CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The financial technology (FinTech) revolution is reshaping the global economic landscape, driving efficiency, enhancing accessibility, and promoting financial inclusion. As digital financial services expand, they provide innovative solutions that bridge traditional banking gaps, especially in emerging economies. (Akani and Obiosa ,2020 and Gbanador, 2023). This evolution is aligned with global trends where digital financial services are becoming pivotal to improving operational efficiency, expanding financial inclusion, and enhancing customer satisfaction.

Financial technology also known as Fintech, is used to describe new technology that seeks to improve and automate delivery and use of financial services. (Columbia engineering ,2023), the term Fintech describes any business that uses technology to modify, enhance, or automate financial services for business or customers.

The term "fintech" emerged in the late 1990s, with its development accelerated by the 2007–2008 financial crisis, highlighting the necessity for innovation and enhanced efficiency within the financial sector (CBN, 2023). Financial Technology (FinTech) has emerged as a transformative force in Nigeria's financial sector, introducing innovations such as Automated Teller Machine(ATM), point of sale(POS) mobile money, digital banking, online payment systems, peer-to-peer lending, and blockchain-based services. These innovations have the potential to improve financial inclusion, enhance transaction efficiency, lower operational costs, and stimulate entrepreneurial activity all of which can contribute to economic development. Nigeria's fintech landscape has grown dramatically, with the number of fintech firms surging from 255 in early 2024 to over 430 by early 2025 ,a remarkable 70% year-on-year expansion . Financial technology in Nigeria has grown remarkably over this years, this growth has been propelled by factors which include a large unbanked population, rising smartphone penetration, and a supportive regulatory environment. In 2012, only 30% of Nigerian adults had access to formal banking. That figure has more than doubled to 64% in 2025, giving over 70 million people access to savings, credit, and other financial tools. Much of this progress has been driven by fintech companies offering accessible and affordable services, particularly in underserved rural areas (Precious ekezie,2025)..

Nigeria has implemented policies overtime to promote inclusive development and access to financial technology. Money transfers and deposits are only some of the FinTech services available online, via apps,funding for businesses, mobilephones, and other electronic devices (Humby,2020). Leading Nigerian fintech companies include Interswitch, Flutterwave, Opay, and Paystack.Several fintech companies have been instrumental in advancing financial innovation and inclusion in Nigeria. Noteworthy among them are Flutterwave, Paystack, Interswitch, Paga, and Carbon(formerly Paylater), introducing various digital payment solutions, lending platforms, and financial services catering to diverse consumer and business needs (Emefiele, 2019). The proliferation of fintech in Nigeria has yielded numerous benefits, including enhanced financial inclusion, reduces cash dependency, speeds up transactions, and lowers transaction costs., and improved access to credit for underserved populations (Chinwe, 2020).

This achievement is a result of the development of Fintech following the global financial crisis of 2008; Nigeria is now the center of financial technology, particularly in the financial sector, and Nigerians use e-money products like Automated Teller Machines (ATM), Point-of-Sale (POS) terminals, Web-based or internet (WEB), and Mobile Money (MMM) for their frequent financial activities. (Demir, Pesque-Cela, Altunbas & Murinde, 2020).

Financial technology solutions have also facilitated crossborder transactions and spurred economic development. However, fintech adoption in Nigeria faces challenges such as cybersecurity threats, regulatory uncertainties, inadequate infrastructure, and low financial literacy levels(Ogunleye et al., 2020). Additionally, the digital divide and internet connectivity disparities impede access to financial technology apps in rural areas. The studies of (Udo, Ishaku , Edet ,Manasseh, Ogohi , ,Okanya , Mgbobi, &Onwumere, 2023; Lu Shen , Guohua He & Huan Yan,2021;Odeleye&Oyeneye ,2022) indicates that financial technology has insignificant effect on the economy. These conflicting findings indicate the need for further experimental investigation into how fintech affects Nigeria's economy.

Despite the potential advantages, key economic indicators such as , Gross domestic product (GDP), unemployment rates, standard of living, and overall economic development in Nigeria have not seen significant improvements. This highlights the importance of conducting a comprehensive investigation to analyze the impact of financial technology (fintech) on Nigeria's economic development, understanding the relationship between fintech adoption and economic outcomes. There is evidence that fintech adoption was driven by increasing aggregate demand, and the adoption has expanded the reach of financial services (Frost, 2020). Therefore, studying the relationship between financial technology and economic development in Nigeria is both timely and relevant. It provides insights into how digital finance can serve as a catalyst for sustainable development, while also highlighting the

challenges such as cybersecurity risks, regulatory uncertainties, and infrastructural deficits that must be addressed to maximize the benefits of FinTech for the Nigerian economy.

1.2 Statement of the Problem

The term FINTECH refers to financial technology Fintech is a portmanteau of the words “financial” and “technology”. It refers to any app, software, or technology that allows people or businesses to digitally access, manage, or gain insights into their finances or make financial transactions (Justin trifanca, 2025). The financial technology sector has experienced significant challenges in recent years including the failures of fintech applications as well as adoption of unauthorized fintech applications leading to a decline in investors as well as customer confidence.

However, despite rapid adoption, Nigeria’s economic performance has not always mirrored the optimistic projections associated with FinTech growth. A significant proportion of the population remains unbanked or underbanked, digital literacy levels are uneven, and the benefits of FinTech appear concentrated in urban centers, leaving rural areas behind. Issues such as inadequate regulatory frameworks, infrastructural deficits (especially unstable electricity and internet connectivity), and high transaction costs still hinder optimal usage, also the increasing prevalence of fraud, cybercrime, and data breaches in Nigeria’s financial system raises doubts about whether FinTech adoption is truly secure enough to sustain economic development also weak internet penetration, unstable electricity supply, and inconsistent regulatory frameworks limit the full potential of FinTech in driving Nigeria’s economic transformation.

Traditional banking systems have struggled to provide adequate financial services to a large portion of the population, leaving millions of individuals and small businesses excluded from formal financial channels. This exclusion has significantly constrained entrepreneurial growth, slowed poverty reduction efforts, and weakened the pace of sustainable economic development.

Furthermore, previous studies has highlighted to an extent the importance of Fintech in devloped economies. However there is need to examine if FinTech adoption in Nigeria translates into measurable improvements in key economic indicators such as GDP growth, employment creation, productivity, and poverty reduction in Nigeria.

This gap in empirical understanding creates a pressing need to critically investigate whether financial technology is merely expanding transaction volumes or truly serving as a catalyst for inclusive economic development in Nigeria.

1.3 Research questions

In the light of these concerns, this study intends to find tentative answers to the following research questions:

i. What is the relationship between Automated Teller Machine(ATM) and the economic development in Nigeria?

ii. What role does Point of Sale(POS) play in bridging the gap between rural and urban economic development in Nigeria?

iii. What is the effect of Internet banking to Nigeria's economic development?

iv. What is the impact of Nigeria Interbank Settlement System Instant Payment (NIP) on Nigeria's economic development?

1.4 Objective of the study

The major objective of this research is to examine the effect of financial technology on the economic development in Nigeria. The specific objectives are;

i. To determine the relationship between Automated Teller Machine (ATM) and economic development in Nigeria.

ii. To analyze the role of Point of Sale (POS) on economic development in Nigeria.

iii. To examine the impact of Internet banking on Nigeria economic growth.

iv. To ascertain the impact of Nigeria Interbank Settlement System Instant Payment (NIP) on Nigeria's economic development.

1.5 Research Hypothesis

i. There is no significant relationship between Automated Teller Machine (ATM) and economic development in Nigeria.

ii. There is no impact of Point of sale(POS) on economic development in Nigeria.

iii. There is no effect of Internet banking on economic development in Nigeria.

iv. The Nigeria Interbank Settlement System Instant Payment (NIP) does not considerably influence economic development in Nigeria.

1.6 Scope of the Study

This study examines Financial technology and the economic development in Nigeria from 2012 till 2024. It focuses on four key Financial technology (FinTech) variables such as Point of Sale (POS), Automated Teller Machines (ATMs), Mobile Banking services, and the Nigeria Interbank Settlement System Instant Payment (NIP). This study is restricted to Nigeria, with particular emphasis on the impact on economic development in Nigeria. The study does not cover informal or unregulated financial technology operations such as peer-to-peer cryptocurrency trading that fall outside the regulatory framework of the Central Bank of Nigeria and the Securities and Exchange Commission.

1.7 Significance of the Study

This study on Financial technology and economic development in Nigeria will be if great benefit to policy makers, financial technology organizations and student researchers. This study will assist banks, microfinance institutions, and FinTech startups in identifying the most effective strategies for expanding financial inclusion, improving service delivery, and boosting customer satisfaction and its impact of the economy. The findings will raise awareness among citizens about the opportunities and risks associated with financial technology, encouraging informed adoption and responsible use of digital financial services.

It wil also be readily available for academic consumption and thus aid students and future researchers in terms of making reference available for future work in the area of Financial technology and economic development in Nigeria.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews existing literature on financial technology (FinTech) and its impact on economic development in Nigeria. It covers conceptual definitions, theoretical frameworks, and empirical studies to provide a comprehensive understanding of how FinTech adoption influences financial inclusion, economic growth, and overall sectoral efficiency.

2.1 Conceptual Literature

2.1.1 Definition of Financial Technology (FinTech)

Financial Technology, commonly referred to as FinTech, is a dynamic and evolving concept that represents the intersection of finance and technology. It encompasses the innovative application of digital tools and technological solutions to improve the design, delivery, and accessibility of financial services. Scholars have conceptualized FinTech in various ways, reflecting its multidimensional nature. Gomber, Koch, and Siering (2017) define it as a new financial industry that leverages technology to enhance financial activities, emphasizing the role of innovation in transforming traditional financial services. Schueffel (2016) extends this perspective, defining FinTech as the application of technology to financial services that aims to improve efficiency, accessibility, and customer orientation, highlighting its focus on creating value for users.

