INTERNATIONAL JOURNAL OF ENTREPRENEURSHIP, BUSINESS AND SCIENTIFIC RESEARCH (IJEBSR) *ISSN*: (***Print***: 3115-5103 - ***Online***: 3115-557X). ***Vol***. 1, ***Issue*** 3., **2025**
https://journals.iempsglobal.org/index.php/IJEBSR

IMPACT OF FINANCIAL TECHNOLOGY AND FINANCIAL INCLUSION ON ECONOMIC DEVELOPMENT IN NIGERIA: AN EMPIRICAL ANALYSIS

2009–2024

Dr Emmanuel Chika Obizue
FIEMPS, FMIMPS, FIAPS, FCIAP, MAMN, CFC, ChMC
Institute of Education, Management and Professional Studies
c/o Department of Banking and Finance, Faculty of Management Sciences,
Imo State University Owerri, Imo state
ORCID: 0009-0002-9119-1668
dremmanuelobizue@gmail.com
+2348068099918

Dr Mirian N. Obizue
Institute of Education, Management and Professional Studies
ORCID: 0009-0001-9712-0337
mnobizue@gmail.com
+2347031976469

Abstract

This study empirically investigates the impact of financial technology (FinTech) and financial inclusion on economic development in Nigeria using annual time-series data covering 2009–2023 (15 years). Financial technology is proxied by digital payment channels such as mobile banking transactions, ATM transactions and POS transactions, while financial inclusion was represented by number of bank accounts, (NBA) and credit to the private sector (CPS). Economic development is measured using real GDP per capita (RGDPPC). The study employs the Autoregressive Distributed Lag (ARDL) model alongside descriptive statistics, unit root test, bounds test, and diagnostic tests. The results indicate that financial technology significantly enhances financial inclusion and contributes positively to economic development in Nigeria in the long run. The ARDL bounds test confirms the existence of a long-run relationship among the variables. The findings suggest that improvements in digital financial services and access to financial institutions increase economic

participation and productivity. The study recommends strengthening fintech infrastructure, expanding digital payment systems and implementing policies that encourage financial access in rural areas to accelerate economic development.

Keywords: Financial Technology, Financial Inclusion, Economic Development, ATM Transactions, POS Transactions

Introduction

The financial sector plays a vital role in driving economic growth and development in any nation. A well-developed financial system will effectively function in the financial intermediation role that is known of the sector, mobilize funds and allocate resources efficiently thereby facilitating business and investment activities that are contributory to development of the economy. Studies have revealed that the growth of the financial sector is closely tied to the development of the real sector and financial development enables investment, savings and risk management which ultimately lead to rapid economic growth. Ihenacho 2016 and Ozims (2024) averred that the growth of the real sector has a direct impact on the financial sector's development, while the financial sector's growth influences the real economy.

The Nigerian financial sector has undergone significant transformation steps in recent years with increased competition, regulatory reforms, technological advancements and visible improvements having based on financial technology and financial inclusion.

Financial technology (FinTech) has transformed financial service delivery globally by integrating digital technologies into banking and financial operations. FinTech innovations such as mobile banking, internet banking, and electronic payment systems have enhanced financial accessibility and efficiency while financial inclusion remains a critical policy objective due to the large proportion of the population excluded from formal financial services. Financial inclusion refers to the availability and accessibility of financial services such as savings, credit, insurance, and payments to all segments of society.

Financial technology plays a vital role in bridging financial inclusion gaps by enabling digital transactions and reducing the cost of financial services. Obizue & Obizue (2024) posited that digital platforms allow individuals and businesses to access financial services remotely, thereby promoting economic participation.

Empirical evidence suggests that financial inclusion and financial sector development positively influence economic growth by facilitating savings mobilization, investment, and resource allocation. For instance, studies have shown that financial inclusion indicators such as bank branches and credit to the private sector significantly influence economic growth in Nigeria.

Furthermore, digital financial services have expanded financial access and improved economic welfare through digital credit and mobile banking platforms.

Given Nigeria's rapid digital transformation and policy efforts to increase financial inclusion, it becomes necessary to empirically evaluate how fintech and financial inclusion jointly influence economic development.

The study is expected to be of significant benefit in the following ways:

Policy Makers: The study will provides insights for designing policies that enhance fintech development and financial inclusion.

Financial Institutions: It will be of immense help to banks and fintech companies to understand the economic implications of digital financial services.

Researchers: Contribution to the existing empirical literature on financial technology and economic development to build the body of knowledge for the benefit of up-coming research investigations.

Government: She will assisted in evaluating the effectiveness of financial inclusion strategies.

Despite the rapid growth of financial technology in Nigeria, financial exclusion remains relatively high, especially in rural areas and among low-income populations. A significant proportion of Nigerians still lack access to formal banking services, limiting their access to banking services like deposits and credit facilities and also their ability to save, invest, and participate in economic activities. Although fintech innovations such as mobile banking and electronic payments have expanded access to financial services, the extent to which these innovations contribute to economic development remains debated. The transformative potentials of financial technology have been revolutionary, it presents systemic risks. Eneberi (2022) emphasizes that rapid digitalization increases exposure to cybersecurity vulnerabilities and operational risk. Weak digital literacy and infrastructural deficiencies can limit adoption rates, particularly in developing economies. Several studies have revealed that innovation adoption is influenced by social readiness and institutional credibility, suggesting that digital banking diffusion may be uneven. This make financial technology

seen as serving both a catalyst for financial deepening and a source of structural complexity, necessitating empirical examination of its developmental implications. Some empirical studies suggest that fintech adoption has not yet translated into significant improvements in financial inclusion in the short run. Additionally, there are some infrastructural challenges, digital literacy gaps, and regulatory issues hinder the full potential of fintech in promoting economic development. Therefore, the problem addressed in this study is the uncertain empirical relationship between financial technology, financial inclusion, and economic development in Nigeria.

