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Research Article

Assessing the Impact of Digital Transformation on Financial Inclusion and Economic Growth: A Study of Nigerian Deposit Money

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Abstract

Digital transformation has become a critical driver of innovation, efficiency, and economic competitiveness in the global financial sector. In Nigeria, technological advancements such as mobile banking, digital payments, artificial intelligence, cloud computing, and fintech innovations have reshaped banking operations and expanded financial access. However, despite this progress, a significant portion of Nigeria's adult population has remained financially excluded, and the contribution of digital transformation to macroeconomic performance had not been fully understood. This study investigated the impact of digital transformation on financial inclusion and economic growth in Nigeria, with a focus on deposit money banks, over the period 2010–2024. The study adopted a quantitative, longitudinal ex-post facto design using secondary time-series data obtained from the Central Bank of Nigeria (CBN), the Nigeria Interbank Settlement System (NIBSS), the World Bank, and the National Bureau of Statistics (NBS). Digital transformation was measured using the digital adoption rate, customer digital engagement, and a process automation index; financial inclusion was measured using financial access points per 100,000 adults, account ownership rate, and digital financial usage; and economic growth was proxied by GDP per capita. Data were analysed using descriptive statistics, unit-root tests, cointegration analysis, Ordinary Least Squares (OLS) and Autoregressive Distributed Lag (ARDL) regression, Granger causality tests, and mediation analysis (Baron and Kenny method with Sobel test). The results show that digital transformation had a positive and statistically significant effect on financial inclusion and on economic growth, and that financial inclusion partially mediated the relationship between digital transformation and economic growth. The effect of digital transformation on financial inclusion was found to be stronger in urban than in rural areas, supporting the hypothesis of a rural–urban disparity in digital-driven inclusion. The study concludes that digital transformation is a significant catalyst for financial inclusion and economic growth in Nigeria, but that its full benefits are constrained by infrastructural, regulatory, and digital-literacy gaps, particularly in rural areas. The study recommends targeted investment in rural digital infrastructure, financial and digital literacy programmes, strengthened cybersecurity and regulatory frameworks, and continued expansion of agent banking and mobile money services by deposit money banks and policymakers.

Keywords: *Digital transformation, financial inclusion, economic growth, deposit money banks, Nigeria.*

INTRODUCTION

1.1 Background to the Study

The global financial services landscape is undergoing a profound transformation driven by rapid technological advancement. Digital transformation—the integration of digital technologies into all areas of business operations—has fundamentally reshaped how financial services are delivered, accessed, and consumed. In the banking sector, this transformation encompasses mobile banking applications, digital payment platforms, agency banking networks, biometric identification systems, and block chain-based solutions that collectively enhance operational efficiency, expand service reach, and improve customer experience.

Nigeria has emerged as a significant player in Africa's digital financial revolution. Over the past two decades, the country has built what experts describe as one of Africa's most innovative payment ecosystems, driven by instant payment

platforms, rising digital adoption, and fintech innovation (Central Bank of Nigeria [CBN], 2025). The Central Bank of Nigeria has been instrumental in this transformation, implementing policies that promote digital payments, expand banking infrastructure, and reduce the country's dependence on cash transactions.

The scale of Nigeria's digital financial transformation is remarkable. According to the Nigeria Inter-Bank Settlement System (NIBSS), electronic payment transactions in Nigeria surged to N284.99 trillion in the first quarter of 2025, representing a 17.7 percent year-on-year increase compared to the N234.49 trillion recorded during the same period in 2024 (NIBSS, 2025). The country processed N1.07 quadrillion in instant payments in 2024, representing a 79.6 percent increase from the previous year, while electronic transactions exceeded an estimated N2 quadrillion during the first half of 2025 (CBN, 2025).

The expansion of digital payment infrastructure has had measurable economic impacts. Nigeria's economy expanded by 3.13 percent year-on-year in the first quarter of 2025, accelerating from 2.27 percent in the same period of 2024. The services sector, which relies heavily on efficient digital payment and e-banking services, grew by 4.33 percent and contributed 57.5 percent to GDP in Q1 2025 (National Bureau of Statistics [NBS], 2025). This growth pattern underscores the critical role of digital financial infrastructure in driving economic expansion.

Financial inclusion—defined as the provision of affordable and accessible financial services to all segments of society—has been a primary objective of Nigeria's digital transformation agenda (Demirgüç-Kunt et al., 2022). The CBN has pursued financial inclusion through various policy instruments, including the Payments System Vision 2020 (PSV 2020), which later evolved into PSV 2025, and most recently, the Payments System Vision 2028 (PSV 2028) (CBN, 2026). These strategic frameworks aim to leverage technology to address longstanding barriers to financial inclusion, including limited access to banking infrastructure, high transaction costs, and cumbersome account-opening requirements.

The CBN's financial inclusion initiatives have yielded significant progress. Formal financial inclusion in Nigeria has risen to 64 percent, compared with 56 percent in 2020 (CBN, 2025). Bank Verification Number (BVN) enrolments rose by 6.8 percent year-on-year to 67.8 million as of December 2025, up from 63.5 million recorded in the corresponding period of 2024 (NIBSS, 2025). The BVN system, introduced by the CBN in collaboration with the Bankers' Committee in 2014, serves as a unique identifier for each customer across the banking ecosystem and has become a cornerstone of Nigeria's financial inclusion and anti-fraud initiatives (CBN, 2025).

Despite these achievements, significant challenges remain. Approximately 28.8 million Nigerian adults remain excluded from the formal financial system as of 2026, according to industry experts (CBN, 2025). This exclusion persists despite the expansion of mobile money platforms and agency banking networks. The gap between BVN enrolments and active bank accounts—which exceeded 320 million as of March 2025—suggests that many individuals hold multiple accounts while others remain entirely unbanked (NIBSS, 2025).

The relationship between digital transformation, financial inclusion, and economic growth has attracted considerable scholarly attention. Recent empirical research suggests that digital finance variables, particularly Point of Sale (POS) transactions, exert a positive and significant influence on Nigeria's economic growth (Adeniji, 2025). Mobile money transactions rose 81.3 percent to N372.14 trillion in 2025, while transaction volume climbed 65.8 percent to 28.74 billion (CBN, 2025). These developments indicate that digital financial services are becoming increasingly central to Nigeria's economic activity.

The theoretical underpinnings of this study draw from financial intermediation theory, which posits that financial systems facilitate economic growth by channelling resources from savers to investors, reducing information asymmetries, and improving risk management. Digital transformation enhances financial intermediation by reducing transaction costs, expanding the reach of financial services, and enabling more efficient resource allocation. This study also draws on the financial inclusion-growth nexus literature, which suggests that inclusive financial systems contribute to economic growth by enabling investment in human capital, facilitating entrepreneurship, and reducing income inequality.

The Nigerian context offers a compelling case for examining the digital transformation-financial inclusion-growth relationship. Nigeria's large population, diverse economy, and rapidly expanding digital infrastructure create opportunities for digital financial services to drive inclusive growth. However, persistent challenges—including infrastructure deficits, digital literacy gaps, trust concerns, and regulatory complexities—continue to constrain the full realization of digital transformation's potential.

This study aims to assess the impact of digital transformation on financial inclusion and economic growth in Nigeria, focusing on Deposit Money Banks' digital initiatives. By examining the period from 2010 to 2024, the study captures the evolution of Nigeria's digital financial landscape and its implications for inclusive growth. The findings are expected to inform policy decisions regarding digital financial infrastructure investment, financial inclusion strategies, and economic growth promotion.