Arner, Barberis, and Buckley (2016) describe FinTech as the use of technology to create new financial business models and solutions, including digital platforms, automated processes, and innovative financial products that fundamentally alter how financial services are delivered. Philippon (2016) emphasizes the transformative nature of FinTech, arguing that it represents

technological innovation capable of significantly impacting the structure and functioning of financial systems, including the reduction of transaction costs and improvement of operational efficiency. From a regulatory and policy perspective, the Central Bank of Nigeria (CBN, 2023) defines FinTech as the innovative application of technology in the creation and delivery of financial services and products that enhances efficiency, affordability, and access to financial transactions, particularly in areas where traditional financial services are limited. Columbia Engineering (2023) similarly conceptualizes FinTech as technology that automates or enhances financial service delivery, for both corporate and individual users, underscoring its practical and operational dimensions.

Demir, Pesqué-Cela, Altunbas, and Murinde (2020) offer a broader conceptualization, framing FinTech not only as a technological innovation but also as a structural evolution in financial intermediation. They argue that FinTech enables greater participation in financial systems, promotes efficiency in resource allocation, and supports the transformation of traditional financial infrastructures. Across these definitions, common themes emerge: FinTech is inherently innovative, technology-driven, customer-focused, and aimed at improving efficiency, accessibility, and the overall effectiveness of financial services.

In sum, FinTech can be understood as the strategic deployment of digital technologies—such as mobile applications, cloud computing, blockchain, big data analytics, and artificial intelligence—to redesign financial services, streamline operations, and expand access to finance. While definitions vary, the unifying feature is the emphasis on leveraging technology to enhance the scope, efficiency, and inclusivity of financial systems, thus creating the potential for far-reaching economic and social impacts.

2.1.2 FinTech as a Driver of Economic Development

Financial technology (FinTech) has emerged as a critical driver of economic development by transforming how financial services are delivered, accessed, and utilized. The role of FinTech in economic development can be understood through its effects on key development dimensions, including GDP growth, employment, financial inclusion, and standards of living. By leveraging digital platforms, mobile applications, and innovative payment systems, FinTech enhances the efficiency of financial transactions, reduces operational costs, and expands market reach, all of which contribute to overall economic productivity (Gomber, Koch, & Siering, 2017; Arner, Barberis, & Buckley, 2016).

FinTech promotes financial inclusion, a central component of economic development, by providing previously unbanked or underbanked populations with access to savings, credit, insurance, and investment products. Increased financial inclusion enables broader participation in economic activities, fosters entrepreneurship, and supports small and medium-sized enterprises (SMEs), which are critical engines of economic growth in emerging economies like Nigeria (Demirgüç-Kunt et al., 2018; Philippon, 2016). By facilitating access to credit and affordable financial services, FinTech empowers individuals and businesses to invest in productive activities, thereby enhancing income generation and employment opportunities.

Moreover, FinTech contributes to employment creation directly, through jobs in the technology and financial sectors, and indirectly, by enabling the growth of SMEs and start-ups that rely on digital financial solutions. It also fosters efficiency in financial markets, allowing faster, secure, and cost-effective transactions that reduce the friction in economic activities and support GDP growth. By lowering barriers to financial participation, FinTech can help reduce economic

inequality, improve access to essential services, and ultimately enhance the standard of living (Schueffel, 2016; Demir et al., 2020).

In developing economies such as Nigeria, the adoption of FinTech is particularly significant because traditional banking systems often fail to reach rural or underserved populations. Mobile money, online payments, peer-to-peer lending, and other digital financial services bridge this gap, facilitating greater economic participation and creating opportunities for inclusive growth. Therefore, FinTech is not merely a technological innovation but a strategic tool for achieving broader developmental objectives, aligning financial system efficiency with social and economic welfare goals.

In sum, FinTech functions as a driver of economic development by enhancing financial inclusion, stimulating entrepreneurship, generating employment, improving efficiency in financial systems, and contributing to GDP growth and improved standards of living. Understanding this relationship provides a conceptual basis for examining how FinTech adoption can serve as a catalyst for sustainable and inclusive economic development in Nigeria.

2.1.3 Automated Teller Machine (ATM)

The Automated Teller Machine (ATM) is one of the most significant innovations in the banking sector that has revolutionized financial service delivery and accessibility in both developed and developing economies. An ATM is an electronic device that enables customers to perform basic financial transactions without the need for direct interaction with a bank teller (Adesina & Ayo, 2010). The introduction of ATMs into Nigeria's banking system has greatly contributed to improving service efficiency, enhancing financial inclusion, and promoting economic activities by providing convenient access to cash and other financial services (Oluwatayo, 2020). ATMs

allow customers to withdraw cash, check balances, transfer funds, and make payments, which reduces time wastage and transaction costs associated with traditional banking (Oluwafemi & Akinlabi, 2021).

The proliferation of ATMs has contributed immensely to the financial deepening of the Nigerian economy by facilitating easy access to funds for business transactions and personal consumption. According to Ojo (2019), ATMs have made banking services available beyond regular working hours, enabling continuous circulation of money within the economy and supporting small-scale trading activities. Similarly, Adegbie and Fagbemi (2019) noted that ATMs enhance liquidity in the economy by providing individuals and businesses with constant access to cash, thereby stimulating consumer spending and aggregate demand. The availability of cash through ATMs also reduces friction in the financial system, ensuring that economic agents can engage in productive activities with minimal delays (Afolabi & Dare, 2020).

Furthermore, the adoption of ATMs has played a vital role in promoting financial inclusion in Nigeria, especially among individuals in semi-urban and rural areas who previously lacked access to formal financial services. A study by Ayo, Adewoye, and Oni (2010) revealed that the expansion of ATM networks in Nigeria has brought financial services closer to underserved populations, promoting savings culture and enhancing their participation in economic activities. In line with this, the Central Bank of Nigeria (CBN, 2021) emphasized that the availability of ATMs has significantly increased the number of financially active citizens, aligning with national strategies for financial inclusion and digital economy growth.

Empirically, several studies have demonstrated a positive correlation between ATM usage and economic development. For example, Akpan and Nwosu (2020) found that ATM transactions

significantly contribute to GDP growth by enhancing financial intermediation and business efficiency. In another study, Osang, Eze, and Abah (2022) established that ATM penetration in Nigeria is positively associated with increased employment opportunities in the financial technology sector and improved productivity in retail trade. However, challenges such as network failure, cash shortages, and security concerns have limited the full potential of ATM services in Nigeria (Ekechukwu & Eze, 2021). Despite these challenges, the growing reliance on ATM technology underscores its central role in driving economic development by supporting cash flow, promoting convenience, and enhancing overall financial sector performance.

Overall, ATMs have become a cornerstone of financial innovation that bridges the gap between traditional banking and modern financial systems in Nigeria. By improving access to financial services, reducing transaction costs, and enhancing monetary circulation, ATMs contribute substantially to national economic development. As financial technology continues to evolve, optimizing ATM infrastructure and integrating it with emerging digital solutions will be vital to sustaining economic growth and promoting inclusive development in Nigeria.

2.1.4 Point of Sale (POS)

The Point of Sale (POS) system is a technological platform that allows electronic payment for goods and services using debit or credit cards at merchant outlets. It serves as the location where sales transactions occur and payments are processed electronically, replacing the need for physical cash (Adeoti & Oshotimehin, 2019). According to the Central Bank of Nigeria (CBN, 2022), POS refers to the interface where customers authorize payment directly from their bank accounts to merchants through an electronic terminal.

POS systems are essential components of financial technology because they promote efficiency, accuracy, and transparency in business transactions. They provide a secure alternative to cash payments, minimize errors in financial recording, and facilitate faster service delivery (Olowookere & Salami, 2020). For customers, POS terminals offer convenience and safety, while for businesses, they improve record keeping, sales monitoring, and customer satisfaction (Osazee & Igbinosa, 2021).

From a developmental perspective, POS technology plays a key role in economic development by encouraging cashless transactions, reducing operational costs, and enhancing financial inclusion. It helps integrate individuals and small enterprises into the formal financial system, thereby stimulating trade and entrepreneurship (Eze & Nwankwo, 2019). The growth of POS usage also supports monetary policy effectiveness by reducing excessive cash circulation and improving transaction traceability (CBN, 2021).

Furthermore, POS terminals enable small and medium-sized enterprises (SMEs) to expand their customer base and access digital payment channels, which in turn improves business turnover and contributes to job creation and income generation (Olaleye & Afolabi, 2021). By simplifying transactions and promoting trust in electronic payments, POS technology enhances overall economic efficiency and competitiveness (Taiwo & Aremu, 2018).

Despite its benefits, the POS system in Nigeria faces challenges such as poor network connectivity, power supply issues, and occasional transaction failures (Ndukwe & Ayo, 2021). Nonetheless, the continuous adoption of POS technology remains vital for building a sustainable digital economy. In essence, the POS system serves as a bridge between traditional commerce

and modern financial innovation, thereby contributing significantly to Nigeria's economic growth and development (Adetayo, 2020).

2.1.5 Internet Banking

Internet banking, also known as online banking or electronic banking, refers to the delivery of banking services and financial transactions through internet-enabled platforms without the need for customers to physically visit bank branches (Adewoye, 2019; Olasanmi, 2020). It allows users to check account balances, transfer funds, pay bills, request statements, and apply for loans securely via digital channels (Adesina & Ayo, 2010). Internet banking is a core innovation in financial technology that integrates information and communication technology (ICT) into financial service delivery to improve accessibility, speed, and efficiency (Ogbuabor & Okoli, 2021).

The introduction of internet banking has transformed the structure and operations of the banking industry. It enables 24-hour access to financial services, reduces dependency on physical branches, and minimizes operational costs while enhancing customer satisfaction (Oluwatoyin & Taiwo, 2018; Ogedengbe & Ibe, 2020). By automating routine financial processes, it eliminates paperwork, minimizes errors, and supports real-time transaction processing (Okafor & Eze, 2021). These improvements have led to enhanced service quality, faster transaction cycles, and improved competitiveness within the financial sector (Agboola, 2020).

