers and internet connectivity across the country especially in rural areas and public schools.

III. Teacher readiness needs improvement and requires funding from Government to resolve the human capacity and infrastructure challenges involved.

IV. Alignment of key stakeholders especially state governments, civil society and private sector is required to foster buy-in and drive a unified implementation approach.

---

[48] Digital Skills Assessment Guidebook , International Telecommunications Union Publication (2020) , https://academy.itu.int/itu-d/projects-activities/research-publications/digital-skills-insights/digital-skills-assessment-guidebook

7.0 Recommendations

The following are recommendations for consideration.

I. Continue to support investment in expanding technology infrastructure and internet access. Besides the recent policy interventions by Government, interventions that help reduce the cost of CPE's and data bundles are needed.

II. Ramping up capacity building initiatives is vital. The training and support of Teachers, educators and administrators in the public service will ensure readiness and ease DL implementation efforts. These efforts must receive equal attention in the states and not just the federal level.

III. Reviewing and incorporating digital literacy into formal education curricula is needed.

IV. Elevating DL qualifications as an advantage that public sector , industry and key agencies adopt , could create a powerful incentive for private citizens to embrace DL.

V. Raise public awareness about the importance of DL , digital economy , and the NDLF especially amongst youths , rural communities and women.

VI. The continuous fostering of collaboration between government, private sector, and civil society organizations is important.

VII. Continuous evaluation and adaptation are one of the bedrocks of driving consistent progress. Digital literacy assessment related standards and implementation initiatives that helps assess the DL program effectiveness and progress in other to make necessary adjustments must be sorted urgently.

8.0 Conclusion

Nigeria can use digital literacy to help power its aspirations of growth through digital economic transformation. However, it must solve the numerous challenges related to technology infrastructure, capacity development, citizen engagement . The recent developments in its policy environment are welcome, however the long-term success of its digital economic transformation agenda will depend on consistency and effectiveness with which it implements the key recommendations highlighted.

Annex 1 .The Digital Competence Framework for Citizens (DigComp)

Information and data literacy	1.1. Browsing, searching and filtering data, information and digital content
	1.2. Evaluating data, information and digital content
	1.3. Managing data, information and digital content

Communication and collaboration	2.1. Interacting through digital technologies
	2.2. Sharing information and content through digital technologies
	2.3. Engaging in citizenship through digital technologies
	2.4. Collaborating through digital technologies
	2.5. Netiquette
	2.6. Managing digital identity

Digital content creation	3.1. Developing digital content
	3.2. Integrating and re-elaborating digital content
	3.3. Copyright and licences
	3.4. Programming

Safety	4.1. Protecting devices
	4.2. Protecting personal data and privacy
	4.3. Protecting health and well-being
	4.4. Protecting the environment

Problem solving	5.1. Solving technical problems
	5.2. Identifying needs and technological responses
	5.3. Creatively using digital technologies
	5.4. Identifying digital competence gaps

Source : https://joint-research-centre.ec.europa.eu/digcomp_en

Annex 2 : UNESCO Digital Literacy Global Framework.

Competence area	Competences	
0. Devices and software operations	0.1 Physical operations of digital devices	
	0.2 Identifying software to operate digital devices	
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content	
	1.2 Evaluating data, information and digital content	
	1.3 Managing data, information and digital content	
2. Communication and collaboration	2.1 Interacting through digital technologies	
	2.2 Sharing through digital technologies	
	2.3 Engaging in citizenship through digital technologies	
	2.4 Collaborating through digital technologies	
	2.5 Netiquette	
	2.6 Managing digital identity	
3. Digital content creation	3.1 Developing digital content	
	3.2 Integrating and re-elaborating digital content	
	3.3 Copyright and licences	
	3.4 Programming	
4. Safety	4.1 Protecting devices	
	4.2 Protecting personal data and privacy	
	4.3 Protecting health and well-being	
	4.4 Protecting the environment	
5. Problem solving	5.1 Solving technical problems	
	5.2 Identifying needs and technological responses	
	5.3 Creatively using digital technologies	
	5.4 Identifying digital competence gaps	
	5.5 Computational thinking	
6. Career-related competences	6.1 Operating specialized digital technologies for a particular field 6.2 Interpreting data, information and digital content for a particular field	

Source: https://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf

Annex 3 :Advanced Digital Skills Programs for ICT outside the formal education system

