

FINANCIAL TECHNOLOGY AND FINANCIAL INCLUSION IN NIGERIA

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**A RESEARCH PROJECT WRITTEN AND SUBMITTED TO THE DEPARTMENT OF
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DECLARATION

I. The study was undertaken by **SHARON EHIAIRINMWIAN OSAHENUMASE** in the Department of Finance University of Benin, under the supervision of **Dr O.F.Ogieva** of Department of Finance , Faculty of Management Science, University of Benin.

II. To the best of my knowledge this study has never been previously submitted for the award of a degree elsewhere and the research is conducted by me and all material consulted are duly acknowledged in the reference.

III. I also take responsibility for any liability that may flow from the work.

SHARON EHIAIRINMWIAN OSAHENUMASE

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CERTIFICATION

We certify that this project has been carried out by **Sharon Ehiainmwian Osahenumase** with the matriculation number **MGS2104735** in the Department of Finance, Faculty of Management Sciences, University of Benin. It is adequate in scope and in quality in partial fulfilment of the requirement for the award of Bachelor of Science (B.Sc) degree in Finance.

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DEDICATION

This project is dedicated to Almighty God, the giver of life who has made it possible to complete my Bachelor of Science Degree (B. Sc) program in the Department of finance

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I am deeply grateful for the unwavering support and guidance I received throughout this project. First and foremost, I thank God Almighty for His unrelenting support and blessings, which sustained me throughout this journey. I extend my heartfelt appreciation to my supervisor Dr. Ogieva for his invaluable guidance, expertise, and encouragement. Your support was instrumental in shaping this work. Also, to my parents Mr. and Mrs. Ehiainmwian, my siblings and friends God bless you all, I am indeed grateful.

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ABSTRACT

This study examines the effect of FinTech on financial inclusion in Nigeria, with emphasis on the access and usage dimensions of financial inclusion. The study adopts a secondary data, time series in nature for quoted deposit money banks within the period of 2000 to 2024. The study utilized the multivariate ordinary least square technique, descriptive statistics and Pearson correlation to lucidly explain the impact of financial technology on financial inclusion in Nigeria. This study is a hypothesis testing study in which it examines the relationship between financial technology and financial inclusion in Nigeria within the period of 2000 to 2022. The multivariate ordinary least square was used to estimate the result. ATM usage and mobile banking was found to impact positively on financial inclusion in Nigeria while point of sales services impact negatively on financial inclusion in Nigeria. The estimation results indicate that the determination coefficient adjusted (R^2) of 0.94 shows that 94% of performance variation can be explained by variables of ATM usage, mobile banking and point of sales services; while the rest (6%) is explained by other variables outside the model. However to strengthen the statement, multicollinearity was tested using a correlation matrix. The test results obtained correlation coefficient values lower than 0.9, so it can be said that the model used is free from the problems of multicollinearity. The study recommends that concerted effort should be directed at promoting the provision and adoption of FinTech enabled services as they can act as key drivers of financial inclusion in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The advent of financial technology has profoundly reshaped the landscape of financial services globally, as well as reshaping the financial inclusivity in Nigeria for the past few decades. Using advanced technology and imaginative business models, a new financial industry has emerged, offering services that operate outside of the traditional financial sector. This field is commonly known as fintech (Arnaut & Bećirović, 2023).

Fintech has had a major impact on sectors like credit, transactions, and international transfers. In 2015, there were at least 4,000 functioning fintech businesses, with more than twelve of them valued at over \$1 billion. Worldwide investment in fintech reached approximately \$22.3 billion in 2015, which represented an increase of more than 12 times the investment made in 2010. By leveraging big data, fintech has been able to challenge established financial players like Deposit Money Banks (DMBs) by creating new business models (Awotunde et al, 2021).

Fintech firms have expanded their services beyond standard payment systems to now include offerings such as insurance, credit, savings, and investment products. By leveraging technology, they are able to grow their customer base with minimal capital investment in physical infrastructure. This approach results in lower costs for financial intermediation and enables improved products and services for consumers. In 2016, electronic payment transactions in Nigeria increased by 32.5% to a total of N83.1 trillion, up from N62.7 trillion in the preceding year.

Financial technology includes business models and digital innovations that are enabled by technology within the financial industry. Its influence on human activities is increasing worldwide, which has led various economic players to adopt different systems that integrate finance and technology. This is driven by fintech's ability to adapt to the business environment and its end-users (United Nations, 2021).

The gap between traditional financial institutions and the financially excluded is being bridged primarily by FinTech. The potential to increase financial inclusion is significant with the rise of new financial technologies, including online mobile banking, crowdfunding, digital wallet, POS, automated teller machines (ATM), cryptocurrencies, and blockchain-based transaction platforms. Furthermore, research shows that a rise in overall demand spurred the adoption of these technologies, which in turn has successfully broadened the accessibility of financial services (Frost, 2020).

There's no doubt that financial inclusion is a crucial way to reduce poverty and improve economic prosperity. Consequently, the effort to increase the availability of economic resources, support inclusive growth, and encourage savings among poor and underserved populations has continued to heighten interest in financial inclusion in most countries, particularly in Africa. Nanda and Kaur (2016) described financial inclusion as the accessibility and equal opportunity to obtain financial services. They also explained that Financial inclusion is the process through which individuals and companies can get appropriate, affordable, and prompt financial products and services. This has been a significant hurdle globally, particularly in Africa, where there are great opportunities for micro-level financial services (Adesanya, 2017).

In consequence, Sahay, Allmen, Lahreche, Khera, Ogwa, Bazarbash, and Beaton (2020) state that technology has been reshaping the financial sector, significantly improving access to financial services. These shifts have unquestionably been occurring for several years, impacting the financial sectors of almost every country globally.

According to the National Financial Inclusion Strategy (NFIS, 2020), financial inclusion is achieved when adult Nigerians can access affordable and appropriate financial products and services. These services include things like savings, payments, e-commerce, investments, and insurance. FinTech has also grown to influence other parts of life, such as getting medical care, paying for education, and purchasing taxi rides and plane tickets.

Margijoyo et al. (2024) state that mobile network technology is driving financial inclusion and bringing more people into the financial system in developing countries, where FinTech is improving consumers' lives worldwide. It has changed how we send and receive money, lend and borrow money, find and communicate with clients, obtain insurance, and interact with banks.

Recognizing the substantial number of unbanked and financially excluded individuals, the Central Bank of Nigeria (CBN), in collaboration with other key stakeholders, launched the National Financial Inclusion Strategy (NFIS) in 2012. Despite being Africa's most populous nation, with over 200 million inhabitants, a substantial 35.9% of Nigeria's adult bankable population remains financially excluded. This exclusion largely stems from a lack of access to traditional financial institutions like Deposit Money Banks (DMBs) and Micro-finance Banks (MFBs), as well as insurance services.

In 2012, the Central Bank of Nigeria introduced a cashless policy to decrease the amount of cash in circulation and encourage electronic payments, which has been a major factor in the recent growth of FinTech in Nigeria. Additionally, the COVID-19 pandemic forced many businesses to find ways to connect with customers without in-person interactions. Since digital technology was the only available method, transactions could be conducted through proxy labor.

The World Bank's 2020 report shows a major increase in global financial inclusion, with 1.2 billion adults getting access to financial accounts since 2011. However, a significant problem remains: 1.7 billion adults, mostly in poor rural areas, are still unbanked. This issue particularly impacts women in developing countries, as noted by Ahmad, Adamu & Murtala (2023). These ongoing disparities show an urgent need for targeted policies to truly advance financial inclusion. The fact that this gap still exists, despite major technological and policy efforts, highlights the need for more research into the relationship between FinTech adoption and genuine financial inclusion specifically within Nigeria.