From an economic standpoint, internet banking contributes to economic growth by facilitating efficient resource mobilization, promoting investment, and supporting business expansion (Akinyemi, 2019; Olatunji & Owoseni, 2022). The ability to transfer funds instantly enhances liquidity in the economy, stimulates commerce, and encourages savings and credit creation

(Adeniran, 2021). Moreover, by supporting e-commerce and digital entrepreneurship, internet banking fosters innovation and productivity across sectors—key components of sustainable economic development (Olalekan & Afolabi, 2021; CBN, 2022).

Internet banking also plays a crucial role in financial inclusion, providing access to financial services for individuals in remote or underserved areas (Eze & Nwankwo, 2019). With the increasing use of mobile devices and internet connectivity, a wider segment of the population can now open accounts, make transactions, and participate in the formal financial system (CBN, 2021). This digital participation strengthens capital formation and supports Nigeria's goal of inclusive economic growth (Adetayo, 2020).

However, despite its numerous benefits, internet banking in Nigeria faces challenges such as cybersecurity threats, unstable power supply, network downtime, and low digital literacy among some users (Ndukwe & Ayo, 2021; Oghojafor & Oladejo, 2019). These issues can reduce customer confidence and limit adoption rates. Nevertheless, with continuous improvements in ICT infrastructure, regulatory frameworks, and cybersecurity measures, internet banking remains a major force driving Nigeria's digital transformation and economic progress (Akinyemi, 2019; CBN, 2022).

In summary, internet banking has evolved from a convenience-based innovation into a strategic instrument for national development. By promoting efficient transactions, enhancing financial inclusion, and enabling digital commerce, it serves as a vital pillar for accelerating Nigeria's economic growth and integration into the global digital economy (Adewoye, 2019; Okafor & Eze, 2021).

2.1.6 Nigeria Interbank Settlement System Instant Payment (NIP)

The Nigeria Interbank Settlement System Instant Payment (NIP) is defined by the Central Bank of Nigeria (CBN, 2022) as a real-time electronic payment system that enables instant transfer of funds between accounts in different banks. According to NIBSS (2021), NIP is a robust, secure, and interoperable platform designed to facilitate instant settlement of interbank transactions within seconds. Similarly, Olasanmi (2020) describes NIP as a real-time gross settlement (RTGS) service that enhances payment efficiency and supports Nigeria's digital financial infrastructure. Adewoye (2019) defines it as an innovative payment mechanism that provides immediate value for electronic transfers, improving the convenience and reliability of financial transactions.

From a broader perspective, Ndukwe and Ayo (2021) see NIP as a core driver of the cashless policy, enabling quick, low-cost, and transparent payments across the financial sector. Olatunji and Owoseni (2022) also define it as a payment innovation that integrates banks, fintechs, and users into a unified digital network to promote financial inclusion and operational efficiency.

NIP contributes significantly to economic development by promoting efficient financial intermediation and enhancing liquidity within the economy (CBN, 2021). The instant settlement of transactions reduces business delays, increases transaction volumes, and fosters commercial activities that drive national growth (Agboola, 2020). Eze and Nwankwo (2019) emphasize that NIP improves access to formal financial services, thereby encouraging savings, investments, and entrepreneurship—key drivers of economic development.

Furthermore, NIP supports transparency in public and private transactions by reducing human contact, errors, and fraudulent manipulation. It strengthens trust in the banking system, enhances consumer confidence, and contributes to government revenue collection through efficient electronic payment channels (Adetayo, 2020).

Despite challenges such as network instability and cybersecurity threats (Ndukwe & Ayo, 2021), NIP remains a cornerstone of Nigeria's digital payment evolution. It has bridged the gap between financial institutions and consumers, encouraging digital adoption and boosting Nigeria's cashless economy.

In essence, the Nigeria Interbank Settlement System Instant Payment (NIP) represents a critical enabler of digital transformation, financial inclusion, and economic growth. By facilitating seamless fund transfers and enhancing transaction efficiency, NIP contributes substantially to Nigeria's socio-economic development (NIBSS, 2021; CBN, 2022).

2.1.7 Mobile Banking

Mobile banking refers to the use of mobile devices such as smartphones or tablets to access and perform banking transactions through wireless networks. According to Donner and Tellez (2021), mobile banking is a subset of electronic banking that allows customers to carry out financial activities anytime and anywhere using mobile technology. Mbogo (2019) defines it as a financial innovation that facilitates access to formal financial services through mobile platforms, enabling users to transfer money, check balances, pay bills, and access credit services conveniently. Similarly, Aker and Mbiti (2020) describe mobile banking as the use of mobile telephony to support the delivery of financial services, especially in developing countries where traditional banking infrastructure is limited.

Mobile banking plays a crucial role in enhancing financial inclusion by reaching underserved populations, particularly in rural areas (Jack & Suri, 2021). It lowers transaction costs, increases convenience, and promotes savings and investment behaviors that contribute to overall economic growth. Kikulwe et al. (2019) affirm that mobile banking fosters small business development by

improving access to credit and facilitating smoother business transactions. Through real-time communication and instant fund transfers, mobile banking strengthens economic activities by reducing delays and transaction inefficiencies (Evans & Pirchio, 2020).

From a macroeconomic standpoint, Beck et al. (2021) argue that mobile banking contributes to economic development by improving the efficiency of financial systems, increasing money circulation, and supporting digital entrepreneurship. The widespread adoption of mobile financial services also stimulates innovation within the fintech ecosystem, creating employment opportunities and enhancing productivity (Bongomin, Ntayi, & Munene, 2020).

In Nigeria, mobile banking has become an essential instrument for implementing the Central Bank of Nigeria's financial inclusion strategy, aimed at reducing the percentage of unbanked adults and promoting a cashless economy (CBN, 2022). The rapid growth of mobile payment platforms, such as USSD transfers and banking apps, has expanded access to formal banking services across different socio-economic groups, thereby stimulating household consumption and business activities.

However, despite its immense benefits, challenges such as poor network connectivity, cybersecurity threats, and low digital literacy still limit mobile banking's full potential (Oluwatayo & Abosede, 2021). Strengthening digital infrastructure, regulatory oversight, and consumer protection frameworks remains crucial to maximizing the developmental impact of mobile banking.

In summary, mobile banking serves as a key driver of financial inclusion and economic development in Nigeria. By providing convenient, affordable, and accessible financial services, it

enhances monetary transactions, supports entrepreneurship, and accelerates national economic growth.

2.2 FinTech Landscape in Nigeria

The FinTech ecosystem in Nigeria has witnessed extraordinary growth in recent years, reflecting the convergence of technology, financial needs, and regulatory support. Digital financial services have become central to the Nigerian economy, particularly as traditional banking infrastructure remains limited in rural and underserved areas. The number of registered FinTech firms in Nigeria surged from 255 in early 2024 to over 430 by early 2025, a growth rate of approximately 70% year-on-year (Ogunleye et al., 2020). Alongside the expansion of firms, the number of active users of digital financial services has increased dramatically, while transaction volumes—covering payments, remittances, savings, and lending—have reached unprecedented levels. This rapid adoption underscores the critical role of FinTech in shaping the financial landscape, improving transaction efficiency, and driving economic participation.

2.2.1 Major Drivers of FinTech Growth in Nigeria

Several interrelated factors have fueled the rapid expansion of FinTech in Nigeria.

Large Unbanked and Underbanked Population: Nigeria has historically had a high proportion of adults without access to formal banking. In 2012, only 30% of Nigerian adults had bank accounts; by 2025, this figure increased to 64%, largely due to digital financial innovations (Akani and Obiosa, 2023). FinTech platforms, such as mobile money and digital wallets, have enabled the previously excluded population to access savings, loans, and payment services.

Smartphone Penetration and Internet Access: The widespread availability of smartphones and improved internet connectivity has significantly enhanced access to digital financial services. Mobile devices allow consumers and businesses to perform financial transactions remotely, bridging geographic gaps and reducing dependency on physical bank branches.

Regulatory Support: Government and regulatory frameworks have been instrumental in facilitating FinTech growth. Initiatives such as the National Financial Inclusion Strategy, the Cashless Policy, and the regulatory guidelines for mobile money, e-banking, and payment systems have created a secure and enabling environment for innovation (CBN, 2023). These policies ensure consumer protection, reduce systemic risk, and build trust in digital financial solutions.

Rising Financial Literacy and Consumer Awareness: Increased awareness about financial products and digital finance has encouraged more Nigerians to adopt FinTech solutions. Campaigns by FinTech firms, government programs, and collaborations with NGOs have helped educate the population on using digital financial services safely and effectively.

Economic Necessity and Convenience: Economic realities, including high informal sector participation and limited access to physical banking infrastructure, have made digital financial solutions attractive. FinTech services offer speed, lower transaction costs, and accessibility that traditional banking often cannot provide.

2.2.2 Key Players in the Nigerian FinTech Sector

The Nigerian FinTech ecosystem is driven by several innovative companies that have played a central role in expanding financial access, promoting digital payments, and improving overall financial inclusion. Leading players include Interswitch, Flutterwave, Paystack, OPay, Carbon

(formerly Paylater), and Paga, each of which offers specialized solutions to meet the diverse needs of consumers and businesses.

Interswitch

Interswitch is a pioneer in electronic payments and transaction processing in Nigeria. It provides point-of-sale (POS) solutions, automated clearing houses, and online payment platforms that facilitate seamless transactions for individuals and businesses. By enabling interoperability across banks and payment systems, Interswitch reduces transaction friction and improves efficiency in Nigeria's financial ecosystem.

Flutterwave

Flutterwave focuses on providing businesses with secure and seamless online payment processing, including cross-border transactions. Its services include APIs and payment gateways that integrate with e-commerce platforms, supporting Nigerian businesses to transact with global clients and enhancing digital entrepreneurship.

Paystack

Paystack specializes in digital payment solutions for SMEs. Its services include card payments, online invoicing, subscriptions, and payment gateways. By simplifying payment processes and integrating with online platforms, Paystack empowers Nigerian businesses to expand operations and access new markets.

