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Digital infrastructure and ease of doing business in Nigeria

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Abstract
This study investigates the impact of digital infrastructure on the ease of doing business in Nigeria, focusing on broadband penetration, digital payment systems, and government policies. Using a mixed-methods approach, quantitative data was drawn from national and international databases, while qualitative insights were gathered from interviews with business owners across various sectors. The findings reveal a positive correlation between improved digital infrastructure and Nigeria's ease of doing business rankings, with notable advancements in broadband penetration and digital payment adoption. However, challenges such as inconsistent internet access and underdeveloped digital literacy persist, particularly in rural areas. The study underscores the need for targeted investment in digital infrastructure and policy reforms to drive economic growth, enhance regulatory efficiency, and improve Nigeria's global business competitiveness.

Keywords: Digital Infrastructure, Ease of Doing Business, Digital Economy, Digital Transformation, Government Policy

1. Introduction

Digital infrastructure is increasingly recognized as a cornerstone of modern economic development. Globally, countries like Estonia and Singapore have demonstrated how strategic investments in broadband networks, digital platforms, and e-governance systems can revolutionize business environments, streamline regulatory processes, and foster entrepreneurial growth (World Bank, 2022). In contrast, developing economies often struggle with inadequate digital infrastructure, which stifles innovation and hinders business operations. Nigeria, despite being Africa's largest economy, faces significant digital connectivity challenges, with internet penetration standing at 40% as of 2023, compared to the global average of 66% (Nigerian Communications Commission, 2023). The ease of doing business, a critical determinant of economic competitiveness, is closely tied to the availability and quality of digital infrastructure. Nigeria's ranking in the World Bank's Ease of Doing Business Index improved from 169 in 2015 to 131 in 2023, largely due to incremental gains in digital adoption and policy reforms. Yet, businesses, particularly small and medium enterprises (SMEs), continue to face barriers such as high transaction costs, bureaucratic inefficiencies, and limited access to digital tools (Adedeji & Thompson, 2020). This paper explores the nexus between digital infrastructure and ease of doing business in Nigeria, evaluating both progress and persistent challenges.

2. Literature Review

2.1. Digital Infrastructure comprises the physical and virtual systems enabling digital services, including broadband networks, cloud computing, and digital payment systems. These elements are essential for fostering connectivity,

enhancing data exchange and reducing transaction costs (World Bank, 2020.

2.2 Ease of Doing Business refers to the regulatory and operational environment facilitating business creation, operation, and growth. Key metrics include starting a business, obtaining permits, registering property, and resolving insolvencies (Kumar & Singh, 2021).

2.2 Empirical Evidence

Studies highlight a direct relationship between digital infrastructure and business efficiency. For instance, countries like Singapore have achieved significant economic growth through comprehensive e-governance systems (Molla et al., 2019). In Nigeria, initiatives like mobile banking have reduced the time required to start businesses, though rural areas lag due to inadequate infrastructure (Okonjo-Iweala, 2021). Comparative studies from sub-Saharan Africa underscore the transformative potential of digital tools, especially in reducing costs and increasing market accessibility (Adedeji & Thompson, 2020).

2.3 Theoretical Framework

The study adopts the Diffusion of Innovation Theory (Rogers, 1962), which explains how technologies are adopted within societies. The theory's focus on knowledge, persuasion, decision-making, implementation, and confirmation stages is particularly relevant to understanding the uneven adoption of digital infrastructure in Nigeria. Early adopters, predominantly urban businesses, have realized significant gains, while rural regions face systemic barriers such as limited broadband access and high costs.

2.3.1 Diffusion of Innovation Theory (DOI) (Rogers, 1962) - The Diffusion of Innovation (DOI) theory explains how new technologies and innovations spread through societies and industries. According to this theory, innovations such as digital infrastructure (e.g., broadband networks, mobile banking, and e-governance platforms) follow a predictable path from introduction to widespread adoption.

The theory identifies five stages of innovation adoption: Knowledge: Individuals or businesses become aware of the existence of new technologies, Persuasion: They develop an interest and evaluate the potential benefits of adoption, Decision: They decide whether or not to adopt the technology, Implementation: They begin using the technology in their operations and Confirmation: They continue using the technology after seeing its benefits.

In the context of Nigeria, DOI theory helps explain the varying levels of adoption of digital infrastructure across sectors and regions. It also highlights the role of external factors such as government policies, digital literacy, and the availability of affordable digital services in influencing adoption rates. Businesses that are early adopters of digital technologies can gain competitive advantages through cost reductions, increased efficiency, and greater market reach.

In Nigeria, the diffusion of digital infrastructure is still evolving, with varying levels of penetration across different regions and sectors. This framework provides the theoretical foundation for understanding the adoption and impact of digital infrastructure on businesses in Nigeria.

