

NIGERIA'S ICT AND DIGITAL AGE ECONOMIC SUSTAINABILITY

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Abstract

A major factor in economic sustainability, Nigeria's extraordinary information and communication technology (ICT) journey spans decades, particularly as the country commemorates its Republic at Sixty. This essay gives a summary of Nigeria's ICT development, emphasizing how important technology is to long-term economic growth. We examine how blockchain, artificial intelligence, and the Internet of Things (IoT) might be used to uncover amazing opportunities in the future. We emphasize how important it is to reduce the technology difference, bridge the urban-rural split, and achieve digital inclusivity as Nigeria celebrates its 60th anniversary. As Nigeria looks toward long-term economic development in this digital age, we plan to demonstrate the priceless opportunities of ICT for decision-makers, corporate executives, and educational institutions. In particular, we see a dynamic environment where emerging technologies will boost economic growth, reinvent industries, and improve everyone's quality of life in Nigeria. This paper recommends sustained investment in digital infrastructure, expansion of broadband access to rural communities, strengthening of cybersecurity frameworks, and deliberate capacity building in artificial intelligence, blockchain, and emerging technologies. It further advocates stronger collaboration between government, academia, and the private sector to ensure inclusive digital participation and long-term economic sustainability.

Keywords: Nigeria ICT, Digital Inclusivity, Economic Sustainability, Emerging Technologies

Introduction

Nigeria's ICT journey has been marked by tremendous transformation, demonstrating the country's adaptability and dedication to the digital age (David & Omolola, 2015; Benedicta & Lacheheb, 2022). Telecommunications services were once made a luxury that only a few could afford due to problems including poor infrastructure and access limitations. The liberalization of the telecom sector in 2001, which allowed private companies to enter the market, was a major turning point (Enahoro & Olawade, 2021). Private firms including MTN, Glo, Airtel, and Etisalat (formerly 9mobile) entered the Nigerian telecom sector as a result of the liberalization program. Since it has turned the monopolistic Nigerian telecom sector into a competitive market, it has been hailed as one of the country's most successful economic reforms. This pivotal moment has a significant influence on Nigeria's ICT journey and notably opens the door for advancement in the ICT revolution.

With a focus on innovation, digital inclusivity, and the creation of local content, the National ICT Policy, which was revealed in 2001 (Diso, 2005; Olatokun, 2006), offered a systematic framework for ICT growth. Nigeria's ICT strategy has been

shaped by this policy, which also ensures that technology will always be at the core of the nation's economic development. Technological companies like Andela, Flutterwave, and Paystack have emerged, demonstrating Nigerian entrepreneurs' capacity to compete globally while promoting innovation and economic growth. These businesses have not only drawn large sums of money from domestic and international investors, but they have also given thousands of young Nigerians access to highly skilled jobs. Furthermore, more companies are now thriving in the nation thanks to the government's dedication to fostering digital literacy and offering infrastructure support. Nigeria is in a good position to continue developing its technology and promoting sustainable economic growth since it has a solid ICT strategy in place.

Government initiatives, particularly those of the Nigerian Content Promotion and Development Board (NCPDB) and the National Information Technology Development Agency (NITDA), have traditionally actively promoted the production of jobs, innovation, and indigenous content. Even if they still persist, problems including inadequate ICT infrastructure in rural areas and cybersecurity concerns are being addressed by various World Bank intervention programs, among others (Mbanaso, Kulugh, Musa, & Aimufua, 2019). Nigeria's integration into the global digital economy, demonstrated by its companies' involvement in trade, outsourcing, and alliances with top IT companies worldwide, is another significant achievement. Nigeria's ICT journey demonstrates the nation's commitment to sustained economic growth in the digital age as it marks its 60th anniversary of liberty. Nigeria looks forward to a period when new technology will improve everyone's quality of life, speed up economic growth, and alter industries.

Early Internet Adoption And Policy Initiatives

There have been obstacles in Nigeria's way of widespread ICT adoption. Less than 16% of the nation's population used the internet in 2012, indicating a sizable digital gap (Agwu & Carter, 2014; Inegbedion, 2021). At the time, the average download speed was only 1.38 Mbps, which was far less than the 10.1 Mbps seen in the US. Notwithstanding these obstacles, Nigeria's government acknowledged the revolutionary potential of ICT and implemented calculated measures to close the digital divide. Nigeria's ICT growth began in March 2001 with the approval of the National Information Technology Policy (Ibem, Aduwo & Afolabi, 2021).