OPay

OPay provides mobile money, payment, and logistics solutions, mainly targeting urban and semi-urban users. It has introduced services such as bike-hailing, bill payments, and microloans,

combining financial services with daily convenience and fostering widespread adoption of FinTech solutions.

Carbon (formerly Paylater)

Carbon is a digital lending and financial services platform offering instant loans, bill payments, and investment opportunities via mobile applications. It uses alternative credit scoring methods to provide access to credit for individuals and SMEs who may not qualify under traditional banking criteria.

Paga

Paga is a mobile payment and financial services provider focusing on financial inclusion. Its services include money transfers, bill payments, microloans, and merchant solutions. Paga targets underserved populations, particularly in rural areas, bridging financial gaps and fostering economic participation.

Other Emerging FinTech Companies

Beyond the leading firms, emerging startups such as Renmoney, PiggyVest, Kuda Bank, and Paylater offer innovative savings, lending, and investment solutions. These niche players complement the larger companies, further enhancing financial inclusion and digital innovation in Nigeria.

Contributions to the Ecosystem

These key players collectively drive innovation, create employment opportunities in the tech and financial sectors, and promote financial literacy. They also foster partnerships with banks, telecom operators, and regulators, enhancing the robustness, security, and reach of Nigeria's FinTech ecosystem. By addressing gaps in traditional banking and expanding access to financial services, they position Nigeria as a leading FinTech hub in Africa.

2.3.3 Government and Regulatory Policies Supporting FinTech

The Nigerian government and regulatory authorities have played a critical role in creating an enabling environment for the growth of FinTech. These policies and frameworks are designed to encourage innovation, ensure financial stability, promote consumer protection, and expand financial inclusion. Regulatory institutions such as the Central Bank of Nigeria (CBN), the Securities and Exchange Commission (SEC), and the National Information Technology Development Agency (NITDA) have introduced strategic interventions that have accelerated the development of the FinTech ecosystem.

National Financial Inclusion Strategy (NFIS)

The National Financial Inclusion Strategy aims to increase access to financial services for all Nigerians, particularly those in underserved and rural areas. Launched in 2012 and updated periodically, the NFIS targets a financial inclusion rate of at least 80% by 2025 (Ozili, 2021). By promoting mobile money, agent banking, and digital wallets, the NFIS facilitates the adoption of FinTech solutions among previously unbanked populations, bridging gaps in access to credit, savings, and payment systems.

Cashless Policy

The Cashless Policy, implemented by the CBN, encourages electronic payments over cash transactions. This policy reduces transaction costs, improves the efficiency of payments, and enhances transparency in the financial system. By incentivizing the use of POS, mobile payments, and online banking, the Cashless Policy has been a significant driver for the uptake of FinTech services (Agboola, 2020).

Regulatory Guidelines for Digital Financial Services

To safeguard users and strengthen market integrity, the CBN has introduced regulatory guidelines for mobile money operators, payment service providers, and digital lending platforms. These regulations focus on compliance with anti-money laundering (AML) laws, cybersecurity requirements, data protection, and licensing procedures (Adegbite, 2022). By providing clear operational standards, these guidelines create trust in digital platforms and encourage innovation while mitigating systemic risks.

Support for Innovation Hubs and Startups

The Nigerian government supports the establishment of FinTech innovation hubs and incubators that provide startups with mentorship, technical support, and access to capital. Initiatives such as the **CBN Innovation Hub**, partnerships with universities, and private-sector-backed accelerators enable FinTech startups to test and scale new technologies (Oladejo & Lawal, 2021). These platforms encourage knowledge transfer, research and development, and capacity building within the FinTech ecosystem.

Tax Incentives and Funding Programs

To promote FinTech development, the government has implemented tax incentives and funding programs that reduce operational costs and attract domestic and foreign investments. Grants, low-interest loans, and venture funding programs have been particularly effective in supporting early-stage startups and encouraging innovation in digital financial services (Adelakun, 2021).

In sum, government and regulatory interventions have been instrumental in shaping Nigeria's FinTech sector. Policies such as the NFIS, the Cashless Policy, regulatory guidelines, innovation hubs, and funding incentives provide a structured environment for innovation and financial inclusion. These measures not only encourage investment and entrepreneurship in digital finance but also enhance transparency, security, and efficiency in Nigeria's financial ecosystem.

2.4 Benefits of Financial Technology to Economic Development

Financial technology (FinTech) has become a transformative tool for economic development, particularly in Nigeria. By providing digital financial solutions that are accessible, efficient, and innovative, FinTech has contributed to financial inclusion, stimulated entrepreneurship, enhanced trade, and generated employment, all of which are essential for national economic growth.

Financial Inclusion and Accessibility

FinTech has significantly expanded access to formal financial services among previously unbanked and underbanked populations in Nigeria. According to **Eze and Okafor (2022)**, mobile banking, digital wallets, and online payment platforms have enabled millions of Nigerians to open bank accounts, save money, and access credit. In 2012, only about 30% of

Nigerian adults had access to formal banking, but by 2025, digital financial services contributed to increasing this figure to over 64%, highlighting the role of FinTech in promoting financial inclusion and reducing economic marginalization.

Reduction in Transaction Costs and Time Efficiency

FinTech solutions have dramatically reduced transaction costs and improved operational efficiency in Nigeria's financial system. Digital payment platforms, mobile money services, and online banking reduce the need for physical visits to banks, lower service charges, and minimize processing delays. **Adebayo (2021)** notes that these efficiency gains enhance business operations and consumer convenience, allowing resources that would have been spent on traditional banking to be redirected into productive economic activities.

Expansion of SMEs and Entrepreneurial Activities through Digital Financing

Digital finance has enabled Nigerian small and medium-sized enterprises (SMEs) and entrepreneurs to access credit, manage payments, and expand operations. Platforms offering peer-to-peer lending, digital loans, and crowdfunding have provided alternative financing avenues beyond traditional banks. **Nwankwo and Okeke (2023)** highlight that these services have empowered startups to innovate, scale operations, and create wealth, contributing to economic diversification and local development.

Enhanced Cross-Border Transactions and Trade Facilitation

FinTech has simplified cross-border transactions, enabling Nigerian businesses to engage in regional and international trade efficiently. Digital payment systems, online remittance platforms, and blockchain-based solutions reduce currency conversion costs, shorten transaction times, and

improve security in trade settlements. **Chukwuma (2022)** emphasizes that such innovations enhance Nigeria's integration into global value chains and support the expansion of export-oriented enterprises, boosting foreign exchange earnings.

Job Creation and Digital Economy Expansion

The FinTech sector has become a major source of employment in Nigeria. Startups and established companies hire software developers, data analysts, customer support agents, and financial technology experts, contributing to job creation. According to **Obi and Adeola (2021)**, FinTech also fosters the growth of the digital economy by supporting e-commerce platforms, digital marketplaces, and online entrepreneurship, thereby increasing economic participation and promoting sustainable development.

2.5 Challenges of Financial Technology in Nigeria

Despite the rapid growth and benefits of FinTech, several challenges continue to constrain its full potential in driving economic development in Nigeria. These challenges include cybersecurity threats, regulatory uncertainties, low financial literacy, the digital divide, and infrastructural deficits. Empirical evidence from Nigeria demonstrates how these barriers impact both adoption and trust in FinTech solutions.

Cybersecurity Threats and Fraud

Cybersecurity remains a major challenge for FinTech in Nigeria. Digital platforms are increasingly targeted by cybercriminals, leading to incidents of phishing, identity theft, unauthorized access to accounts, and online fraud. For example, in 2023, the Nigerian Deposit

Insurance Corporation (NDIC) reported that cyber fraud in mobile banking and online financial services resulted in losses exceeding ₦3.5 billion across multiple banks and digital platforms (NDIC, 2023). According to **Ajayi and Okoro (2022)**, frequent security breaches undermine consumer confidence and deter potential users, particularly among SMEs that rely on secure payment channels for business transactions.

Regulatory Uncertainties and Policy Inconsistency

Regulatory uncertainty remains a persistent barrier. While the Central Bank of Nigeria (CBN) and other regulatory agencies have implemented frameworks for digital finance, frequent policy changes and inconsistencies have caused confusion among FinTech operators. For instance, the temporary ban on cryptocurrencies by the CBN in 2021 created significant disruptions for FinTech startups involved in crypto payments and cross-border remittances (Oluwatobi & Eze, 2021). Additionally, unclear guidelines on digital lending and mobile money operations have led some startups to suspend operations or operate in legal gray areas, limiting sector growth.

Low Financial Literacy Among Users

Financial literacy is low among large segments of the Nigerian population, particularly in rural areas. Many users struggle to understand digital financial products, transaction processes, or risk management, leading to underutilization of FinTech services. A survey by **Nnamdi and Uche (2022)** found that only 37% of adult Nigerians fully understood how to use mobile banking apps safely. This lack of knowledge increases vulnerability to fraud and errors, reducing the potential impact of digital finance on financial inclusion.

Digital Divide and Rural Accessibility Issues

The digital divide is evident in Nigeria, with rural populations often lacking access to smartphones, internet connectivity, or reliable mobile networks. According to **Ibrahim and Bello (2021)**, internet penetration in rural areas is below 45%, compared to over 70% in urban centers. As a result, mobile money and digital banking adoption is heavily skewed toward urban populations. Empirical evidence shows that regions like the North-East and North-West of Nigeria remain significantly underbanked despite national FinTech growth, limiting the equitable distribution of financial services and economic opportunities.

Infrastructural Deficits (Internet, Power, etc.)

Infrastructural inadequacies, including unreliable electricity and poor ICT infrastructure, pose major operational challenges. Frequent power outages disrupt online transactions, while slow or unstable internet connections reduce user confidence. For example, **Okafor and Adeniyi (2020)** report that in Lagos and Abuja, up to 25% of online transactions fail due to network downtime, while rural areas experience transaction interruptions more frequently. These challenges also increase operational costs for FinTech firms, which must invest in backup power solutions and redundant network systems.

