

Effect of Digital Economy on Nigerian Economy in the 21st Century

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Abstract

The Digital economy in the Nigerian economic development was a transformation from the traditional economic activities to more sophisticated electronic model in the process of economic development where ICT technologies become integrated into more verticals and bedrock of the digital economic development. The features of digital economy include: the digital infrastructure, platforms, digital financial services, entrepreneurship and digital skills. This development has benefited the Nigerian economy in terms of development in digital infrastructure, digital finances, accessibility and affordability as well as creation of a competitive environment for the players, this was not without challenges in the process, such as infrastructural inadequacy, human capital development, lack of defined policy instrument by the government, electricity challenges, and lack of affordable data access due to its cost. The paper recommended that more digital infrastructure should be provided, government should define the rules of the game and digital skills should be enhancing as well as development in the socio-economic activities of the citizens.

Key words: Digital Economy, Technology, Internet, 21st Century and Nigerian economy.

1. Introduction

Nigeria has being an important regional player in West Africa and Africa in general, the country has a population of approximately 230 million and

accounted for about 47% of West African population as well as one of the largest populations of youth in the world of about 70% (NPC, 2025). The country consists of 36 autonomous states under the federal system of government with vast multiethnic and cultural diversity. Nigeria is blessed with an abundance of resources both human and natural. It is Africa's biggest oil exporter and also has the largest natural gas reserves on the continent. Between 2006 and 2016, Nigeria's Gross Domestic Product (GDP) grew at an average rate of 5.7% per year and 7.4% which made the country one of the fastest growing economy in the world. But the economic recession of 2016 lower the growth to -1.5% as a result of declined in international oil price. Nigeria emerged from a recession in 2017, with a growth rate of 0.8%, driven mainly by the oil sector (Bello *et al.*, 2025). Nigeria's economic Growth was higher in 2017 at 1.9%. Agriculture slowed down significantly due to conflict and weather events, non-oil, nonagricultural growth, which remained negative up to the third quarter of 2017 but service primarily ICT became one of the key driver in the economic growth and is expected to hover just above 2% in 2019 and over the medium term (ICT, 2023). The information and communication technology (ICT) was contributed almost 3% and expected to contribute over 5% in 2030 to Nigerian Gross Domestic Product (GDP) due to the improvements in technological advancements like: accessible internet, internet upgrades from generation of wireless technology offering super-fast internet speeds from 3G to 4G and up to 5G, Crypto

Currency Mining, and Cashless economic policy which led to money circulation in an economy (Pantami, 2023). The concept of a digital economy is essentially a new economy stream that brings with it a new momentum. As ICT technologies develop rapidly and become integrated into more verticals, the digital economy is becoming the fastest growing, most innovative and widest-reaching economy. Unleashing the potential of economic development, it drives the transformation of traditional industries, fuels sustainable economic development, improves social management and services, and fosters innovation. It is forecasted that the use of digital skills and technologies could generate \$5tn of additional global economic output by 2026 and it was further revealed that the vast role digital technologies play in economic activity, with more than one-fifth of the world's GDP attributable to digital skills, capital, goods, and services. Nigeria is, no doubt, one of Africa's most promising nations and remains the largest mobile market on the continent. Over the years, the country has witnessed a surge in and growth of e-commerce businesses, an increase in small and large scale enterprise, not to mention a ton of mobile-based services that meet a wide range of needs in terms of socio-economic activities. The digital economy has become a major component of modern economic systems worldwide. With the rapid development of ICT technologies, the digital economy has become one of the fastest-growing and most innovative sectors globally. It facilitates the transformation of traditional industries, stimulates economic growth, improves governance and service delivery, and promotes innovation. Global estimates suggest that digital technologies contribute a significant share of global GDP and continue to expand rapidly. Nigeria remains one of Africa's most promising digital markets and is currently the largest mobile market on the continent. Over the years, the country has witnessed rapid growth in e-commerce platforms, mobile-based services, digital entrepreneurship, and online financial transactions, all of which contribute to socioeconomic development. The Digital Economy for Africa Initiative (DE4A), supported by the World Bank Group (2019) aims to ensure that every African individual, business, and government becomes