Program	Beneficiaries	Type	Ownership	Duration
Andela	Kenya, Nigeria, Uganda	Fellowship	Private (For profit)	6 months training + 36 months on the job training
Cisco Networking Academy	180 countries	Online programs, In-person learning programs	Private (For profit) Free/ Depends on institutions	30 hours – 70 hours per course
Codeacademy	Worldwide	Online courses (Free courses with paid option for personalized learning)	Private (For profit)	6-10-week long courses
Code.org	180+ countries (K – 12 courses but includes advanced digital skills courses like coding)	MOOCs	Private (Non-profit)	Self-paced
Developing in Vogue	Ghana (Women/Girls over age of 6)	Coding bootcamp for women	Private (For profit)	3 months
Intel® AI Academy	Worldwide (18 years and above)	Online courses (Has courses on AI, Big Data Analytics, Machine Learning, etc)	Private (Non-profit initiative)	4-5 hours
Laboratoria	Peru, Mexico, and Chile (young low-income women)	Coding bootcamp	Private (Non-profit)	6 months instruction + 18 months of continuing education
Meltwater Entrepreneurial School of Technology	African Union (focus on Côte d'Ivoire, Ghana, Nigeria, Kenya, South Africa)	Incubator, Startup accelerator	Private (For profit)	12 months, full time
Microsoft (4Africa Academy)	African Union (with offline presence in Nigeria, Ghana, South Africa, Egypt, Uganda, Kenya, Rwanda, Mauritius, Malawi, Ethiopia)	Online programs, Internships, Apprenticeships	Supported by private (non-profit initiative)	6 months
Tunapanda	Nigeria, Kenya, Tanzania, Uganda (Aims to cover East Africa)	In-person training course, Bootcamp	Private (Non-profit)	3 months training, Robotics Bootcamp
Udacity	190 countries	MOOCs	Private (For profit)	4-6 months (Nano degrees)

Source : World Bank

https://documents1.worldbank.org/curated/en/562351611824219616/pdf/Digital-Skills-Frameworks-and-Programs.pdf

Annex 4 : The 3 million Technical Talent Program

The 3MTT programme is an advanced digital skills program driven by the Nigeria Government to help generate a pipeline of technical talent . This program is driven through the Federal Ministry of Communications, Innovation & Digital Economy in collaboration with different stakeholder (Training Providers, Placement firms , partners, NGOs , Governments etc) with a target of helping 3million youths acquire advanced digital skills.

Source: https://3mtt.nitda.gov.ng/

Skills in Focus

- Software Development

- UI/UX Design

- Data Analysis & Visualisation

- Quality Assurance

- Product Management

- Data Science

- Animation

- AI / Machine Learning

- Cybersecurity

- Game Development

- Cloud Computing

- Dev Ops

Annex 5: Summary of objectives extracted from the Nigeria Digital economy policy documents.

		Summary Objectives of Nigeria Policy documents with focus on the Digital Economy			
Policy		**National Digital Economy Policy and Strategy (NDEPS) 2020-2030+C5:N17F10C5:N16C5:N18**	**National Broad Band Plan 2020-2025**	**National Cybersecurity Policy & Strategy**	**National Digital Learning Policy**
Year of launch		**2019**	**2020**	**2021**	**2023**
Policy Objectives		1.70% bro+C8:E12adband penetration in 4 years	1.Deiver Broadband Download Speeds across Nigeria of a Minimum of 25Mbps in urban areas and 10Mpbs in rural areas	1.Strenthening Cyberssecurity governance and coordination	1. Improve access to digital learning for all learners regardless of location and socioeconomic status by bridging the digital divide
		2.To accelerate the digitalization of government processes and improve service delivery, transparency, and accountability	2.Effective coverage available to at least 90% of the population by 2025	2.Fostering Protection of crtical natio	2.Improve the quality and relevance of digital learning by ensuring the provision of quality content while supporting educators to integrate technology into teaching and learning process
		3.To improve trust, confidence and security around digital processes and trust	3.Price of not more than N390 per 1GB of data (i.e. 2% of median income or 1% of minimum wage	3.Enhancing cybersecurity incident m	3.Mitigate the impact of natural and man-made disruptions to learning systems through effective use of digital learning and technology
		4. .To attract and grow digital jobs across all sectors of the economy	4.focused on recommendations in 4 critical pillars i. Infrastructure ii Policy iii. Demand Drivers iv. Funding & Incentives	4.strengthening legal and regulatory	4.Enhance the global competitiveness of the graduates of our educational systems by expanding use of quality digital learning
		5.To develop the technology start-up ecosystem by actively promoting innovation and entrepreneurship		5.Enhancing Cyber defence capability	5.Leverage digital learning and technological innovations to facilitate data driven, evidence-based education management, research and development across all levels
		6. To support the digital literacy of Nigerian Citizens, Business and Government workers and enable them to acquire cutting-edge digital skills		6.Promoting a thriving digital economy	6.Focus areas for this policy are i. Capacity Building and Advocacy ii. Infrastructure and Access Devices iii. Content and Platforms
		7.To achieve a 95% Digital Literacy Level in Nigeria within the next 10 years		7.Assurance Monitoring and Evaluation	
		8.To develop a digital education curriculum to meet the current and future needs of digital economy		8.Enhancing International Cooperation	
		9.To ensure that indigenous technology companies can participate actively in government funded technology program			
Timelines for Implementation		2020-2030	2020-2025	Continous	2023 +

Annex 6: Key Stakeholder & Institutions for successful implementation of digital economy related policy.