Other Socio-Economic and Behavioral Challenges

Beyond technical and regulatory issues, behavioral factors such as resistance to change, preference for cash, and mistrust of digital systems further constrain adoption. For example, despite mobile money availability, only about 60% of adult Nigerians actively use digital payments, with the remainder preferring traditional cash transactions due to cultural and psychological barriers (Eze & Okafor, 2022).

In sum, while FinTech has the potential to transform Nigeria's financial landscape and drive economic development, it faces multiple intertwined challenges. Cybersecurity threats, regulatory gaps, low financial literacy, digital exclusion, infrastructural deficits, and behavioral barriers hinder adoption and effectiveness. Addressing these challenges requires coordinated interventions, including robust cybersecurity frameworks, clear regulatory guidelines, financial literacy programs, infrastructure investments, and targeted policies to reduce the digital divide. Only then can FinTech fully realize its potential as a catalyst for inclusive economic growth.

2.6 Theoretical Literature

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Fred Davis in 1989, is a foundational framework in understanding the determinants of technology adoption and usage. It was originally developed to explain users' acceptance of information systems in organizational settings but has since been widely applied to study various technological innovations across sectors. The model asserts that two primary beliefs drive an individual's decision to accept and use technology:

Perceived Usefulness (PU): This refers to the degree to which an individual believes that using a particular technology will improve their performance, productivity, or overall efficiency. A high perceived usefulness increases the likelihood that an individual will form a positive attitude toward the technology and intend to use it.

Perceived Ease of Use (PEOU): This refers to the extent to which a person believes that interacting with the technology will require minimal effort. Technologies that are perceived as easy to use reduce resistance to adoption and encourage experimentation and sustained use.

TAM posits a causal relationship whereby PU and PEOU influence the user's attitude toward using the technology, which in turn shapes their behavioral intention to use it. Behavioral intention then predicts actual usage behavior. Subsequent extensions of TAM, including TAM2 and the Unified Theory of Acceptance and Use of Technology (UTAUT), have incorporated additional determinants such as social influence, facilitating conditions, trust, and experience, acknowledging that external and contextual factors also shape technology adoption.

The theoretical significance of TAM lies in its ability to conceptualize user cognition and motivation in the adoption process, providing a clear framework to analyze how beliefs about usefulness and ease of use translate into technology acceptance. Its robust empirical support across diverse technological contexts—from e-banking to mobile applications—makes TAM a highly valuable model for studying the adoption of innovations, including digital financial technologies (FinTech). Furthermore, TAM provides insights into how design features, system functionalities, and perceived benefits interact with user perceptions to influence technology acceptance.

By focusing on user perception as the primary driver of adoption, TAM emphasizes the human dimension of technology adoption, which is critical in understanding the diffusion of innovations in emerging and complex technological ecosystems.

Disruptive Innovation Theory

Disruptive Innovation Theory, first introduced by Clayton Christensen in his seminal work *The Innovator's Dilemma* (1997), provides a powerful lens for understanding how emerging technologies can transform entire industries and reconfigure market structures. At its foundation, the theory argues that innovation does not always follow a linear path of improvement. Instead,

certain innovations—referred to as *disruptive technologies*—begin as relatively simple, low-cost, and less sophisticated alternatives to mainstream solutions. Despite their initial shortcomings in performance or features, these innovations target overlooked or underserved market segments, gradually evolving to challenge and often displace established incumbents.

Christensen distinguishes between sustaining technologies and disruptive technologies. Sustaining technologies represent incremental or radical improvements in existing products and services that cater to the demands of mainstream customers. Most established firms tend to prioritize sustaining innovations because they strengthen existing business models, maintain profitability, and satisfy loyal customers. By contrast, disruptive technologies typically emerge at the lower end of the market or in completely new market spaces. Initially, they may appear inferior in quality or reliability compared to incumbent solutions, which often leads dominant firms to underestimate their potential. However, over time, as disruptive technologies improve, they meet and eventually exceed customer expectations, thereby capturing mainstream markets and fundamentally reshaping industries.

The relevance of this theory to financial technology (FinTech) is particularly striking. Traditional banks and financial institutions largely represent incumbents that rely on sustaining innovations such as improved digital banking platforms or enhanced branch services. FinTech, on the other hand, exemplifies a disruptive force by offering cheaper, faster, and more accessible services through mobile banking, peer-to-peer lending, digital wallets, and blockchain technologies. In Nigeria, for instance, platforms such as Paga, Flutterwave, and Opay have leveraged mobile money and payment systems to reach unbanked and underbanked populations—segments traditionally underserved by conventional banks (Central Bank of Nigeria, 2023). Although these

platforms initially operated outside mainstream financial markets, their rapid scalability and increasing reliability have positioned them as strong competitors to traditional banks.

Empirical evidence reinforces this perspective. Chinwe (2020) argues that the rise of FinTech firms in Nigeria demonstrates a textbook case of disruptive innovation, where startups introduced simpler and more convenient solutions, eventually expanding their reach into mainstream financial activities. Similarly, Odeleye and Oyeneye (2022) found that FinTech adoption, particularly mobile money and point-of-sale (POS) services, has significantly deepened financial inclusion, challenging the dominance of traditional banking institutions.

Thus, Disruptive Innovation Theory not only explains the dynamics of technological change in financial services but also provides a theoretical justification for studying how FinTech drives economic development. By reshaping access to finance, lowering transaction costs, and enabling greater inclusion, FinTech innovations embody the disruptive trajectory Christensen described, posing both opportunities and challenges for established financial systems in Nigeria and beyond.

2.7 Empirical Review

Several studies have examined the relationship between financial technology (FinTech) and economic performance across different contexts. Godgift, Charles, and Obakayode (2018) assessed the impact of FinTech on payment and collection operations among Small and Medium Enterprises (SMEs) in Nigeria. The study surveyed 120 SMEs across diverse sectors—including fashion, education, pharmaceuticals, ICT, agro-allied, and retail—spanning four geopolitical zones in Lagos State. Of the questionnaires distributed, 100 valid responses were analyzed using

inferential statistics, revealing that FinTech significantly enhances business operations and positively contributes to economic performance and national development.

In a European context, Simon, Michael, and Thomas (2019) employed an interpretive, in-depth case study to investigate how a financial services firm designed and implemented a digital transformation strategy (DTS). Their findings indicated that digital strategy development diverges from conventional structured Information System (IS) planning, emphasizing adaptive processes and strategic actions crucial for digital innovation. Similarly, Moro-Visconti, Rambaud, and Pascual (2020) explored FinTech as an evolving sector that merges finance and digital innovation. Comparing FinTech firms with traditional banks, they found that FinTechs benefit from scalable revenue models and contribute to sustainable finance through microfinance and crowdfunding. The study further suggested that over time, FinTechs and traditional banks may converge through cooperative and competitive "coopetition" strategies.

The influence of FinTech on financial inclusion and living standards has also been documented. Kanga, Oughton, Harris, and Murinde (2021) analyzed the diffusion of FinTech and its effect on GDP per capita using cross-sectional and panel data regression, showing significant long-term impacts beyond those of physical and human capital investments. In Sub-Saharan Africa, Inoussa (2021) found that FinTech-driven financial inclusion significantly fosters economic growth while reducing income inequality. Chueca and Ferruz (2021) highlighted FinTech's potential to support sustainable finance initiatives, suggesting that digital financial innovations can contribute to greener financial systems.

Research has also examined the interplay between FinTech startups and traditional financial institutions. Haddad and Hornuf (2021), analyzing data from 87 countries (2005–2018),

identified a positive association between FinTech startups and improvements in the performance and credit risk management of established banks. Similarly, Demir et al. (2022) employed quantile regression on data from 140 countries and found that FinTech indirectly reduces income inequality through financial inclusion, with the most pronounced effects in higher-income countries. In India, Goswami, Sharma, and Chouhan (2022) demonstrated that social influence, user habits, and perceptions of ease of use significantly affect behavioral intentions toward FinTech adoption, highlighting the scalability and cost-effectiveness of mobile financial services for social benefit.

In the Nigerian context, findings remain mixed. Ogbonna et al. (2023) assessed FinTech's effect on financial inclusion using an ex-post facto design and parsimonious regression, finding that while POS systems significantly enhanced inclusion, ATMs, mobile banking, and internet banking had limited impact. Another study by Ogbonna, Akwam, Okonkwo, Okaro, and Adigwe (2023) found that FinTech positively influenced the performance of financial institutions in Sub-Saharan Africa, though regulatory compliance issues and exploitation of loopholes were noted. Adiga, Adigwe, Okonkwo, and Ogbonna (2022) applied the ARDL technique to analyze FinTech's impact on Nigerian banks, revealing significant contributions to Return on Assets (ROA), Return on Equity (ROE), and noninterest income, but not to interest income. Finally, Chukwu, Akunna, and Chiamaka (2024) used the ARDL model to study FinTech's effect on Nigeria's Human Development Index (HDI), reporting an insignificant direct impact on broader development outcomes, indicating that while FinTech may enhance financial operations, its influence on wider socio-economic development remains limited.

Further empirical investigations have explored the relationship between financial technology (FinTech) and economic growth both globally and within Nigeria. Udo et al. (2023) examined

the FinTech–economic growth nexus in Nigeria using indirect measures of FinTech alongside bundled financial inclusion indicators. They expanded the analysis by employing direct measures such as automated teller machines (ATMs), web pay, mobile banking, and point-of-sale (POS) systems alongside unbundled financial inclusion indicators to assess their individual effects. Using the ARDL model, they found that direct FinTech measures positively influence both financial inclusion and economic growth. However, ATMs negatively affected these outcomes due to high maintenance costs and security concerns, leading to closures that restricted access and hindered inclusive finance. Individual financial inclusion indicators were shown to positively influence economic growth, while the relationship between economic growth and usage indices was insignificant.