The main objective is to examine the impact of financial technology and financial inclusion on economic development in Nigeria.

The study specifically sought the following objectives:

1. To examine the effect of POS transactions as proxy for financial technology on economic development in Nigeria.
2. To determine the effect of ATM transactions as proxy for financial technology on economic development in Nigeria.
3. To examine the impact of number of bank accounts (NBA) as proxy for financial inclusion on economic development in Nigeria.
4. To identify the relationship between credit to private sector (CPS) as proxy for financial inclusion and economic development.

The following research questions were formulated to guide this study;

1. What is the effect of POS transactions as proxy for financial technology on economic development in Nigeria?
2. What is the effect of ATM transactions as proxy for financial technology on economic development in Nigeria?
3. To what extent does the number of bank accounts (NBA) as proxy for financial inclusion impact on economic development in Nigeria?
4. What is the correlation between credit to private sector (CPS) as proxy for financial inclusion and economic development?

Based on the research specific objectives and questions, the study tested the following null hypotheses.

1. POS as proxy for Financial technology does not significantly affect economic development in Nigeria
2. There is no significant effect of ATM as proxy for financial technology on economic development in Nigeria
3. Number of bank accounts (NBA) as a proxy for financial inclusion has no significant impact on economic development in Nigeria
4. There is no significant correlationship between credit to private sector (CPS) as proxy for financial inclusion and economic development

Literature Review

Financial Technology

Financial technology refers to the application of digital technologies to financial services including mobile payments, digital banking, blockchain, and online lending. Fintech is a technological innovation used to improve and automate financial services and product delivery which may be at a reduced cost. Obizue & Ihejirika (2025) posited that financial technology is the technology-driven banking services conducted via electronic platforms such as mobile apps and internet banking and it can also be called digital banking. It constitutes a core dimension of banking service re-engineering and refers to the use of electronic technologies to deliver financial services through internet platforms, mobile devices, automated systems, and digital payment infrastructures. Financial technology is a digital resource innovation that brought about e-business in the banking industry where banking services and products are delivered through electronic channels, such as mobile phones, the internet, automated teller machines and point-of-sales facilities. Oyedele & Akinbola (2019) described digital finance as a transformative instrument that enhances accessibility and operationa20190l efficiency within financial systems. Ibrahim & Musa (2023) demonstrated that digital financial services significantly expand inclusion by lowering transaction costs and eliminating geographical barriers.

Financial Inclusion

The degree to which individuals and businesses have access to financial services called financial inclusion (Obizue & Ihejirika, 2025). Financial inclusion is the process of ensuring access to appropriate and affordable financial services such as savings, credit, and insurance for individuals and businesses. Financial inclusion is the opposite of financial exclusion which implies that adults can easily access banking, credit, savings and payment services through formal financial institutions. According to Akunna et al (2025), Financial Inclusion is the availability and quality of opportunities

to access financial services, the process by which individual and businesses can access appropriate, affordable and timely financial products and services. They further posited that financial inclusion increases the number of individuals that have access to formal financial services through having formal bank account with its positive impact on poverty reduction and economic growth. Amadi & Ezeoma (2018) averred that financial inclusion connotes the availability and accessibility of affordable financial services to all segments of society, particularly marginalized and underserved populations. Financial inclusion offers all members of the economy who were excluded from banking services to begin to access financial system products and facilities without difficulty. Obizue & Obizue (2024) from another perspective, defined financial inclusion as the effort made to identify what the customers need, financial literacy to help in counseling, screening and proper monitoring. When larger part of the citizenry is involved in the financial mainstream, saving, investment, job creation and rate of economic growth will be enhanced (Nnanna, 2004).

In Nigeria, digital banking innovations such as mobile money, agency banking networks, and USSD-based transactions have expanded outreach to rural populations. Ozili (2020) highlights that digital channels enhance inclusion by providing flexible and low-cost financial access points. However, inclusion outcomes depend heavily on institutional trust, regulatory frameworks, and infrastructural stability. World Bank (2022) defined financial inclusion as the process in which all adults and business firms have easy access to formal financial services. According to Slemem et al (2025), the Bank also viewed it as the efforts by government and relevant authorities to make financial services and products easily, cheaply and affordably available to all adult population without any form of discrimination.

According to Akunna et al (2025), the following are the types of financial inclusion.

Geographic Inclusion: Geographic inclusion: Ensure that financial services are available in all parts of a country including rural and remote areas.

Demographic inclusion: This ensure that all segments of society have access to financial services,

regardless of age, gender, in come and education.

Production Inclusion: Ensure that a range of financial products and services are available to meet

the diverse needs of individuals and business.

Digital Inclusion: Ensures that digital technologies such as mobile phones and the internet are

accessible and affordable to all so that people can procure, access and use digital financial product and services effectively.

Social Inclusion: Ensures that financial services are accessible to marginalized and disadvantaged

groups in the society (refugees and disables).