1.2 Statement of the Research Problem

Nigeria projects itself as having a strong financial sector, with 24 commercial banks, 6 merchant banks, 887 microfinance banks, and 47 mobile money operators. This high level of competition and the presence of numerous institutions might suggest a high rate of financial inclusion.

However, despite this, available statistics from an (EFInA Report in 2022) show a persistent problem: approximately 36% of adult Nigerians remain financially excluded from formal financial products and services. This indicates that while the infrastructure for financial services is extensive, a significant portion of the population is still not being reached or served effectively.

Globally, many countries, particularly those that are still developing, face a significant problem with financial exclusion. The World Bank's Global Findex Database from 2021 revealed that approximately 24% of the world's population was financially excluded. The situation was slightly worse for developing countries, with a rate of 29% during the same period (World Bank, 2021). Similarly, the 2020 report from Enhancing Financial Innovation and Access (EFInA) indicated that in Nigeria alone, roughly 38 million adults, or 36% of the population, were financially excluded. This has serious negative effects on poverty reduction and economic development (EFInA, 2021). These individuals do not use any financial products or services, whether formal or informal.

Nigeria is one of seven developing economies, including China, India, Indonesia, Mexico, and Pakistan, that collectively account for nearly half of the world's financially excluded adults. A 2017 World Bank Findex database report revealed that about 48% of Nigeria's adult population was financially excluded (Demirgüç-Kunt, et al, 2018).

This high rate of financial exclusion is a major concern for Nigeria's efforts to combat poverty (Nigeria Bureau of Statistics, 2020; World Bank, 2020). This exclusion is particularly acute in rural areas, where 37% of adults remain unbanked compared to 17% in urban centers, and is most severe in Northern Nigeria, with 47% exclusion in both the Northeast and Northwest regions.

The challenges are multi-faceted and deeply embedded in the Nigerian context: inadequate digital infrastructure, particularly in remote areas, presents a fundamental barrier to FinTech adoption, as evidenced by the Nigerian Communications Commission's 2022 report indicating that only 40% of Nigerians had internet access, with rural areas disproportionately underserved.

Furthermore, low digital literacy levels, as noted by the (World Bank in 2021), and prevailing concerns about security and trust in digital platforms, which Aliyu (2023) described as being constantly undermined by "persistent problems such as erroneous debits, lengthy transaction reversals, and difficulties in reclaiming funds after failed Point of Sale (PoS) transactions," impede usage among underserved populations.

As a result, the country has made financial inclusion a key priority, as outlined in its National Financial Inclusion Strategy (NFIS), which was launched in 2012 and revised in 2018. The strategy's core approach is to leverage FinTech-enabled services like mobile money, mobile banking, internet banking, and Digital Financial Services (DFS) agents to increase financial inclusion.

Despite a 601.3% growth in the volume of electronic transactions between 2012 and 2019, the financial inclusion rate only grew by 4.81% during the same period. This discrepancy meant that the financial inclusion rate of 63.2% in 2019 fell short of the NFIS's 2020 target of 80% (CBN, 2016, 2019, 2020; EFinA, 2018).

Existing literature on financial inclusion in Nigeria doesn't seem to fully address the role of FinTech or the challenges it faces in promoting financial inclusion. This knowledge gap is a concern given the constantly changing nature of financial technology and the complexities of an emerging economy like Nigeria.

Recent events highlight just how dynamic this sector is. On April 30, 2024, the Central Bank of Nigeria (CBN) placed restrictions on FinTech firms, reportedly to safeguard the financial system and prevent risks from crypto assets and foreign currency speculation (Tunji, 2024). Just one

month later, the ban was lifted, allowing five major FinTech companies—Opay, Moniepoint, Kuda, Palmpay, and Paga—to begin onboarding new customers again (Ogaga, 2024).

While the general positive correlation between FinTech and financial inclusion is acknowledged, there is a crucial knowledge gap concerning the specific efficacy of different FinTech instruments, such as Automated Teller Machines (ATMs), mobile banking, Point of Sale (POS) terminals, and internet banking, in effectively overcoming these unique Nigerian barriers—especially for rural and low-income populations. Existing research often lacks granular, context-specific insights into how factors like digital literacy, infrastructure reliability, and consumer trust specifically modulate the impact of these technologies on financial inclusion outcomes across Nigeria's diverse socio-geographic landscape.

These developments show that the FinTech landscape in Nigeria is still evolving. Therefore, it's crucial for any current study to go beyond just the role of FinTech and also examine its current challenges in advancing financial inclusion within Nigeria's specific context.

1.3 Research Questions

The following research questions arose from the problem statement;

1. To what extent does Point of Sale(POS) affect financial inclusion in Nigeria?
2. To what degree does Automated teller Machine (ATM) affect financial inclusion in Nigeria?
3. How does Mobile Banking affect financial inclusion in Nigeria?
4. Does Digital Wallet affect financial inclusion Nigeria?

1.4 Objectives of the study

The main goal of this research was to investigate the relationship between FinTech and financial inclusion in Nigeria. Its specific objectives were;

1. Ascertain the extent to which Point of Sale (POS) on financial inclusion in Nigeria
2. Examine the effect of Automated Teller Machine (ATM) on financial inclusion in Nigeria
3. Investigate the effect of Mobile Banking on financial inclusion in Nigeria
4. Determine the extent to which Digital Wallet affect financial inclusion in Nigeria

1.5 Hypotheses of the Study

The study is guided by the following null hypotheses they include;

Ho₁: Point of Sales (POS) has no significant effect on financial inclusion in Nigeria

Ho₂: Automated Teller machine (ATM) has no significant effect on financial inclusion in Nigeria

Ho₃: Mobile Banking has no significant effect on financial inclusion in Nigeria

Ho₄: Digital Wallet has no significant effects on financial inclusion in Nigeria

1.6 Scope of the Study

This study focuses on the effects of financial technology and financial inclusion in Nigeria. This study covers the period from (2012 to 2024). The choice of this period was to ascertain the current trend of financial technology and financial inclusion in Nigeria .

This timeframe is specifically chosen to capture the rapid acceleration of FinTech growth and related financial inclusion initiatives in Nigeria; indeed, FinTech News Africa reported in March

2025 that the country saw "significant FinTech investment growth between 2020 and 2024," underscoring the dynamism and relevance of this period. Geographically, the concentration on rural areas is critical due to the persistent challenge highlighted by EFinA's December 2023 Access to Finance survey, which starkly revealed that "37% of adults in rural areas remain unbanked compared to 17% in urban centers." The strategic selection of representative rural communities across different geopolitical zones will allow for in-depth analysis of local conditions affecting FinTech adoption and financial inclusion.

1.7 Significance of the Study

The study on financial technology and financial inclusion in Nigeria is significant for several key reasons.

The significance of this study, specifically, lies in its direct contribution to understanding and overcoming the critical issue of financial exclusion in Nigeria through the strategic application of FinTech.

Directly Addresses a National Priority: The study directly tackles the Central Bank of Nigeria's (CBN) ambitious goal of 95% financial inclusion by 2024. By focusing on the persistent gaps (e.g., 37% rural exclusion, 38-47% in Northern Nigeria), it provides actionable insights to help Nigeria achieve this crucial national target, fostering economic stability and growth.

Provides Granular, Actionable Insights for Policymakers and Innovators: Unlike broad discussions of FinTech, this study dissects the effectiveness of specific, widely adopted channels: POS ATM services, mobile banking, and digital wallets. This specificity means that policymakers can craft highly targeted regulations, incentives, and infrastructure development

plans, while FinTech companies can refine their products and outreach strategies to better serve the unbanked and underbanked. It moves beyond "FinTech is good" to "which FinTech, how, and for whom."