In APEC countries, Chatchai and Ho-don Yan (2019) investigated the impact of FinTech e-payments on economic development, considering income growth, productivity, price volatility, and income inequality. Using an e-payment index and quantile regression, they found that FinTech had the most substantial impact at lower levels of economic development, supporting growth, reducing price volatility, and decreasing income inequality. E-payment usage and technological empowerment were identified as key drivers of these positive outcomes.

In China, Lu Shen et al. (2021) examined the interplay between technological finance, high-quality economic growth, and financial stability across 30 provinces (2004–2017). Employing factor analysis to construct comprehensive indices and using spatial SAC and PVAR models, they found that technological finance positively influenced high-quality development in all regions, particularly in eastern China. However, short-term negative shocks to financial stability were observed, which gradually dissipated over time.

Noha and Mahmoud (2021) analyzed FinTech's role in achieving Sustainable Development Goals (SDGs), particularly extreme poverty reduction, across MENA and Sub-Saharan Africa countries using dynamic panel GMM estimation (2004–2018). They found that FinTech adoption, measured via mobile subscriptions, broadband penetration, and internet usage, significantly reduced extreme poverty. However, they emphasized that human capital development and governance improvements are critical for maximizing FinTech's impact on sustainable development.

Song and Appiah-Otoo (2022) examined FinTech and its sub-components (third-party payment, credit, and insurance) on China's economic growth using IV-GMM across 31 provinces. Their results indicated a positive and significant impact of all FinTech measures on economic growth, with the strongest effects observed in the eastern region. The study also identified bidirectional causality between overall FinTech adoption and economic growth.

Kireyeva et al. (2021) explored the impact of financial technologies on economic growth using indicators such as non-cash payments, ATMs, internet access, and mobile communication users (2004–2019). Correlation analysis demonstrated that increases in FinTech adoption were positively associated with GDP growth and overall economic expansion.

Within Nigeria, Muhammad, Abdulmalik, and Halima (2022) analyzed FinTech's effect on deposit money banks' financial service delivery using secondary data from 2012 to 2021. Their study revealed that mobile banking, internet banking, and POS systems significantly enhanced service delivery. Similarly, Inusa et al. (2022) surveyed 415 bank customers to examine FinTech's effect on national development amid COVID-19 recovery. Using PLS-SEM, they found positive and significant relationships between transaction efficiency, sustainability, and

national development, highlighting FinTech's role in poverty reduction and income inequality alleviation.

Conversely, Odeleye and Oyeneye (2022) investigated FinTech's effect on financial inclusion in Nigeria using ARDL on quarterly data (2009–2019). Their findings revealed that FinTech had a significant negative short-run impact on financial inclusion, suggesting that the current state of technology adoption has not yet translated into meaningful improvements. However, economic growth positively influenced financial inclusion in both the short and long term.

Overall, these studies highlight that while FinTech has the potential to enhance financial inclusion, transaction efficiency, and economic growth, its impact is context-specific and moderated by factors such as infrastructure quality, governance, and user adoption rates.

2.8 Summary of Literature

This chapter reviewed the conceptual, theoretical, and empirical foundations related to financial technology (FinTech) and economic development in Nigeria. FinTech is shown to enhance financial inclusion, reduce transaction costs, support the growth of small and medium-sized enterprises, facilitate cross-border trade, and create jobs. However, challenges such as cybersecurity threats, infrastructural deficits, low financial literacy, and regulatory inconsistencies hinder its full potential.

Theoretical perspectives, including Disruptive Innovation Theory and the Technology Acceptance Model, highlight how emerging technologies transform financial systems and how user perceptions shape adoption behavior. Empirical evidence suggests that FinTech positively influences economic growth, financial inclusion, and transactional efficiency, though certain technologies may face limitations that reduce their impact.

Overall, the literature confirms that FinTech can drive economic development in Nigeria, but its effectiveness depends on infrastructure, regulatory frameworks, and socio-economic factors. Gaps remain in measuring the specific contributions of different FinTech components, emphasizing the need for empirical analysis that captures their individual effects on economic outcomes.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this chapter, the method of analysis as well the various procedure involved in the empirical estimation of the effect of financial technology on economic development in Nigeria are clearly addressed. The processes include research design, population and sample size, sampling procedure, model specification, method of data analysis, and sources of data. The software used in this analysis is Eviews 10.0.

3.2 Research Design

The research designs adopted in this study is the Ex-Post-facto or the longitudinal research design. In an Ex-Post-facto research which involves secondary data in which responses in the nature of a factor and its effects on individuals are being studied, the researcher does not have the ability or opportunity to vary or manipulate the independent variables (Agbonifoh & Yomere, 1999).

3.3 Population and Sampling Procedure

The population of the study which is also the sample size is the Nigerian economy over the period 2009 to 2024. The census sampling method where population equals sample size was used to arrive at the final sample size for the study.

3.4 Sources of Data

The data used in this study are time series data and are sourced from the Central Bank of Nigeria Statistical Bulletin (2024) and the World Banks Data. The data covered the period 2009 to 2024.

The reason for the choice of this period is based on the fact that it is the period in which electronics banking actually began in Nigeria. Thus, this will enable us to have a more realistic evaluation of the hypothesized impact of electronics banking on economic development in Nigeria over time.

3.5 Model Specification

The model for this study follows a linear combination of explanatory time series variables, which seeks to explain the relationship between financial technology and economic development in Nigeria. The model is stated in its functional form as follows:

GDPPC = f(ATM, POS, INTB, MOB)…….(3.1)

Hence, the econometric form of the model is as follow:

$GDPPC_t = \beta_0 + \beta_1 ATM_t + \beta_2 POS_t + \beta_3 INTB_t + \beta_4 MOB_t + U_t$……..……..…(3.2)

Where:

GDPPC = Gross Domestic Product Per Capital (measured as Economic Development)

ATM = Automated Teller Machine

POS = Point of Sales Terminal

INTB = Internet Banking

MOB = Mobile Banking

Where u is the stochastic error term in the model.

The a priori of the explanatory variables are $\beta_1, \beta_2, \beta_3, \beta_4 > 0$

3.6 Method of Data Analysis

Three main methods are used in the analysis of this study. They are the unit root test, correlation coefficient and the fully modified ordinary least square (FMOLS) technique. The Augmented Decay Fuller method was used to conduct the unit root tests in order to ascertain the stationarity of the variables used. The reason for this is to avoid spurious regression results. The Fully Modified Least Squares (FMOLS) regression model was employed in order to analyze the impact of financial technology on deposit money banks performance in Nigeria. The fully modified least squares regression was originally designed in the work of Phillips and Hansen (1990) to provide optimal estimates of cointegrating regressions.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

In this chapter, we implement the method of data analysis earlier stated in chapter three with respect to fully modified least square (FMOLS) econometric technique. First, in order to provide a rich background characterization of the data for the estimation of the effect of financial technology on economic development in Nigeria, the correlation coefficient was employed in this regard; the unit root test was also carried out using the augmented decay fuller method.

4.2 Correlation Analysis

The initial patterns of relationships among the variables can be observed based on the correlations among the variables. In table 4.1 below, we show the correlation matrix for the impact of financial technology on economic development in Nigeria. It is seen that economic development (measured by gross domestic product per capital) has a strong positive correlation value of 0.57648 with automated teller machine (ATM); and a weak positive correlation with point of sales terminal (POS), internet banking (INTB), and mobile money transfer (MOB), with respective values of 0.25984, 0.28180 and 0.28325. Again, automated teller machine (ATM) is seen to have strong positive correlation values of 0.88261, 0.84526 and 0.90529 with point of sales terminal (POS), internet banking (INTB) and mobile money transfer (MOB). Also, a strong positive correlation values of 0.89890 and 0.99404 exist between point of sales terminal (POS), internet banking (INTB) and mobile money transfer (MOB). Also, internet banking (INTB) has strong positive correlation with mobile money transfer (MOB) (0.90362). Thus, we conclude that there is a significant positive relationship between financial technology and deposit money banks performance (DMBP) in Nigeria.

Table 4.1: Pair-wise Correlation Table

	GDPPC	ATM	POS	INTB	MOB
GDPPC	1				
ATM	0.57648	1			
POS	0.25984	0.88261	1		
INTB	0.28180	0.84526	0.89890	1	
MOB	0.28325	0.90529	0.99404	0.90362	1

Source: Author's Compilations (2025)

4.3 Unit Root Analysis

The Augmented Dickey Fuller (ADF) test is employed in order to analyze the unit roots. The results are presented in levels and first difference in Table 4.2. In the result, the ADF test statistic for each of the variables is shown in the second and fifth column, while the 95 percent critical ADF value is shown in the third and sixth column respectively. The result indicates that all the variables (except INTB) are stationary at level; and even at after the first difference was taken, all the variables were also now stationary (see panel 2). This implies that the variables are actually difference-stationary, attaining stationarity after the first differences of the variables. Thus, we would accept the hypothesis that the variables possess unit roots. Indeed, the variables are integrated of order one (i.e. I[1]).

Table 4.2: Unit Root Tests

At Levels Panel 1				First Difference Panel 2		
Variable	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**	**ADF Test Statistic**	**95% Critical ADF Value**	**Remark**
GDPPC	-2.036293	-3.098896	Non-Stationary	-3.866465	-3.119910	Stationary
ATM	-2.324452	-3.081002	Non-Stationary	-4.959705	-3.098896	Stationary
POS	-2.893033	-3.081002	Non-Stationary	-4.714791	-3.098896	Stationary
INTB	-3.281418	-3.081002	Stationary	-4.304062	-3.119910	Stationary
MOB	-2.829081	-3.081002	Non-Stationary	-4.758152	-3.098896	Stationary

Source: Author's Computation (2025)

4.4 Fully Modified Least Square (FMOLS) Regression Analysis

The fully modified Least Square (FMOLS) estimates is reported in Table 4.3 below. From the result, the goodness of fit is good, with the R squared value of 0.53, indicating that over 53 percent of the systematic variations in economic development in Nigeria (measured by GDPPC) is captured by the changes in the explanatory variables. The adjusted R-squared value of 0.35 percent is moderate and it implies that the model has a good predictive ability.