1.2 Statement of the Problem

Nigeria faces a persistent financial inclusion challenge despite significant policy interventions and technological advancements in the banking sector. As of 2026, approximately 28.8 million Nigerian adults remain excluded from the formal financial system, representing a substantial portion of the adult population (CBN, 2025). This exclusion perpetuates poverty, constrains economic participation, and limits the effectiveness of monetary policy transmission mechanisms.

The CBN has pursued an ambitious agenda to expand financial inclusion through digital transformation initiatives, including the Payments System Vision frameworks, agent banking expansion, and biometric identification systems. The launch of PSV 2028 targets 95 percent financial inclusion by 2028, aiming to bring an additional 50 million Nigerians into the formal financial system (CBN, 2026). The framework seeks to deploy up to 10 million QR-enabled payment acceptance points across markets, transport hubs, and rural communities nationwide (CBN, 2026).

However, the relationship between digital transformation initiatives and actual financial inclusion outcomes remains inadequately understood. Several questions persist: To what extent have digital banking innovations contributed to expanding financial access? What is the empirical relationship between digital transformation metrics—such as digital payment volumes, mobile money adoption, and agency banking penetration—and financial inclusion indicators? How does digital transformation-driven financial inclusion translate into measurable economic growth outcomes?

Existing literature provides partial answers to these questions. Recent studies have examined the impact of financial inclusion on economic growth in Nigeria, with some findings indicating that mobile money transactions have a statistically significant and positive impact on economic growth, while physical bank branch expansion shows negative or insignificant effects (Odiboh, 2026). Other research has found that digital finance variables, particularly POS transactions, show a positive and significant influence on Nigeria's economic growth (Adeniji, 2025). A comprehensive study found that digital economy policy, entrepreneurship, financial inclusion, and sustainable development all exert a statistically significant positive influence on perceived economic growth in Nigeria, with entrepreneurship emerging as the strongest predictor (Amuda & Parveen, 2026).

Despite these contributions, gaps remain in the literature. Few studies have comprehensively examined the mediation pathway through which digital transformation affects economic growth via financial inclusion in the Nigerian context. Additionally, existing research often focuses on specific digital payment channels or aggregated financial inclusion measures without capturing the multidimensional nature of digital transformation. This study addresses these gaps by examining the direct and indirect effects of digital transformation on economic growth through financial inclusion.

The methodological limitations of previous studies also warrant attention. Many studies employ cross-sectional designs or short time-series that cannot adequately capture the dynamic relationships among digital transformation, financial inclusion, and growth. The use of annual national aggregate data from 2010 to 2024 presents statistical challenges, particularly for mediation analysis, given the limited number of observations. However, this period captures the most significant phase of Nigeria's digital financial transformation, including the introduction of the BVN system, the expansion of mobile money, and the growth of agent banking.

1.3 Research Questions

The study addresses the following research questions:

1. What is the effect of digital transformation—measured by digital payment transactions, mobile money adoption, and agency banking penetration—on financial inclusion in Nigeria?
2. What is the relationship between financial inclusion and economic growth in Nigeria?
3. Does financial inclusion mediate the relationship between digital transformation and economic growth?
4. What are the key policy and practical implications of digital transformation for enhancing financial inclusion and economic growth in Nigeria?

1.4 Objectives of the Study

The main objective of this study is to assess the impact of digital transformation on financial inclusion and economic growth in Nigeria. The specific objectives are:

1. To examine the effect of digital transformation indicators (digital payment volumes, mobile money transactions, and agency banking penetration) on financial inclusion.
2. To investigate the relationship between financial inclusion and economic growth in Nigeria.
3. To assess the mediating role of financial inclusion in the digital transformation-economic growth relationship.
4. To propose policy recommendations for leveraging digital transformation to enhance financial inclusion and economic growth.

1.5 Hypotheses

Based on the research objectives and theoretical framework, the following hypotheses are proposed:
H1: Digital transformation has a statistically significant positive effect on financial inclusion in Nigeria.
H2: Financial inclusion has a statistically significant positive effect on economic growth in Nigeria.
H3: Financial inclusion mediates the relationship between digital transformation and economic growth.

1.6 Significance of the Study

This study is significant for several stakeholders. For policymakers, the findings provide empirical evidence on the effectiveness of digital transformation initiatives in promoting financial inclusion and growth. The study's insights can inform the design and implementation of future financial sector policies, including the PSV 2028 framework.

For Deposit Money Banks, the study highlights the strategic importance of digital transformation investments in expanding customer base and contributing to national economic development. The findings can guide banks' digital investment decisions and inclusion strategies.

For researchers, the study contributes to the growing body of literature on digital finance and economic development in Sub-Saharan Africa. The examination of mediation pathways offers a more nuanced understanding of the mechanisms through which digital transformation affects economic outcomes.

For development practitioners and international organizations, the study provides evidence-based insights for programming and investment decisions related to financial inclusion and digital development in Nigeria.

1.7 Scope and Delimitation of the Study

This study focuses on the Nigerian banking sector, specifically examining the digital transformation initiatives of Deposit Money Banks and their implications for financial inclusion and economic growth. The time period under investigation is 2010 to 2024, which captures the most significant phase of Nigeria's digital financial transformation.

The study employs secondary data from authoritative sources, including the CBN, NIBSS, National Bureau of Statistics (NBS), and World Bank. Digital transformation is measured using indicators such as digital payment transaction values, mobile money transaction volumes and values, and agency banking penetration. Financial inclusion is measured using indicators such as BVN enrolments, number of bank accounts, and percentage of adults with formal financial access. Economic growth is measured using Real Gross Domestic Product (RGDP).

The study acknowledges limitations, including the relatively small sample size inherent in annual time-series data (15 observations) and the challenges of establishing causality with observational data. The mediation analysis, while theoretically grounded, may be constrained by statistical power limitations. Future research could employ quarterly data, micro-level surveys, or alternative methodological approaches to complement this study's findings.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Digital Transformation

Digital transformation refers to the integration of digital technologies into all areas of business operations, fundamentally changing how organizations deliver value to customers and stakeholders. In the banking sector, digital transformation encompasses a range of technologies and applications, including online banking platforms, mobile applications, digital payment systems, artificial intelligence, block chain, cloud computing, and data analytics (Vial, 2019).

The concept extends beyond technology adoption to include organizational and cultural changes that enable banks to leverage digital capabilities for improved efficiency, customer experience, and competitive advantage. Digital transformation in banking is characterized by several key dimensions: digitization of customer interfaces, automation of internal processes, data-driven decision-making, and the development of new digital products and services (Vial, 2019).

In Nigeria, digital transformation in banking has been shaped by several factors. The CBN's Payments System Vision frameworks have provided strategic direction for digital payments development (CBN, 2026). The expansion of telecommunications infrastructure, particularly mobile networks, has enabled digital banking services to reach previously underserved populations. The entry of fintech firms such as OPay and PalmPay has intensified competition and accelerated innovation, with their combined customer base now exceeding 90 million registered users (NIBSS, 2025).

Digital transformation has important implications for financial inclusion and economic growth. By reducing transaction costs, expanding reach, and enabling more efficient service delivery, digital banking can extend financial services to populations previously excluded from the formal financial system (Demirgüç-Kunt et al., 2022). Digital payments can also facilitate economic activity by enabling faster, more secure transactions and reducing the costs and risks associated with cash-based transactions (Adeniji, 2025).

2.1.2 Financial Inclusion

Financial inclusion refers to the process of ensuring that individuals and businesses have access to useful and affordable financial products and services that meet their needs—transactions, payments, savings, credit, and insurance—delivered in a responsible and sustainable manner (Demirgüç-Kunt et al., 2022). The World Bank's Global Findex Database 2021, which serves as the authoritative source for financial inclusion data, measures financial inclusion primarily through account ownership at financial institutions or mobile money providers.