Illuminates Specific Barriers to Adoption: The research will pinpoint concrete challenges currently hindering FinTech adoption, such as inadequate internet connectivity, unreliable electricity, specific security concerns (fraud, data theft), high transaction costs, and nuanced aspects of low digital literacy. By clearly articulating these barriers, the study provides a roadmap for targeted interventions and resource allocation to overcome them.

Empowers the Unbanked and Underbanked: By understanding the perspectives, challenges, and opportunities from the ground up, the study aims to facilitate greater access to essential financial services (savings, credit, insurance, pensions) for those currently excluded. This directly translates to improved economic resilience, increased opportunities for entrepreneurship, and a pathway out of poverty for millions of Nigerians.

Promotes Equitable and Inclusive Growth: The emphasis on regional disparities and marginalized groups (women, youth) means the study will identify specific needs and barriers for these populations. This is crucial for developing inclusive FinTech solutions that ensure the benefits of financial innovation are spread across all segments of society, rather than deepening existing inequalities.

1.8 Limitations of the Study

This research is relevant and important, but some limitations were encountered that could affect its scope, depth, and how widely applicable the findings are.

Generalizability of Findings (Geographical Scope)

While the study focuses on Nigeria, findings might not be uniformly applicable across all its diverse regions due to significant variations in infrastructure, cultural norms, digital literacy levels, and economic conditions. Data collected from specific areas or a limited number of states might not fully represent the complexities of financial exclusion and FinTech adoption across the entire country, particularly in very remote or conflict-affected areas.

Reliance on Self-Reported Data

The study will likely involve surveys or interviews with unbanked and underbanked populations. Responses related to awareness, utilization, challenges, and benefits are self-reported and thus subject to potential biases, including recall bias, social desirability bias (respondents giving answers they believe are expected), or a lack of complete understanding of complex financial concepts.

Causality vs. Correlation

While the study aims to assess the "impact" of FinTech, establishing a definitive causal link between the adoption of specific FinTech channels and improved financial inclusion can be complex. Other socio-economic factors, government initiatives, or broader economic trends might also be influencing financial inclusion levels, making it difficult to isolate the sole effect of FinTech adoption. The study might identify strong correlations rather than strict causality.

Limited Scope of FinTech Channels

The study specifically focuses on POS ATM services, mobile banking, and digital wallets. While these are significant, they do not encompass the entire spectrum of FinTech innovations

(e.g., crowdfunding, peer-to-peer lending platforms, advanced AI-driven credit scoring, blockchain applications). Therefore, the findings might not be generalizable to other emerging FinTech solutions not included in the scope.

Data Quality and Availability

Obtaining reliable and granular data on financial inclusion, particularly disaggregated by specific FinTech channel usage and socio-economic demographics in rural and underserved areas, can be difficult. The availability and accuracy of secondary data from financial institutions or government bodies might be a limiting factor.

Digital Literacy and Understanding of Technical Concepts

Participants from the unbanked and underbanked segments may have varying levels of digital literacy. Explaining complex FinTech concepts or security concerns might prove challenging, potentially leading to misunderstandings or superficial responses that do not fully capture their knowledge or experience.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter offers a comprehensive review of the existing literature on financial technology (FinTech) and financial inclusion, with a specific focus on Nigeria. It synthesizes insights from conceptual, theoretical, and empirical studies relevant to this critical nexus. The review begins by establishing a clear conceptual understanding of both FinTech and financial inclusion, exploring how FinTech serves as a catalyst for expanding access to financial services in Nigeria. A significant portion of the chapter is dedicated to synthesizing empirical findings from various studies conducted in Nigeria. This includes examining the impact of mobile money and digital payment platforms on increasing access to banking services, the role of FinTech in reducing transaction costs, and the challenges and opportunities presented by regulatory frameworks.

Ultimately, this chapter provides a holistic understanding of the progress, obstacles, and future potential of leveraging FinTech to foster greater financial inclusion in Nigeria, serving as a valuable resource for researchers, policymakers, and industry professionals.

2.2 Conceptual Review

This section presents the meanings of the dependent variable (financial inclusion) and the independent variables: financial technology (digital wallet, ATM, mobile banking, POS) and other relevant factors (such as regulatory frameworks, digital literacy, and infrastructure).

2.2.1 The Concept of Financial Inclusion

Financial inclusion is a multi-faceted concept that goes beyond simply providing access to financial services. It focuses on the active use of these services by all members of the economy (Sarma, 2008). According to Mubiru (2012), financial inclusion plays a crucial role in social

inclusion and economic progress by enabling individuals to contribute to and benefit from economic activities.

The concept is further elaborated by Amidižić, Massara, and Mialou (2014), who highlight its key dimensions: accessibility, affordability, and the usability of services like savings, loans, and insurance. The primary goal is to integrate people into the formal financial system, which reduces their dependence on informal lenders and improves their financial security.

While organizations like the World Bank (2019) acknowledge both voluntary and involuntary forms of financial exclusion, researchers like Parc and Mercado (2015) point out that involuntary exclusion—caused by market failures, regulatory hurdles, and limited banking infrastructure—is particularly prevalent in rural areas, where financial literacy is also often low (Hussaini & Chibuzo, 2018). Other barriers include inflexible product structures and regulatory obstacles (Dashi, Lahaye, & Rizvanolli, 2013). Furthermore, studies by Honohan (2008) show that factors such as mobile phone usage and institutional quality are key drivers of financial inclusion, while a high reliance on cash and demographic pressures are significant inhibitors. Financial technology can also be seen as a cornerstone for sustainable and equitable development in Nigeria, reflecting a commitment to ensuring that all individuals and businesses, regardless of their socio-economic status or location, have meaningful access to a range of appropriate, affordable, and quality financial products and services. Sarma and Pais (2018) define it as making affordable financial services and credit available to low-income and vulnerable groups. A 2016 United Nations Report states that financial inclusion is about reliably offering affordable financial services that integrate impoverished populations into the formal economic system. Ozili (2020) further clarifies this by defining financial inclusion as ensuring fair and equal access to financial services for everyone. Essentially, these definitions point to a shared view: true

financial inclusion isn't just about availability; it's also about effective utilization to boost economic participation. Demirgüç-Kunt et al. (2018) offer a comprehensive definition, highlighting that financial inclusion allows individuals and businesses to access meaningful, affordable, and appropriate financial products (like transactions, payments, savings, credit, and insurance) that are delivered responsibly and sustainably. Kumar (2021) adds that formal financial services should also include consumer protection and financial literacy. This collective understanding emphasizes that financial inclusion involves not just access, but also the quality, usage, and sustainability of financial services. The World Bank (2018) underscores its vital role in reducing poverty and fostering prosperity, especially in developing nations like Nigeria.

2.2.2 The Evolving Landscape of Financial Inclusion: Drivers, Opportunities, and Challenges

Current academic literature suggests a dynamic evolution within the field of financial inclusion. Sriram (2019) observes a notable shift from a state-centric, policy-driven approach to one now led by private sector actors through the application of digital technologies. This technological pivot is considered instrumental in poverty alleviation, as digital innovations facilitate access for low-income individuals to the formal financial system (Lumsden, 2018). Support for this transition comes from donors and investors who are actively funding new FinTech solutions designed to maximize their developmental impact for financially excluded and low-income clientele (Murthy et al., 2019). In a similar vein, Barr et al. (2020) argue that central banks can strategically deploy digital technologies, such as virtual currencies and mobile payment systems, to enhance payment infrastructure and support objectives related to poverty and inequality reduction. A number of studies suggest that leveraging digital systems is essential for accelerating financial inclusion and fostering economic growth, and countries that fail to adapt may lose significant opportunities. The vast potential of financial inclusion is well-documented

in the literature. For example, Kempson and Collard (2012) defined it as ensuring everyone has access to a secure account for managing income and making online payments, while Adams (2018) argued that it empowers individuals, creates economic opportunities, and serves neglected societal segments. Research has also shown that increased financial inclusion can lead to better outcomes in areas like healthcare, education, and food consumption (Sakyi-Nyarko et al., 2022). Enablers of financial inclusion are also a key focus of academic inquiry. Studies consistently show that financial education and awareness boost inclusion levels (Kumar & Pathak, 2022), with education also helping to narrow the gender gap in financial access (Sharif et al., 2022). The convenience and efficiency of digital finance, particularly for people with irregular incomes, are also noted as powerful drivers (Ozili, 2018). Beyond simple account ownership, digital technology improves payment systems by making them faster, cheaper, and more secure, thereby reducing the incidence of payment-related crime (Demirgüç-Kunt et al., 2018).