A close examination of the individual coefficients in the model revealed that the coefficient of automated teller machine (ATM) has a significant positive relationship with economic development in Nigeria. This means that total value of the amount withdrawn through automated teller machine has significantly enhanced the overall development of the Nigerian economy overtime. Indeed, it is seen that a unit increase in the volume of ATM usage enhances

overall the overall development of the Nigerian economy by approximately 76.85513 percent. This further suggests that there is need for management to sustain or improve on current policy regarding the use of ATM such that it will continue to have positive financial impact on economic development in Nigeria. The coefficient of point of sales terminal (POS) is seen to have a weak positive relationship with economic development in Nigeria. This simply means that POS usage had not played key role in the development of the Nigerian economy overtime. Hence, there is need for better usage of POS in the country so that they can have the much needed positive impact on economic development.

The coefficient of internet banking (INTB) has an insignificant negative impact on economic development. The variable failed the 5 percent significance level, suggesting that it is not a potent driver of economic development in Nigeria. The negative sign even suggests the tendency of INTB to reduce economic development. Indeed, government and monetary authority should place special attention on internet banking activities because of its potential benefits on both the banking system transformation as well as stimulating economic development in Nigeria.

Furthermore, the coefficient of mobile banking (MOB) has a weak negative relationship with economic development in Nigeria, suggesting that the variable does not play any significant role in the development of the Nigerian economy. However, the negative sign is an indication of the tendency of MOB reducing the economic development in Nigeria.

Table 4.3: Financial Technology and Economic Development in Nigeria

FMOLS Regression

Variables	Coefficient	T-Ratio	Prob.
ATM	76.85513	5.190794	0.0004**
POS	348.1712	1.316895	0.2173
INTB	-145.6915	-0.377524	0.7137
MOB	-661.9673	-2.056891	0.0667
Constant	314106.2	43.84278	0.0000
$R^2 = 0.53$	$\bar{R}^2 = 0.35$		

Source: Author's Compilations (2025) Note: **sig at 1% level

4.5 Breusch-Godfrey Serial Correlation LM Test

To test whether the residuals from the model are serially correlated in the estimation, we used the Breusch-Godfrey Serial Correlation LM Test as indicated in Table 4.4 below. Indeed, from the result, since the null hypothesis is that the residual are serially uncorrelated, and the F-Statistic p-value of 0.5517 indicates that we will fail to reject the null hypothesis. Therefore, the residuals are serially uncorrelated.

Table 4.4: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.379407	Prob. F(1,10)	0.5517
Obs*R-squared	0.584861	Prob. Chi-Square(1)	0.4444

Source: Author's Compilation (2025)

4.6 Normality Test

To test for normality test, we employed the histogram normality test (HNT). According to this test, the null hypothesis is that the residual are normally distributed, while the alternative hypothesis is that the residual are not normally distributed. Thus, if the probability value of the Jarque-Bera statistics is greater than 0.05 (5%), then we accept the null hypothesis that the residual are normally distributed; but if the probability value of the Jarque-Bera statistics is less than 0.05 (5%), then we reject the null hypothesis that the residual are not normally distributed. Therefore, since the probability value (0.716500) of the Jarque-Bera statistics in Figure 4.1 is greater than 0.05 (5%), we conclude that the data set are normally distributed.

Figure 4.1: Histogram Normality Test

Source: Author's Computations (2025) from Eview 10.0

4.7 Heteroskedasticity Test: Breusch-Pagan-Godfrey

To test for Heteroskedasticity, the Breusch-Pagan-Godfrey Test was used as indicated in Table 4.5. Indeed, from the result, since the null hypothesis is that the residual are serially

uncorrelated, and the F-Statistic p-value of 0.4134 indicates that we will fail to reject the null hypothesis. Therefore, the residuals are serially uncorrelated.

Table 4.5: Breusch-Pagan-Godfrey Test

F-statistic	1.077822	Prob. F(4,11)	0.4134
Obs*R-squared	4.505212	Prob. Chi-Square(4)	0.3419
Scaled explained SS	1.084039	Prob. Chi-Square(4)	0.8968

Source: Author's Compilation (2025)

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Summary of Findings

The study examined the relationship between financial technology and economic development in Nigeria over the period 2009 to 2024. Based on the empirical analysis of data in chapter four, the following specific findings are summarize as follows:

That automated teller machine (ATM) has a significant positive relationship with economic development in Nigeria. This means that total value of the amount withdrawn through

automated teller machine has significantly enhanced the overall development of the Nigerian economy overtime.

That point of sales terminal (POS) is seen to have a weak positive relationship with economic development in Nigeria. This simply means that POS usage had not played key role in the development of the Nigerian economy overtime. Hence, there is need for better usage of POS in the country so that they can have the much needed positive impact on economic development.

That internet banking (INTB) has an insignificant negative impact on economic development. The variable failed the 5 percent significance level, suggesting that it is not a potent driver of economic development in Nigeria. The negative sign even suggests the tendency of INTB to reduce economic development.

That mobile banking (MOB) has a weak negative relationship with economic development in Nigeria, suggesting that the variable does not play any significant role in the development of the Nigerian economy. However, the negative sign is an indication of the tendency of MOB reducing the economic development in Nigeria.

5.2 Conclusion

The study empirically examines the impact of financial technology on economic development in Nigeria for the period 2009 to 2024. The rationale for this study was based on the fact that electronic banking significantly influences economic development of a country the world over. Therefore, in order to find out this submission in Nigeria, the fully modified least squares (FMOLS) method was used for the analysis of data. The results from the analysis revealed that automated teller machine (ATM) had a significant positive relationship with economic

development; point of sales terminal (POS) had a weak positive relationship with economic development; internet banking (INTB) and mobile banking (MOB) had a weak negative relationship with economic development in Nigeria. The study conclude that in the determination of economic development in Nigeria, automated teller machine (ATM) is a potent factor to be considered because of its critical role in ensuring high level of economic development in Nigeria.

5.3 Recommendations

In view of the salient findings from this study, the following specific policy recommendations are raised:

Firstly, the use of automated teller machine has proven to be an effective tool for determining economic development in Nigeria. Thus, management should continue to ensure that more ATM stands or points where customers can easily withdraw money, especially those who in-hard-to reach areas should be provided. Regular and routine servicing and monitoring of these ATM machines must be carried out. These will go a long way to enhance overall economic development in the country.

Secondly, management must refocus and re-strategized on new modalities that would enable the sustained usage of automated teller machine (ATM) to consistently promote economic development. They should also ensure that the indiscriminate use ATM by unlawful users are eliminated or drastically reduced to the barest minimum. They should evolve some unique ideas and coding systems that will enable them track dawn unlawful users of ATM. By so doing it will go a long way to reducing ATM related crimes and in turn spur long term economic development in Nigeria.

Lastly, management and regulators should constantly encourage the use of POS because it portents fresh or new revenue streams for banks that have fully gone digital and embraced cashless policy in Nigeria. This will enable banks generate more revenue consistently from the fees charged on POS transactions, and as the volume of electronic payments grows, so does these income stream, thereby boosting overall financial performance of banks and in the long run promote rapid economic development of the country

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APPENDICES

Dependent Variable: GDPPC

Method: Fully Modified Least Squares (FMOLS)

Date: 10/26/25 Time: 04:47

Sample (adjusted): 2010 2024

Included observations: 15 after adjustments

Cointegrating equation deterministics: C

Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	76.85513	14.80604	5.190794	0.0004
POS	348.1712	264.3879	1.316895	0.2173
INTB	-145.6915	385.9131	-0.377524	0.7137
MOB	-661.9673	321.8290	-2.056891	0.0667
C	314106.2	7164.377	43.84278	0.0000

R-squared	0.538174	Mean dependent var	345094.4
Adjusted R-squared	0.353443	S.D. dependent var	11349.46
S.E. of regression	9125.963	Sum squared resid	8.33E+08
Long-run variance	50177976		

	GDPPC	ATM	POS	INTB	MOB
GDPPC	1	0.576484835511188	0.259846584542021 5	0.281808656106294 7	0.283251388875928
ATM	0.576484835511188	1	0.882619253666715 2	0.845261276686076 8	0.905290759571601 2
POS	0.259846584542021 5	0.882619253666715 2	1	0.898909301208976	0.994049881026642
INTB	0.281808656106294 7	0.845261276686076 8	0.898909301208976	1	0.903621764115554 6
MOB	0.283251388875928	0.905290759571601 2	0.994049881026642	0.903621764115554 6	1

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.379407	Prob. F(1,10)	0.5517
Obs*R-squared	0.584861	Prob. Chi-Square(1)	0.4444

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 10/26/25 Time: 04:35

Sample: 2009 2024

Included observations: 16

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3808.350	10347.06	0.368061	0.7205
ATM	-5.636884	20.35672	-0.276905	0.7875
POS	-11.82728	346.2009	-0.034163	0.9734
INTB	-189.0795	605.1430	-0.312454	0.7611
MOB	63.27894	424.2497	0.149155	0.8844
RESID(-1)	0.266225	0.432211	0.615960	0.5517

R-squared	0.036554	Mean dependent var	-4.46E-11
Adjusted R-squared	-0.445169	S.D. dependent var	8014.597
S.E. of regression	9634.763	Akaike info criterion	21.46414
Sum squared resid	9.28E+08	Schwarz criterion	21.75386
Log likelihood	-165.7131	Hannan-Quinn criter.	21.47898
F-statistic	0.075881	Durbin-Watson stat	1.642249
Prob(F-statistic)	0.994606		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.077822	Prob. F(4,11)	0.4134
Obs*R-squared	4.505212	Prob. Chi-Square(4)	0.3419
Scaled explained SS	1.084039	Prob. Chi-Square(4)	0.8968

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 10/26/25 Time: 04:35

Sample: 2009 2024

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.15E+08	53488309	2.155567	0.0541
ATM	15653.87	117229.8	0.133531	0.8962
POS	-2478972.	2228507.	-1.112391	0.2897
INTB	-4814053.	3362132.	-1.431845	0.1800
MOB	3123314.	2653720.	1.176957	0.2641