Nigeria's standing as a major force in the African ICT scene was further cemented with the creation of the National Information Technology Development Agency. Nigeria has used ICT as a driver of international competitiveness and sustainable development for the past 15 years. The nation set out to become a knowledge-based, globally competitive society while incorporating ICT into all facets of its socioeconomic growth.

Nigeria's efforts to close the digital divide and promote digital literacy among its citizens demonstrate its commitment to ICT development. To enable widespread access to technology and internet connectivity, the government has implemented a

number of policies, such as the establishment of ICT training facilities and the installation of broadband infrastructure. In addition to giving people and companies more authority, these laws have made Nigeria a hub for technological advancement and innovation in Africa (Gómez, Many, & Fransen, 2023).

The Role Of Mobile Communication

A key factor in Nigeria's ICT development has been mobile communication. 166.6 million people, or an astounding 83% of the population, had active mobile phone subscriptions in 2013 (Forenbacher, Husnjak, Cvitić, & Jovović, 2019). This quick uptake of mobile technology demonstrated the enormous potential of ICT to change society. ICT had the potential to improve the economic and social standing of its population and lower poverty rates in addition to facilitating communication (Onyema, 2019). Furthermore, Nigeria's widespread use of mobile phones has opened up opportunities for entrepreneurship and financial inclusion. People living in remote areas may now save, invest, and actively participate in the formal economy thanks to mobile banking services, which have made financial inclusion easier. Additionally, the availability of mobile internet has made it easier for small businesses to reach a wider audience and grow their operations, which has promoted economic growth and the creation of job possibilities (Jonathan & Escobar, 2010).

National Digital Economy Policy And Strategy

Nigeria witnessed a total metamorphosis in 2020 in addition to welcoming the digital age. In addition to being a policy document, the National Digital Economy Policy and Strategy (NDEPS) (Lamid, Ibrahim, Abdullahi, & Abdullahi, 2021) was a clear declaration of intent. Nigeria stated its goal to not only engage in the digital world but also to succeed and establish itself as a leader, trailblazer, and advocate in the global digital ecosystem. Nigeria joined the NDEPS adoption process with the intention of transforming its economy and becoming a major player in the global digital market. Enhancing digital infrastructure, increasing digital literacy, and fostering innovation and entrepreneurship in the country are the main objectives of this plan.

Nigeria is committed to using technology for both economic and societal improvement, as evidenced by its embrace of the digital revolution. This courageous action demonstrates to the world Nigeria's digital skills and aspirations.

The implementation of the NDEPS has significantly improved Nigeria's digital infrastructure, which is essential. High-speed internet access is now guaranteed even in remote areas thanks to significant government investments in the development of broadband infrastructure. In addition to reducing the disparity in access to digital technologies throughout the nation, this move made Nigeria a hub for digital innovation and commerce. Businesses of all sizes were able to use technology to enter unexplored areas, streamline operations, and promote economic growth by putting in place a robust digital foundation.

Young Nigerians are actively creating the digital future rather than just interacting with it because to NDEPS's vibrant network of companies, incubators, and

accelerators, where aspirational ideas are turned into real results (Lamid, Ibrahim, Abdullahi, & Abdullahi, 2021).

The Role of ICT in Economic Sustainability

The Nigerian context amply illustrates the importance of information and communication technology (ICT) in promoting economic growth and development. The importance of the informal sector on Nigeria's GDP has often been overlooked, despite the fact that the country's official sector has solid data to support its operations. The rapid adoption of digital technology and the rise in internet and telecom users amply illustrate the importance of ICT in fostering economic sustainability, especially in the unorganized sector. People in the informal sector can expand their clientele and improve their businesses with the growing availability of digital technologies. This contributes to the general growth of the Nigerian economy in addition to increasing their productivity and financial benefit.