Despite these benefits, a cautionary perspective has emerged. Ozili (2021a) highlights how banks can exhibit economic bias by designing products that favor wealthy customers, potentially alienating and even causing some to abandon formal banking services. This suggests that while financial inclusion is a goal, the methods used to achieve it must be carefully examined to avoid unintended negative consequences. Academic literature raises concerns about the long-term viability of financial inclusion interventions delivered via public banks, primarily because these initiatives require continuous government subsidization. Furthermore, research consistently identifies a strong correlation between financial inclusion outcomes and improvements in other economic and societal spheres. Dikshit and Pandey (2021) contend that financial inclusion is a crucial factor in achieving the Sustainable Development Goals, as its influence extends to addressing challenges related to poverty, inequality, and environmental degradation. Ozili

(2021b) concludes that it is essential for policymakers to have a clear understanding of the dynamic relationships that exist between financial inclusion and other key variables, including poverty levels, financial innovation, economic stability, financial literacy, and regulatory systems.

2.2.3 Measuring Financial Inclusion: Dimensions and Data Sources

The challenge of measuring financial inclusion is a key concern for researchers, governments, and policymakers. Up to now, measurement has largely focused on the use of and access to formal financial services. This has been done primarily using supply-side aggregate data, as seen in the work of various researchers like Honohan (2007) and Sarma (2008, 2012). The only research that uses demand-side, individual-level data has been limited to looking at various indicators related to usage and barriers in isolation (Demirgüç-Kunt and Klapper, 2013). However, tracking these individual indicators, while helpful, doesn't provide a comprehensive view of a country's level of financial inclusion. Similarly, the few attempts to use composite indices for measurement have been incomplete and have suffered from methodological issues and measurement errors.

The authors argue that high usage of formal financial services or widespread access points do not automatically make a system inclusive. The use of these services can be influenced by other socio-economic factors, such as GDP per capita, education levels, and cultural habits, which affect how people use them. They consider the use of formal financial services to be an output of financial inclusion, rather than a direct measure of an inclusive system. Likewise, the availability of infrastructure like ATMs and bank branches only partially captures the extent of access. Without information on the location or concentration of these service points, it's not accurate to assume that a higher number of them indicates a more inclusive financial system.

This paper proposes that both access and usage are necessary but not sufficient conditions for measuring financial system inclusiveness. The authors' hypothesis is that focusing only on these two aspects results in a limited understanding of financial inclusion. Therefore, they suggest that individual-level demand-side surveys, which collect information on why people fail to use formal financial services, can provide crucial additional data about the degree of a system's inclusiveness.

An inclusive financial system, as defined by the authors, is one that maximizes usage and access while also minimizing involuntary financial exclusion. The latter is measured by the barriers perceived by those who do not use the formal financial system. Thus, they propose that the level of financial inclusion is determined by three dimensions: usage, barriers, and access. These dimensions are, in turn, determined by individual-level, demand-side indicators for usage and barriers, and country-level, supply-side indicators for access.

The authors' approach to measurement is twofold. They account for inclusion from the perspective of the banked population by measuring the actual use of formal financial services (the "inclusion output"). At the same time, they also include information from the unbanked population to evaluate the barriers to financial inclusion by assessing the obstacles people perceive that prevent them from using these services.

To calculate their index, the authors use the World Bank's Global Findex (2011), which is described as the largest harmonized demand-side dataset ever collected at an individual level. This database provides a consistent measure of individuals' use of financial products across 148 countries. The fact that the data is at the individual, rather than household, level is highlighted as a benefit for improving the accuracy and comparability of the analysis. They also use supply-side aggregate data on access from the International Monetary Fund's Financial Access Survey

(2013). This source provides information on 189 countries and helps fill an important gap in the financial inclusion data landscape.

Usage

To determine how much individuals use formal financial services, the authors look at the utility of these services through three key indicators. Using the Global Findex dataset, they are able to measure this dimension of financial service usage.

They created an indicator for people who use at least one formal financial service by combining information from several questions in the Global Findex survey. This group includes individuals with a bank account, those who use mobile banking without having an account, and people who have a credit or debit card but no account. They also count individuals as "banked" if they reported not having a personal bank account because a family member already had one, as this indicates they use financial services indirectly. The other two indicators—savings and loans—represent the percentage of the adult population that saves and has a loan with a formal financial institution, respectively. The descriptive statistics for these usage indicators are shown in the top part of Table 1. The data is aggregated at the country level by calculating the proportion of individuals in each category and then applying a weight corresponding to the population of each country.

Barriers

The barriers to financial inclusion, as perceived by unbanked individuals, offer insight into the obstacles that prevent them from using formal financial services. This information is valuable for evaluating the extent of financial inclusion because it provides a perspective on why some people are excluded from the formal financial system. There are two types of financial exclusion: voluntary, or self-exclusion, and involuntary. Voluntary exclusion can happen when individuals

don't demand formal financial services, possibly due to cultural reasons, a lack of money, or not being aware of the benefits. This choice can be influenced by imperfect information about how financial services can help with risk management, future savings, or affordability of investments like education or housing. However, exclusion can also be involuntary, caused by issues like a lack of access to services or a limited range of products that don't meet people's needs. This means people can't satisfy their demand for financial services.

To measure the inclusiveness of financial systems from the unbanked perspective, the authors only use data on barriers that represent involuntary exclusion. These include distance, a lack of necessary documentation, affordability, and a lack of trust in the formal financial system. The Global Findex survey questionnaire allowed individuals to choose multiple reasons for not having a bank account.

According to the Global Findex dataset, nearly 20% of the unbanked population cites distance as a reason they are prevented from having an account. This is more common in developing countries, where access points are often remote. Documentation requirements are also cited by about 20% of the unbanked as a barrier. After a lack of money, affordability is the second most cited obstacle, preventing 25% of the unbanked from using formal financial services. Finally, 13% of adults cite a lack of trust in the financial system. All these variables are used in their negative form in the analysis, so a lower number of people reporting a specific barrier indicates a more inclusive financial system.

Access

Access to formal financial services represents the possibility for individuals to use them. The authors believe that greater access doesn't always lead to a higher level of financial inclusion. They suggest there's a threshold for access, where an increase beyond a certain point may not

boost financial inclusion as they've defined it. While it might increase the frequency of use (the intensive margin), it won't necessarily increase the number of people holding accounts or using other services (the extensive margin). However, when access levels are below this threshold, increasing availability is expected to promote financial inclusion, as long as the services meet the population's needs. Also, when an increase in access is driven by different financial companies, greater competition might lead to more use of financial services through better prices, even above the threshold.

The authors build the access dimension using country-level supply-side data from the IMF's Financial Access Survey (FAS). They use four basic indicators: automated teller machines (ATMs) and commercial bank branches per 100,000 adults, as well as ATMs and commercial bank branches per 1,000 km². These indicators account for the physical service points offered by various types of financial institutions.

The authors acknowledge that traditional access indicators are incomplete today. New technologies like mobile and internet banking and banking correspondents are creating new ways to access services that can overcome the barrier of distance. While almost 20% of the unbanked worldwide still see distance as a problem, this figure drops to only 10% in developed countries. However, measuring the impact of these new channels is difficult due to a lack of consistent measures across a wide range of countries. Although they cannot get an accurate proxy for these new channels in the access dimension, they do include mobile and internet banking information in the usage dimension of their analysis.