Economic Development

Obizue & Ihejirika (2025) asserted that economic development refers to the improvement in economic well-being and quality of life, typically measured through indicators like GDP growth, employment generation, poverty reduction and improved standard of living. Economic development refers to sustained improvements in income levels, employment, and overall welfare within an economy. It is the structural improvements in the economy reflected in GDP growth, employment expansion, and enhanced living standards (Adeyemi & Bola, 2023).

Economic development refers to the improvement in economic well-being and quality of life, typically measured through indicators like GDP growth, employment generation, poverty reduction and improved standard of living. According to Obizue & Ihejirika (2025), economic development is a multidimensional and dynamic process that transcends mere output expansion to encompass structural transformation, poverty reduction, employment generation, income redistribution, institutional strengthening, and improvements in human welfare. Development has been widely conceptualized as a process that involves major structural changes in social systems, institutional arrangements, and economic performance. Traditional growth metrics such as Gross Domestic Product (GDP) provide partial insight into economic performance but fail to capture distributional equity, social inclusion, and institutional robustness (Ofaite & Kesen, 2018) argues that development should be understood as the expansion of substantive freedoms and capabilities, emphasizing access to opportunities and institutional empowerment. Schumpeter (1911) earlier asserted that banks finance entrepreneurial innovation, thereby catalyzing structural economic transformation.

In the Nigerian context, financial sector performance has demonstrated measurable influence on macroeconomic outcomes. Iwedi (2024) find that financial reforms positively affected economic growth through improved capital adequacy and stability. Understanding economic development within this study requires situating banking service re-engineering within a broader development framework encompassing financial deepening, technological innovation, institutional quality, and inclusive growth dynamics.

Relationship between Financial Technology, Financial Inclusion and Economic Development

FinTech has played a critical role in expanding financial inclusion in Nigeria. Digital platforms such as mobile banking and agent banking enable individuals in rural and underserved communities to access financial services without visiting physical bank branches.

Empirical evidence shows that FinTech services such as mobile payments, digital lending, and digital investment significantly improve financial inclusion levels in Nigeria. Ihenacho (2016) posited that mobile payment platforms in particular, have the strongest positive impact on expanding access to financial services. Digital finance has significantly improved financial inclusion in Nigeria by expanding access to financial services beyond traditional banking institutions and mobile banking, digital wallets, and fintech innovations have made it easier for individuals, especially those in rural and underserved areas, to perform transactions, save and access credit without needing to visit physical bank branches (Nnaji, Akpan & Omele, (2023). The rise of mobile money services has also allowed previously unbanked populations to participate in the formal financial system, reducing reliance on cash-based transactions and informal savings methods. Osagie & Afolabi (2025) supported that digital lending platforms have provided microloans to small businesses and individuals who would otherwise struggle to secure credit from traditional banks due to stringent requirements. However, despite these advancements, several challenges limit the full impact of digital finance on financial inclusion. Poor internet connectivity, unreliable electricity and a lack of digital literacy among rural populations hinder widespread adoption (Amadi & Ezeoma, 2018). Many people remain skeptical of digital financial services due to concerns about fraud, cybercrime, and hidden charges. Moreover, transaction costs and regulatory constraints sometimes make digital financial services less attractive, particularly for low income earners. To maximize the benefits of digital finance, policymakers and financial institutions must invest in digital infrastructure, enhance cybersecurity measures, and implement targeted financial literacy programs to build trust and encourage broader adoption of digital financial solutions.

According to Amadi & Ezeoma (2018), Oscar (2023), Iwedi (2024) and Chukwu & Mohamed (2025), financial inclusion has contributed to economic development through several mechanisms as below;

Increased investment and savings: Access to financial services encourages individuals and businesses to save and invest in productive activities. Several research studies showed that a strong positive relationship exist between financial inclusion and economic growth, with increased access to banking services contributing to higher GDP per capita and such are evident in the following areas.

Poverty reduction: Financial inclusion allows poor households to access credit and financial tools that improve income generation.

Entrepreneurship development: Small and medium enterprises (SMEs) gain access to financing for business expansion.

Economic participation: When more citizens participate in the formal financial system, economic activities increase, contributing to GDP growth.

Researches have shown a strong positive relationship between financial inclusion and economic growth, with increased access to banking services contributing to higher GDP per capita.

Empirical studies have revealed that FinTech enhances the economic benefits of financial inclusion by making financial services more accessible and efficient and that financial inclusion has a positive and significant effect on Nigeria's economic growth and development of nations.

Obizue & Obizue (2024) averred that the adoption of FinTech strengthens the impact of financial inclusion on economic development which means that when financial inclusion is supported by technological innovation, the impact on economic development becomes stronger.

Channels through which FinTech and Financial Inclusion Promote Economic Development

Wide empirical review, the following are few channels through which financial innovation can impact on financial inclusion and also on economic development.

Digital Payment Systems: Digital payment systems reduce transaction costs and improve efficiency in financial transactions thereby enhancing inclusion.

Credit Access for SMEs: FinTech lending platforms provide quick access to credit for small businesses that lack collateral.

Job Creation: The growth of FinTech companies and financial inclusion create employment opportunities in technology, finance, and digital services.

Financial Deepening: FinTech expands the range of financial services available in the economy.

Rural Financial Access: Mobile banking and agent banking enable rural populations to access financial services thus frustrating exclusion situations.