3. Methodology

This study employs a mixed-methods approach: The Quantitative Analysis - Data from the World Bank, NCC, and NIBSS was analyzed using descriptive statistics. Metrics include broadband penetration, SME adoption of digital payment systems, and ease of doing business rankings. Graphs and charts visually represent these trends. The Qualitative Analysis - Semi-structured interviews with 20 Nigerian business owners from technology, retail, and manufacturing sectors were conducted. Thematic analysis identified key

challenges and opportunities associated with digital infrastructure.

4. Results and Discussions

4.1 Broadband Penetration and Ease of Doing Business

The data reveals a positive correlation between broadband penetration and Nigeria's ease of doing business ranking. From 2015 to 2023, as broadband access increased from 10% to 40%, Nigeria's ranking improved from 169 to 131.

Table 4.1: Broadband Penetration and Ease of Doing Business in Nigeria

Year	Broadband Penetration (%)	Ease of Doing Business Ranking
2015	10	169
2016	12	170
2017	15	169
2018	20	146
2019	25	145
2020	28	131
2021	30	131
2022	35	131
2023	40	131

Source: Nigerian Communications Commission (NCC) and World Bank's Doing Business Reports (2023)

The table shows that as broadband penetration increased, the Nigeria's ease of doing business ranking also significantly improved, especially between 2017 and 2020.

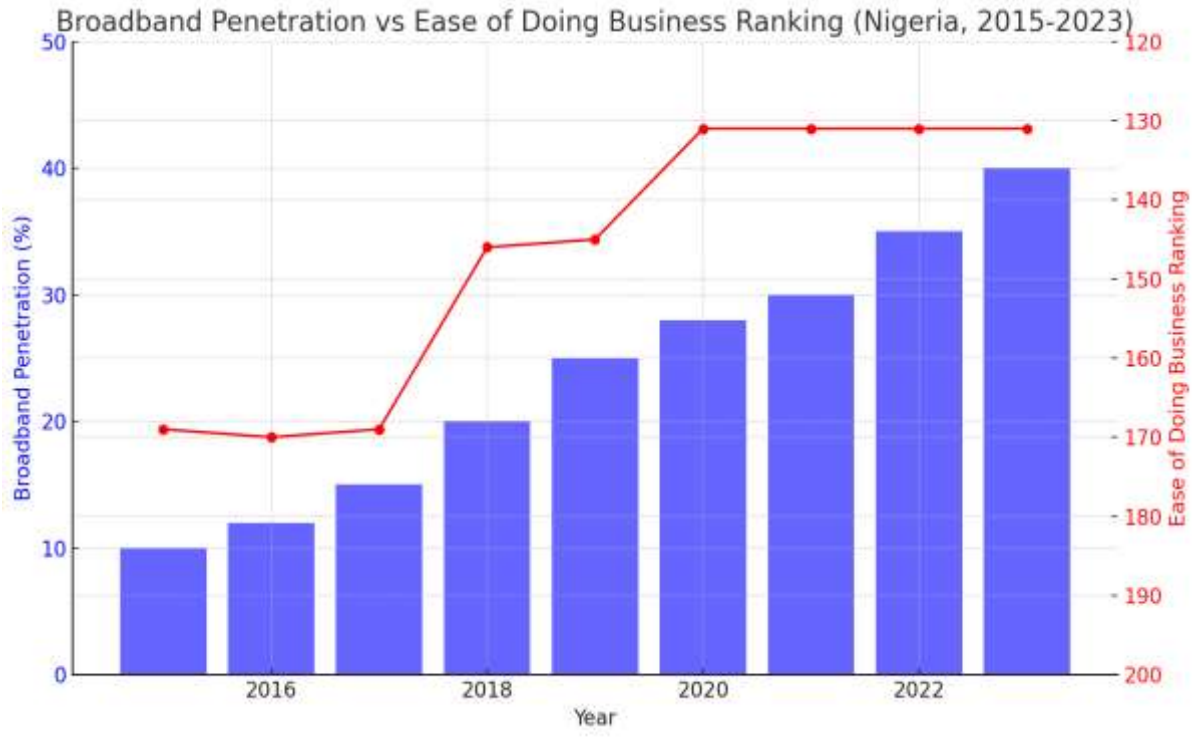

Figure 4.1: Broadband Penetration and Ease of Doing Business Ranking

The bar chart shows correlation between broadband penetration and Nigeria's ease of doing business ranking from 2015 to 2023. The blue bars represent the increasing broadband penetration, while the red line tracks the improvement in Nigeria's ease of doing business ranking (a lower number indicates better performance). The chart indicates that as broadband access increased, the ease of doing business ranking also significantly improved.

4.2 Digital Payment Systems and Customer Satisfaction

Adoption of digital payment systems (e.g., mobile banking, online payments) has grown substantially, with 75% of small and medium enterprises (SMEs) adopting these technologies by 2023. Business owners reported that this shift has reduced transaction costs and improved customer satisfaction.