2.2.4 The Rationale for Financial Inclusion

Financial inclusion is defined as giving individuals and businesses access to and the ability to use affordable, useful financial products and services, such as accounts, loans, and insurance, that are

delivered responsibly. It's a crucial driver for progress, supporting at least seven of the 17 Sustainable Development Goals. It helps foster economic growth, reduce poverty, and empowers women economically.

Financial inclusion supports entrepreneurship and business growth. By providing access to credit, savings, and efficient payment systems, it enables small businesses to expand, create jobs, and drive economic development. Insurance protects against unforeseen risks, giving both individuals and entrepreneurs the confidence to pursue new ventures. Bringing more people into the formal economy also boosts productivity and establishes a foundation for inclusive and sustainable growth.

Financial inclusion empowers women. By removing barriers to economic participation, financial services equip women with the tools they need to start businesses, manage their finances, and invest in their futures. This strengthens their role in financial decisions and helps close the gender gap, promoting greater social and economic equality.

Financial inclusion also helps build resilience for people and businesses vulnerable to climate change and natural disasters. More than 80% of the world's unbanked adults live in areas at risk from climate change. Financial services enable them to invest in climate-resilient infrastructure and sustainable practices, while savings and insurance products help them recover faster from environmental shocks.

Challenge Ahead

While significant progress has been made, particularly through the expansion of digital financial services, which has reduced the number of unbanked adults from 2.5 billion in 2011 to 1.4 billion in 2021, persistent challenges remain. The gap in account ownership between low- and high-income countries highlights the need for continued global effort.

The gender gap in account ownership has narrowed in developing countries, from 9 to 6 percentage points between 2017 and 2021. The rise of mobile money, especially in Sub-Saharan Africa, has played a key role in this progress. The World Bank's Gender Strategy 2024-2030 aims to further close this gap by facilitating capital for millions of women and women-led businesses.

For countries with high account ownership, like China, Kenya, India, and Thailand, the new challenge is to move from simple access to active usage of a wider range of financial products. Between 2011 and 2021, the savings and borrowing gaps between advanced and developing economies actually widened, showing that more needs to be done to encourage people to use these services.

Small businesses continue to face a massive financing gap, estimated at \$5.7 trillion. This shortfall affects a large percentage of formal Micro-, Small-, and Medium-sized Enterprises (MSMEs) and is even greater when informal businesses are included. Closing this gap is crucial for boosting productivity and creating jobs, as MSMEs are vital to economic growth.

Since 2010, over 60 countries have launched National Financial Inclusion Strategies to coordinate efforts across various government sectors. Large-scale policies, such as India's Aadhaar digital identification initiative, have been instrumental in this progress. Using government payments as a gateway to financial services has also proved effective.

In fostering the use of financial products, policymakers must also prioritize consumer protection. As new products emerge, it's essential to have a strong regulatory framework and supervision to ensure that these services are beneficial and safe for all users. The World Bank and G20, through their partnership and advocacy for principles on digital financial inclusion and SME financing,

are working to ensure that everyone has access to affordable and effective financial services to foster inclusive growth and development.

2.2.5 Digital Financial inclusion

Digital financial inclusion uses affordable digital technology to bring a variety of formal financial services to people who are currently excluded or underserved. These services are designed to meet their specific needs, are delivered responsibly, and are priced affordably for customers while remaining profitable for providers.

While providers with experience in digital financial services have an advantage, new risks arise from several factors. These include the entry of non-financial companies using novel technologies, and the formation of new partnerships between financial institutions and third parties, like agent networks. Additional risks stem from how deposit-like products are regulated differently from traditional deposits, the potential for unforeseen costs for inexperienced and vulnerable customers, and the new privacy and data security challenges that come with the use of new types of data and its applications.

2.2.5.1 The essential components of digital financial inclusion

Digital Transactional platforms are digital systems that allow customers to handle money electronically. They let you make or receive payments, send money, and store value. These platforms work by using various devices—like mobile phones or payment cards—to send and receive transaction data. This data then connects to a bank or another approved institution that can securely hold your electronic funds.

Customers use different tools to interact with these digital financial services. Some devices, like mobile phones, can directly send and receive information. Other tools, like payment cards, need to be connected to another digital device, such as a point-of-sale (POS) terminal, to work.

Additionally, retail agents with digital devices and internet access play a crucial role. They make it possible for customers to exchange physical cash for digital money, a process called "cash-in," and to turn their digital funds back into cash, which is known as "cash-out."

Financial institutions, including both banks and non-banks, can offer a broader range of services like credit, savings, insurance, and even securities through digital platforms. They often use the digital data from these platforms to identify suitable customers and manage risk effectively.

This shift to digital financial services can be life-changing for the 2.5 billion adults who currently rely on cash because they lack access to formal financial institutions. The benefits of digital financial inclusion for these underserved populations are numerous:

Expanded Access to Financial Services: People gain access to a full suite of services, including payments, transfers, and savings. As they become more comfortable with a digital platform, they tend to move toward more account-based services. Government payments, like conditional cash transfers, can also create a pathway into the formal financial system by providing people with a digital stored-value account.

Lower Costs and Greater Flexibility: Digital platforms are generally more affordable for both providers and customers. This makes it possible for people to make frequent, small-amount transactions locally, which helps them manage their often unpredictable incomes and expenses.

Customized Financial Products: The data generated from a digital platform's transaction history allows providers to create and offer financial products that are specifically tailored to a customer's individual needs and financial situation.

Reduced Risks: Using digital transactions reduces the risk of loss, theft, and other financial crimes associated with handling cash. It also eliminates the costs and risks of using informal financial providers.

Economic Empowerment: Digital financial services can promote asset building and savings. For women, in particular, it can increase their participation in the economy, offering a path to greater financial independence.

2.3 Financial inclusion in Nigeria

Financial inclusion, as defined in Nigeria, is the ideal state where all adults have easy access to a variety of formal financial services that meet their individual needs. This is seen as a critical catalyst for national growth, as it empowers more people to participate in the economy. By extending financial access, a country can enable entrepreneurship, create jobs, build skills, and foster a competitive market environment where innovation can flourish.

This perspective is strongly supported by research. A 2017 study from the World Bank and IMF revealed a significant positive correlation of 0.79 between bank account ownership and GDP per capita, demonstrating that these two factors tend to move in the same direction. The data further emphasizes this link by showing that in high-income countries, approximately 94% of adults have a bank account. An even stronger connection was found between account penetration and the Human Development Index (HDI), with a correlation of 0.88, indicating that financial access is a key driver of broader development.

Based on years of research, the Financial Inclusion Secretariat has developed several assumptions specific to developing nations, especially Nigeria. They believe that vulnerable groups, such as the poor, women, youth, and rural populations, are most susceptible to financial crises because they lack basic buffers like savings and insurance. The Secretariat also argues that the cost of serving these groups is not disproportionately high when considering the long-term returns for economic and social development. Moreover, they contend that the risks associated

with providing services to the poor are often overstated and that the real opportunity lies in finding innovative solutions that can expand financial access without the need for expensive, traditional infrastructure. Finally, the Secretariat highlights new technologies as the business justification for financial inclusion, as they drastically reduce costs for financial service providers and help reach populations in difficult-to-access areas, ultimately making these initiatives both viable and effective.

2.3.1 The National Financial Inclusion Strategy 1.0 (2012-2018)

In 2010, the Central Bank of Nigeria became a signatory to the global "Maya Declaration," setting a national goal to reduce financial exclusion to just 20% by 2020. To achieve this, the bank launched the National Financial Inclusion Strategy (NFIS) in 2012, aiming for an 80% adult financial inclusion rate by the same year. This was a significant undertaking, as the baseline for financial exclusion in 2012 was 46.3%.