Challenges Limiting the Impact of FinTech and Financial Inclusion on Economic Development

Evidence from scholarly studies show that although FinTech adoption is increasing, low financial literacy among rural populations limits its full potential. Despite the benefits, several challenges still limit their impact on economic development in Nigeria:

Low financial literacy

Poor digital infrastructure

Cybersecurity risks

Regulatory challenges

Limited internet access in rural areas

Others are poor internet connectivity, unreliable electricity and lack of digital literacy among rural populations (Obizue and Obizue, 2025)

Theoretical Review

This study is anchored on three major theories as examined below.

Financial Intermediation Theory

This theory explains how financial institutions channel funds from savers to investors, thereby promoting productive economic activities. Financial intermediation theory explains how financial institutions (e.g., banks, fintech companies) facilitate the flow of funds between savers and borrowers, reducing transaction costs and information asymmetry. The key concepts are:

Financial intermediaries which include institutions that provide these financial services like deposits, loans, payments etc.

Information asymmetry: Unequal access to information between parties, leading to market inefficiencies.

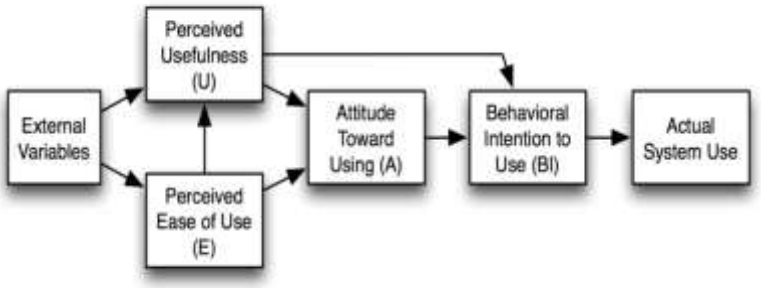
Transaction costs: Costs associated with financial transactions example; fees, time.

The financial intermediaries serve in pooling and managing risk, proving liquidity to borrowers and savers, gathering and processing information to assess creditworthiness and monitoring and overseeing borrowers' activities. It should also be noted that financial technology disrupts traditional financial intermediation by reducing transaction costs and fastening transactions, increasing access to and expanding financial services to underserved populations as well as improving efficiency by streamlining processes and enhancing risk management.

The theory of financial intermediation is relevant to the study because fintech companies are new financial intermediaries that changes how financial services are delivered and by enhancing financial inclusion by reaching underserved populations and facilitating efficient financial intermediation that promotes economic development through the mobilization of savings and allocating capital effectively.

By applying financial intermediation theory, the study can provide insights into fintech's role in promoting financial inclusion and economic development in Nigeria. 💡.

Technology Acceptance Model (TAM)



This theory explains how individuals adopt new technologies such as mobile banking and digital payments. The theory expounds how people perceive and accept the introduction of new technology. TAM was introduced by Davis (1989) and adapted from the Theory of Reasoned Action (TRA). TAM describes the acceptance of technology in an organization by individuals (Davis, 1989). It also explains an individual's intention to use new information technology (Cheng et al., 2006). The Technology Acceptance Model (TAM) is a widely used theoretical framework that explains how users accept and adopt new technologies. By applying TAM, the study can provide insights into the factors that drive fintech adoption and financial inclusion, and inform strategies to promote economic development in Nigeria. In the context of financial technology (fintech), TAM can help

explain how users (individuals and businesses) adopt and use fintech services, such as mobile payments, internet banking, and digital financial services. (TAM) is more oriented towards analyzing human behavior in using information systems

TAM posits that two key factors influence an individual's intention to use a technology:

Perceived Usefulness (PU): The degree to which a user believes that a technology will improve their performance or make their life easier. Fintech services are perceived as useful if they provide convenience, speed, and security in financial transactions, and improve access to financial services.

Perceived Ease of Use (PEOU): The degree to which a user believes that a technology is easy to use and requires minimal effort. Fintech services are perceived as easy to use if they have user-friendly interfaces, are accessible via mobile devices, and require minimal technical expertise.

The TAM framework is relevant to the study on the impact of fintech and financial inclusion on economic development in Nigeria because of the following:

Adoption of fintech services: Understanding the factors that influence the adoption of fintech services (e.g., mobile payments, internet banking) can help policymakers and service providers design and promote services that meet the needs of users.

Financial inclusion: Fintech services can enhance financial inclusion by providing access to financial services for underserved populations. TAM can help identify the factors that influence the adoption of fintech services among these populations.

Economic development: By understanding the factors that drive fintech adoption and financial inclusion, policymakers can design strategies to promote economic development in Nigeria.

Public Good Theory of Financial Inclusion

The public good concept of financial inclusion postulated that formal financial services should be considered a public good and be made equally accessible to everyone, hence to the benefit of all and sundry. The theory is of the view that financial services should not be restricted some set of people or excluded from some set of people due to social, political, wealth or educational status. This is because formal financial services are a public good, one person's access to them will hinder its availability for others benefits. According to this point of view, financial inclusion benefits everyone and leaves no one out. The public benefit principle of financial inclusion explain the fact that anyone

can make use of financial services without disrupting another at any instance. For example, it allows for the distribution of free debit cards to anybody who opens a formal bank account. They can use Automated Teller Machines (ATMs) to conduct transactions without incurring a transaction fee. As a sunk cost of doing business, financial institutions and other suppliers of formal financial services will be accountable for paying the costs associated with providing those services.

Empirical Review

Several studies have examined the relationship between financial technology, financial inclusion and economic growth. A few of them are summarily reviewed in this study.