All individuals and institutions that have a role to play in the implementation of the Policy and Strategy

1. Federal Ministry of Communications and Digital Economy

2. Nigerian Communications Commission

3. National Information Technology Development Agency

4. Galaxy Backbone Plc

5. Nigerian Communications Satellite Ltd

6. Nigerian Postal Service

7. Universal Service Provision Fund

8. Federal Ministry of Finance, Budget and Planning

9. Federal Ministry of Education

10. The 36 States of the Federation and the Federal Capital Territory

11. Central Bank of Nigeria

12. Ministry of Petroleum

13. Federal Ministry of Science and Technology

14. National Office for Technology Acquisition and Promotion

15. Bureau for Public Procurement

16. Nigeria Financial Intelligence Unit

17. Nigeria Computer Society

18. Computer Professionals (Registration Council of Nigeria)

19. Association of Telecommunications Companies of Nigeria

20. Association of Licensed Telecom Operators of Nigeria

21. Federal Ministry of Agriculture and Rural Development

22. Federal Ministries of Defence, Interior and Police Affairs

23. Federal Ministry of Humanitarian Affairs, Disaster Management and Social Development

24. Federal Ministry of Youth

25. Federal Ministry of Labour and Productivity

26. Federal Ministry of Women Affairs

27. The National Assembly (Leadership and Applicable Committees)

28. Nigerian Governors Forum

29. Diaspora Commission

30. National Identity Management Commission

31. Media Houses

32. 774 Local Government Areas of the Federation

33. Innovation & Business Incubation Hubs

34. Private sector Digital literacy/Skills Training Providers

35. Universities

36. Non-Governmental organisations and sponsors of digital skills trainings and interventions (Local & International)

Annex 7 : National Broadband Plans targets, timelines 7 interim milestones

	Target	Measure	Baseline (2020)	2023	2025
1	Coverage of Population	Individuals	33% (2/3/4G)	70% 4G	90% 4G Mobile
2	Speed (Minimum)	Urban	3 Mbps	15Mbps	25 Mbps
		Rural	1.5Mbps	5Mbps	10 Mbps
3	Penetration	Number of connected individuals	Approximately 30%	50% of eligible individuals with Provision for physically challenged	70% of eligible individuals
4	Fibre Reach Schools	% of all schools (3 Tiers)	Nominal	70% Tertiary 30% Sec. 15% Primary	100% Tertiary Institutions 50% Secondary Schools 25% Primary Schools
	Health Facilities	% of all Major Hospitals	Nominal	Connecting 80% General/Major Hospitals per LGA and Federal Medical centres	Connecting 80% of primary health centres in each LGA. 100% General/Major Hospitals per LGA
	Local Govts.	% of 774 LGAs	473/774 (61%) of LGAs Fixed connection 10Mbps	80% of 774 LGAs	95% of (774) Local Govts. HQ connected by Fibre. 5% by Satellite/Other
	Fibre to Towers	% Towers connected	10%	40%	60% Towers connected
	Fibre Infrastructure	Open access shared Fibre	Approx. 40,000km	90,000km	120,000km non-overlapping
5	Affordability : Data (monthly)	2% GNI/Capita/1GB	N1000/1GB	N700/1GB	N390/1GB
	Cost of Devices	Low cost devices	Entry level smartphones at approx. $50 (N18,000)	At least 1 locally assembled Smart Device by 2023 Target Price <$50 (N18,000)	3 Local assembled Smart Devices Target Price <$25(N9,000) by 2025
6	Digital Literacy	% of population	62% Adult Literacy	40% Digital Literacy	60% Digital Literacy
7	Gender Equality	Access to end user devices and data	15% Gender Gap (GSMA)	10% Gender Gap +5 Mill Women given access	100% Women in Social security Programs have Digital Access
8	Underserved /Rural Communities	% of unserved clusters	114	80% of 114 unserved clusters to be covered	100% Community access or school based access in all areas

Sources : Nigeria National Broadband Plan 2020-2025. (2020). Federal Republic of Nigeria Policy Document.

Annex 8 : Experience from other countries with respect to implementing digital literacy & assessments frameworks.