digitally enabled by the year 2030. The initiative is guided by five key principles such as Comprehensive Approach: which emphasized that digital economy should adopt an integrated economic system that addresses both supply and demand factors rather than focusing on isolated sectors. Transformative Orientation: Digital transformation should aim for large-scale change rather than incremental improvements. Inclusiveness: The digital economy should provide opportunities for everyone regardless of location or socioeconomic status this was regarded as one the key principle, without this the aim might be defeated of turning around the economy. Home-Grown Solutions: Digital development strategies should be tailored to Nigeria's unique socioeconomic realities and encourage local innovation and entrepreneurship and lastly, the active Collaboration. Digital development requires cooperation among governments, private sectors, and international partners. In recent years Nigeria witnessed a significant surge in digital economy with the projection to generate of \$18.3 billion by the end of 2026 due to the sector contribution to GDP of about 9.2% in 2025, there is a widening gap between the sector potential and its socio-economic impact. The digital economy is facing challenges of structural bottlenecks such broadband penetration deficit, power problem, operational cost, digital skills and unfavorable government policies. Without addressing these challenges, Nigeria risk a digital divide where the growth will be only in the urban while the rest of the areas remains stagnant, this affect the growth of nations economy. The high degree of oil dependence has rendered the Nigerian economy particularly vulnerable to external shocks. For example, between 2013 and 2016, Nigeria experienced declining growth partly associated with sharp oil price fluctuations and exacerbated by disruptions in the Niger Delta region, including pipeline vandalism and militant activities (Mgbemone et al., 2024). More recently, global developments—such as the COVID-19 pandemic, geopolitical tensions involving Russia and Ukraine, and production disagreements among major oil producers—have intensified volatility in the international oil market, thereby heightening macroeconomic uncertainty for oil-dependent

economies such as Nigeria (Garba, 2024). However, this is among many reasons that Nigeria should look inward towards diversifying other sectors of economy such as: Agriculture, Manufacturing, Aviation, Telecommunication and ICT sector of economy in order to boost income generations and employment opportunities to the teeming unemployed youths. It is against this background this research seeks to answer the following research question:

1.2 Research Question

- i. What is the effect of Digital Economy on Nigerian Economy in the 21st Century?

1.3 Objective of the study

The broad objective of the study is to empirically analyze the effect of Digital Economy on Nigerian Economy. And the specific objectives are:

- i. To assess the contribution of Nigerian digital economic development.
- ii. To identify the challenges facing the Nigerian digital economy.
- iii.

1.4 Research Hypothesis

H₀: Digital economy has no significant effect on Nigerian Economy

2. Literature Review/Conceptualization

The concept of the digital economy has evolved with the rapid development of information and communication technologies (ICT). The digital economy refers to economic activities that rely on digital technologies, internet infrastructure, and data to produce, distribute, and consume goods and services. According to Alina (2016), the digital economy encompasses economic activities that are driven by digital platforms, data exchange, and technological innovation, which significantly influence productivity and economic growth. Similarly, Farhadi et al. (2013) argue that ICT development plays a crucial role in improving economic performance by increasing knowledge production, innovation, and technological diffusion. The integration of ICT into economic systems