The strategy was developed based on a detailed understanding of the financial landscape. Usage of key financial products was notably low at the time: Payments stood at 21.6%, Savings at 22.4%, Credit at 1.8%, Insurance at 1.0%, and Pensions at 5.0%.

Furthermore, the infrastructure to deliver these services was limited in 2010. There were only 6.8 commercial bank branches and 2.9 microfinance bank branches for every 100,000 people. While digital points like ATMs (11.8) and POS Devices (13.3) were present, there were effectively no mobile agents (0.0) to extend services into remote communities. This data established a clear need for an innovative, widespread approach to financial service delivery.

2.3.2 Financial Inclusion Targets

By 2020, the goal was to increase the use of Payments to 70% and Savings to 60%. Credit, Insurance, and Pensions were each targeted to reach 40%. The strategy also aimed to expand

infrastructure: DMB branches were to increase to 7.6 per 100,000 people, MFB branches to 5.0, ATMs to 203.6, POS devices to 850, and Mobile Agents to 62.0.

The 2012 National Financial Inclusion Strategy focused on five key areas: making services more accessible, affordable, diverse, simple, and convenient. It also identified five main barriers to inclusion and proposed specific solutions for each.

- i. Lack of income: The plan was to offer no-frills accounts.
- ii. Long distances: The solution was to use agent banking and mobile money services.
- iii. Lack of knowledge: This was to be addressed with financial literacy and consumer protection.
- iv. High cost of services: The strategy involved using the MSME development fund to lower costs.
- v. Cumbersome KYC requirements: This was to be fixed by implementing a tiered-KYC system.

2.3.3 Regulatory Adaptation

From 2012 to 2017, numerous new regulations were put in place to support sustained financial inclusion. A flexible regulatory environment was essential for making the changes needed to advance this goal. For example, a tiered-KYC system was introduced in 2013, and the release of Takaful Guidelines followed in 2014. By 2017, a broad range of regulatory changes had been implemented, encompassing microinsurance, a cashless policy, the Bank Verification Number (BVN), non-interest banks, regulation of agent banking, guidelines on bank charges, a framework for licensing super agents, the national financial literacy framework, guidelines on mobile money services, transaction switching in Nigeria, the Bancassurance referral model, the licensing and regulation of payments services banks, the operations of electronic payments

channels, and the establishment of the Financial Inclusion Secretariat within the CBN. These many legal and structural changes were driven by the commitment of the CBN and its partners to create a supportive environment that would make financial services accessible to the unbanked.

2.3.4 The National Financial Inclusion Strategy 2.0 (2018-2020)

In 2017, the Central Bank of Nigeria initiated a review and update of the National Financial Inclusion Strategy (NFIS) to better align with the changing economic and industry landscape. This revision was necessary for several clear reasons.

First, the Nigerian economy experienced a recession in 2015, which significantly impacted exchange rates and purchasing power. This economic downturn made imports expensive and negatively affected people's ability to engage with financial services. Second, the insurgency in the Northeast region disrupted economic activities and led to the destruction of financial infrastructure, leaving many communities without access to services. These unexpected challenges showed that the initial assumptions of the NFIS 1.0 were no longer viable and required a new approach.

Third, the rapid rise of Financial Technology (Fintech) platforms and other technological innovations made the original strategy's focus on traditional channels like ATMs and bank branches seem outdated. A new, more innovative approach was urgently needed to reach the unbanked population, and the fintech sector offered a promising solution. Fourth, Nigeria's vast geography, diverse population, and remote rural areas presented a major challenge for conventional financial outreach methods. The strategy needed to be retooled to take advantage of new and emerging innovations.

Based on these and other factors, the NFIS was revised and re-launched as NFIS 2.0. This new strategy adopted a more focused approach, prioritizing key segments such as women, youth,

rural communities, Northern Nigeria, and MSMEs. The revised strategy was built on key principles, which included:

1. Creating a supportive regulatory and policy environment for innovation.
2. Rolling out a large-scale network of agents, particularly in the most excluded regions of the country (the North East and North West).
3. Simplifying identity and Know Your Customer (KYC) requirements to make financial services more accessible.
4. Aggressive promotion of Digital Financial Services (DFS) and;
5. The creation of a digital payment ecosystem to support Government-to- Persons (G2P) and Persons-to-Government (P2G) transactions.

2.3.5 Conceptual Issues and Relevance of Financial Inclusion

Financial inclusion has been consistently shown to be a crucial driver of economic growth and development. It is now widely seen as a fundamental right, enabling social inclusion, improving quality of life, and empowering the poor by strengthening their economic capabilities (Banco Central do Brazil, 2010). Given this, policymakers have come to view financial inclusion as an essential public service that should be accessible to everyone without exclusion and without diminishing its availability for others. Because financial inclusion exhibits these two characteristics, Mehrotra et al (2009) determined that it possesses some degree of "publicness," even if it differs from a more traditional public good. Financial inclusion can be considered a quasi-public good because it meets two key criteria of a public good. This concept is a process or state where everyone in an economy can easily and affordably access and use formal financial systems. This means that individuals, households, and groups should not have trouble opening a bank account, getting credit, or consistently using financial products. The goal is to help people

make the most of their income, manage their spending, and make informed financial decisions by having access to basic financial services.

On the other hand, financial exclusion is the opposite: it's the inability of certain individuals or groups to access formal financial services and products. According to Mohan (2006), this means a portion of the population lacks access to suitable, low-cost, and safe financial products from mainstream providers.

While there isn't one universally accepted list, experts agree that financial inclusion is a multi-faceted concept. It includes three main dimensions: access to financial services, the use of those services, and the capability or financial literacy to use them effectively. As Stephen Sinclair et al (2009) summarized, true financial inclusion exists when all people have access to banking, insurance, and the knowledge to use them wisely. Chima (2011) further defined it as a financial system where every member of society can access the right financial products and services to manage their money, fund their businesses, and seize opportunities to increase their income.

The Centre for Financial Inclusion defines financial inclusion as a condition where everyone who can use them has access to a comprehensive range of high-quality financial services. These services should be affordable, easy to get, and delivered with respect for the client. The goal is to have a variety of providers, primarily from the private sector, serving all potential users, including those who are poor, disabled, live in rural areas, or are otherwise excluded from the financial system.

Despite these efforts, a 2011 research paper by Ardic et al. highlighted that there was still significant work to be done. Their findings showed that globally, 56% of adults did not have access to formal financial services, and this problem was more severe in developing countries, where 64% of adults were "unbanked."

A separate study by Beck et al. in 2007 provided a regional breakdown of these issues. They found that Sub-Saharan Africa and South Asia had the lowest rates of banked individuals, with a median of just 12% and 22%, respectively. Other regions followed with higher, but still low, percentages: Latin America and the Caribbean, East Asia and the Pacific, and the Middle East and North Africa all had a median of 40-42%. Europe and Central Asia had the highest percentage of banked households among developing regions, with a median of 50%.

2.3.6 The Relevance of Financial Inclusion

Based on a study by Ardic et al. in 2011, the global average for financial inclusion is less than 50% of adults having access to financial services. This issue is particularly severe in developing nations and especially in Africa, making it a significant global challenge to improve financial inclusion levels. The worldwide goal is to eliminate barriers such as lack of education, gender inequality, age restrictions, irregular income, strict regulations, and remote geographical locations. These factors collectively prevent billions of adults around the world from accessing essential financial services.

Sanusi (2011) linked the rise in poverty in Nigeria to... (The provided text cuts off here, so the specific attribution is incomplete.)