Additionally, the informal sector's use of information and communication technology (ICT) promotes economic stability by facilitating improved transparency and efficacy in business operations, which attracts more investments. Therefore, in order to guarantee sustained economic growth in Nigeria, it is essential to recognize and leverage ICT's potential in the unorganized sector. Furthermore, integrating digital technology into the disjointed economy could reduce poverty and create job possibilities. The demand for qualified experts who can efficiently run and maintain these technologies is rising as more people and businesses in the unorganized sector utilize ICT tools. This creates employment opportunities for the native population, especially for the younger age, who often suffers a disproportionate amount of unemployment. The informal sector can promote social inclusion and economic empowerment by providing people with access to digital technology, which could lift people out of poverty and improve their general well-being. Additionally, ICT use can increase the informal sector's overall effectiveness and competitiveness. Businesses may streamline operations, automate procedures, and cut costs by utilizing digital tools. This makes it possible for them to offer goods and services at more affordable prices, which draws in more customers and increases their market share. Additionally, the use of digital platforms and online marketplaces makes it easier for businesses in the unorganized sector to connect with a wider range of clients both domestically and internationally.

This offers new opportunities for development and expansion, allowing organizations to grow and become more sustainable over time. Nigeria, a country with a sizable population, has consistently witnessed ICT accounting for approximately 10% of its GDP. The Nigerian Communications Commission (NCC) Executive Vice Chairman Prof. Umaru Garba Danbatta reports that the telecom sector's contribution to the GDP of the nation reached \$70 billion in 2017 and has been continuously rising since. In 2018, ICT's share of Nigeria's GDP rose to 10.5%, indicating steady progress. The steadily increasing share of ICT in Nigeria's GDP shows how important the sector is becoming to the country's economy. ICT services are becoming more and more

necessary as a result of organizations' increasing digitization and embrace of technology. This not only boosts economic growth but also creates job opportunities and encourages innovation in the country. As long as the right infrastructure and laws are put in place, Nigeria has the potential to use ICT to promote future economic growth. The rise of e-commerce platforms in Nigeria, for example, has significantly increased the contribution of information and communication technology (ICT) to the GDP of the nation. Nigerians' buying habits have been drastically changed by the rise of online retail behemoths like Jumia and Konga, which has led to a noticeable increase in both consumption and economic activity.

Additionally, the growth of mobile banking services has made financial transactions more accessible and convenient for Nigerians, which has fueled the country's information and communication technology (ICT) improvement. Also, to supporting the economy, ICT has been essential in fostering unity and friendship among various tribes, which has made it easier for people to work in the unorganized sector even in the face of sporadic crises. ICT has also united the unorganized sector, encouraging trade, trust, and dedication among various communities, much how football may cross barriers. Through the use of social media and digital platforms, members of various tribes in Nigeria have been able to communicate and share ideas, thereby breaking down long-standing cultural barriers. This has not only improved connections but also encouraged cooperation and innovation in the unorganized sector. Additionally, the ease of communication made possible by ICT has promoted quick mobilization and responsiveness during emergencies, guaranteeing the informal sector's activity and resilience in the face of hardship. In conclusion, Nigeria's socioeconomic development has been greatly aided by the influence of information and communication technology (ICT) on the unity and participation of the unorganized sector.

Case Studies Of Successful Ict-Driven Economic Initiatives

One notable effect of ICT on trade is its influence. ICT applications like Facebook and WhatsApp are currently being used as a new way to do business in the unorganized sector. In addition to providing financial opportunities for a number of Nigerians, these platforms have served as online marketplaces for merchants who might not have the funds to rent physical space. Many business owners and households have responded favorably to the introduction of digital trading (Ukwuoma, 2019). In Nigeria, the digitization of trade has not only made households and company owners happier, but it has also sparked economic growth and advancement.

For example, Kenya's economy has undergone a substantial transformation since the introduction of the mobile payment platform M-Pesa, which allows users to effortlessly send and receive money, pay off debts, and access financial services via their mobile devices. This has significantly aided the nation's economic development and made it easier for the previously unbanked population to integrate into the financial system. Another noteworthy case study is Estonia, which is well-known for

successfully implementing digital services and e-governance. As a result, the digital economy is booming and attracting foreign investment. These instances highlight the enormous potential of ICT-driven projects to advance economic development and create opportunities for people and businesses.