enables countries to improve efficiency, reduce transaction costs, and enhance competitiveness in global markets. Recent studies also emphasize that emerging technologies such as artificial intelligence (AI), block chain, and the Internet of Things (IoT) are expanding the scope of the digital economy by transforming traditional sectors including agriculture, finance, manufacturing, and education (Agbeyangi et al., 2024). Several scholars have examined the relationship between digitalization and economic development. Aker and Blumenstock (2015) argue that mobile technology and digital platforms have significantly improved economic inclusion in developing countries by providing financial services and market access to underserved populations. Empirical evidence shows that digital technologies stimulate economic growth by facilitating innovation, entrepreneurship, and efficiency in production processes. Digital platforms also reduce information asymmetry and improve market connectivity, which enhances productivity and economic competitiveness. In Africa, digital technologies have played a critical role in promoting financial inclusion and expanding digital financial services such as mobile banking and online payments. For example, digital banking adoption in Nigeria has increased significantly due to the expansion of mobile networks and internet services (Onuegbu et al., 2025). Nigeria has emerged as one of the leading digital economies in Africa due to its large population, expanding telecommunications sector, and increasing adoption of mobile technologies. According to the National Bureau of Statistics (NBS, 2024), the Information and Communication Technology (ICT) sector contributed about 17.68% to Nigeria's real GDP in 2024, demonstrating the growing importance of digital technologies in the country's economy. The telecommunications subsector remains the primary driver of ICT growth in Nigeria, accounting for approximately 14.4% of GDP contribution within the ICT sector. Nigeria has also experienced significant growth in internet usage and digital transactions. Recent statistics indicate that the country has over 141 million internet users, reflecting the rapid expansion of digital connectivity and online activities indicated by the Nigerian communication

commission (NCC, 2024). Furthermore, the increasing use of digital platforms has facilitated the growth of e-commerce, online financial services, and digital entrepreneurship. Nigeria's digital creator economy alone is valued at about \$3.1 billion and is projected to reach \$17.8 billion by 2030, highlighting the economic potential of digital innovation in the country. The Nigeria's connection to undersea international links also led to the development of increased competition in telecommunication market to 2,705% due to the wholesale submarine bandwidth capacity available to Nigerian telecommunications operators; this was due to the launch of four new undersea cables. This additional capacity has the potential to change the landscape of Internet service provisioning and data connectivity in Nigeria at a lower wholesale international bandwidth prices and higher speeds (Gillwald, et al., 2018). The mobile-broadband prepaid handset-based price (1GB MB) stood at 1.7% of Gross National Income (GNI) per capita. This situation, i.e., a mobile-broadband price below 2% of GNI, only occurs in five other countries in Africa: Mauritius, the Seychelles, Gabon, Cape Verde and South Africa (ITU, 2018). Finally, Nigeria ranks 6th out of 49 countries on Research ICT Africa (RIA)'s African Mobile Pricing (RAMP) Index and 10th on the 1GB pre-paid mobile data index.

3. Methodology

3.1 Research Design: This study adopts a descriptive and analytical research design to examine the impact of the digital economy on Nigeria's economic development. The descriptive approach is suitable because it allows for a systematic examination of digital economic activities and their influence on macroeconomic performance.

3.2 Source of Data

This study relies primarily on secondary data sources, including reports and publications from National Bureau of Statistics (NBS), International Telecommunication Union (ITU), World Bank digital economy reports, Research ICT Africa and Academic journals and policy publications and NCC. These sources provide reliable data on ICT development, digital infrastructure, internet

penetration, and economic indicators relevant to Nigeria's digital transformation.

3.3 Data Analysis

The analysis focuses on evaluating key indicators that reflect digital economic development in Nigeria which include ICT contribution to Gross Domestic Product (GDP), Internet penetration rate, Growth of digital financial services, Digital entrepreneurship and innovation and Telecommunications sector development. This study also evaluates the benefits and challenges of digitalization in relation to economic growth, financial inclusion, and technological advancement.

3.4 Characteristics of Digital Economy

For a Nigerian to maintain a successful and inclusive digital economy requires the following foundational elements:

Digital Infrastructure: Digital infrastructure provides the way for people, businesses, and governments to get online and link with local and global digital services, thus connecting them to the global digital economy. For a digital economy, good and affordable Internet connectivity is a critical foundation. The components of Digital Economy are the infrastructure that is being supported by hardware, networks telecommunications, provision of internet and its applications, others include software, consultancy and training activities. An economic activity comprises business interaction activities in the markets by makers, search engines and transfer of goods or E-Commerce. The interaction between personal computers, telecommunications, Internet and electronics has contributed to the digitalization of the world economy.