The Problem of Financial Exclusion

Financial exclusion presents a significant obstacle to economic growth and development, particularly in Nigeria. The text you provided argues that to achieve optimal financial inclusion in the country, it is necessary to empower the 70% of the population living in poverty. By including this large segment of society in the formal financial system, it is possible to stimulate new economic activities, increase national output, and ultimately reduce poverty.

The consequences of excluding such a large portion of the population are severe, as it limits the potential for higher economic growth by shrinking the scale of financeable economic activities. Therefore, achieving financial inclusion requires focusing on both human and institutional factors, such as making sure financial products are affordable and accessible, ensuring the sustainability of financial service providers, and actively reaching out to the most excluded populations.

2.3.7 The Theory and Benefits of Financial Inclusion

Theoretically, improving access to financial services is a powerful driver of economic development. As Andrianaivo and Kpodar (2011) suggest, offering more deposit facilities enables financial institutions to gather savings more effectively. In turn, this allows households to access finance more easily, which empowers them to make productive investments that fuel economic growth.

Additionally, Chong and Chan (2010) highlight that a well-functioning financial system promotes inclusive growth by creating equal opportunities. This enables people who were previously on the fringes of society to integrate into the economy and contribute actively to its development. This role is especially critical for developing and emerging economies.

2.3.8 The Benefits for All Stakeholders

Mohan (2006) details the comprehensive benefits of improved financial access for individuals, regulators, and the economy as a whole. The establishment of a basic bank account is the first step, providing customers with a gateway to a variety of standardized financial products from regulated and supervised institutions. This ensures the safety of their investments. Bank accounts also offer a secure and convenient way to manage funds, facilitating low-cost remittances and credit purchases.

For regulators, the transparency of transactions within the formal system simplifies monitoring and compliance. For the broader economy, increased financial inclusion makes capital accumulation easier and more transparent. Mohan concludes that a single bank account can serve multiple purposes, creating a beneficial situation for all economic units within a country.

Beyond Traditional Banking

In addition to standard financial intermediation, financial inclusion encompasses a range of specialized services designed to meet the needs of lower-income individuals. These services include:

1. No-frills bank accounts for basic payments.
2. Savings products that align with the irregular cash flows of poor households.
3. Money transfer facilities.
4. Life and non-life insurance.

2.3.9 Synthesizing FinTech and Financial Inclusion in Nigeria:

2.3.9.1 FinTech's Direct Influence and the Role of Digital Literacy

Multiple studies show a strong connection between FinTech and financial inclusion. For example, research by Kumar et al. (2024) in India and Amnas et al. (2024) found that FinTech use positively affects financial inclusion, making it simpler for people to access formal financial services. The studies also highlighted the importance of digital financial literacy, which helps people accept and use financial technology-based services. Amnas et al. (2024) specifically found that digital financial literacy acts as a crucial mediator between FinTech use and financial inclusion, meaning a person's digital skills directly influence how effective FinTech is at including them in the financial system.

2.3.9.2 Specific Impacts and Causal Relationships

The impact of financial technology is seen in specific contexts and with specific technologies. Iwedi et al. (2023) showed that in Nigeria, using technologies like ATMs, POS, web, and mobile services directly leads to a greater number of people being financially included. Another study by Ozili and Mhlanga (2024) found a unidirectional causality, where an interest in FinTech information tends to spark an interest in financial inclusion information, suggesting that FinTech can be a gateway to broader financial awareness.

The Interplay of Concepts

Researchers also found that the relationship isn't always linear. Studies by Fitriani and Santi (2023) and Rusliati et al. (2024) suggest that while financial technology has a significant positive impact on financial inclusion, it can also reduce the effect that traditional financial literacy has on inclusion. This implies that the accessibility of FinTech might overcome some of the barriers posed by a lack of financial knowledge. Additionally, Margijoyo et al. (2024) found that financial inclusion can act as a mediator between the use of financial technology, financial literacy, and overall business performance. This means that when businesses are more financially included (thanks to FinTech and literacy), their performance improves as a result.

2.4 Concept of Financial Technology

Financial technology, or FinTech, is the use of technology to deliver financial services. The term also describes the startups that are using this technology to compete with traditional banks and financial institutions. These new companies offer a variety of services, from mobile payments and crowdfunding to online portfolio management and international money transfers. FinTech is attracting significant interest from both consumers and investors who see it as the future of the financial industry.

The term "FinTech" can be traced to a Citigroup project in the early 1990s, but it didn't gain widespread attention from regulators, the industry, and consumers until 2014. While FinTech is often seen as a recent phenomenon, the connection between finance and technology has been a long and mutually beneficial one throughout history. The 2008 global financial crisis was a crucial event that helped establish FinTech as a new norm. This shift has created challenges for both regulators and market participants, who must now find a balance between the benefits and risks of innovation. This raises questions about the future financial landscape, the role of traditional banks, and the new risks that this synergy poses to consumers.

Regulators face the difficult task of finding a balance that allows incumbent firms to survive while enabling new firms to innovate. Hindering new companies would unfairly favor established players. To address this, regulators should follow several key principles. First, they must remain neutral toward technological developments. Rules should foster healthy competition for all market players, regardless of their methods. Second, a harmonized, non-discriminatory set of rules is needed to create a level playing field, which helps prevent market fragmentation and weak competition. Lastly, regulators must ensure the protection of both users and the financial system itself.

This article will proceed as follows: Section 2 will examine the factors driving the evolution of the FinTech sector, including supply-side factors like the digital revolution and demand-side factors related to new consumer behaviors. It will provide a detailed analysis of FinTech's development in payment services, lending, and funding. Section 3 will focus on the role of banks and how they are reacting to FinTech, exploring alternative strategies they could adopt. Finally, Section 4 will discuss the challenges for regulators, different approaches to protecting users, and the existing regulatory framework within the European Union.

2.4.1 Key Drivers of Fintech Innovation

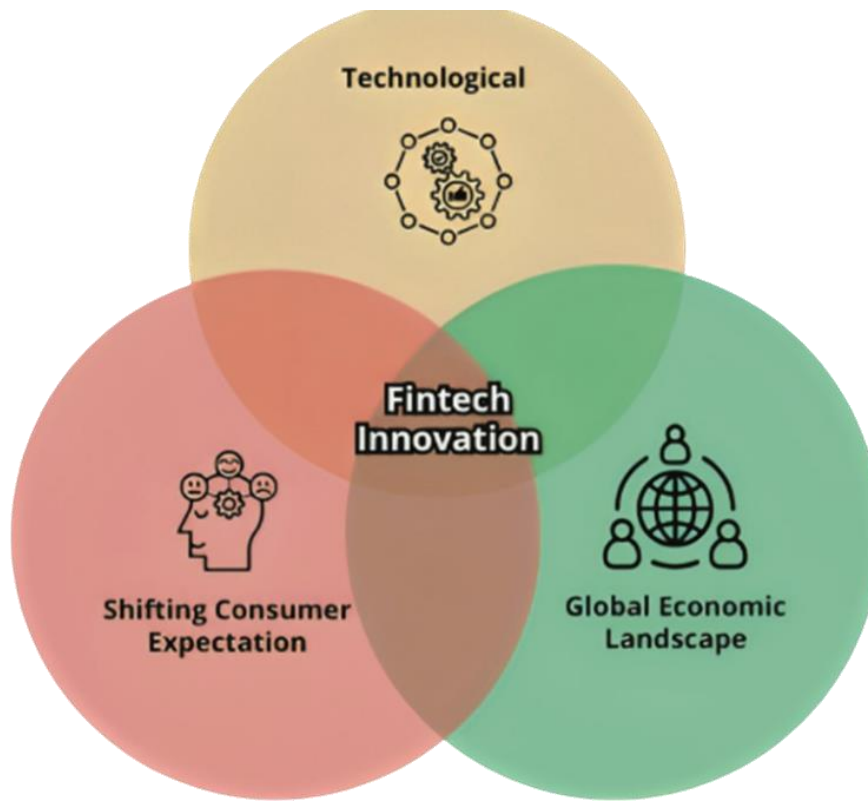
The growth of fintech is fueled by key technological breakthroughs, including advancements in artificial intelligence, machine learning, blockchain, and cloud computing. This is coupled with a change in consumer expectations, who now prioritize convenience, speed, and personalized experiences (Frost, 2020).

