

**DIGITAL DIVIDE AND ECONOMIC PARTICIPATION IN NIGERIA:
CHALLENGES IN RELATION TO SUSTAINABLE DEVELOPMENT GOALS AND
BUILDING A RESILIENT NATIONAL ECONOMY**

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Abstract

In Nigeria, the digital divide is a major challenge to inclusive economic development and sustainable development. While the penetration of broadband marginally touched 50.58 - 51.97 per cent by the end of 2025, severe inequalities in access, competencies and consequent outcomes still persist across the urban-rural, gender and socio-economic divide. This study examines how such inequities limit the engagement in important economic opportunities such as employment, entrepreneurship, e-commerce and fintech, and impede their progress in meeting Sustainable Development Goals 8, 9 and 10. By striking the balance of applying Sen's Capability Approach in concert with Rogers' Diffusion of Innovations Theory, the paper examines the current state of statistics and policy frameworks, including the National Digital Economy Policy and Strategy (NDEPS) 2020 - 2030 and Three Million Technical Talent (3MTT) programme, and assessing problems related to implementation. Results highlight the threats to economic resilience along with nation building efforts. The study concludes by proposing policy recommendations that calls for increased investment in infrastructure, a different approach in digital literacy and the development of multi-stakeholders' partnerships for an inclusive digital transformation.

Keywords: *Economic participation, Digital divide, Sustainable development goals, Digital inclusion, Nation-building, Nigeria*

I. Introduction

Nigeria's path to digital transformation stands at the heart of the nation's overall shift in its plans towards the agenda of governance reforms, policy innovations and inclusive nation-building. Recent empirical evidence suggests measurable improvements in the growth of connectivity subnet connections: internet coverage went over 50 per cent for the first time in late 2025, followed by a subsequent rise of broadband subscription to no less than 109 to 112 million subscribers. Broadband penetration grew from 50.58% to about 51.97% 2025, November and December respectively (Nigerian Communications Commission [NCC], 2025, 2026). Concurrently, data consumption faced a massive boost of data surpassing 13.2 thousand million terabytes data in 2025 which in turn reflects a deeper engagement with digital platforms by connected users (NCC, 2025).

Notwithstanding these gains, Nigeria still has less than 70% penetration rate below the target of 70% penetration set out in the National Broadband Plan phase 2, 2020-2025. Over one hundred million Nigerians are still either offline or under connected, but this has a disproportionate impact on rural communities, as well as on women, and low-income masses (DataReportal, 2025; NCC, 2025). For many citizens, the obstacles to digital inclusion are not only issues of network availability, but also include high costs of devices, high-cost data Plans, unreliable electricity supply, and digital illiteracy.

The Nigerian digital divide may be conceptualised in three interrelated dimensions. The first dimension is related to physical access to digital infrastructure - devices, broadband, and stable connectivity. The second dimension relates to digital skills and the ability to use technology in a useful and safe way. The third dimension focuses on outcomes, that is whether people can turn access and skills into concrete socio-economic benefits (e.g. employment, entrepreneurship, ability to access digital finance, ability to access government services, etc.). Digital inclusion has come to be associated more with economic growth and productivity. As the World Bank (2019) notes, digital technologies are an important catalysing factor in fostering innovation, enlarging markets and boosting national competitiveness. When large sectors of the population are shut out from involvement in the digital world, economic resiliency is compromised and levels of inequality increase.

Consequently, this paper examines the effects of the digital divide in Nigeria on economic participation and its implication on the realization of Sustainable Development Goals (SDGs) and its wider implications for economic resilience and nation building. Combining new data and policy analysis, it makes concrete and context reliant recommendations.

I. Conceptual and Theoretical Framework

Understanding the digital divide in Nigeria calls for conceptual transparency and good theoretical backbone. The term digital divide is not used only to refer solely to digital divides in access to internet, but rather to structured inequalities in access to, use of and benefits derived from information and communication technologies (ICTs). As Van Dijk (2020) explains, the divide operates on three areas that are interrelated, namely; the first level divide (physical access to devices and connectivity), the second-level divide (digital skills and patterns of usage), and the third-level divide (the tangible social and economic outcomes generated through digital engagement).