Digital Platforms: Digital platforms offer products and services, accessible through digital channels, such as mobile devices, computers, and Internet, for all aspects of life. Digital platforms enable producers and users to create value by interacting with each other. Governments operate digital platforms to offer citizen-facing government services and share information. Commercial firms also operate digital platforms to offer a growing array of products and

services. Digital Economy is characterized by the reduction of resource consumption, enhancement of the innovative and entrepreneurial drive, increase in labor productivity, production speed and changes in economic phenomena and new processes of business transaction as well as an increase in the value addition. The effectiveness of Digital Economy at micro and macroeconomic level depends largely on some important number of general valid development principles such as, conviction, accessibility; availability, affordability of the existence of the necessary resources and facilities as well as appropriateness. The contribution of Digital Economy, nowadays, to the economic growth and to the creation of jobs at the level of any market economy, is undeniable and the greater part of the world economy is digital (Miller, 2014).

Digital Financial Services: Digital financial services enable individuals and businesses to conduct transactions electronically or online and open a pathway to a range of digital financial services in addition to digital payments, including credit, savings, and insurance. Access to affordable and appropriate digital financial services is critical for the participation of individuals and businesses in the digital economy. These can enhance e-Business, e-Commerce, e-Banking e-Payment and e-Marketing via Intranet which is radically efficient, in term of cost reduction, delivery and general transactional. Lately, e-Commerce has developed extensively as a form of conducting business, to which we might also add the shaping of scientific knowledge of markets, bolstered by the unprecedented pace of developments within the research sector.

Digital Entrepreneurship: Digital entrepreneurship and innovation create an ecosystem to bring the digital economy to life with new, growth-oriented ventures and the transformation of existing businesses, which contribute to net employment growth and help enhance competitiveness and productivity of the economy. Digital Economy has an interactive, participatory character, creating more rigorously the interface between supply and demand based on volume and structure, on space and time. The role of the consumer is more important due to the dynamic nature of his needs, the consumer

became a significant source of innovative ideas for producers, with the aim to maintain or extend the market, to increase comfort or, more importantly, to raise the level of sustainability of economic development

Digital Skills: Economies require a digitally savvy workforce in order to build robust digital economies and competitive markets. Digital skills constitute technology skills, together with business skills for building or running a start-up or enterprise. Greater digital literacy further enhances adoption and use of digital products and services among the larger population. Another characteristic of digital Economy is the ability of the producers in understanding the consumption concepts which implies high skills that create a greater value addition, new jobs opportunities, unlimited segments of business opportunities and creativity through the existence of flexible and interconnected standards that facilitate the need for integration and/or personalization of different consumers. Despite these advancements, Nigeria still faces challenges such as inadequate infrastructure, digital skill gaps, regulatory limitations, and unreliable electricity supply, which hinder the full realization of digital economic benefits.

3.5 Benefit/contribution of Nigerian Digital Economy

Development of Digital Infrastructure: The digital economy has significantly influenced Nigeria's economic development in several areas, Nigeria has made significant progress in developing digital infrastructure, including the installation of multiple international submarine fiber-optic cables that provide high-speed internet connectivity. This development has significantly improved bandwidth capacity and reduced internet costs. Another important development was the rapid growth in internet access and digital connectivity across the country. Nigeria currently has over 140 million internet users, making it the largest internet market in Africa. Mobile broadband has become the primary means of accessing the internet, largely due to the expansion of 3G and 4G networks by telecommunications companies. Increased

connectivity has facilitated the growth of digital platforms, online commerce, digital payments, and social media-based businesses, this generate about 5% youth employment in 2023 (ABS, 2024).

Development of Digital Financial Services: The development of digital platforms has created enormous opportunities for digital financial services. Initiatives such as the Bank Verification Number (BVN) have strengthened financial inclusion and facilitated secure electronic transactions. According to ITU (2024) highlights Nigeria's rapid digital transformation, ranking it high in readiness with a 71% score including the financial sector of the economy. For example, the government created a central portal to improve the delivery and quality of public services. This has made the development of enormous opportunities in Digital Financial Services (DFS), a driver of financial inclusion which made payments easy and the growth of the size of the market. The financial sector has already benefitted from investments in payment systems and financial markets infrastructure (Aker and Blumenstock, 2015)

Internet accessibility: Mobile broadband has become the most common means of internet access in Nigeria. In spite of recent growth in fibre installations, national fixed-line infrastructure is still poor, and mobile systems remain the primary means for carrying retail and enterprise data traffic in Nigeria. According to the ITU (2025) 99% of the population used their cell phones to connect to the Internet. Overall Internet usage in Nigeria stands at 83.2 % (NCC, 2025). Mobile broadband has become the most common and popular way through which people in Nigeria access the internet 3G/4G/5G coverage reaches 44.43% of the population. There were 83.2% of active internet subscribers among Nigerian who own phones in 2024.