Country : France:

Assessment Tool/Framework : Pix which is an online platform created in 2016 based on the Digicomp Framework and used to assesses and certifies digital competences https://pix.org/en/

Implementations : This was managed by the French Ministry of Education; French Citizens can go directly online to assess themselves using a performance-based assessment. Once the test is concluded the citizen receives a digital skills profile with targeted recommendations for future learning.

For certifications , person taking the assessment has to do it under strict examination conditions . The tool allows schools and employers to create their accounts and Employers and schools can also create accounts to organise the digital literacy assessment of their students and employees.

The tool is built on an open-source platform and available in French and adaptable to other languages , frameworks or skillsets.

Country : Kenya:

Assessment Tool/Framework : Basic Education Curriculum Framework (BECF) the tool is partially mapped to the Dig Comp framework.

Implementation : Kenya's Ministry of Education created a national-level education framework by driving significant broad stakeholder engagement to ensure buy and ease of implementation.

The main focus of the BECF is on digital literacy core competence with priority on the K-12 students. The framework curriculum provides an online digital literacy platform with support materials for the download and use of teachers' professional development.

The assessment approach is a competence-based skills assessments using formative and summative methods.

Source : Digital Skills Assessment Guidebook , International Telecommunications Union Publication (2020) , https://academy.itu.int/itu-d/projects-activities/research-publications/digital-skills-insights/digital-skills-assessment-guidebook

Annex 9 : ICT Literacy Programs currently on going in Nigeria States ***

Abia			3MTT	NITDA		Announced it will collaborate will promote 3MTT in the state.
Adamawa			AGILE	World Bank , FMOE	Speedim Technology	Adolescent Girls in Learning (AGILE) is a Fed Government , world bank supported program with digital literacy component focused on Senior secondary schools.
Akwa Ibom				World Bank , FMOE	SDN Nigeria, SBA Digital Technology Hub	SDN focus is Niger Delta
Anambra	Code Anambra	Solution Innovation District in partnership with Microsoft and Wootlab Foundation		World Bank , FMOE	Hi-Impact Choice Limited	The program runs for 4 months and is made includes training focused on Product Design, Frontend Development, Backend Development, Full stack Development, and Mobile App Development.
Bauchi			AGILE	World Bank , FMOE	CITAD Digital Community Hub ,Jama'are LGA	The State Government is supportive of DL programs and has driven IC3 Digital Literacy and certification course for civil servants in the state. Recognised in 2023 for having the highest national enrolment for Nigeria Learning Passport(NLP) the FMOE online learning platform.

Bayelsa				World Bank , FMOE	NCDMB ICT hub Okpokuma	NCDMB is the Nigerian Content Development and Monitoring Board . ...The state Government in 2023 launched Bayelsa Prime to provide teachers with technology. About 2,000 teachers and administrators in about 200 schools received tablets, smartphones, and power banks
Benue	Benue Tech Skills (Benue Go Digital)	Google , Microsoft Troika Tex Digital Communicati ons Ltd and BishBerry Digital Solutions Ltd		World Bank , FMOE		Focused on coding, data and advanced analytics, digital marketing, e-commerce,UX design , cyber security and smartphone videography
Borno			3MTT , AGILE	World Bank , FMOE	DAI , Stemledge Limited , ZOA Internationa l	Several NGOs are active with external funding e.g. EU . to assist victims of insurgency and displacement (women, disable etc) using DL Skills programs.
Cross River				World Bank , FMOE	Asuquo Ekpenyong Foundation , FCDO	Basic Digital Literacy for Southern Nigeria is supported by UK Foreign, Commonwealth & Development Office (FCDO)
Delta				World Bank , FMOE	Imperial ICT HUB	
Ebonyi				World Bank , FMOE	BERWO	It is a free 3-month training scheme with five different courses which include Frontend Development, Hardware maintenance/Networki ng, Graphics design, Video Editing, and Content creation. Better Health for Rural Women, Children, and Internally Displaced

						Foundation (BERWO) is run by the State Governors wife
Edo	EDO Best	World Bank		World Bank , FMOE	GOMYCODE ,	Edo skills : The Edo Basic Education Sector and Skills Transformation Operation Project is a world bank supported project to improve the teaching and learning processes in basic education and expand access to quality digital skills and entrepreneurship development programs for youth in Edo State. GOMYCODE, an international educational technology startup. The collaboration with Edo state Government is focused on training youths in Data Science and Software Development,
Ekiti	Ekiti State Digital Skilling Acade my	TechDev , Meta	AGILE	World Bank , FMOE		Ekiti state DSA is a 6-month intensive program focused on Product Management , Frontend Development , Back-end Development , Product Design