In the Nigerian context, these three levels can be seen as visible and reinforcing each other. While the growth in broadband infrastructure across the country has resulted in improvements in penetration rates (Nigerian Communications Commission [NCC], 2025) at the national level, gaps still exist across different urban and rural areas of the country, as well as between males and females, and between high and low-income households (DataReportal, 2025). The divide thus represents structural inequality rather than being a technical one of just being behind in terms of new technology.

1. Conceptualising the Three Levels of the Digital Divide

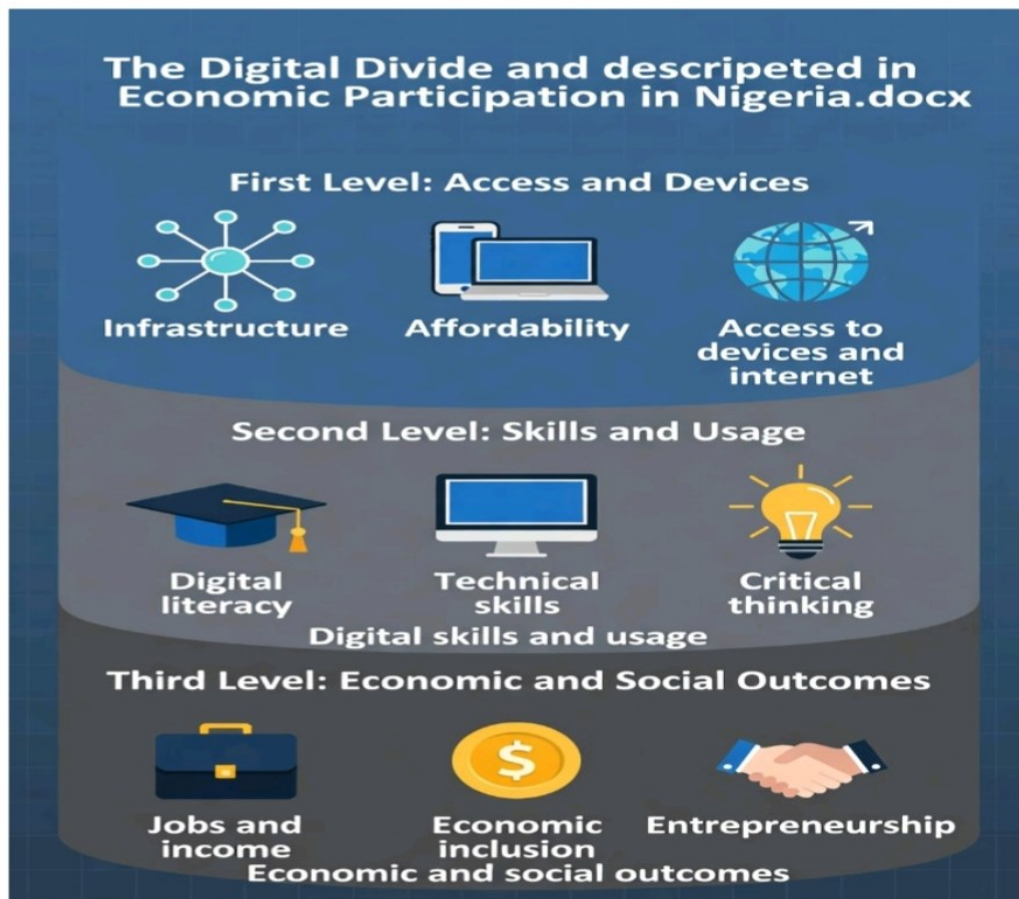
The divide in terms of infrastructure and affordability is the first level divide. Even where there is network coverage, affordability of smartphones, computers and data subscriptions is a significant barrier. According to the International Telecommunication Union (ITU, 2023), affordability is one of the main factors in determining the uptake of broadband in the

developing economies. In Nigeria, the burden of high inflations and income disparities is adding to this challenge, as it restricts the participation in the digital arena within vulnerable populations.