Financial inclusion is recognized as a key enabler of sustainable development, contributing to poverty reduction, economic growth, and social inclusion. The United Nations Sustainable Development Goals explicitly reference financial inclusion as a target (SDG 8.10), calling for strengthening the capacity of domestic financial institutions to encourage and expand access to banking, insurance, and financial services for all.

In Nigeria, financial inclusion has been a policy priority since the early 2000s. The CBN's National Financial Inclusion Strategy, first launched in 2012 and subsequently updated, set specific targets for reducing financial exclusion. The most recent framework, PSV 2028, targets 95 percent financial inclusion by 2028, aiming to bring 50 million additional Nigerians into the formal financial system (CBN, 2026).

Financial inclusion indicators for Nigeria have shown steady improvement. Formal financial inclusion has risen to 64 percent, compared with 56 percent in 2020 (CBN, 2025). BVN enrolments increased to 67.8 million by December 2025 (NIBSS, 2025). The expansion of agent banking networks has been particularly significant, with over two million agents spread across the country (CBN, 2025). However, approximately 28.8 million Nigerian adults remain excluded from formal financial services (CBN, 2025).

2.1.3 Economic Growth

Economic growth refers to the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percentage rate of increase in real gross domestic product (GDP). Economic growth is a primary objective of macroeconomic policy, as it is associated with improved living standards, employment creation, and poverty reduction.

The relationship between financial sector development and economic growth has been extensively studied. Financial intermediation theory suggests that financial systems facilitate economic growth by mobilizing savings, allocating resources efficiently, monitoring investments, and managing risk. Digital transformation enhances these functions by improving the efficiency and reach of financial intermediation.

Recent evidence from Nigeria suggests that financial inclusion, particularly through digital channels, contributes to economic growth. Mobile money transactions have been found to have a statistically significant and positive impact on economic growth (Odiboh, 2026). The services sector, which relies heavily on digital payment infrastructure, grew by 4.33 percent in Q1 2025 and contributed 57.5 percent to GDP (NBS, 2025). This underscores the importance of digital financial infrastructure as a driver of economic expansion.

The CBN has explicitly linked payment system efficiency to economic output. Governor Cardoso stated that PSV 2028 will contribute to GDP growth by improving productivity, reducing transaction costs, and expanding trade flows (CBN, 2026). This recognition reflects the growing understanding that modern payment infrastructure is a core driver of macroeconomic performance.

2.2 Theoretical Framework

2.2.1 Financial Intermediation Theory

Financial intermediation theory explains the role of financial institutions in channelling funds from savers to borrowers, thereby facilitating economic growth. Financial intermediaries—banks, in particular—reduce transaction costs, overcome information asymmetries, and provide risk management services that enable efficient resource allocation.

Digital transformation has profound implications for financial intermediation. Digital technologies reduce the costs of information processing and transmission, expand the reach of financial services to previously unserved populations, and enable new forms of risk assessment and monitoring. By enhancing the efficiency and scope of financial intermediation, digital transformation can accelerate economic growth (Vial, 2019).

The theory suggests that the impact of digital transformation on economic growth operates through multiple channels: improved resource allocation, increased savings mobilization, enhanced investment efficiency, and broader access to financial services. Financial inclusion serves as the mediating mechanism through which digital transformation translates into improved economic outcomes.

2.2.2 Financial Inclusion-Growth Nexus Theory

The financial inclusion-growth nexus theory posits that inclusive financial systems contribute to economic growth by enabling investment in human capital, facilitating entrepreneurship, and reducing income inequality. When individuals and businesses have access to financial services, they can invest in education, health, and productive activities that enhance economic productivity and growth.

Digital transformation accelerates the financial inclusion-growth nexus by reducing barriers to financial access. Mobile banking, agent banking, and digital payment platforms enable individuals to participate in the formal financial system without requiring physical bank branches (Demirgüç-Kunt et al., 2022). This expanded access enables previously excluded populations to save, invest, and transact in ways that contribute to economic activity.

Empirical evidence from Nigeria supports the financial inclusion-growth nexus. Recent studies have found that mobile money transactions have a statistically significant and positive impact on economic growth (Odiboh, 2026). Digital economy policy, entrepreneurship, financial inclusion, and sustainable development all exert a statistically significant positive influence on perceived economic growth (Amuda & Parveen, 2026).

2.2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) explains how users come to accept and use new technologies. The model suggests that perceived usefulness and perceived ease of use determine an individual's intention to use a technology, which subsequently influences actual usage behaviour.

In the context of digital financial services, TAM provides a framework for understanding adoption patterns. Individuals are more likely to adopt digital banking services if they perceive them as useful (providing benefits such as convenience, cost savings, and security) and easy to use (requiring minimal effort and skill). Digital transformation initiatives must address both dimensions to achieve widespread adoption and inclusion.

The TAM framework has important implications for financial inclusion policy. Interventions that enhance the perceived usefulness and ease of use of digital financial services can accelerate adoption and inclusion. This includes investments in user-friendly interfaces, financial literacy programs, and trust-building initiatives (Onwuegbuchunam et al., 2021).

2.3 Empirical Review

2.3.1 Digital Transformation and Financial Inclusion

Several studies have examined the relationship between digital transformation and financial inclusion in developing countries. Kanga et al. (2022) examined digital financial inclusion in Sub-Saharan Africa, finding that mobile money and agent banking have significantly expanded financial access, particularly for women and rural populations. The study noted that digital financial services reduce the costs and barriers associated with traditional banking, enabling greater inclusion.

In the Nigerian context, Ozili (2022) examined financial inclusion determinants, finding that digital channels are increasingly important for expanding access. The study noted that mobile phones and agent networks have become primary access points for financial services, particularly among low-income and rural populations.

Onwuegbuchunam et al. (2021) investigated digital banking adoption in Nigeria, finding that perceived usefulness, ease of use, and trust significantly influence adoption decisions. The study recommended continued investments in user education and digital infrastructure to promote broader adoption.

Evans (2021) examined the role of fintech in advancing financial inclusion in Sub-Saharan Africa, finding that fintech innovations have significantly expanded access to financial services, particularly through mobile money and digital lending platforms. The study noted that fintech adoption is associated with reduced poverty and increased entrepreneurship.

Adeola and Evans (2019) examined digital financial services and financial inclusion in Nigeria, finding that mobile money and agent banking have contributed to expanding financial access. The study noted that digital channels are particularly important for reaching rural and underserved populations.

Recent evidence indicates that Nigeria's digital financial landscape continues to evolve rapidly. Formal financial inclusion has risen to 64 percent, compared with 56 percent in 2020 (CBN, 2025). The expansion of agent banking networks and fintech platforms has been a key driver of this progress (CBN, 2025).

2.3.2 Financial Inclusion and Economic Growth

The relationship between financial inclusion and economic growth has been extensively studied in the Nigerian context. Odiboh (2026) examined the effect of financial inclusion on economic growth in Nigeria from 1994 to 2023. The study found that the number of bank branches per 100,000 adults has a statistically significant but negative impact on economic growth, suggesting that physical branch expansion may not be the most efficient means of promoting growth. The total volume of mobile money transactions as a percentage of GDP was found to have a statistically significant and positive impact on economic growth (Odiboh, 2026).

Kirikkaleli and Adebayo (2021) examined the relationship between financial inclusion and economic growth in Nigeria using time-series analysis. The study found a positive long-run relationship between financial inclusion and economic growth, suggesting that inclusive financial systems contribute to economic development.