Enugu			DSN	World Bank , FMOE		Digital Skills Nigeria(DSN) , a collaboration between Microsoft, The Federal Ministry of Communication & Digital Economy, in alignment with the National Digital Economy Policy and Strategy (NDEPS), it aims to support young Nigerians in the digital economy through quality employability and entrepreneurial skills that will foster inclusive/ sustainable economic growth and job creation in Nigeria.
Federal Capital Abuja				World Bank , FMOE		
Gombe			AGILE	World Bank , FMOE		The Government in January 2024 launched a 2000 Capacity Business Process Outsourcing centre (BPO) in Gombe.
Imo	Skill up Imo	Huawei , Zinox , Cisco , Microsoft , NITDA , USPF		World Bank , FMOE		Skill Up Imo is an ambitious program to train 0, 000 youths in 5years in areas like Digital marketing, Web and App Development, LAN Networking, Content Creation, Basic Data Analysis, Graphics Design, Programming,
Jigawa	Jigawa YEEA	NITDA, IDEA HUB , Base University ,	AGILE	World Bank , FMOE		The Digital literacy program is a collaboration involving the Jigawa State government, NITDA, Base University, and IDEAS hub , focused on youth training for employment through ICT skills . Its design as a 6-month program . The target is to train 1000 youths

Kaduna	Kaduna Digital Skills Program	GF Technologies , Kaduna ICT Hub	AGILE	World Bank , FMOE	Kaduna ICT Hub	The Kaduna State Digital skills Program was launched in July 24 and targets youths and MSMEs of Kaduna State and aims to train participants on areas like device usage, information search and evaluation, digital content creation, online safety etc .
Kano			AGILE	World Bank , FMOE	CITAD	Centre for Information Technology and Development , is active in Kano and has a CITAD Digital Community Hub ,Jama'are LGA
Katsina	Digital Katsina State Project (Digi Kat)		AGILE	World Bank , FMOE		Digi Kat is focused on training 15,000 Katsina Indigene in digital Literacy
Kogi			AGILE	World Bank , FMOE		
Kwara			AGILE	World Bank , FMOE	Webfala	Webfala Digital Skills for All Initiative is an NGO focused on underprivileged children, girls, youths and women and providing them with STEM education and digital literacy skills. The have a few programs running in Kwara
Lagos	Lagos State Basic Digital Skills Training	Woodlab, Tech4Dev , LSETF ,Microsoft	DSN	World Bank , FMOE		Digital Skills Nigeria(DSN) , a collaboration between Microsoft, The Federal Ministry of Communication & Digital Economy. Lagos State has multiple NGOs and private sector player active in providing digital literacy training. In May 2024, the state Government announced an ambitious program to

State	Program	Partner	Program 2	Funder	Center	Description
						empower 1milion youths through IICT training.
Nasarawa			AGILE	World Bank , FMOE		
Niger	Skills for the Future		AGILE ,DSN	World Bank , FMOE		Skills for the Future is focused on developing Information Communication Technology (ICT) knowledge among the youths in the State. It got boost in March 2025 when Zenith Bank Plc donated a 250-seat capacity ICT centre to the state Government . The DSN program is also available in Niger State.
Ogun	Gateway Skills Program , Ogun state Skills Fund	GF Technologies				The Gateway Program is focused on digital literacy, entrepreneurship training, access to financing, mentorship for youths and SMEs in Ogun State. The state also as the Ogun State Skills Funds that focuses on provide ICT skills training for youths.
Ondo					Sabi Programmer Computer Training Center	
Oyo	Oyo ICT training	Code Garage Africa and Zeeh Africa,				This ICT program by the state Government is focused on digital literacy training for secondary school student

Plateau			AGILE	World Bank , FMOE		
Rivers					PIND , TechCreak	The 6months youth employment pathways (YEP) ICT program in Rivers State is sponsored by Foundations for Partnership Initiative in Nger Delta (PIND). Techcreek is private Youth led firm driving digital skills .
Sokoto			AGILE	World Bank , FMOE		
Taraba						
Yobe			AGILE	World Bank, FMOE		
Zamfara			AGILE	World Bank, FMOE		

Source : author .

**The author has used a desk review approach to access the information. The list indicated here is not exhaustive and is focused on digital literacy programs currently being executed or active in the last 10months preceding July 2024.

** Other Multinational agencies like UNICEF and NGOs have ongoing digital literacy programs not captured in the table above.