The second level divide is around skills and the digital literacy. Access does not in any way guarantee meaningful use. Individuals need to have functional literacy, digital navigation skills, cybersecurity awareness and skills for a critical evaluation of information. UNESCO (2021) goes on to stress that digital literacy is fundamental to inclusive knowledge societies. In Nigeria, disparities in the quality of education and poor blending of ICT training in schools contribute to second-level inequalities.

The third level of divide is with respect to outcomes and benefits. This level is one that asks whether, in the case of individuals, digital access can be translated into better income, productivity, job, or social mobility. The World Bank (2019, in particular) maintains that digital technologies are only contributing to inclusive growth if done in line with human capital and the quality of institutions. In Nigeria, there are many users who are mostly in entertainment and social networking rather than a productive and digital entrepreneurship and/or high-value economic activities, which is a persistent outcome gap.

Fig. 1: Levels of the Digital Divide



This is a layered structure that clearly shows that solving infrastructural deficit alone will not end digital inequality.

2. Sen's Capability Approach

The Capability Approach as conceptualised by Amartya Sen in 1999 offers a strong theoretical perspective that allows the relationship between digital inclusion and development to be understood. Sen conceptualises development as the growth in the capabilities of individuals - the actual freedoms they have to realise valued "functioning": in education, employment, health and civic participation, for instance. Within the Nigerian digital context, access to ICTs is considered an important avenue for providing boosts to these capacities. Learning and skill acquisition, e-commerce and digital entrepreneurship, mobile financial services, political discourse and governance are all made possible through digital technologies.