Slemem, Freeman, & Godfrey (2025) adopted the analytical research design to examine the impact of financial inclusion on economic growth in Nigeria from 1992 to 2022. The data used were obtained from CBN statistical bulletins for data on bank credits and bank branches and World Bank and World Development Indicators, 2022 for data on economic growth rate. The study conducted correlation test, unit root test, ARDL bound test for co-integration to analyze the data. The ARDL results revealed that negative relationship between financial inclusion and economic growth. The study therefore concluded that financial inclusion has a positive impact in promoting economic growth in Nigeria for the period under review. It was recommended that government and policymakers should encourage financial literacy programs that enlighten people on the importance of increased access to financial products and also reassess the current financial inclusion strategies to prioritize productivity enhancing sectors such as agriculture, manufacturing and technology.

Akunna, Ikenna & Chukwu (2025) investigated the effect of digital finance on financial inclusion in Nigeria from 2009 to 2023. Using time series data from the Central Bank of Nigeria Statistical Bulletin (2023), the research examined the influence of Automated Teller Machines (ATMs), Point of Sale (POS) terminals, and mobile banking on the deposits of rural bank branches and the Auto-Regressive Distributed Lag (ARDL) result indicated that although digital finance had a positive effect, its impact was statistically insignificant throughout the study of period. The study suggests that the government and financial institutions should prioritize expanding digital infrastructure, including stable internet connectivity and electricity, particularly in rural areas and to overcome barriers to mobile banking and other digital financial services, financial institutions should introduce targeted financial literacy programs to educate users and build trust.

Akoma (2023) examined the impact of financial inclusion on inclusive economic growth in Nigeria. Time series data was obtained from CBN statistical bulletin and work development

indicator from 1981 to 2020. Loans to rural dwellers, number of bank branches, money supply GDP ratio, private sector credits to GDP ratio were the independent variables and GDP per capita was the dependent variable. The study adopted the unit root and co-integration tests and ARDL model and the results revealed that positive and significant correlation with the GDP growth in both short and long run while inclusive economic growth was hampered by interest rate. The study recommended that more improved financial services should be provided to the rural dwellers and all the adult population in the country at large to easily help them participate and contribute to national productivity towards removing inequality and enhancing the rate of economic growth and development in Nigeria.

Chude & Chude (2022) used secondary data from 1986 to 2021 to evaluate the impact of financial

inclusion on economic growth in Nigeria. The variables used were number of bank branches, total

loans, commercial banks deposits and ATMs services. Best Linear Unbiased estimators (BLUE)

and Ordinary least squares (OLS) techniques were used for data analysis. The study revealed that there is an inverse relationship between total bank loans and economic growth. This implies that total bank loans do not contribute anything positively and significantly to the economic growth in Nigeria but deposit by people and bank branches have a significant and positive relationship with economic growth. The study therefore recommended that banks should firstly know or specify what the borrowed funds are to be used for and ensure the provision of reliable collateral security before giving credits to their customers.

Gap in Literature

Most of the previous empirical studies did not focus on the combined impact of finance technology and financial inclusion on the economic development of Nigeria as this current study did even the variables it adopted. This study looked at the relationship between financial technology and financial inclusion as well as the relationship the two and economic development, xraying how fintech enhances financial inclusion and their respective and general impact on economic development. The researcher's literature search revealed that it's very rare to find past studies in this direction

Methodology

This study adopted the expote facto research design. Secondary data were sourced from CBN Statistical Bulletin, World Bank Indicators (WDI), National Bereau of Statistics NBS, Nigerian

Interbank settlement System (NIBSS). Financial technology was proxied by digital payment channels such as ATM transactions and POS transactions while financial inclusion was measured by number of bank accounts (NBA) and credit to the private sector (CPS). This study used real GDP per Capita (RGDPPC) as the indicator for economic development. The tool of analysis was the Autoregressive Distributed Lag (ARDL) model alongside descriptive statistics, correlation matrix, unit root test, bounds test and diagnostic tests.

Model Specification

The functional model is:

RGDPPC = f(FINTECH, FININC) ……..……1

The econometric model:

RGDPPC = ATM + POS + NBA + CPS

ARDL model:

RGDPPC = $\alpha 0 + \alpha 1 \text{ATM}t + \alpha 2\ \text{POS}t + \alpha 3\ \text{NBA}t + \alpha 4\ \text{CPS}t + \varepsilon t$……..…….2

Where:

RGDPPC = Real Gross Domestic Product per Capita for economic development

ATM = ATM Transactions measure for Financial Technology

POS = POS Transactions measure for Financial Technology

NBA = Number of Bank Accounts measure for Financial Inclusion

CPS = Credit to Private Sector measure for Financial Inclusion

$\alpha 0$ = Intercept

εt = Error term

The ARDL equation for economic growth model is as follows:

$RGDP$PCt=α0+α1iΔATM$t-i$+α2iΔPOS$t-i$+α3iΔNBA$t-i$+α4iCPS$t-i$+β1ATM$t-1$+β2POS$t-1$+ β4NBA$t-1$$\beta$5CPS$t-1$+μ ……..…….3

Thus the error correction version of ARDL model pertaining to the variables in equation (3) is

as follows:

$RGDP$PCt=α0+α1iΔATM$t-i$+α2iΔPOS$t-i$+α3iΔNBA$t-i$+α4iCPS$t-i$+β1ATM$t-1$+β2POS$t-1$+ β4NBA$t-1$$\beta$5CPS$t-1$ +$\lambda ECt-1$+μt ……..…….4

EC represents the residuals that were obtained from the estimated co-integration model of equation and λ is the speed of adjustment parameter