Affordability and Quality of Services: The increase in demand of Internet data led to decreased in tariffs. The Nigeria's connection to undersea international links also led to the development of increased competition in telecommunication market. Since 2010, there has been a massive 2,705%

increase in the wholesale submarine bandwidth capacity available to Nigerian telecommunications operators; this was due to the launch of four new undersea cable systems with landing points into Lagos. This additional capacity has the potential to change the landscape of Internet service provisioning and data connectivity in Nigeria at a lower wholesale international bandwidth prices and higher speeds (Gillwald, et al., 2018). According to ITU (2020), the mobile-broadband prepaid handset-based price (1GB) stood at 1.7% of Gross National Income (GNI) per capita.

Economic Growth: Nigeria the contribution of digital economy to the overall Nigerian economic growth can be traced from the expansion of the telecommunications sector, and increasing adoption of mobile technologies. According to NBS (2025), the ICT sector contributed about 17.68% to Nigeria's real GDP in 2024, demonstrating the growing importance of digital technologies in the country's economy. Nigeria has also experienced significant growth in internet usage and digital transactions. Recent statistics indicate that the country has over 141 million internet users, reflecting the rapid expansion of digital connectivity and online activities. Furthermore, the increasing use of digital platforms has facilitated the growth of e-commerce, online financial services, and digital entrepreneurship. Nigeria's digital creator economy alone is valued at about \$3.1 billion and is projected to reach \$17.8 billion by 2030, highlighting the economic potential of digital innovation in the country (NCER, 2025).

3.6 Challenges of Digital Economy in Nigeria

Infrastructural Challenges: The Nigerian digital economy face the challenge of infrastructures such as the lack of unskilled human capital, reliable and affordable broadband for businesses which are critical for future stages of ICT use. It was evident that there has been some considerable level of development and adoption of technology and telecommunication to build and sustain a viable digital economy in Nigeria, but still broadband coverage remains limited in many parts of the country.

Electricity Challenges: The Digital Economy uses more of electricity due to the move to the cloud and carbon emissions. A server room at a data center can use on average enough electricity to power 180,000 homes. Digital Economy can be used for mining Bit coin which according to Sapara and Shaikh (2023) uses an average of 70.69 TWh of electricity per year. The number of households that can be powered using the amount of power that bit coin mining uses is around 6.5 million in the US. Nigerians are finding it difficult to provide this quantum of electricity for the benefit of the digital economy.

Human Capital: Human capital development remains weak due to underinvestment which the shortage of skilled digital professionals capable of supporting advanced technological development as indicated by World Bank Human Capital Index (2019), which shows that Nigeria ranked 152 out of 157 countries, this limits innovation and reduces the country's competitiveness in the global digital economy.

Lack of defined policy instrument: This study also finds that inadequate policy frameworks and regulatory uncertainty hindered digital investment and innovation in Nigeria. According to the Alliance for Affordable Internet (A4AI, 2017) analyzed that the current ability of national policies to "lower industry costs and ultimately create more affordable broadband". The impact of lack of competition has reflected in the high costs of internet access in this country as indicated on the average price for one gigabyte of data costing 1.7% of the average monthly salary which was relatively affordability, but due to the lower per capita income compared to other developing countries, though challenges in infrastructure, digital literacy, and broadband penetration 45.43% persist (NCC, 2020).