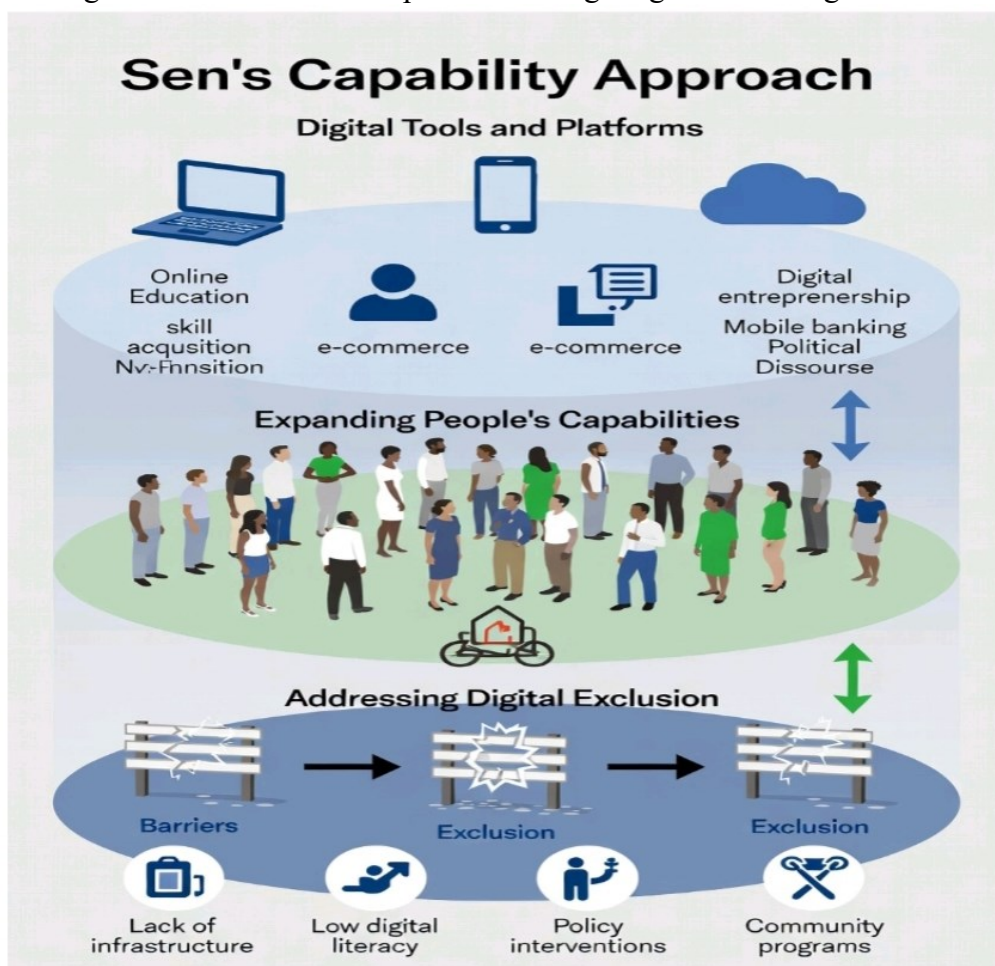


Figure 2: Sen's Capability Approach

The persistent digital exclusion means that one finds the evidence of restricted access to economic, social, etc. opportunities. Rural farmers lacking connectivity cannot access agricultural online platforms, while unskilled graduates have a hard time in technology-driven labour markets. Furthermore, even where penetration at the national level goes up, the lack of equal access between different areas and genders means that the development is not inclusive (International Telecommunication Union, 2023). Drawing from the work of Amartya Sen and his Capability Approach, digital inclusion, therefore, is a technological and a social justice concern and the key to equitable growth as well as meaningful inclusion.

3. Diffusion of Innovations Theory

Everett Rogers Diffusion of Innovations Theory is a good framework for understanding how digital technologies spread through society over time (Rogers, 2003). Rogers proposes that five factors are key to adoption, which include relative advantage, compatibility, complexity, trialability and observability. In Nigeria, digital tools like mobile banking have definite and great relative advantage in reducing transaction costs and driving financial inclusion. However, high data prices, unreliable electricity, language barriers and a lack of digital literacy make it more complex and incompatible for the marginalised. It is also observed that diffusion still happens unevenly among social groups: urban youth in cities such as Lagos and Abuja often become earlier adopters, while many populations in rural areas are considered late adopters and this shows a state of infrastructural and socio-economic constraints (Rogers, 2003).

4. Connecting Digital Inclusion with Human Capital and Economic Resilience

Digital inclusion has a strong link to human capital development and economic resilience. Human capital theory contends that when countries invest in education and digital skills, there will be improvement in productivity and growth in the long-term. The World Bank (2019) notes that where digital transformation is supported by strong institutions and skilled populations, it only leads to GDP growth. In Nigeria, being digitally competent is now a mandate for work in the fields of fintech, e-commerce, agritech and creative industries. However, there are second- and third-level digital divides, which refer to gaps in both skills and benefits from technology, which prevent people from actually participating. These risks concentrating the gains of the digital economy to already advantaged groups of people.

Digital systems can also enhance the resilience. During crises like pandemics or supply chains, digitally intimate economies keep up activities by working remotely, paying electronically and accessing online services (World Bank, 2019). In the case of the Nigerian economy, inclusive digital infrastructure offers many benefits, including improved good governance, financial inclusion, youth employment, and global competitiveness.

The integration of new information is theoretically deepened by this. In layered inequalities of access, skills, and outcomes, Jan van Dijk (2020); in the need for technology to enlarge real freedoms Amartya Sen (1999); and the uneven adoption of technologies Everett Rogers (2003) process. Together, they demonstrate the need for achieving sustainable growth through infrastructure, skills and inclusive diffusion development go hand in hand (International Telecommunication Union, 2023; and UNESCO, 2021).

III. Literature Review

Global scholarship has time and again shown that the digital divide strengthens and deepens existing socio-economic divides. According to the World Bank (2019) digital technologies can boost the productivity and innovation of people and communities, as well as combating inequality, - but only where access is widespread, and complemented by other investments in skills and institutions. Similarly, in the International Telecommunication Union 2025, it is reported that large disparities still exist between high income and low-income regions in terms of the penetration of the internet and meaningful digital use. Sub-Saharan Africa is by far the world's least-connected area with Internet usage hovering around 38-40% in 2024 although, by far, Nigeria society is slightly above regional average.

Within Africa, structural constraints like expensive data costs, lack of rural broadband infrastructure, unavailability of electricity and low level of digital literacy have made it difficult to achieve inclusive connectivity. Even where the national averages improve, disaggregated data indicate sharp urban-rural and gender disparities (ITU, 2025). This makes it seem that statistics on penetration, reported in headlining, often conceal deep internal inequalities.