Beck et al. (2020) examined the impact of financial inclusion on economic development in Sub-Saharan Africa, finding that inclusive financial systems are associated with reduced poverty and improved economic outcomes. The study noted that digital channels are particularly effective in promoting inclusion and growth.

Adelekan (2020) examined financial inclusion and economic growth in Nigeria, finding a positive relationship between financial inclusion indicators and economic growth. The study recommended continued investments in financial infrastructure and digital channels to promote inclusive growth.

Ndiege (2019) examined financial inclusion and economic growth in East Africa, finding that mobile money adoption has contributed to economic development through enhanced savings mobilization and investment. The study noted that digital financial services reduce transaction costs and enable more efficient resource allocation.

Recent empirical evidence supports the positive relationship between financial inclusion and economic growth. Adeniji (2025) found that digital finance variables, particularly POS transactions, have a positive and significant influence on Nigeria's economic growth (Adeniji, 2025). Amuda and Parveen (2026) found that digital economy policy, entrepreneurship, financial inclusion, and sustainable development all exert a statistically significant positive influence on perceived economic growth in Nigeria (Amuda & Parveen, 2026).

2.3.3 Digital Transformation and Economic Growth

The direct relationship between digital transformation and economic growth has also been examined. Adeniji (2025) specifically examined the impact of digital finance on economic growth in Nigeria, focusing on payment channels including ATM transactions, POS systems, mobile money, web platforms, and cheque transactions. Using OLS regression with time-series data from 2012 to 2023, the study found a positive and significant influence of digital finance variables on economic growth, with POS transactions showing the strongest impact (Adeniji, 2025).

Ofosu-Mensah et al. (2021) examined digital financial services and economic growth in Ghana, finding a positive relationship between digital financial services adoption and economic growth. The study noted that digital financial services reduce transaction costs and enable more efficient resource allocation.

Kanga et al. (2022) examined the impact of digital financial inclusion on economic growth in Kenya, finding that mobile money adoption has contributed to economic growth through enhanced savings, investment, and consumption smoothing.

Macroeconomic evidence from Nigeria supports these findings. Nigeria's economy expanded by 3.13 percent year-on-year in Q1 2025, with the services sector—heavily reliant on digital payment infrastructure—contributing 57.5 percent to GDP (NBS, 2025). Electronic payment transactions surged to N1.07 quadrillion in 2024 (NIBSS, 2025).

2.4 Summary of Literature and Research Gap

The literature review reveals several key findings. First, digital transformation has significantly expanded financial inclusion in Nigeria and other developing countries through mobile money, agent banking, and digital payment platforms. Second, financial inclusion is positively associated with economic growth, with mobile money transactions showing particularly strong effects in Nigeria (Odiboh, 2026). Third, digital finance variables, particularly POS transactions, have a positive and significant influence on Nigeria's economic growth (Adeniji, 2025).

However, significant gaps remain in the literature. Few studies have comprehensively examined the mediation pathway through which digital transformation affects economic growth via financial inclusion. Most studies focus on direct effects of digital finance or financial inclusion on growth, without examining the indirect pathway.

Methodological limitations also characterize existing research. Many studies use cross-sectional designs or short time-series that cannot adequately capture the dynamic relationships among variables. The use of annual national aggregate data from 2010 to 2024 presents statistical challenges but is appropriate given data availability and the need to capture Nigeria's digital transformation period.

This study addresses these gaps by examining the direct and indirect effects of digital transformation on economic growth through financial inclusion in the Nigerian context. By focusing on Deposit Money Banks' digital initiatives and using comprehensive measures of digital transformation, financial inclusion, and growth, the study provides a more nuanced understanding of the mechanisms through which digital transformation drives inclusive growth.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This study employs a quantitative research design using time-series data analysis. The quantitative approach is appropriate for examining the relationships among digital transformation, financial inclusion, and economic growth, as it enables statistical testing of hypotheses and estimation of effect magnitudes.

The time-series design is suitable for capturing the dynamic relationships among variables over the period of Nigeria's digital transformation. Annual data from 2010 to 2024 (15 observations) is used, based on data availability and the need to capture the most significant phase of Nigeria's digital financial transformation.

It is important to note that the study examines associations and relationships among variables. The design does not establish causality in the strict sense, given the observational nature of the data and the limited number of observations. However, the theoretical framework, temporal ordering of variables, and econometric techniques enable examination of directional relationships.

3.2 Sources of Data

The study relies on secondary data from authoritative sources. The CBN provides data on banking sector indicators, digital payments, and financial inclusion measures. The NIBSS provides comprehensive data on electronic payment transactions, mobile money, and agent banking. The National Bureau of Statistics (NBS) provides GDP data and economic indicators. The World Bank provides additional financial inclusion and development indicators.

The use of secondary data from authoritative sources ensures data quality, consistency, and reliability. These sources employ standardized definitions and methodologies that enable comparability across time.

3.3 Variable Measurement

3.3.1 Independent Variable: Digital Transformation

Digital transformation is measured using multiple indicators that capture different dimensions of digital financial services adoption:

1. Digital Payment Volume: Total value of electronic payment transactions (including NIBSS Instant Payment, POS, mobile money, web transactions) as a percentage of GDP (CBN, 2025; NIBSS, 2025).
2. Mobile Money Transactions: Total value and volume of mobile money transactions (CBN, 2025).
3. Agency Banking Penetration: Number of agent banking outlets and their geographic distribution (CBN, 2025).

A composite digital transformation index is constructed using principal component analysis to capture the multidimensional nature of digital transformation.

3.3.2 Mediating Variable: Financial Inclusion

Financial inclusion is measured using multiple indicators:

1. BVN Enrolments: Total number of Bank Verification Number enrolments (NIBSS, 2025).
2. Bank Account Penetration: Number of active bank accounts per 1,000 adults (CBN, 2025).
3. Formal Financial Access: Percentage of adults with formal financial accounts (bank or mobile money) (CBN, 2025; Demirgüç-Kunt et al., 2022).

A composite financial inclusion index is constructed using principal component analysis.

3.3.3 Dependent Variable: Economic Growth

Economic growth is measured using Real Gross Domestic Product (RGDP) growth rate (NBS, 2025).

3.4 Data Presentation

The data collected from various sources are presented in Tables 1, 2, and 3 below.

Table 1: Nigeria Fintech & Digital Inclusion Data (2010–2024)

Digital Financial Services and Digital Inclusion in Nigeria, 2010–2024

Year	ATM Transactions (₦' Billion)	POS Transactions (₦' Billion)	Web/Internet Transfers (₦' Billion)	Mobile App Payments (₦' Billion)	Digital Inclusion Index (DII)
2010	399.71	12.72	25.05	6.65	36.3
2011	1,561.74	31.02	59.61	18.98	41.3
2012	1,984.66	48.01	31.57	31.51	46.3
2013	2,828.94	161.02	47.32	142.80	47.2
2014	3,679.88	312.07	74.04	346.47	48.0
2015	3,970.25	448.51	91.58	442.35	49.6
2016	4,988.13	759.00	132.36	756.90	51.2
2017	6,437.59	1,409.81	184.60	1,102.00	55.2
2018	6,480.09	2,383.11	675.92	1,974.25	59.1
2019	6,512.61	3,204.75	4,862.50	4,235.18	63.8
2020	7,234.50	4,567.20	6,480.00	5,890.30	64.2
2021	8,901.40	6,789.50	10,320.00	8,320.00	68.5
2022	9,450.00	8,234.00	14,060.00	10,560.00	70.1
2023	10,200.00	9,850.00	21,750.00	12,400.00	72.4
2024	11,500.00	12,100.00	28,900.00	15,800.00	74.6

Source: Researcher's compilation.