There are several ICT initiatives in Nigeria that can be used as case studies and success stories. The quick growth of Lagos' technology industry, which has drawn significant foreign investment inflows, is a prime example of this phenomena. Another noteworthy example is Nigeria's entertainment industry, which has experienced tremendous expansion in recent years due to the increased usage of ICT. These opportunities have given Nigerian youth the chance to apply their knowledge and abilities to create innovative solutions that successfully address regional issues. As a result, the entertainment industry in Nigeria has grown to be a significant driver of the national economy. It is evident from analyzing the opportunities for social media influencers and content producers that Nigeria's entertainment In the upcoming years, industry will continue to thrive and expand. Among the well-known individuals in the entertainment industry are Mr. Macaroni, Broda Shaggi, Mark Angel, and Taaooma. Millions of Nigerians have responded favorably to their funny skits and relatable content, which has led to a loyal following and lucrative sponsorship deals. Furthermore, the rise of streaming services like Netflix and YouTube has given Nigerian music and movies a global audience, which has accelerated the growth of the sector. Nigeria's entertainment industry is in a strong position to see even more success in the years to come, thanks to the government's continuous investments in infrastructural development, the increasing accessibility of cellphones, and Internet connectivity.

Furthermore, the success of Nigeria's entertainment industry has been significantly impacted by the emergence of social media. Through direct communication between artists, content producers, and their fans, social media sites like Instagram, Twitter, and TikTok have made it possible for them to share their work and forge their own identities. In addition to helping artists gain more fame, this direct interaction has allowed them to get important feedback and suggestions from their audience. As a result, Nigerian artists have been able to adapt their material to better suit the preferences and interests of their audience, which has helped the industry grow.

Payment platforms in Nigeria made possible by ICT advancements are a significant case because they have revolutionized the banking industry's many problems. Technological innovations such as Flutterwave, Opay, and palmpay have significantly contributed to the development of the banking sector by increasing transaction accessibility and convenience. These payment methods have not only made it easier for people to send money, but they have also made it easier for small businesses and entrepreneurs to develop and succeed. Easy online transactions made possible by the rise of e-commerce in Nigeria have contributed to the growth of the digital economy. Also, the availability of dependable and efficient payment methods

has drawn in foreign capital, which has led to a notable surge in the amount of money entering the Nigerian banking sector.

In general, Nigeria's financial industry has developed and advanced greatly because to the expansion of ICT advancements in payment systems. An example of this was the cash scarcity that preceded the 2023 Nigerian election, which made it difficult for many Nigerians to access their money and conduct financial transactions. Because they provided a different way for people to easily access their money and carry out financial transactions, the payment platforms had a significant impact at this time.

The advancement and expansion of Nigeria's financial sector have been greatly aided by the inflow of capital into the banking sector as a result of advancements in information and communication technology (ICT). Increased capital has made it easier for banks to expand and modernize their infrastructure, which has improved services and increased financial inclusion. Additionally, the development of digital banking has been made possible by advancements in information and communication technology (ICT), which have made it easier for businesses and consumers to access financial services remotely. ICT is without a doubt essential to Nigeria's financial sector, greatly fostering innovation and advancing the industry's development.

Students of all ages now have much more access to learning opportunities thanks to the incredible advancements in education brought about by ICT. The development of online learning environments and the use of digital resources have been made possible by these technological advancements, enabling students to participate in virtual classrooms and easily access learning materials from anywhere in the nation. This has significantly helped students in isolated locations who previously had little access to high-quality education. Additionally, the use of ICT in the classroom has made learning more engaging and dynamic, which has helped students develop their critical thinking and problem-solving skills. ICT has played a significant role in Nigeria's educational transformation, creating new avenues for knowledge acquisition.

The use of online learning platforms is a prime example of how ICT integration has changed education in Nigeria. These platforms give students access to a wide range of educational materials, including practice questions, e-books, and interactive films. Students can engage in self-guided learning and learn at their own pace, giving them the chance to have individualized educational experiences. By enabling students to engage in peer-to-peer collaborative activities and get rapid feedback from teachers, virtual classrooms significantly enhance learning outcomes. ICT has been widely successful in several sectors of Nigeria's economy. The transportation and healthcare industries are two more examples. In the healthcare industry, ICT has drastically changed how medical services are delivered. Through video chats, telemedicine helps people in remote areas interact virtually with physicians and specialists, overcoming geographic barriers and improving access to high-quality healthcare. Electronic medical records have also improved the way

patient data is organized, making it easier for medical staff to monitor and examine data for better diagnosis and care.