Apriori Expactation

This explains the theoretical linkage on the signs and magnitudes of parameter of the specified functions. Apriori expectations are determined by the principles of economic theory guiding the economic relationship among the variables being studied. Nnanna (2004) asserted that many literatures has given credence to the positive impact of all these financial development indicators on the economic growth. Hence α1 – α4 > 0

Results

Descriptive Statistics

The extents to which the manifest constructs of these variables are prevalent are described in relation to some statistical measures. Accordingly, descriptive statistical measures such as mean, median, mode, standard deviation, range, kurtosis, skewness, histogram and Jarque-Bera statistic, are calculated for each of the variables with a view to quantifying the manifest construct of the variables in terms of central tendency, dispersion and shapes of their distributions. In view of this, each of the variables and their descriptive properties are presented in table 1 collectively.

Table 1: Descriptive Statistics Result

Variables	RGDPPC	ATM	POS	NBA	CPS
Mean	0.271061	1.251487	0.769971	4.675972	0.789624
Median	0.149500	0.864122	0.541999	0.850442	0.637022
Maximum	1.244100	23.80491	29.62830	1955.934	4.412249
Minimum	-0.026900	0.004624	-59.65890	0.032319	-0.601570
Std. Dev.	0.264972	2.039184	3.544171	84.12947	0.715369
Skewness	1.125801	6.616316	-7.306497	23.16924	2.346052
Kurtosis	3.328292	57.37126	175.0073	537.8764	9.734768
Jarque-Bera	116.4935	70455.08	670501.0	6485401.	1515.891
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	146.3728	675.8028	415.7844	2525.025	426.3968
Sum Sq. Dev.	37.84330	2241.309	6770.458	3814916.	275.8348
Observations	140	140	140	140	140

Source: Researcher's Desk/ Computation, 2025 (E-views 10)

From the tables, RGDPPC recorded an observed mean value of 0.271061, maximum is approximately 1.244100 minimum is approximately -0.026900. The standard deviation of 0.264972 is skewed to the right. By the Jarque-Bera statistic and associated probability value, the distribution is not normally distributed. But the distribution is positively skewed (tilted toward the right direction of the mean value). The mean value of ATM is approximately 1.251487 and the distribution is skewed to the right and not normally distributed as the probability value of Jaque Bera is statistically significant at 5% level. It show fair stability. POS generated 0.769971 with maximum and minimum value of 29.62830 and -59.65890 respectively. The standard deviation of 3.544171 is higher than the mean implying that the coefficient of variation is considerably high. This high degree of variability. The Jarque-Bera statistic and the associated probability value indicate that the distribution of ratio of equity to total debt is not normally distributed. It is negatively skewed (tilted toward the left side). NBA has maximum and minimum values of ₦19.55934 and ₦0.032319 respectively and the distribution is slightly skewed to the right and asymmetric. For CPS, minimum is approximately -0.601570 for every ₦1 short term debt. The standard deviation is 0.715369 and is skewed to the right. Conclusively, the descriptive statistics show moderate variability among the variables, indicating stable trends during the study period.

Multicollineraity (Correlation Analysis)

Table 2 below presents the correlation matrix of the variables wherein the degree and direction of effect are indicated with the aid of Pearson's product moment correlation. Depending on the number of variables in any study, correlation matrix of study variables presents three (3) major distinctive bivariate effect are within the context of the study. These comprise of pair-wise effect among the independent variables, pair-wise effect between dependent and independent variables, and pair-wise effect among the dependent variables. Each category of these pair-wise effect has unique implication for the study. Meanwhile, the test result is summarized below.

Table 2: Summary of the Partial Correlation Coefficient between the Dependent and Independent Variables

Variables	RGDPPC	ATM	POS	NBA	CPS
RGDPPC	1.000000				
ATM	-0.096936	1.000000			
POS	-0.003681	0.200830	1.000000		
NBA	0.061419	0.100416	0.029666	1.000000	
CPS	-0.071449	-0.069054	-0.001074	-0.001371	1.000000

Source: Researcher's Desk/ Computation, 2025 (E-views 10)

The first pair-wise correlation is mostly useful to the study by way of enabling the researcher to develop diagnostic capability in mitigating the effect of multi-collinearity by introducing biases in the standard error estimates of the coefficients. Multi-colinearity exists when the predictor variables are themselves highly correlated that is when the coefficient of correlation is higher than or equal to 0.80. If the variables have variance inflation factor (VIF) of above 10, then there is a strong indication of the existence of excess correlation, (Gujarati, 2004). From the above result, none of the explanatory variables are highly correlated. That means the explanatory variables are relatively having low levels of correlation as indicated in the table clearly establishes there is no multicollinearity in the model.

Conclusively, we discovered that there is no multicollinearity among the explanatory variables in the model in all the sectors as none of the coefficient of the correlation is above 0.80. Therefore, the model conforms to our apriori expectation. The category of bivariate effect between independent variables is mostly that of theoretical or empirical validation, the basis upon which the hypotheses are confirmed or rejected.

Unit root test

To begin, it is necessary to test whether the underlying processes that generated the data series can be assumed to be invariant with respect to time. If the process is not stationary, it will often be difficult to represent the time series equations with fixed coefficients. The Augmented Dickey-Fuller (ADF) test is widely used due to its robustness and its capacity to remove autocorrelation from the model. Furthermore, the unit root test was conducted to avoid a biased estimate that may lead to spurious regression results in the stated model.