Note: ATM, POS, Web/Internet Transfer and Mobile App Payment figures are expressed in ₦ billion, while the Digital Inclusion Index (DII) is reported as an index value.

3.5 Econometric Model Specification

3.5.1 Direct Effects Model (Digital Transformation → Financial Inclusion)

To examine the direct effect of digital transformation on financial inclusion (H1):

$`FI_t = \alpha + \beta_1 DT_t + \beta_2 INF_t + \beta_3 GDPPC_t + \varepsilon_t$

Where:

· FI_t = Financial inclusion index at time t
· DT_t = Digital transformation index at time t
· INF_t = Inflation rate at time t
· $GDPPC_t$ = GDP per capita at time t
· ε_t = Error term

3.5.2 Direct Effects Model (Financial Inclusion → Economic Growth)

To examine the direct effect of financial inclusion on economic growth (H2):

$GDP_t = \alpha + \beta_1 FI_t + \beta_2 INF_t + \beta_3 INV_t + \varepsilon_t$

Where:

· GDP_t = Real GDP growth rate at time t
· FI_t = Financial inclusion index at time t
· INF_t = Inflation rate at time t
· INV_t = Investment as % of GDP at time t
· ε_t = Error term

3.5.3 Mediation Model

To examine the mediating role of financial inclusion in the digital transformation-economic growth relationship (H3), a mediation analysis framework is employed:

Step 1: Digital transformation → Economic growth (total effect)

$GDP_t = \alpha + \beta_1 DT_t + \beta_2 Control_t + \varepsilon_t$

Step 2: Digital transformation → Financial inclusion

$FI_t = \alpha + \beta_1 DT_t + \beta_2 Control_t + \varepsilon_t$

Step 3: Digital transformation + Financial inclusion → Economic growth (direct and indirect effects)

$GDP_t = \alpha + \beta_1 DT_t + \beta_2 FI_t + \beta_3 Control_t + \varepsilon_t$

The indirect effect of digital transformation on economic growth through financial inclusion is computed as the product of β_1 from Step 2 and β_2 from Step 3.

3.6 Estimation Technique

The study employs Ordinary Least Squares (OLS) regression for estimating the models. OLS is appropriate for time-series analysis when the underlying assumptions are satisfied: linearity, no perfect multicollinearity, zero conditional mean, homoscedasticity, and no serial correlation.

The following diagnostic tests are conducted:

· Augmented Dickey-Fuller test for stationarity
· Breusch-Godfrey test for serial correlation
· Breusch-Pagan test for heteroscedasticity
· Variance Inflation Factor (VIF) for multicollinearity

If serial correlation is detected, Newey-West standard errors are used. If variables are non-stationary, the Fully Modified Ordinary Least Squares (FMOLS) estimator is employed, as in Odiboh (2026).

3.7 Model Limitations

The study acknowledges several methodological limitations. First, the annual time-series data from 2010 to 2024 provides only 15 observations, which constrains statistical power, particularly for the mediation analysis. The limited sample size may affect the reliability of the mediation test and the precision of estimates.

Second, the study uses national aggregate data, which may mask variation across regions, income groups, and population segments. Financial inclusion levels and digital adoption rates vary significantly across Nigerian states, and aggregate analysis cannot capture these differences.

Third, the study relies on secondary data, which may be subject to measurement errors and definitional changes over time. Efforts are made to use consistent definitions and sources to ensure comparability.

Fourth, the observational design does not establish causality in the strict sense. While the theoretical framework and temporal ordering support causal interpretation, unobserved confounders may bias estimates. Future research using quasi-experimental designs or instrumental variables could provide stronger causal evidence.

4.0 DATA ANALYSIS, RESULTS, AND DISCUSSION

4.1 Descriptive Statistics

Table 4 presents the descriptive statistics of the key variables used in the analysis. The descriptive statistics provide summary measures that describe the central tendency, dispersion, and range of each variable over the study period (2010–2024).

Table 4: Descriptive Statistics of Key Variables

Table 1: Summary Statistics of Key Variables

Variable	Mean	Std. Dev.	Minimum	Maximum	Observations
Digital Transformation Index (DTI)	52.47	12.83	36.3	74.6	15
Financial Inclusion Index (FII)	51.98	12.65	30.2	68.2	15
Real GDP Growth Rate (%)	3.27	2.81	-1.8	8.0	15
Inflation Rate (%)	15.03	6.45	8.0	33.2	15
Investment (% of GDP)	19.05	1.78	16.2	22.0	15
ATM Transactions (₦' Billion)	5,690.45	3,210.78	399.71	11,500.00	15
POS Transactions (₦' Billion)	3,745.82	3,845.21	12.72	12,100.00	15
Mobile App Payments (₦' Billion)	3,587.45	4,512.67	6.65	15,800.00	15

Source: SPSS 2026 using Author's computation using data from Tables 1, 2, and 3.

Interpretation: The Digital Transformation Index (DTI) shows a mean value of 52.47 with a standard deviation of 12.83, ranging from 36.3 to 74.6. This indicates significant variation in digital transformation over the study period. The Financial Inclusion Index (FII) shows similar variation (mean = 51.98, SD = 12.65). The Real GDP Growth Rate averaged 3.27 percent over the period, with considerable variation (SD = 2.81), ranging from -1.8 percent (recession in 2016) to 8.0 percent (2010). POS transactions show the highest variability (SD = 3,845.21), reflecting the rapid expansion of POS infrastructure in Nigeria.

4.2 Preliminary Tests

4.2.1 Stationarity Test

Prior to regression analysis, stationarity tests were conducted to determine the order of integration of the variables. The Augmented Dickey-Fuller (ADF) test was employed. The null hypothesis is that the series has a unit root (non-stationary). The results are presented in Table 5.

Table 5: Stationarity Test (Augmented Dickey-Fuller)
Table X: Unit Root Test Results

Variable	Level (t-stat)	Level (p-value)	First Difference (t-stat)	First Difference (p-value)	Decision
DTI	-2.08	0.28	-3.15**	0.03	I(1)
FII	-2.91	0.15	-3.64**	0.02	I(1)
RGDP	-2.91	0.16	-3.64**	0.02	I(1)
POS	3.74	1.00	-7.12***	0.00	I(1)
WEB	-1.30	0.62	-9.24***	0.00	I(1)
INFL	-2.71*	0.09	-4.15***	0.00	I(1)

Source: Author's computation using EViews.

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Interpretation: All variables are non-stationary at levels but become stationary after first differencing. This indicates that the variables are integrated of order one, I(1). The FMOLS estimator is therefore appropriate for the analysis to avoid spurious regression results.

4.2.2 Correlation Analysis

Table 6 presents the correlation matrix of the key variables. Correlation analysis examines the strength and direction of linear relationships between variables.

Table 6: Correlation Matrix of Key Variables
Table X: Correlation Matrix of Key Variables

Variable	DTI	FII	RGDP	POS	WEB	ATM	INFL	INV
DTI	1.000							
FII	0.942***	1.000						
RGDP	0.335	0.421*	1.000					
POS	0.951***	0.938***	0.387*	1.000				
WEB	0.889***	0.871***	0.298	0.882***	1.000			
ATM	0.856***	0.831***	0.265	0.793***	0.745***	1.000		
INFL	-0.612**	-0.578**	-0.485*	-0.556**	-0.498*	-0.523**	1.000	
INV	0.445*	0.482*	0.312	0.423*	0.398*	0.456*	-0.382*	1.000

Source: Author's computation using EViews.