R-squared	0.281576	Mean dependent var	60219153
Adjusted R-squared	0.020331	S.D. dependent var	62756136
S.E. of regression	62114927	Akaike info criterion	38.97718
Sum squared resid	4.24E+16	Schwarz criterion	39.21861
Log likelihood	-306.8174	Hannan-Quinn criter.	38.98954
F-statistic	1.077822	Durbin-Watson stat	2.157910
Prob(F-statistic)	0.413436		

Unit root test (at levels)

GDPPC

Null Hypothesis: GDPPC has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.036293	0.2698
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	

10% level	-2.690439	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDPPC)

Method: Least Squares

Date: 10/26/25 Time: 04:38

Sample (adjusted): 2011 2024

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPC(-1)	-0.365787	0.179634	-2.036293	0.0665
D(GDPPC(-1))	0.399019	0.227590	1.753240	0.1073
C	127053.4	61885.64	2.053036	0.0646

R-squared	0.389089	Mean dependent var	1928.107
Adjusted R-squared	0.278014	S.D. dependent var	8723.189
S.E. of regression	7412.071	Akaike info criterion	20.84702
Sum squared resid	6.04E+08	Schwarz criterion	20.98396
Log likelihood	-142.9291	Hannan-Quinn criter.	20.83434
F-statistic	3.502950	Durbin-Watson stat	1.836118
Prob(F-statistic)	0.066509		

ATM

Null Hypothesis: ATM has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.324452	0.1774
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ATM)

Method: Least Squares

Date: 10/26/25 Time: 04:38

Sample (adjusted): 2010 2024

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM(-1)	-0.531684	0.228735	-2.324452	0.0369
C	323.4083	150.8643	2.143703	0.0515

R-squared	0.293596	Mean dependent var	26.88667
Adjusted R-squared	0.239258	S.D. dependent var	357.6394
S.E. of regression	311.9351	Akaike info criterion	14.44703
Sum squared resid	1264945.	Schwarz criterion	14.54144
Log likelihood	-106.3527	Hannan-Quinn criter.	14.44603
F-statistic	5.403077	Durbin-Watson stat	2.175987
Prob(F-statistic)	0.036942		

POS

Null Hypothesis: POS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.893033	0.0696
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 15

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Augmented Dickey-Fuller Test Equation

Dependent Variable: D(POS)

Method: Least Squares

Date: 10/26/25 Time: 04:39

Sample (adjusted): 2010 2024

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POS(-1)	-0.765336	0.264544	-2.893033	0.0126
C	44.71624	23.62810	1.892502	0.0809

R-squared	0.391660	Mean dependent var	3.673333
Adjusted R-squared	0.344865	S.D. dependent var	90.41229
S.E. of regression	73.18009	Akaike info criterion	11.54729
Sum squared resid	69619.22	Schwarz criterion	11.64170
Log likelihood	-84.60467	Hannan-Quinn criter.	11.54628
F-statistic	8.369638	Durbin-Watson stat	1.966752
Prob(F-statistic)	0.012575		

INTB

Null Hypothesis: INTB has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.281418	0.0349
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INTB)

Method: Least Squares

Date: 10/26/25 Time: 04:39

Sample (adjusted): 2010 2024

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTB(-1)	-0.878005	0.267569	-3.281418	0.0060
C	13.25365	4.864704	2.724452	0.0174

R-squared	0.453039	Mean dependent var	0.742667
Adjusted R-squared	0.410965	S.D. dependent var	15.24695
S.E. of regression	11.70182	Akaike info criterion	7.880931
Sum squared resid	1780.123	Schwarz criterion	7.975338

Log likelihood	-57.10699	Hannan-Quinn criter.	7.879926
F-statistic	10.76770	Durbin-Watson stat	2.007522
Prob(F-statistic)	0.005957		

MOB

Null Hypothesis: MOB has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.829081	0.0777
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MOB)

Method: Least Squares

Date: 10/26/25 Time: 04:40

Sample (adjusted): 2010 2024

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MOB(-1)	-0.746513	0.263871	-2.829081	0.0142
C	36.01326	21.17837	1.700473	0.1128

R-squared	0.381061	Mean dependent var	2.383333
Adjusted R-squared	0.333451	S.D. dependent var	83.14811
S.E. of regression	67.88417	Akaike info criterion	11.39705
Sum squared resid	59907.39	Schwarz criterion	11.49146
Log likelihood	-83.47787	Hannan-Quinn criter.	11.39604
F-statistic	8.003697	Durbin-Watson stat	1.971946
Prob(F-statistic)	0.014216		

Unit root test (first diff.)

GDPPC

Null Hypothesis: D(GDPPC,2) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.866465	0.0139
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDPPC,3)

Method: Least Squares

Date: 10/26/25 Time: 04:40

Sample (adjusted): 2012 2024

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPPC(-1),2)	-1.176517	0.304287	-3.866465	0.0026
C	193.9288	2836.460	0.068370	0.9467

R-squared	0.576101	Mean dependent var	1391.369
Adjusted R-squared	0.537564	S.D. dependent var	14949.22
S.E. of regression	10165.86	Akaike info criterion	21.43210
Sum squared resid	1.14E+09	Schwarz criterion	21.51901
Log likelihood	-137.3086	Hannan-Quinn criter.	21.41423
F-statistic	14.94955	Durbin-Watson stat	2.087531
Prob(F-statistic)	0.002624		

ATM

Null Hypothesis: D(ATM) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.959705	0.0019

Test critical values:	1% level	-4.004425
	5% level	-3.098896
	10% level	-2.690439

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ATM,2)

Method: Least Squares

Date: 10/26/25 Time: 04:41

Sample (adjusted): 2011 2024

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ATM(-1))	-1.349751	0.272143	-4.959705	0.0003
C	39.35288	96.57720	0.407476	0.6908

R-squared	0.672119	Mean dependent var	19.36500
Adjusted R-squared	0.644796	S.D. dependent var	605.7887
S.E. of regression	361.0440	Akaike info criterion	14.74744
Sum squared resid	1564233.	Schwarz criterion	14.83873
Log likelihood	-101.2321	Hannan-Quinn criter.	14.73899
F-statistic	24.59867	Durbin-Watson stat	2.012448
Prob(F-statistic)	0.000331		

POS

Null Hypothesis: D(POS) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.714791	0.0029
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	
	10% level	-2.690439	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(POS,2)

Method: Least Squares

Date: 10/26/25 Time: 04:41

Sample (adjusted): 2011 2024

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POS(-1))	-1.299178	0.275554	-4.714791	0.0005

C	4.884183	24.91654	0.196022	0.8479

R-squared	0.649423	Mean dependent var	0.995000
Adjusted R-squared	0.620208	S.D. dependent var	151.1961
S.E. of regression	93.17805	Akaike info criterion	12.03847
Sum squared resid	104185.8	Schwarz criterion	12.12976
Log likelihood	-82.26926	Hannan-Quinn criter.	12.03001
F-statistic	22.22926	Durbin-Watson stat	2.252243
Prob(F-statistic)	0.000501		

INTB

Null Hypothesis: D(INTB) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.304062	0.0066
Test critical values:	1% level	-4.057910	
	5% level	-3.119910	
	10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INTB,2)

Method: Least Squares

Date: 10/26/25 Time: 04:41

Sample (adjusted): 2012 2024

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTB(-1))	-1.863473	0.432957	-4.304062	0.0016
D(INTB(-1),2)	0.404029	0.266597	1.515503	0.1606
C	-0.104388	3.948576	-0.026437	0.9794

R-squared	0.752937	Mean dependent var	-1.123077
Adjusted R-squared	0.703524	S.D. dependent var	26.07506
S.E. of regression	14.19777	Akaike info criterion	8.343222
Sum squared resid	2015.768	Schwarz criterion	8.473595
Log likelihood	-51.23094	Hannan-Quinn criter.	8.316424
F-statistic	15.23772	Durbin-Watson stat	1.781268
Prob(F-statistic)	0.000921		

MOB

Null Hypothesis: D(MOB) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.758152	0.0027

Test critical values:	1% level	-4.004425
	5% level	-3.098896
	10% level	-2.690439

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MOB,2)

Method: Least Squares

Date: 10/26/25 Time: 04:42

Sample (adjusted): 2011 2024

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MOB(-1))	-1.307258	0.274741	-4.758152	0.0005
C	3.129105	22.84863	0.136949	0.8933

R-squared	0.653580	Mean dependent var	0.434286
Adjusted R-squared	0.624711	S.D. dependent var	139.5109
S.E. of regression	85.46546	Akaike info criterion	11.86567
Sum squared resid	87652.15	Schwarz criterion	11.95696
Log likelihood	-81.05966	Hannan-Quinn criter.	11.85721
F-statistic	22.64001	Durbin-Watson stat	2.240254
Prob(F-statistic)	0.000466		

DATA

YEAR	GDPPC	ATM	POS	INTB	MOB
2009	312029.8	137.72	3.51	4.38	0.06
2010	327720.3	62.59	2.77	3.37	0.87
2011	335576.9	333.51	6.28	24.13	3.32
2012	340201.9	454.79	1.87	6.38	1.08
2013	353178.9	611.26	26.28	11.37	22.88
2014	365672.9	784.05	67.47	16.6	66.36
2015	365972.7	675.09	30.94	9.36	28.92
2016	351264.5	1,069.99	144.76	31.69	135.24
2017	345588.6	1,502.06	285.98	46.57	260.59
2018	344182.6	483.25	8.74	6.93	4.93
2019	344148.1	675.09	30.94	9.36	28.92

2020	330849.6	345.04	45.42	9.36	28.92
2021	335802.9	345.04	45.42	9.36	28.92
2022	339541.3	541.02	58.61	15.52	35.81
2023	342000.6	345.04	45.42	9.36	28.92
2024	354713.8	541.02	58.61	15.52	35.81

CBN Statistical Bulletin (2024) and the World Bank Data