Table 3: Summary of the Stationarity Test Results for Selected Firms

Variables	Augmented Dicky-Fuller test statistic	Critical Value at 5% at level	Order of integration	Remarks
RGDPPC	4.169426	-3.428011	I(0)	Stationary at level
ATM	3.454001	4.706619	I(1)	Stationary at first difference
POS	-3.088429	4.224762	I(1)	Stationary at first difference
NBA	15.20128	7.629025	I(0)	Stationary at level
CPS	9.625513	-6.410338	I(0)	Stationary at level

Source: Researcher's Desk/ Computation, 2025 (E-views 10)

The unit root test results in Table 3 shows the Augmented Dickey-Fuller unit root where RGDPPC, NBA and CPS were stationary at level hence integrated at order zero I(0). This is because their ADF is less than their critical values at 5%. Again, The ATM and POS were stationary at first difference due to the fact that ADF values are greater than their critical values at 5% hence integrated if order one I (1). The mixed order of integration of the variables at order I(0) and I(1) therefore validates the use of the ARDL model as specified by Cochrane (2011).

ARDL Bounds Test

Table 4: Bound Test

F-Bounds Test			**Null Hypothesis: No levels relationship**		
Test Statistic		Value	Signif.	I(0)	I(1)
F-statistic		**6**.631329	10%	2.12	3.14
k		4	5%	2.39	3.64
2.5%	2.77	3.96			
1%	3.15	4.29			

Source: Researcher's Desk/ Computation, 2025 (E-views 10)

Note: * implies that computed f-statistics is above upper bound values

Based on the result presented in Table 4, the co-integration approach and bound test result shows that the first method compares the computed f-statistic result to the crucial values provided in the Pesaran, Shin, and Smith (2001) paper. Thus, at 10%, 5%, 2.5%, and 1%, the f-statistic of 6.631329, which is computed at k=4 (number of independent variable), surpasses the upper critical threshold. Without taking into account whether or not they are integrated of the same order and as a result, it was determined that the variables have a long-term relationship. The null hypothesis that stated that there is no run long relationship among the variables is hereby rejected and therefore concluded that financial technology represented by ATM and POS on one side and financial inclusion proxied by NBA and CPS respectively enjoy long-run effect with RDPPC, measure of economic development in Nigeria within the period of the study.

ARDL Short Run Relationship

Table 5 below represented the short run analysis of the variables and the outputs were interpreted using the coefficients of the individual variables, Adjusted R-square, f-statistic and Durbin Watson.

Table 5 ARDL Test Results

Variables	**Coefficients**	**Std Error**	**t-Statistics**	Prob
ATM	4.104910	2.117243	-1.728672	0.0314
POS	1.561202	1.594139	0.811078	0.0456
NBA	-0.071248	0.528290	-1.344309	0.0201
CPS	1.023775	0.108736	0.7634241	0.0145
C	13.25501	22.19084	1.3244787	0.0206

Adjusted R-square = 8.925621, f-statistic = 34.30287, f stat probability = 0.0001 and Durbin Watson = 1.842672

Source: Researcher's Desk/ Computation, 2025 (E-views 10)

The ARDL log-run analysis in table 5 revealed that ATM recorded a coefficient of 4.104910 and probability value of 0.314. This implies that a unit increase in ATM increased economic development by 4.10. In the same vein, the coefficient value of POS is 1.561202 with probability of 0.0456 and CPS got 1.023775 and probability of 0.0145 indicating that a unit increase in POS and CPS increased economic development by 1.56 and 1.02 respectively. Simply put, ATM, POS and CPS correlated positively and statistically significant with economic development in Nigeria.

NBA recorded a negative coefficient of -0.071248 and probability of 0.0201 which implies that a unit increase in NBA plummets economic growth by 0.071. By possessing probability values that are below the 5% level of significance, all the explanatory variables exerted statistical and significant impacted on economic development. The F-statistic probability value of 0.000001 signifies that all the indices of financial technology and financial inclusion jointly and significantly enhances economic development in Nigeria within the period of the study. Durbin -Watson stat of 1.842672 which is an indication of the absence of auto-correlation in the model.

Discussion of Findings

The empirical findings revealed that financial technology measured by ATM and POS facilitates financial inclusion indices NBA and CPS used in this study as both of them significantly improves economic development proxy of RGDPPC in Nigeria. The result showed that these digital payment facilities are financial innovations that enable individuals and businesses to access financial services both in the urban and rural locations conveniently. Particularly, the result indicated that credit to private sector (CPS) influenced economic development positively and significantly. This could be attributed to the fact that CPS fosters innovation and productivity growth by directing funds towards

high-return sectors and entrepreneurs who would otherwise be constrained by lack of funds. The results align with previous empirical studies that found financial inclusion positively influences economic development through improved credit access and investment opportunities. The findings in this study are in consonance with the reports in most previous studies. This result is in consonance with finance-led growth theory that finance plays a key role in promoting economic growth in any economy. The empirical result in this current study is in conformity with the empirical results of Eneberi (2022), Chude &Chude (2022), Akoma (2023), Adeyemi & Bola (2023) and many other empirical literatures earlier reviewed who discovered positive and statistically significant connection between fintech, financial inclusion and economic development. However, some studies have also shown that fintech's short-run impact may be limited due to infrastructure constraints and regulatory challenges. This is to say that some other study results do not validate the findings here as evidenced by the empirical studies where some indices of fintech and financial inclusion exerted inverse and insignificant correlation with economic development. Particularly Slemem, Freeman, & Godfrey (2025) evaluated the impact of financial inclusion on economic growth in Nigeria from 1992 to 2022 and the ARDL result indicated an inverse relationship between financial inclusion and economic growth. Also, Ibrahim & Musa (2023) found a negative and insignificant relationship existed between financial inclusion and economic growth. Akunna, Ikenna & Chukwu (2025) investigated the effect of digital finance on financial inclusion in Nigeria from 2009 to 2023 and they concluded that although digital finance had a positive effect, its impact was statistically insignificant throughout the study of period. From the above review, it can be observed that there are mixed relationships in some previous scholarly studies hence the direction of causality among financial technology, financial inclusion and economic development still remains puzzle since there is not established consensus among researchers.