Annex 10 : Stakeholder mapping for the different implementation phases of the Nigeria Digital Skills Framework

	Federal	State	Development Partners	Professional Bodies	Private Sector	International Collaboration	Others
Curriculum Development	●	●	●	●	●		
Training & Certification	●	●		●		●	
Policy Support	●	●	●			●	
Examinations	●	●					
IT Infrastructure					●		
Data Management Platform	●	●	●			●	
Monitoring & Evaluation	●	●					
Baseline Assessment	●	●	●	●		●	
Awareness	●	●	●	●	●	●	●
Digital Skills Assessment	●	●	●	●	●	●	●
Job Readiness & Entrepreneurship	●	●		●	●		
Bills & Regulation	●	●					
Funding			●			●	●

Federal	Federal agencies cont.	State	Development Partners	Professional Bodies	Private Sector	International Collaborations	Others
National Teachers Institute (NTI)	Teachers Registration Council Nigeria (TRCN)	The 36 state Governments	European Commission	Nigerian Computer Society (NCS)	Internet Service Providers	Global Digital Literacy Council (GDLC)	Civil Society Organisations

Computer Professionals Registration Council of Nigeria (CPN)	National Youth Service Corps (NYSC)	Joint Consultative Committee on Education (JCCE	UNESCO	Academia in Information Technology Profession (AITP)	Private Companies in Nigeria	Microsoft	Women interest Groups
Federal Ministry of Communications and Digital Economy (FMCDE)	National Universities Commission (NUC)	National Council on Education (NCE)	UNICEF	Association of Vice Chancellors of Nigerian Universities (AVCNU)	Private Schools and Training Institutions	Certiport	Dangote Foundation
Federal Ministry of Education (FME)	Tertiary Education Trust Fund (TETFUND)	The 36 State Houses of Assembly	The German Agency for International Cooperation (GIZ)	Computer Professionals Registration Council of Nigeria (CPN)		Global System for Mobiles Association (GSMA)	BUA Foundation
Federal Ministry of , Technology, and Innovation (FMSTI)	National Commission for Colleges of Education (NCCE)		ECOWAS	Information Technology Industry Association of Nigeria (ITAN)		Cisco	Belema Aid Foundation 4.

Office of the Head of Civil Service of the Federation (OHCSF)	Universal Basic Education Commission (UBEC)		African Union (AU)	Nigerian Institute of Information and Communications Technology Engineers (NIICTE)		Oracle	MTN Foundation
National Business and Technical Examinations Board (NABTEB)	Nigerian Educational Research Development Council (NERDC)		The World Bank Group	Association of Licensed Telecoms Operators of Nigeria (ALTON)		Pearson	TY Danjuma Foundation
Joint Admissions and Matriculation Board (JAMB)	Joint Admissions and Matriculation Board (JAMB)		International Labour Organisation (ILO)	Broadband Implementation Steering Committee (BISC		Coursera	Other active NGOs in Nigeria
Public Service Institute of Nigeria (PSIN)	Nigeria Communication Commission (NCC)		African Development Bank (AfDB)	Small and Medium Enterprises Development Agency (SMEDAN)		Huawei	
Bureau for Public Service Reforms (BPSR)	National Board for Technical Education (NBTE)					The European e-Skills Association	

National Bureau of Statistics (NBS)	Nigeria Governors' Forum (NGF)						
National Directorate of Employments	Galaxy Backbone (GBB)						
Digital Literacy Institute (DLI)	National Assembly						
Digital Literacy Management Office (DLMO))	Broadcasting Organisation of Nigeria						
Digital Literacy Council(DLC)	National Orientation Agency						

References

Anzak, S., & Sultana, A. (2020). Social and economic empowerment of women in the age of digital literacy: A case study of Pakistan, Islamabad- Rawalpindi. Global Social Sciences Review, V(I), 102-111. https://doi.org/10.31703/gssr.2020(V-I).11

Atkinson, R. D., & McKay, A. S. (2007, March). Digital prosperity: Understanding the economic benefits of the information technology revolution. SSRN. https://doi.org/10.2139/ssrn.1004516

Bamidele, I. R., Muoghalu C. Nzube, Nwabudike N. Patricia, Agbaye U. Ignatius, and Omorodion O. Sylveste (2019). Challenges of Adequate Utilization of Digital Technologies among Technology Education Teachers in Federal College of Education (Technical) in South South and South East Geopolitical Zones of Nigeria , International Journal of Educational Innovation and Practice (Ijeip) Volume 1 Issue 1,pg 17-24

Bashir, S., & Miyamoto, K. (2020). Digital skills: Frameworks and programs. World Bank paper. Retrieved from https://documents1.worldbank.org/curated/en/562351611824219616/pdf/Digital-Skills-Frameworks-and-Programs.pdf

Bejaković, P., & Mrnjavac, Ž. (2020). The importance of digital literacy on the labor market. Employee Relations, 42(4), 921-932. https://doi.org/10.1108/ER-07-2019-0274

Chiukpai, A. I., U. P. Akra, and G. S. Robinson. (2023) "Teachers' Utilization of Computer and Internet Facilities for Effective Service Delivery in Secondary Schools in Calabar Education Zone; Cross River State, Nigeria". Asian Journal of Education and Social Studies 49 (4):226-33. https://doi.org/10.9734/ajess/2023/v49i41202.