In relation to Nigeria, empirical studies underscore the implications of the digital divide in terms of jobs, micro, small and medium-scale enterprises (MSEs), agriculture and education. When it came to the most recent pandemic, the sudden transition to online learning and working showed that there were devastating connectivity and device gaps. Oyedemi and Fombad (2021) found that rural students were excluded disproportionately from e-learning as a result of lack of devices, poor broadband infrastructure, and the high cost of data. Similarly, many people employed in the informal sector could not leave to work remotely or on a digital platform, causing more income disparities during the crisis.

Gender-based digital inequality is an additional theme that is prominent in the literature. The GSMA (2025) states the fact that in Sub-Saharan Africa, women are almost 30% less likely than men to use mobile internet. In Nigeria, this gap is affected by affordability issues, low levels of digital literacy and socio-culture limiting women from accessing technology. Such disparities constrain women's access to digital entrepreneurship, online financial services and platforms in the so-called gig economy, and hence propagate larger gender economic inequalities.

Emerging research from Nigeria itself correlates the lack of digital access to declines in productivity in fintech, e-commerce and "platform-based employment" etc. Adepoju and Aigbavboa (2023) opine that the development of digital financial services and online market places has featured in the enhancement of efficiency and access to markets for small businesses especially in urban centres. However, these benefits have been distributed unevenly; with rural entrepreneurs thus often left out because of the problems of connectivity.

Policy oriented literature is another source that has been analysed in relation to national digital strategies. Nigeria's National Digital Economy Policy and Strategy (NDEPS) by the Federal Ministry of Communications and Digital Economy (2019) takes us far in terms of goal setting in broadband- and digital skills, and the growth of the innovation ecosystem. More recently the 3 million Technical Talent (3MTT) programme aims to train millions of Nigerians in the digital skills. While these initiatives reflect good intentions in the policy, there are implementation bottlenecks, slow implementation in rural areas, lack of funds, and coordination gaps, according to scholars, between the federal and state levels.

Despite increased scholarship there are important gaps in. Few new empirical analyses make explicit links between Nigeria's digital divide and progress on the Sustainable Development Goals (SDG) especially in relation to quality education, gender equality, decent work and industry innovation. Additionally, there is scant research on the impact of digital exclusion on long-term economic resiliency going forward in the post-2025 period. It is important to address these gaps aiming to understand the full developmental implication of the digital transformation agenda in Nigeria.

IV. The State of the Nigeria Digital Divide

Nigeria has made some measurable progress in expanding digital connectivity, but some structural divides are still large. According to the Nigerian Communications Commission

(NCC, 2025, 2026), broadband penetration is at a percentage of 50.58% with November as the measurement date and the active subscriptions here equal about 109 million. The penetration got better as well by December 2025 to around 51.97%. Estimations from DataReportal (2025) indicate that total internet users had passed the 140 million marks during the year although effective penetration was around 45-50% earlier in the year.

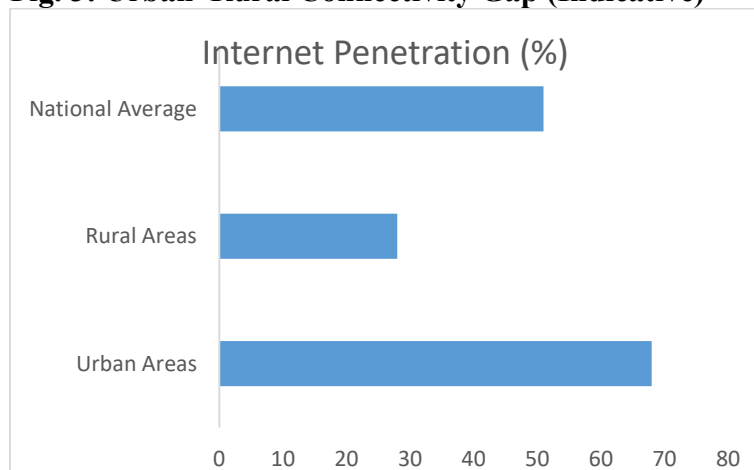
While these figures are sufficient to show the progress made towards the national digital transformation goals, it also shows us that almost half of Nigeria's population has yet to be either offline or under-connected. The national average covers up stark internal variance which exists across geography, gender, income, education and disability status.