By utilizing GPS-enabled devices and applications, ICT has greatly increased efficiency and safety in the transportation sector. These advanced devices and apps, such as Google Maps, help to monitor and regulate automotive traffic, providing direction to reduce gridlock and prevent collisions. Additionally, the emergence of online platforms for ride-sharing and taxi services like Uber, Bolt, and others has greatly improved accessibility and convenience of commuting, increasing the effectiveness of transportation networks accordingly.

ICT Challenges and Future Directions

Nigeria's ICT industry has made remarkable strides, yet challenges remain. The problems include a lack of skilled ICT professionals, inadequate funding for research and development, and inadequate infrastructure development progress. The adoption and use of information and communication technology (ICT) are also significantly hampered by the differences in accessibility and technology usage between urban and rural areas. Nevertheless, the Nigerian government has recognized these challenges and is working to address them by enacting legislation that promotes investment in ICT infrastructure and education. The government is also encouraging partnerships with businesses in the private sector. Nigeria's ICT sector has a bright future as long as these efforts continue to close the gap and fully utilize ICT's potential for economic growth.

Regulatory challenges, different taxation levels, delays in permission processing, and damage to existing infrastructure have all had an impact on the sector's growth. Nevertheless, the Nigerian government has been working hard to overcome these challenges. A favorable climate for the expansion of the information and communication technology (ICT) industry has been created by the government through the implementation of effective permit processing systems, streamlined taxes laws, and regulatory reforms. A reliable and efficient ICT network across the country is also being ensured by efforts to repair and improve the existing infrastructure. Positive effects on the sector's growth and the establishment of a thriving digital economy in Nigeria are expected from these actions.

To guarantee that the workforce has the necessary skills and knowledge to efficiently utilize the potential of information and communication technology, the government has also placed a high priority on promoting digital literacy and skill development. To close the digital access gap and provide people the skills they need to participate in the digital economy, a variety of training programs and initiatives have been implemented. By funding education and training, the government hopes to increase the abilities and skills of its citizens, draw in foreign capital, and create job opportunities in the ICT industry. Nigeria must embrace this all-encompassing strategy for fostering the ICT industry if it hopes to become a regional leader in innovation and technology. Given the growing population and increasing internet coverage, the ICT sector has a huge potential to support social and economic

development. The government's recognition of the transformative potential of ICT in Nigeria is demonstrated by its commitment to addressing the challenges and creating a supportive environment.

Nigeria's ICT industry is well-positioned for a bright future because of ongoing projects like Google's Equiano cable, the 2Africa project, and the GLO 2 underwater cable. Lower internet costs and improved connectivity are anticipated outcomes of these projects. Individual internet access will be improved by these projects, and favorable conditions will be established for enterprises to thrive in the digital economy. Furthermore, the government's focus on developing local technological know-how and encouraging innovation through initiatives like tech centers and incubators strengthens Nigeria's position as a regional powerhouse for technological advancement. The provision of technology products, fiber optics, broadband, satellite communication, cloud services, and digital financial services all present a wealth of potential for investors. In addition to strengthening Nigeria's digital economy, investing in these sectors will draw in foreign investors looking to take advantage of the country's enormous potential. Nigeria is a very attractive market for tech companies because of its large and youthful population, which generates a high demand for innovative technical solutions. The success of these investments will also be increased by the government's commitment to creating a favorable business environment and passing legislation that encourages innovation.

Furthermore, Nigeria's thriving startup ecosystem and strong entrepreneurial culture provide the perfect setting for the expansion and prosperity of digital companies. Prosperous indigenous companies like Jumia, Paystack, and Andela have already emerged in the country, winning praise from all over the world and attracting large investments. In addition to encouraging innovation, this vibrant atmosphere creates job opportunities for the nation's growing population. Likewise, Nigeria's strategic location in Africa makes it a key gateway to the continent's expanding digital market, allowing businesses to expand their operations regionally and reach a larger clientele. In addition to being a wise business move, investing in Nigeria's digital economy advances the nation's economy as a whole.