Table: 4.2 SMEs Adoption of Digital Payment Technologies in Nigeria

Year	SME Adoption of Digital Payment Systems (%)
2015	20
2016	25
2017	30
2018	35
2019	40
2020	50
2021	60
2022	70
2023	75

Source: CBN Financial Stability Reports (2023) and NIBSS Digital Transaction Statistics (2023)

The table 4.2 shows that by 2023, 75% of SMEs in Nigeria had adopted digital payment technologies like mobile banking and online payments.

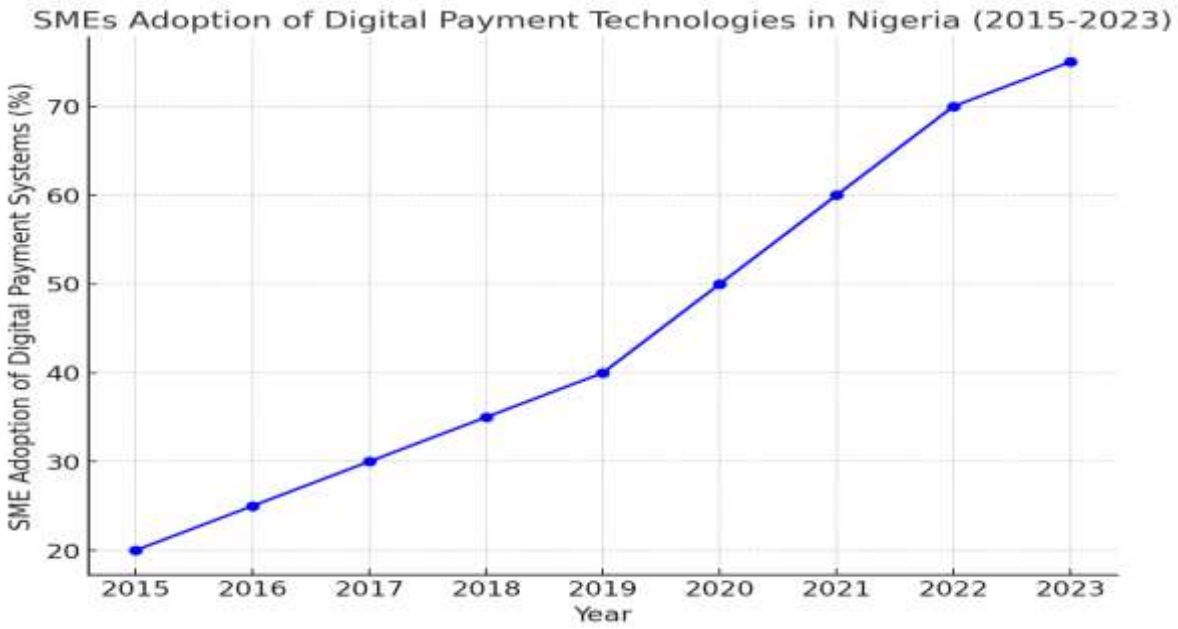

Figure 4.2: SMEs Adoption of Digital Payment Technologies in Nigeria

The line chart shows the adoption of digital payment technologies by SMEs in Nigeria from 2015 to 2023. The steady increase highlights the growing shift towards digital payment systems during this period under review.

Business owners highlighted several challenges, including inconsistent internet connectivity and high costs of digital services. While larger enterprises could navigate these issues, SMEs, particularly in rural areas, struggled with access. However, all respondents acknowledged that digital infrastructure, when available, significantly reduces the time spent on administrative tasks, such as registering businesses or paying taxes online.

4.3 Major Research Findings

1. The Broadband Penetration: From 2015 to 2023, broadband penetration increased from 10% to 40%, correlating with an improvement in Nigeria's ease of doing business ranking from 169 to 131. However, rural regions remain underserved, limiting national progress.

2. Adoption of Digital Payment Systems: By 2023, 75% of SMEs had integrated digital payment technologies, significantly reduced transaction costs and enhancing customer satisfaction. Nonetheless, inconsistent internet access continues to hinder adoption in less-developed areas.

The findings align with global trends, reinforcing the role of digital infrastructure in economic growth. Studies from Estonia and Singapore similarly document how e-governance tools streamline business operations (World Bank, 2022). However, Nigeria's progress remains uneven, reflecting the need for policy interventions and infrastructure investments. Qualitative insights highlight user challenges, such as limited digital literacy and cybersecurity concerns, which are consistent with findings in other emerging markets (Molla et al., 2019).

5. Conclusion and Recommendations

Nigeria's digital infrastructure is pivotal to enhancing its ease of doing business, with broadband access and digital payment systems showing tangible benefits. However, systemic barriers such as rural underdevelopment, digital literacy gaps, and cybersecurity risks persist. Addressing these issues requires:

Policy Reforms: Streamline regulatory frameworks to incentivize digital adoption and e-governance tools.

Infrastructure Investments: Prioritize broadband expansion in rural areas to ensure equitable access.

Capacity Building: Implement nationwide digital literacy programs targeting SMEs and underserved populations.

In conclusion, strategic investment in digital infrastructure, coupled with targeted policy measures, can position Nigeria as a leader in Africa's digital economy.

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