1. Urban-Rural Divide

The urban-rural divide is one of the worst aspects of Nigeria's digital divide. Major urban centres like Lagos, Abuja and Port Harcourt enjoy better infrastructure investments, faster broadband speeds and electricity supply. Internet penetration in urban areas regularly surpasses 60-70% levels, as we have more income and infrastructure concentration.

On the other hand, in many rural communities, the penetration rate is less than 30%. Limited fibre availability, poor mobile broadband service coverage and unreliable power supply severely limit access. Private telecommunications companies have often focused on commercially viable markets in urban areas and low-density rural regions are thus not adequately served. As a result, the rural population is left out of the benefits of e-Commerce, digital financial services, telemedicine, and online education platforms.

Fig. 3: Urban–Rural Connectivity Gap (Indicative)



This disparity strengthens regional imbalances in job creation, source of income and educational opportunities.

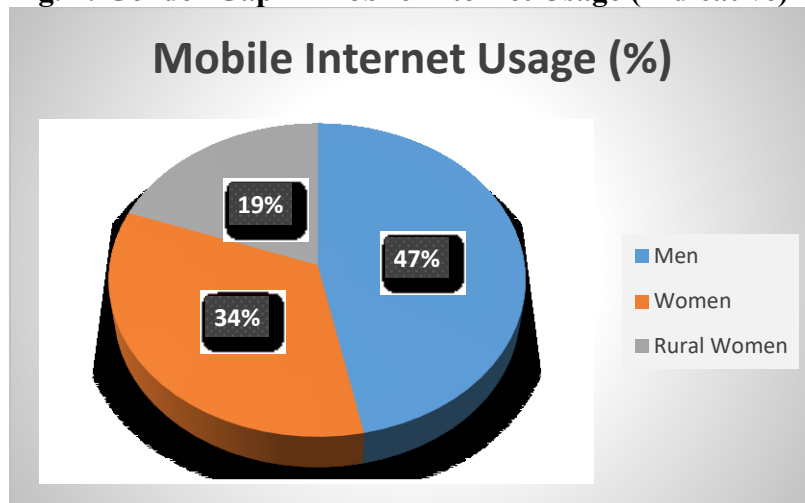
2. Gender Divide

Gender inequality is another important factor of digital exclusion. According to the GSMA (2025) compared to men, women in Nigeria are between 14-30% less likely to use mobile internet. Women make up about 38% of the total number of internet users nationally - with

even larger disparities in rural areas. In some rural community's female mobile internet usage (intent) is as low as 24% compared to substantially higher rates among men.

Barriers that contribute to this divide include having access to affordable services, lower levels of average income among women, low digital literacy, as well as sociocultural norms that limit access to mobile devices for women. In certain households, digital resources are controlled by men and the independent use of those resources by women is restricted. These disparities lead to women's poor engagement in online business, digital finance, and ICT in remote work opportunities.

Fig. 4: Gender Gap in Mobile Internet Usage (Indicative)



The gender divide therefore has an interconnected geographical and income dimension, and consequently further penalizes rural women.

3. Income, Education and Disability

Beyond geography and gender, however, socio-economic status is a strong influence on digital access. Households with higher incomes are more likely to own smart phones and laptops or have a stable internet subscription. Conversely, low-income families commonly have reliance on shared devices and changing internet access due to buying data, preventing online activity on a regular basis.

Education is also a deciding factor. Individuals who have attained secondary or tertiary education are more likely to have digital literacy skills, which will enhance their productive use of technology. Those with limited formal education often experience second-level digital divides - the ability to access but not to squeeze the most out of what is there.

Persons with disabilities are at even more disadvantage with barriers such as inaccessible digital platforms, lack of assistive technologies and attention to inclusive design in the policy. These are challenges that limit participation in education, employment and civic.