Conclusion

Financial technology and financial inclusion play a vital role in promoting economic development in Nigeria. FinTech innovations have improved access to financial services, especially for underserved populations, thereby increasing financial participation and economic activities. Empirical studies confirm that financial inclusion positively affects economic growth and that FinTech enhances this relationship. However, challenges such as poor infrastructure, low financial literacy and regulatory constraints must be addressed to fully harness the developmental benefits of FinTech and financial inclusion. The paper therefore concludes that financial technology and financial inclusion are profound predictors to economic development and with appropriate policies and investments, Nigeria can leverage digital finance to achieve sustainable and inclusive economic development.

Recommendations

Based on the findings, the study therefore proffers the following recommendations.

1. The deposit money banks should strengthen fintech infrastructure, expand digital payment systems and implement policies that will encourage financial access in rural areas to accelerate economic development.
2. Policymakers should ensure regulatory frameworks for fintech that will expand or improve digital financial infrastructure.
3. There should be digital financial literacy programs that will target financial inclusion in rural areas.

References

Adeyemi, B. & Bola, M.A. (2023). Fintech adoption and economic participation in Nigeria: Evidence from VECM analysis (2015–2023). *International Journal of Finance and Digital Economy*, 4(1), 23–39.

Akoma, B.M. (2023). Financial inclusion and inclusive economic growth in Nigeria. *Journal of Management Review,* 8(2), 144 - 160

Akunna, R. C., Ikenna, E. & Chukwu, K. O. (2025). Effect of digital finance on financial inclusion in Nigeria. *International Journal of Finance, Accounting and Management Studies*, 1(4), 137-150

Amadi, C. & Ezeoma, O. A. (2018). Fintech innovations and financial inclusion in Nigeria: A survey approach. *Journal of Banking and Finance Research,* 10(1), 277 – 293.

Chude, N. P. & Chude, D. I. (2022). Effects of financial inclusion on economic growth in Nigeria. *African Journal of Finance and Management,* 12(2), 149 -166

Chukwu, C., & Mohammed, Y. (2025). Fintech channels and financial inclusion across Nigeria's geopolitical zones: A mixed-method approach. *Journal of African Business and Economic Research*, 10(1), 90–108.

Eneberi, C.O. (2022). Financial inclusion and economic growth: The role of governance. *International Journal of Economics, Finance, Accounting and Management,* 1(2), 117 - 133

Ibrahim, C. & Musa, K (2023). Financial inclusion, investment and economic development in Nigeria. *Journal of Finance and Administration*, 4(2), 119 - 132

Iheanacho, E. (2016). Financial development and economic growth in Nigeria. IIARD *International Journal of Economics and Business Management* E-ISSN 2489-0065

Iwedi, M. (2024). Financial inclusion and economic growth nexus in Nigeria. *DS Reviews of Journal of Finance & Economics*. 2(3), 62-71. Doi.org/eiki/10.59652/jeime. v2i3.256.

Nnaji, C., Akpan, O. & Omele, P. (2023). Digital lending and household financial resilience in Nigeria. *African Journal of Development Studies,* 9(2), 102–119.

Nnanna, O.J. (2004). Financial sector development and economic growth in Nigeria: An Empirical Investigation", *CBN Economic and Financial Review* 42(3).

Obizue, E. C. & Ihejirika, F.I. (2025). Re-engineering banking services and economic development in Nigeria. *International Journal of Education, Social and Management Sciences*, 1(3), 227 - 239

Obizue, E.C., & Obizue, M.N. (2024). Impact of FinTech innovation and financial literacy in sustainable financial inclusion in Nigeria. *International Journal of Economics, Finance, Accounting and Management,* 1(2), 272 – 289

Ofaite & kesen (2018). Financial inclusion and economic growth in Nigeria. *Economic Development review*, 16(1), 2130 - 2142.

Osagie, J., & Afolabi, D. (2025). Digital investment platforms, wealth creation, and financial inclusion in Nigeria. *Journal of Emerging Markets Finance and Technology*, 7(1), 120 -138.

Oscar, F.C. (2023). Mobile money services and financial inclusion in Nigeria: An ARDL approach. *International Journal of Economics and Digital Finance*, 6(1), 78 - 93.

Oyedele, O. & Akinbola, M.F. (2018). Fintech services and financial exclusion in Nigeria. *Journal of Economic Policy and Digital Development,* 8(1), 33–47.

Ozims, B. (2024). Digital finance and financial sector development in Nigeria: Empirical analysis. *Digital Finance Management Research,* 11(2), 191 - 205

Slemem, L., Freeman, A. & Godfrey, O. O. (2025). Financial inclusion and economic growth in Nigeria. IIARD *International Journal of Economics and Business Management.* 11(1), 165 - 182