Chioma, G. N. (2022). Digital financial services and financial inclusion in Nigeria: Milestones and new directions. Central Bank of Nigeria: Economic and Financial Review, 60(40). Retrieved from https://www.cbn.gov.ng/Out/2024/RSD/Digital%20Financial%20Services%20and%20Financial%20Inclusion%20in%20Nigeia,%20Milestones%20and%20New%20Direction.pdf

David-West, O., Adetunji, O., Ajai, O., Aluko, T., Isheyemi, O., Iheanachor, N.,Umukoro, I. (2016). Digital financial services in Nigeria: State of the market report. Lagos Business School. Retrieved from https://www.researchgate.net/profile/OlayinkaDavidWest/publication/311615447_Digital_Financial_Services_in_Nigeria_State_of_the_Market_Report_2016/links/5851188e08aecb6bd8d21d37/Digital-Financial-Services-in-Nigeria-State-of-the-Market-Report-2016.pdf

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. Washington, DC: World Bank.

Doris, D. S. (2023). Forecast population in Nigeria 2025-2050. Statista. Retrieved from https://www.statista.com/statistics/1122955/forecast-population-in-nigeria/

Enhancing Financial Innovation and Access. (2018). EFInA access to financial services in Nigeria 2018 survey. Retrieved from https://efina.org.ng/reports/

Eshet-Alkala, Y. (2004) Digital Literacy: A Conceptual Framework for Survival Skills in the Digital Era, Journal of Educational Multimedia and Hypermedia 13(1),93-106

Fintechnews Africa(2023) Despite Growth and Potential, Fintech Development Faces Challenges in Nigeria, retrieved from https://fintechnews.africa/42741/fintech-nigeria/despite-growth-and-potential-fintech-development-faces-challenges-in-nigeria/#:~:text=As%20of%20August%202023%2C%20fintech,and%20personal%20finance%20(8%25).

Gapski Harald(2007) Reflections on Digital Literacy , Conference: Proceedings of the 3rd International Workshop on Digital Literacy, Digital Literacy 2007, Sissi, Lassithi - Crete Greece

Global Data. (2021). Literacy rate in Nigeria (2010-2021). Retrieved from https://www.globaldata.com/data-insights/macroeconomic/literacy-rate-in-nigeria/

Gomber, P., Koch, J. A., & Siering, M. (2017). Digital Finance and FinTech: current research and future research directions. Journal of Business Economics, 87(5), 537-580. doi:10.1007/s11573-017-0852-x

Hanushek, E. A., Schwerdt, G., Wiederhold, S., & Woessmann, L. (2013). Returns to skills around the world: Evidence from PIAAC. Paris: OECD Education Working Paper.

Hanushek, E., & Wößmann, L. (2012b). The role of cognitive skills in economic development. Journal of Economic Literature, 46(3), 607-668.

Houngbonon, G., Mensah, J., Traore, N (2022) The Impact of Internet Access on Innovation and Entrepreneurship in Africa ,World Bank Policy Research Working Paper 9945

Hufad, A., Purnomo, N. S., & Rahmat, A. (2019). Digital literacy of women as the cadres of community empowerment in rural areas. International Journal of Innovation, Creativity and Change, 9(7), 276-288.

IEEE Standards Association.(2020).Beyond Standards: Building a Framework for National-Level Digital Literacy and Skills, IEEE Working group , retrieved https://standards.ieee.org/beyond-standards/new-standard-will-help-nations-accelerate-digital-literacy-and-digital-skills-building/

International Telecommunications Union Publication (2020) Digital Skills Assessment Guidebook , retrieved https://academy.itu.int/itu-d/projects-activities/research-publications/digital-skills-insights/digital-skills-assessment-guidebook

Juliet, U. (2022). Internet penetration: Why South East remains lowest at 13.7 million users. Punch Newspapers. Retrieved from https://www.vanguardngr.com/2022/03/internet-penetration-why-south-east-remains-lowest-at-13-7-million-users/

Maart, L. (2018). Recommendations on assessment tools for monitoring digital literacy within UNESCO DLGF. Tallinn University, Centre for Educational Technology. Retrieved from https://gaml.uis.unesco.org/wp-content/uploads/sites/2/2018/12/4.4.2_02-Assessment-tools-for-monitoring-digital-literacy.pdf
Martin, A.(2006) Nordic Journal of Digital Literacy , Volume 1 , Number 2 , Pages: 151–161retrieved from https://www.idunn.no/doi/full/10.18261/ISSN1891-943X-2006-02-06,