4. Structural Barriers

Three systemic constraints rise consistently from study to study:

Affordability: The cost of data is still expensive relative to average income, especially to low-income households.

Electricity shortages: Unreliable power supply makes device connectivity more expensive and compels devices to be switched off.

Low digital literacy: Many users do not have advanced skills needed for entrepreneurship, cyber security awareness, and being able to appear productive.

5. Policy Responses and Remaining Gaps

As a way to address these divides, there have been strategic policy initiatives filed in Nigeria. The National Digital Economy Policy and Strategy (NDEPS), launched by the Federal Ministry of Communications and Digital Economy 2019 sets an ambitious digital target that leads to the creation of a more inclusive and diverse ICT landscape in Ghana. broadband and digital inclusion - including a broad goal of attaining 95% digital literacy by the year 2030

In addition, one initiative hosted by the National Information Technology Development Agency, 3 million Technical Talent (3MTT), with support from the Nigerian Federal Ministry of Science and Technology and the Office of the Presidency, is set to provide digital skills to millions of Nigerians. While these initiatives show a solid policy will, their implementation is uneven and still faces certain above-average challenges especially in rural areas where infrastructure constraints still remain.

Nigeria's digital world touches condemnation of progress and poverty. Expanding access will not, therefore, close the divide unless the issues of affordability, skills development and inclusive design are tackled at the same time.

V. Digital Divide and the Economic Participation in Nigeria

The digital divide in Nigeria is a major limitation on economic participation, especially among the youth, small businesses and rural people. Limited digital skills are contributing to high youth unemployment levels as there is a lack of youth access to online training and digital learning platforms needed for the technology-driven job sectors and remote work (Adepoju & Aigbavboa, 2023). This skills gap limits people's employment options and undermines the development of human capital at the national level. Micro, small and medium-sized enterprise (MSMEs) also have barriers in taking advantage of the developed e-commerce and digital marketing tools, particularly in the rural and informal sectors where infrastructure and training is scarce (Federal Ministry of Communications and Digital Economy, 2019). In the agriculture industry, agricultural digital platforms such as e-extension services and agritech enable finite productivity for connected farmers, but most rural producers are excluded because of the high cost of data use as well as low digital literacy (Oyedemi & Fombad, 2021). Although there is an improvement in financial inclusion as seen in urban areas thanks to fintech services, barriers of access still exist for rural women, and unbanked groups (GSMA, 2025). As a result, digital exclusion restricts income growth, diversification and economic resilience overall (World Bank, 2019).

VI. Implications to Sustainable Development Goals

Digital connectivity is becoming increasingly acknowledged as a vital contributor to the Sustainable Development Goals (SDGs) however the problem of digital divide in Nigeria creates challenges to the attainment of the 2030 Agenda. Inclusiveness, innovation, Anti-poverty, human growth, are the key words of the SDGs, established by the United Nations in 2015: all of them depend on equal access to digital infrastructure and skills.

In terms of SDG 8 (Decent Work and Economic Growth), it is through digital exclusion that opportunities are restricted in their forms of fintech, e-commerce, and remote work, concentrating high growth jobs in urban and socio-economically advantaged locations. This inequality means that inclusive economic participation is destroyed and national productivity negatively impacted (ITU, 2025). SDG 9 (Industry, Innovation and Infrastructure) is similarly affected: gaps in the broadband networks, data centers and digital platforms cause low rates of innovation spread and limit the competitiveness of developing digital industries, especially in rural areas.

The digital Divide also makes disparities that are being targeted by SDG 10 (Reduced Inequalities) worse. Women, rural and low-income people as well as persons with disabilities are significantly hindered from online education, digital financial services and entrepreneurial ecosystems, causing socio-economic disparities (ITU, 2025). Indirectly, the phenomenon of digital exclusion impedes on SDG 1 (Poverty Reduction), SDG 4 (Quality Education), and SDG 5 (Gender Equality) with respect to access to income-generating platforms, online learning courses, and economic empowerment of women.