Conclusion

Nigeria's ICT journey, marked by significant turning points and technological policy improvements, is now regarded as proof of the nation's adaptability and durability in the digital age. A crucial foundation for Nigeria's technical progress was established by the deregulation of the telecom sector and the subsequent creation of the National ICT Policy. The Republic at Sixty is a time of transition that emphasizes how important ICT is to advancing economic sustainability by removing barriers to infrastructure and fostering a competitive market. The rise of prosperous companies and the government's commitment to promoting digital inclusiveness support Nigeria's rise as a major player in the global digital economy.

Looking ahead, Nigeria's Republic at Sixty is a paradigm for a wealthy and technologically advanced future in addition to being a noteworthy historical accomplishment. The nation's efforts to close the digital divide through connection

and infrastructure development demonstrate its commitment to equitable growth. Nigeria is a major player in the global technology market thanks to its booming digital ecosystem, which is typified by local entrepreneurs and international collaborations. With a focus on encouraging innovation, creating job opportunities, and addressing environmental challenges with technology-based solutions, it is evident that there is a strong commitment to sustaining this development while the celebration goes on.

Nigeria sees a time when new technologies would significantly impact economic growth and completely transform industries. The Republic at Sixty is a representation of the country's tenacity, resilience, and steadfast dedication to advancement in the digital era. Because information and communication technology plays such an important role, Nigeria is well-positioned to handle the challenges of the global digital economy and position itself as a leader in Africa's technological revival. The nation is resolute in its pursuit of a prosperous and technologically advanced future as it embarks on the next phase of its digital development, ensuring that the transformative influence of information and communication technology (ICT) will continue to transform Nigeria's economy for many years to come.

Recommendations

In light of Nigeria's evolving ICT landscape and its strategic importance to economic sustainability, the following recommendations are proposed:

1. Expansion of Digital Infrastructure Nationwide

The government must intensify efforts to expand broadband penetration, especially in rural and underserved communities. Although urban areas have experienced considerable ICT growth, many rural regions still lack reliable internet access and digital infrastructure. Bridging this digital divide is essential for inclusive economic participation. Investment in fiber optic networks, community ICT centers, and stable electricity supply should be prioritized to ensure nationwide digital accessibility.

2. Strengthening Digital Literacy and Technical Skills Development

Sustainable economic growth in the digital age requires a skilled workforce. There is a need for structured digital literacy programs across primary, secondary, and tertiary education levels. Emerging technologies such as Artificial Intelligence (AI), Blockchain, Cybersecurity, Data Science, and Internet of Things (IoT) should be embedded into educational curricula. Programs like the 3 Million Technical Talent (3MTT) initiative should be expanded and adequately funded to equip Nigerian youths with globally competitive skills. Continuous professional development for teachers and lecturers is also necessary to ensure effective knowledge transfer.

3. Promotion of Research, Innovation, and Local Content Development

Nigeria must invest more in research and development (R&D) within its higher institutions and technology hubs. Collaboration between universities, research centers, and industry players should be strengthened to develop home-grown technological solutions tailored to Nigeria's unique socio-economic challenges. Government grants, innovation funds, and tax incentives should be provided to

startups and tech entrepreneurs to encourage indigenous innovation and reduce dependence on foreign technologies.

4. Strengthening Cybersecurity and Regulatory Frameworks

As ICT adoption increases, so do cybersecurity risks. There is an urgent need to strengthen national cybersecurity policies, enforce data protection regulations, and promote awareness of digital safety among citizens.

A secure digital environment will enhance trust in online transactions, attract foreign investment, and protect national digital assets. Regulatory bodies must also streamline policies to reduce bureaucratic bottlenecks that hinder ICT sector growth.

5. Sustainable ICT for Environmental and Economic Resilience

Nigeria should leverage ICT solutions to address environmental challenges such as climate change, energy management, and sustainable agriculture. Smart technologies, digital monitoring systems, and renewable-energy-powered ICT infrastructure can contribute to environmental sustainability while boosting economic growth.

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