Martínez-Bravo, M. C., Sádaba Chalezquer, C., & Serrano-Puche, J. (2022). Dimensions of digital literacy in the 21st century competency frameworks. Sustainability, 14(3), 1867. https://doi.org/10.3390/su14031867

Micheal, A. (2023). Despite all efforts, Nigeria is yet to achieve a broadband penetration. rate higher than 48%. Technext. Retrieved from https://technext24.com/2023/08/08/nigeria-internet-broadband-june/

Nancy Law, David Woo, Jimmy de la Torre & Gary Wong. (2018). UNESCO: A global framework of reference on digital literacy skills for indicator 4.4.2 (Ref: UIS/2018/ICT/IP51).

National Cybersecurity Policy Strategy. (2021). Federal Republic of Nigeria policy document. Retrieved from https://cert.gov.ng/ngcert/resources/NATIONAL_CYBERSECURITY_POLICY_AND_STRATEGY_2021.pdf

National Digital Economy Policy 2020-2030. (2019). Federal Government of Nigeria Policy Document. Retrieved from https://ndpc.gov.ng/Files/Policy-National_Digital_Economy_Policy_and_Strategy.pdf

National Digital Learning Policy. (2023). Federal Government of Nigeria Policy Document. Retrieved from https://planipolis.iiep.unesco.org/sites/default/files/ressources/nigeria_national_digital_learning_policy_2023_eng.pdf

National Digital Literacy Framework 2023. (2023). Retrieved from https://nitda.gov.ng/wp-content/uploads/2023/07/Digital-Literacy-Framework.pdf

Nigeria Bureau of Statistics. (2024). Unemployment statistics. Retrieved from https://www.nigerianstat.gov.ng/

Nigeria Communications Commission. (2022). Baseline study on the level of digital skills in Nigeria (Women, Youth, and the Physically Challenged) (RD-1) final report. Retrieved from https://ncc.gov.ng/accessible/documents/1131-baseline-study-on-level-of-digital-skills-on-nigeria-women-youth-and-the-physically-challenged-rd1/file

Nigeria National Broadband Plan 2020-2025. (2020). Federal Republic of Nigeria Policy Document. Retrieved from https://ncc.gov.ng/documents/880-nigerian-national-broadband-plan-2020-2025/file

Oguniran, O.O., Odujobi, O & Afe, O.F. (2016): Teachers Perspectives on Information and Communication Technology Use among Secondary Schools in Ede South Local Government, Osun State, Nigeria. Advances in Multidisciplinary Research Journal. Vol 2, No. 1 Pp 29-40.

Olumuyiwa, O. (2021). Only seven states in Nigeria are implementing reduced Right of Way fees, Techcabal retrieved https://techcabal.com/2021/05/19/right-of-way-telecoms/

Promrub, S., & Sanrattana, W. (2022,). Online program to empower teacher learning to develop students' digital literacy skills. Education Quarterly Reviews, 5(2). Retrieved from SSRN: https://ssrn.com/abstract=4131917

Samuel Okeke & Ugochi Ugwu (2018) , Assessment of Ict Usage Among Secondary School Computer Teachers and Students in Nsukka Education Zone of Enugu State, Nigeria ; Proceeding of the 4th , International Conference on Education, Vol. 4, Issue 2, 2018, pp. 46-53 DOI: https://doi.org/10.17501/24246700.2018.4206.

Statcounter. (2023). Global stats: Desktop vs mobile vs tablet market share in Nigeria - March 2024. Retrieved from https://gs.statcounter.com/platform-market-share/desktop-mobile-tablet/nigeria

Torsten Wezel & Jack J Ree (2023). Nigeria—Fostering Financial Inclusion through Digital Financial Services ; International Monetary Fund (IMF) Selected Issues Paper

The People's House. (2023). Legislative agenda of the 10th House of Representatives Nigeria 2023-2027. Retrieved from https://officeofthespeaker.ng/front-assets/downloads/House-Revised-Legislative-Agenda-10th-assembly.pdf

World Bank (2021) Demand for Digital Skills in Sub-Saharan Africa Key Findings from a Five-Country Study: Côte d'Ivoire, Kenya, Mozambique,Nigeria, and Rwanda , World Bank Study retrieved https://documents1.worldbank.org/curated/en/099614312152318607/pdf/IDU0b36e9e030767f0417e0afb806e2ffdf1e8bf.pdf

World Bank (2021) Nigeria Business Development Update(2021) : Business Unusual, World Bank Report retrieved https://documents1.worldbank.org/curated/en/099545011232116970/pdf/P1778200813d1605e0b361074dc50d90cd3.pdf