Overall, literature highlights the premise that digital technologies are of fundamental importance to sustainable development. Inclusive digital transformation is vital to the development of the SDGs in Nigeria because of the persistent gaps in connectivity, which may cause the economic resilience, human capability development, and broader nation-building goals to stall (United Nations, 2015; ITU, 2025).

VII. The Digital Divide and Threat to Economic Resilience and Nation Building

Recent scholarship makes digital inclusion one of the main pillars of economic resilience in an era characterised by global volatility, commodity dependence, inflationary processes and post-pandemic recovery issues. In Nigeria, continuing digital exclusion contributes to the problem of increased vulnerability as it affects the right to remotely employment provision, access to digital finance, market information, and early warning systems (International Telecommunication Union [ITU], 2025). As per the World Bank (2019), economically and together digitally connected economies respond better to shocks because of the range of income avenues and continuity of income through technology.

Beyond economics, the gulf grows ever deeper social marginalisation, in Nigeria's plural and multi-ethnic context, and contributes to the deepening inequality and lack of cohesion in the country. Due to the lack of universal availability of e-governance platforms, the scope of civic participation and institutional transparency also limits the inclusive objectives of nation building in consonance with the United Nations (2015) governance framework.

VIII. Policy Innovations and Recommendations and the Way Forward

Nigeria already has some foundational digital economy initiatives in the form of the National Digital Economy Policy and Strategy (NDEPS), the NBP, and the 3 million Technical Talent (3MTT) programme. However, meaningful efforts to achieve universal digital inclusion need to approach implementation at speed, focus, and be better coordinated. The following evidence-based recommendations have been suggested:

To bridge the digital divide in Nigeria, last-mile connectivity in rural and underserved regions in Nigeria should be fast-tracked using public-private partnerships, satellite broadband, fixed wireless access, and 5G expansion in peri-urban areas. Affordability can be enhanced through

targeted subsidies or vouchers for low-income households, students, women and persons with disabilities, though digital literacy programmes such as the 3MTT initiative will be spread throughout schools, tertiary educational institutions, NYSC camps and community centres with a gender and youth focus.

Regulatory reforms, including data price caps, transparent wholesale prices and local content requirements can increase the efficiency of the market. Strengthening multi-stakeholder governance through international cooperation, concessional financing, technology transfer and capacity-building will help support SDG 17 goals. Robust monitoring and evaluation frameworks should measure progress in terms of access, skills and outcome, while gender disaggregated and rural-urban reporting for inclusivity must focus on the digital transformation.

IX. Conclusion

Despite great progress - internet coverage reaching well over 50%, and more than 110 million broadband subscriptions by the end of 2025 - Nigeria's digital divide still poses a major structural challenge to inclusive economic growth, equitable participation in the digital economy, and progress towards the attainment of the Sustainable Development Agenda by 2030. Persistent inequalities in access, digital skills and meaningful outcomes continue to exclude large segments of the population, particularly rural dwellers, women and the low-income groups, and this excludes individual capabilities, and widens socio-economic gaps further weakening the national economic resilience of the population in an increasingly digital global landscape.

Closing this divide is not only a challenge of expansiveness of infrastructure but a precondition to the development of inclusive, adaptive and cohesive Nigerian society. By wisely and meaningfully implementing the recommendations suggested and capitalizing on the already installed policy frameworks (NDEPS, 3MTT, National Broadband Plan), Nigeria can revolutionize digital technologies from tools of exclusion to useful enablers of opportunity, innovation, financial inclusion, quality education, gender Equity and Civic Engagement. Urgent, sustained and concerted action is critical to unlocking the digital potential to bring about broad-based prosperity and resilience in the face of long-term nationalism.

Limitations and Suggestions for Future Research

This study is a secondary data collection work based on several different sources such as NCC, ITU and GSMA, and the World Bank, which is limited by the fact that in several areas the main data gap, mainly rural and peri-urban areas and the national level figures conceals the intra-regional and demographic disparity. Future studies should be conducted on large-scale primary surveys, longitudinal assessments of programmes such as 3MTT; comparative African studies; and gender- and intersectionality-based studies for policy formulation for the digital inclusion of specific contexts.

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