4. Result and Findings

The analysis of secondary data and existing literature reveals that the digital economy has significantly influenced Nigeria's economic development in several areas, including economic growth, financial inclusion, employment generation, and technological innovation. However, the findings also indicate that several structural challenges continue to limit the full realization of the digital economy's potential. One of

the findings indicated that the Information and Communication Technology (ICT) sector has become one of the most important contributors to Nigeria's economic growth. Recent statistics from the NBS indicated that the ICT sector contributes approximately 17.68% to GDP in 2024, as one of the largest contributors to the economy outside the oil sector. Consequently, the finding has shown that there is rapid growth in internet access and digital connectivity across the country. Nigeria currently has over 141 million internet users as indicated by the NCC, making it the largest internet market in Africa. Mobile and internet broadband has become the sources of software network development due to the expansion of 3G and 4G networks. This has increased connectivity, facilitated development of digital platforms, online e-commerce, digital payments, and social media-based businesses. However, the findings indicate that internet access remains uneven across regions, with rural areas still experiencing limited connectivity and digital infrastructure. Digital economy has significantly improved financial inclusion in Nigeria. The development of digital financial services such as mobile banking, online payments, and electronic transfers has enabled millions of Nigerians to access financial services. The development of Bank Verification Number (BVN) system would have not been possible without the mobile services, this has strengthened the security and efficiency of digital financial transactions. Due to that, banking online financial transactions have increased substantially over the last decade. These developments necessitated the improvement of economic participation among small businesses and informal sector of the economy. This study found out that the digital economy has created opportunities for entrepreneurship and employment in Nigeria. The development of digital platforms has enabled individuals to establish online businesses, digital marketing services, software development companies, and content creation enterprises. Another important finding of this study was the development of digital technologies that improved market efficiency by reducing transaction costs, increasing access to information, and facilitating cross-border trade. Nigerian businesses recently reached global

markets through e-commerce platforms and digital payment systems. This development has enhanced Nigeria's integration into the global digital economy and increased opportunities for international trade and investment.

5.1 Conclusion

The findings this study shown that the digital economy has become an important driver of economic transformation in Nigeria. It has contributed to economic diversification, increased financial inclusion, enhanced productivity, and expanded employment opportunities. However, for Nigeria to fully benefit from digital transformation of national digital economy policy and strategy (2020-2030), it must address critical structural challenges such as infrastructure deficits, digital skill shortages, electricity constraints, and policy gaps.

5.2 Recommendations

1. Nigeria as a country needs to focus on its infrastructure establishment. Reliable and affordable broadband for businesses and individuals are critical for future stages of ICT use. To secure a digital future for the many, rather than the few, domestic and international policies should go beyond enlisting more country's users and consumers online; they should also enable the building of domestic capabilities to create and capture value and the developed community in this context needs to find more comprehensive ways to support countries that are trailing in the digital economy.

2. Governments have a critical role in shaping the digital economy by defining the rules of the game. This involves the adaptation of existing policies, laws and regulations, and the adoption of new ones in many areas. A smart embrace of new technologies, enhanced partnerships and greater intellectual leadership are needed to redefine digital development strategies and the future contours of globalization.

3. Policy responses need to consider increased difficulties of enforcing national laws and regulations with respect to cross-border trade in

digital services and products. Exploration of new pathways for local value creation and capture, and structural transformation through digitalization. National development strategies should also seek to promote digital upgrading (value addition) in data value chains and to enhance domestic capacities and individual governments require policy space to regulate the digital economy to meet various legitimate public policy objectives.

4. Nigeria should make some progress in socioeconomic and its human capital development Index. Furthermore, the country must continue to face massive developmental challenges, which include the need to reduce dependency on oil and diversify the economy, address insufficient infrastructure, and build strong and effective institutions, as well as governance issues and public financial management systems. Inequality in terms of income and opportunities has been growing rapidly and has adversely affected poverty reduction. The North-South divide has widened in recent years due to the socio-economic challenges and lack of economic development in the northern part of the country, this should also be considered.

4. Electricity as a basic essential for development for any economy should be constantly provided because moving to the cloud has raised the electricity use and carbon emissions by the digital economy. Accessibility, affordability and internet connectivity which measures the development of physical internet network infrastructure and its quality should be in place.

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