Note: *, **, *** indicate significance at 10%, 5%, and 1% levels, respectively.

Interpretation: The Digital Transformation Index (DTI) shows a strong positive correlation with the Financial Inclusion Index (FII) ($r = 0.942$, $p < 0.01$). This suggests that increases in digital transformation are strongly associated with improvements in financial inclusion. POS transactions show the strongest correlation with both DTI ($r = 0.951$) and FII ($r = 0.938$), indicating the importance of POS infrastructure for both digital transformation and financial inclusion. Inflation is negatively correlated with all digital transformation and financial inclusion variables, suggesting that high inflation may impede digital financial services adoption.

4.3 Test of Hypotheses

4.3.1 Hypothesis 1: Digital Transformation and Financial Inclusion

H1: Digital transformation has a statistically significant positive effect on financial inclusion in Nigeria.
To test this hypothesis, the effect of the Digital Transformation Index (DTI) on the Financial Inclusion Index (FII) was estimated using FMOLS regression. The results are presented in Table 7.

Table 7: Regression Results – Impact on Financial Inclusion
Dependent Variable: Financial Inclusion Index (FII)

Table7: **Regression Coefficients**

Independent Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	12.456**	4.891	2.547	0.026
Digital Transformation Index	0.742***	0.089	8.337	0.000
Inflation Rate	-0.215**	0.081	-2.654	0.022
GDP Per Capita	0.008***	0.002	4.000	0.002

Model Statistics

Statistic	Value
R-squared	0.912
Adjusted R-squared	0.888
F-statistic	38.456***
Durbin-Watson	1.876
Observations	15

Source: Author's estimation Using EViews

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

Interpretation: The coefficient of the Digital Transformation Index is 0.742, which is statistically significant at the 1% level (p = 0.000). This indicates that a one-unit increase in the Digital Transformation Index is associated with a 0.742-unit increase in the Financial Inclusion Index.

The control variables—Inflation Rate and GDP Per Capita—are also statistically significant. Inflation has a negative effect on financial inclusion (-0.215, p = 0.022), while GDP per capita has a positive effect (0.008, p = 0.002).

The R-squared value of 0.912 indicates that the model explains 91.2% of the variation in the Financial Inclusion Index. The adjusted R-squared (0.888) confirms the model's overall goodness of fit. The F-statistic (38.456, p = 0.000) indicates that the model is statistically significant overall. The Durbin-Watson statistic (1.876) suggests no serious serial correlation.

Decision: Since the p-value for the Digital Transformation Index coefficient is less than 0.05, we reject the null hypothesis and conclude that digital transformation has a statistically significant positive effect on financial inclusion in Nigeria. H1 is supported.

4.3.2 Hypothesis 2: Financial Inclusion and Economic Growth

H2: Financial inclusion has a statistically significant positive effect on economic growth in Nigeria.
To test this hypothesis, the effect of the Financial Inclusion Index (FII) on Real GDP Growth Rate was estimated using FMOLS regression. The results are presented in Table 8.

Table 8: Regression Results – Impact on Economic Growth
Dependent Variable: Real GDP Growth Rate

Table 2: Regression Results

Regression Coefficients

Independent Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	-2.341	1.567	-1.494	0.162
Financial Inclusion Index	0.089***	0.021	4.238	0.001
Inflation Rate	-0.124**	0.045	-2.756	0.018
Investment (% of GDP)	0.152**	0.067	2.269	0.044

Model Statistics

Statistic	Value
R-squared	0.785
Adjusted R-squared	0.726
F-statistic	13.456***
Durbin-Watson	1.923
Observations	15

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

Source: Author's estimation. Using EViews

Interpretation: The coefficient of the Financial Inclusion Index is 0.089, which is statistically significant at the 1% level (p = 0.001). This indicates that a one-unit increase in the Financial Inclusion Index is associated with a 0.089 percentage-point increase in the Real GDP Growth Rate. The control variables—Inflation Rate and Investment—are also statistically significant. Inflation has a negative effect on economic growth (-0.124, p = 0.018), while Investment has a positive effect (0.152, p = 0.044).

The R-squared value of 0.785 indicates that the model explains 78.5% of the variation in the Real GDP Growth Rate. The adjusted R-squared (0.726) confirms the model's overall goodness of fit. The F-statistic (13.456, p = 0.000) indicates

that the model is statistically significant overall. The Durbin-Watson statistic (1.923) suggests no serious serial correlation.

Decision: Since the p-value for the Financial Inclusion Index coefficient is less than 0.05, we reject the null hypothesis and conclude that financial inclusion has a statistically significant positive effect on economic growth in Nigeria. H2 is supported.

4.3.3 Hypothesis 3: Mediation Analysis

H3: Financial inclusion mediates the relationship between digital transformation and economic growth.
To test this hypothesis, the Baron and Kenny (1986) mediation analysis framework was employed. The results are presented in Table 9.

Table 9: Mediation Analysis Results

Mediation Analysis Results

Step	Coefficient	p-value	Conclusion
Step 1: DT → RGDP	0.087**	0.024	Significant (Total Effect)
Step 2: DT → FII	0.742***	0.000	Significant
Step 3: DT → RGDP (controlling for FII)	0.032	0.345	Insignificant (Direct Effect)
Step 3: FII → RGDP (controlling for DT)	0.072**	0.018	Significant (Mediator Effect)

Sobel Test for Mediation

Test	Statistic Value	p-value
Sobel Test	2.847**	0.004
Aroian Test	2.801**	0.005
Goodman Test	2.895**	0.004

Mediation Effect Size

Mediation Effect	Value	% of Total Effect
Direct Effect (c')	0.032	36.8%
Indirect Effect (ab)	0.055	63.2%
Total Effect (c)	0.087	100.0%

Source: Author's estimation.

Step Coefficient p-value Conclusion

Step 1: DT → RGDP 0.087** 0.024 Significant (Total Effect)

Step 2: DT → FII0.742*** 0.000 Significant

Step 3: DT → RGDP (controlling for FII) 0.032 0.345 Insignificant (Direct Effect)

Step 3: FII → RGDP (controlling for DT) 0.072** 0.018 Significant (Mediator Effect)

Mediation Analysis Results

Step	Coefficient	p-value	Conclusion
Step 1: DT → RGDP	0.087**	0.024	Significant (Total Effect)
Step 2: DT → FII	0.742***	0.000	Significant
Step 3: DT → RGDP (controlling for FII)	0.032	0.345	Insignificant (Direct Effect)
Step 3: FII → RGDP (controlling for DT)	0.072**	0.018	Significant (Mediator Effect)

Sobel Test for Mediation

Test	Statistic Value	p-value
Sobel Test	2.847**	0.004
Aroian Test	2.801**	0.005
Goodman Test	2.895**	0.004

Mediation Effect Size

Mediation Effect	Value	% of Total Effect
Direct Effect (c')	0.032	36.8%
Indirect Effect (ab)	0.055	63.2%
Total Effect (c)	0.087	100.0%

Author's computation using EViews

Note: *, **, *** indicate significance at 10%, 5%, and 1% levels respectively. DT = Digital Transformation. FII = Financial Inclusion Index. RGDP = Real GDP Growth Rate.

Interpretation: The mediation analysis reveals the following:

1. Step 1 (Total Effect): The total effect of Digital Transformation on Economic Growth is 0.087, which is statistically significant (p = 0.024). This indicates that digital transformation has a positive total effect on economic growth.
2. Step 2 (DT → FII): The effect of Digital Transformation on Financial Inclusion is 0.742, which is statistically significant (p = 0.000). This confirms that digital transformation positively affects financial inclusion.
3. Step 3 (Direct and Mediated Effects): When Financial Inclusion is included in the model:
   · The direct effect of Digital Transformation on Economic Growth drops to 0.032 and becomes statistically insignificant (p = 0.345).
   · The effect of Financial Inclusion on Economic Growth is 0.072, which is statistically significant (p = 0.018).
4. Sobel Test: The Sobel test statistic of 2.847 (p = 0.004) confirms that the indirect effect is statistically significant, indicating full mediation.
5. Effect Size: The indirect effect (0.055) accounts for 63.2% of the total effect, while the direct effect (0.032) accounts for only 36.8%. This indicates that financial inclusion is the primary channel through which digital transformation affects economic growth.

Decision: Since the indirect effect is statistically significant (Sobel test $p < 0.05$) and the direct effect becomes insignificant when the mediator is included (full mediation), we reject the null hypothesis and conclude that financial inclusion mediates the relationship between digital transformation and economic growth in Nigeria. H3 is supported.

4.4 Diagnostic Tests

Table 10 presents the diagnostic test results to verify that the regression models satisfy the necessary assumptions for valid inference.

Table 10: Diagnostic Test Results

Diagnostic Tests

Test	Statistic	p-value	Result
Normality (Jarque-Bera)	1.847	0.397	Residuals normally distributed
Heteroskedasticity (Breusch-Pagan)	0.982	0.456	No heteroskedasticity
Serial Correlation (Breusch-Godfrey)	1.234	0.267	No serial correlation
Multicollinearity (VIF)	Max: 3.82	-	No multicollinearity
Ramsey RESET Test	1.456	0.182	Model correctly specified

Source: Author's estimation using EViews

Interpretation: All diagnostic tests yield satisfactory results. The Jarque-Bera test confirms that residuals are normally distributed ($p > 0.10$). The Breusch-Pagan test indicates no heteroskedasticity ($p > 0.10$). The Breusch-Godfrey test shows no serial correlation ($p > 0.10$). The Variance Inflation Factor (VIF) values are all below 5.0, indicating no multicollinearity. The Ramsey RESET test confirms that the models are correctly specified ($p > 0.10$).

4.5 Discussion of Findings

4.5.1 Digital Transformation and Financial Inclusion

The finding that digital transformation has a statistically significant positive effect on financial inclusion ($\beta = 0.742$, $p < 0.01$) is consistent with prior empirical research. This result aligns with the findings of Kanga et al. (2022), who found that mobile money and agent banking have significantly expanded financial access in Sub-Saharan Africa. Similarly, Ozili (2022) found that digital channels are increasingly important for expanding financial access in Nigeria.

The strong positive relationship is attributable to several factors. Digital channels reduce the costs and barriers associated with traditional banking, enabling individuals to participate in the formal financial system without requiring physical branch access (Demirgüç-Kunt et al., 2022). The expansion of agent banking networks, with over two million agents across the country (CBN, 2025), has been a key driver of inclusion. Mobile money platforms, with combined customer bases exceeding 90 million users (NIBSS, 2025), have extended financial services to communities beyond the reach of conventional banking infrastructure.

The negative effect of inflation on financial inclusion (-0.215, $p < 0.05$) is noteworthy. High inflation erodes the value of savings and reduces disposable income, potentially discouraging individuals from using formal financial services. This finding underscores the importance of macroeconomic stability for financial inclusion.

4.5.2 Financial Inclusion and Economic Growth

The finding that financial inclusion has a statistically significant positive effect on economic growth ($\beta = 0.089$, $p < 0.01$) is consistent with the financial inclusion-growth nexus theory and prior empirical research. This result aligns with

Odiboh (2026), who found that mobile money transactions have a statistically significant and positive impact on economic growth in Nigeria. Similarly, Adeniji (2025) found that digital finance variables, particularly POS transactions, show a positive and significant influence on Nigeria's economic growth.

The positive relationship reflects the developmental benefits of inclusive financial systems. When individuals and businesses have access to financial services, they can invest in productive activities, smooth consumption, manage risk, and build assets (Demirgüç-Kunt et al., 2022). These activities contribute to economic growth at the aggregate level.

The finding that investment has a positive effect on economic growth (0.152, $p < 0.05$) is also consistent with economic theory. Investment in productive activities is a key driver of economic growth, and financial inclusion facilitates investment by providing access to capital. The negative effect of inflation on growth (-0.124, $p < 0.05$) reinforces the importance of macroeconomic stability for economic development.

4.5.3 Mediation Analysis

The finding that financial inclusion fully mediates the relationship between digital transformation and economic growth (Sobel test $p = 0.004$, indirect effect = 63.2% of total effect) is a key contribution of this study. This result suggests that digital transformation's impact on economic growth operates primarily through its effect on financial inclusion.

The mediation pathway reflects the mechanisms through which digital financial services translate into economic outcomes: expanded access enables savings mobilization, investment, entrepreneurship, and consumption smoothing (Demirgüç-Kunt et al., 2022). The full mediation finding indicates that financial inclusion is not merely a channel but the primary mechanism through which digital transformation drives economic growth in Nigeria.

This finding has important policy implications. It suggests that investments in digital infrastructure, while important, must be accompanied by measures that enable individuals to effectively use digital financial services. Financial literacy programs, consumer protection frameworks, and trust-building initiatives are essential for maximizing the economic impact of digital transformation (Onwuegbuchunam et al., 2021).

4.5.4 Comparison with Prior Studies

The findings of this study are consistent with prior empirical research. Amuda and Parveen (2026) found that digital economy policy, entrepreneurship, financial inclusion, and sustainable development all exert a statistically significant positive influence on perceived economic growth in Nigeria. The present study extends this finding by demonstrating the mediating role of financial inclusion.

The finding that POS transactions show the strongest correlation with both digital transformation and financial inclusion ($r = 0.951$ and 0.938, respectively) is consistent with Adeniji (2025), who found that POS transactions have the strongest impact on Nigeria's economic growth. This suggests that POS infrastructure is a critical component of Nigeria's digital transformation strategy.

The finding that inflation has a negative effect on both financial inclusion and economic growth is consistent with macroeconomic theory. Kirikkaleli and Adebayo (2021) also found that inflation negatively affects economic growth in Nigeria, reinforcing the importance of price stability.

5.0 SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of the Study

This study examined the impact of digital transformation on financial inclusion and economic growth in Nigeria, focusing on Deposit Money Banks' digital initiatives. The study employed a quantitative research design using time-series data from 2010 to 2024, drawing on authoritative sources including the CBN, NIBSS, NBS, and World Bank.

The study was guided by three research objectives: examining the effect of digital transformation on financial inclusion, investigating the relationship between financial inclusion and economic growth, and assessing the mediating role of financial inclusion in the digital transformation-economic growth relationship. Three hypotheses were formulated and tested using FMOLS estimation techniques.

The findings reveal that:

1. Digital transformation has a statistically significant positive effect on financial inclusion in Nigeria ($\beta = 0.742$, $p < 0.01$).
2. Financial inclusion has a statistically significant positive effect on economic growth in Nigeria ($\beta = 0.089$, $p < 0.01$).
3. Financial inclusion fully mediates the relationship between digital transformation and economic growth, with the indirect effect accounting for 63.2% of the total effect (Sobel test $p = 0.004$).

These findings align with the theoretical framework and prior empirical research. The diagnostic tests confirm that the models satisfy the necessary assumptions for valid inference.

5.2 Summary of Key Findings

Hypothesis Finding Coefficient p-value Decision

H1: DT → FII Positive & Significant 0.742 0.000 Supported

H2: FII → RGDP Positive & Significant 0.089 0.001 Supported

H3: DT → FII → RGDP Full Mediation Indirect: 0.055 0.004 Supported

5.3 Policy Recommendations

Based on the findings of this study, the following policy recommendations are proposed:

1. Accelerate Digital Infrastructure Investment

Given the strong positive effect of digital transformation on financial inclusion (β = 0.742), policymakers should prioritize investments in digital financial infrastructure. This includes expanding broadband connectivity, promoting mobile network coverage, and strengthening the interoperability of payment systems. The PSV 2028 target of deploying 10 million QR-enabled payment acceptance points is a positive step in this direction (CBN, 2026).

2. Strengthen Financial Literacy and Consumer Protection

The mediation finding indicates that digital transformation's impact on growth operates primarily through financial inclusion. To maximize this effect, policymakers should invest in financial literacy programs that enable individuals to effectively use digital financial services. Consumer protection frameworks, including mechanisms for addressing fraud and disputes, are essential for building trust in digital systems (Onwuegbuchunam et al., 2021).

3. Promote Fintech Innovation and Competition

Fintech firms such as OPay and PalmPay have been instrumental in expanding financial access (NIBSS, 2025). The PSV 2028 target of reducing fraud losses to below 0.001 percent of total transactions is important for building confidence in digital systems (CBN, 2026).

4. Address Remaining Exclusion Gaps

Approximately 28.8 million Nigerian adults remain excluded from formal financial services (CBN, 2025). Targeted interventions for women, rural populations, and low-income groups are needed to address persistent exclusion gaps. The PSV 2028 target of 95 percent financial inclusion is ambitious but achievable if targeted measures are implemented (CBN, 2026).

5. Maintain Macroeconomic Stability

The finding that inflation has a negative effect on both financial inclusion (-0.215) and economic growth (-0.124) underscores the importance of macroeconomic stability. Policymakers should pursue prudent monetary and fiscal policies to maintain price stability, as high inflation erodes the benefits of financial inclusion and undermines economic growth.

5.4 Recommendations for Deposit Money Banks

Based on the findings of this study, the following recommendations are proposed for Deposit Money Banks:

1. Expand Digital Banking Channels

Banks should continue investing in digital banking channels, including mobile applications, digital wallets, and agent banking networks. Digital channels are more effective for reaching underserved populations than physical branch expansion (Odiboh, 2026). The strong correlation between POS transactions and both digital transformation (r = 0.951) and financial inclusion (r = 0.938) suggests that POS expansion should be a priority.

2. Leverage Partnerships with Fintech Firms

Partnerships with fintech firms can enable banks to reach new customer segments and leverage innovative technologies. The combined customer base of OPay and PalmPay exceeding 90 million users demonstrates the potential of fintech partnerships for expanding financial access (NIBSS, 2025).

3. Strengthen Digital Identity Systems

Continued investment in biometric identification systems, particularly BVN and NIN integration, is essential for enabling secure digital banking. The growth of BVN enrolments to 67.8 million demonstrates the importance of identity systems for financial inclusion (NIBSS, 2025).

4. Build Trust in Digital Systems

Trust in digital payment systems remains a major challenge, with some traders preferring cash transactions because of concerns about payment reliability (Onwuegbuchunam et al., 2021). Banks should invest in fraud prevention, customer education, and dispute resolution mechanisms to build trust in digital channels.

5. Develop Targeted Products for Underserved Segments

Given that approximately 28.8 million Nigerian adults remain excluded from formal financial services (CBN, 2025), banks should develop targeted products for women, rural populations, and low-income groups. Micro-savings products, micro-insurance, and small-ticket loans delivered through digital channels can address the needs of underserved segments.

5.5 Recommendations for Future Research

The study suggests several avenues for future research:

1. Disaggregated Analysis

Future research could examine digital transformation, financial inclusion, and growth at sub-national levels to capture regional variation. Nigeria's states differ significantly in infrastructure, economic structure, and financial inclusion levels, and disaggregated analysis could identify context-specific factors.

2. Micro-Level Analysis

Household and firm-level surveys could complement the aggregate analysis by examining the mechanisms through which digital financial services affect economic outcomes at the individual level. This could provide insights into the pathways through which digital transformation promotes inclusion and growth.

3. Expanded Data

Future research could employ quarterly data, which would provide more observations and enable more sophisticated econometric analysis. As more frequent data becomes available, researchers can examine seasonal patterns and short-run dynamics.

4. Alternative Methodological Approaches

Future research could employ alternative identification strategies, such as instrumental variables or difference-in-differences, to strengthen causal inference. These approaches could complement the time-series analysis employed in this study.

5. Comparative Analysis

Comparative studies across Sub-Saharan African countries could examine how different policy environments, institutional contexts, and technological conditions shape the digital transformation-inclusion-growth relationship. Such studies could generate insights for regional policy coordination.

6. Sectoral Analysis

Future research could examine the differential effects of digital financial services across economic sectors. Understanding which sectors benefit most from digital financial inclusion could inform targeted policy interventions.

7. Gender Analysis

Given the persistent gender gaps in financial inclusion (Demirgüç-Kunt et al., 2022), future research could examine the differential impacts of digital transformation on male and female financial inclusion. This could inform gender-sensitive policy interventions.

5.6 Conclusion

This study assessed the impact of digital transformation on financial inclusion and economic growth in Nigeria, focusing on Deposit Money Banks' digital initiatives. The study employed a quantitative research design using time-series data from 2010 to 2024, drawing on authoritative sources including the CBN, NIBSS, NBS, and World Bank.

The findings indicate that digital transformation has a positive and statistically significant effect on financial inclusion ($\beta = 0.742$, $p < 0.01$), financial inclusion has a positive and statistically significant effect on economic growth ($\beta = 0.089$, $p < 0.01$), and financial inclusion fully mediates the digital transformation-economic growth relationship (indirect effect = 63.2% of total effect, Sobel $p = 0.004$). These findings suggest that digital transformation initiatives, including investments in payment systems, mobile money, and agent banking, have contributed to expanding financial access and promoting economic growth.

Nigeria's digital financial landscape has evolved significantly over the past decade. Electronic payment transactions reached N1.07 quadrillion in 2024, formal financial inclusion increased to 64 percent, and BVN enrolments grew to 67.8 million (NIBSS, 2025; CBN, 2025). The launch of PSV 2028, targeting 95 percent financial inclusion by 2028, demonstrates continued policy commitment to digital transformation and inclusive growth (CBN, 2026).

Despite significant progress, persistent challenges remain. Approximately 28.8 million Nigerian adults remain excluded from formal financial services (CBN, 2025). Trust in digital payment systems remains a concern (Onwuegbuchunam et al., 2021). Infrastructure deficits, digital literacy gaps, and regulatory complexities continue to constrain the full realization of digital transformation's potential.

The study's findings underscore the importance of continued policy support for digital transformation, financial inclusion, and economic growth. Investments in digital infrastructure, financial literacy, and consumer protection are essential for realizing the full benefits of digital financial services. Deposit Money Banks have an important role to play in expanding digital channels, building trust, and promoting inclusive access.

In conclusion, digital transformation has been a significant driver of financial inclusion and economic growth in Nigeria. The study's findings support the policy direction of continuing and strengthening digital financial initiatives. With continued commitment from policymakers, financial institutions, and other stakeholders, Nigeria can build a digital financial ecosystem that promotes inclusive and sustainable growth.

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