The global economic climate, shaped by financial fluctuations and shifting regulations, creates opportunities for fintech to address new needs and overcome challenges (Schindler, 2017). A variety of factors have propelled the rise of fintech. The figure you've mentioned (Figure 1) outlines these key drivers. Other contributing elements include the regulatory environment and ongoing technological research.

According to Fadhul and Hamdan (2020), fintech is a multifaceted field with the power to reshape financial expectations and realities. Countries globally are competing to become leaders in this industry, and investment in research and development often determines who succeeds. Regulators have also supported this growth by creating controlled environments, such as regulatory sandboxes, where innovators and investors can safely test products, which in turn builds investor confidence.

However, the fintech industry is still in its early stages and has considerable challenges to overcome before it can be fully mastered.

Figure 2.1 Key drivers of fintech innovation



2.4.2 Fintech as Financial Knowledge

Financial knowledge is the grasp of financial principles that allows people to make smart decisions about their money. This includes skills like budgeting, saving, investing, and managing debt, all of which contribute to financial stability and well-being (Bhat, 2008). In today's world, this knowledge is more important than ever. With people living longer and becoming more responsible for their own financial security as pension and welfare systems face pressure, financial literacy is now essential (Lusardi, 2019).

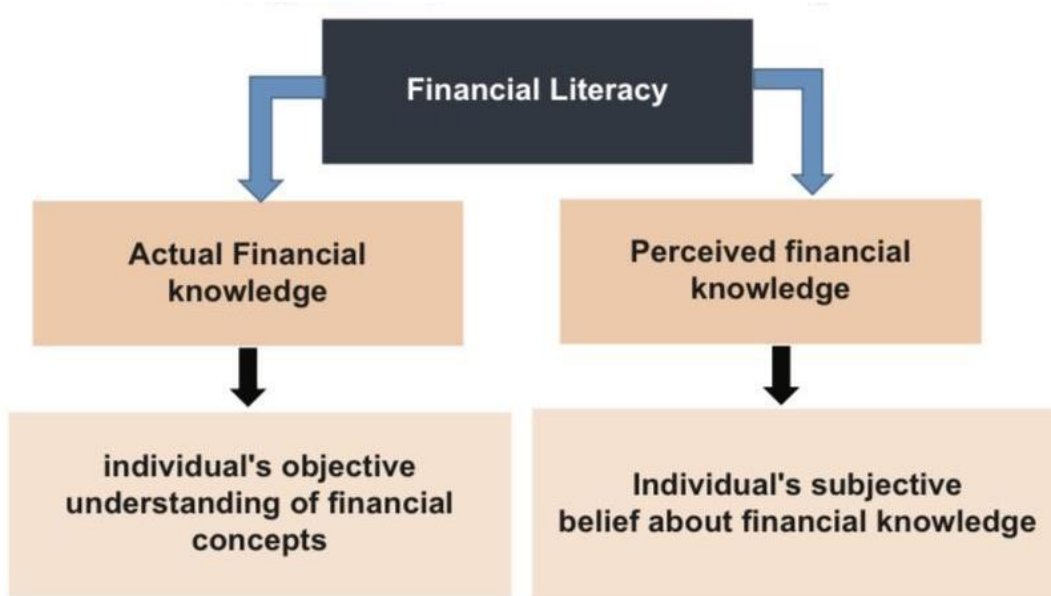
Past research has primarily focused on two types of financial knowledge: actual financial knowledge and perceived financial knowledge (Nguyen, 2022). As shown in Figure 2, actual financial knowledge is a person's objective understanding of concepts like interest rates and budgeting, usually measured with tests (Allgood and Walstad, 2011). In contrast, perceived

financial knowledge is an individual's personal belief in their financial expertise, which is typically gauged through self-assessment surveys (Nguyen et al., 2017).

This two-pronged approach is vital for fully evaluating both a person's understanding of financial concepts (Remund, 2010) and their confidence in applying that knowledge (Orton, 2007). Nguyen (2022) explored how financial knowledge influences the use of Fintech. Based on a survey of 527 people, the study found that women had lower actual and perceived financial knowledge than men, and men were more likely to use Fintech services. A separate study by Chen et al. (2023) identified a notable "Fintech gender gap," showing that only 21% of men use Fintech products and services. The study attributes this gap to differences in a country's characteristics and a person's willingness to adopt new technology. Researchers believe that a lack of awareness and knowledge is a key obstacle to the widespread adoption of Fintech.

In a related study, Manikandan and Chandramohan (2016) examined how aware management students were of mobile wallet services at the Alagappa Institute of Management in India. They concluded that a lack of awareness was the main hurdle to using these services, noting that students living on campus were less aware than those living off-campus. More recently, Pramawati et al. (2023) studied Fintech education. When surveyed, over 64% of respondents reported using Fintech frequently or daily. They found that social media and the internet were the main sources of Fintech information for 60.9% of respondents, followed by learning materials and peer-to-peer learning. Several studies, including those by Awale and Kulmie (2024) and Ali et al. (2018), highlight a gap in Fintech knowledge and awareness among students. For example, a 2018 study in Pakistan by Ali et al. found that only 2% of students were familiar with Fintech terms, and 68% were completely unaware of crowdfunding, which underscores the need for more education on these topics.

Figure 2.2 Aspects of Financial Literacy



2.4.3 Classifications of Financial Technology

Suryono et al. (2020) categorized Fintech research based on business models, dividing the field into areas such as general Fintech; payments, clearing, and settlements; risk management and investment; market aggregators; crowdfunding; peer-to-peer (P2P) lending; cryptocurrency; and blockchain.

In their work, Takeda and Ito (2021) sorted Fintech into four categories based on company growth and the value generated by innovation: established financial firms, new companies, new value creation, and improved efficiency. They observed that most of the articles they reviewed focused on new value from new companies, while the fewest examined how established financial institutions improved efficiency.

Gomber et al. (2017) introduced the "digital finance cube" concept, approaching it from a business administration perspective. They segmented Fintech across three dimensions: business functions (like financing, investments, and payments), technology and concepts (like blockchain,

social networks, and near-field communication), and institutions (like Fintech companies and traditional service providers). However, their model saw Fintech as just one part of digital finance and didn't track the frequency of studies in each dimension to show the current research landscape. Overall, previous research has lacked a consistent way to systematically differentiate the various dimensions within Fintech studies.

Fintech, primarily made up of startups that create innovative services for specific financial functions, is still a new field. However, its growing importance in the financial sector and ongoing debates make it essential to review and analyze existing research. This is necessary to organize current knowledge and pinpoint strategic areas for future innovation and growth.

According to Goldstein et al. (2019), reviewing past and current work is crucial for predicting future trends in Fintech. Therefore, this study aims to fill a gap by summarizing and analyzing current Fintech research. It seeks to bring together the different threads of Fintech research to offer a full picture of both present and future studies. By using a comprehensive Fintech classification system, this research presents a systematic mapping review of Fintech studies. It will analyze the existing literature to understand its current state and developmental trajectory and suggest new research directions by answering the following research questions:

RQ1. What is the present status of Fintech research?

RQ2. How mature is the current Fintech research field?

RQ3. What specific types of Fintech are covered in Fintech research?

RQ4. What are the potential future directions for Fintech studies?

These four questions are driven by the research goals mentioned above. RQ1 and RQ2 are designed to create a foundational understanding of how broad Fintech research is developing. RQ3 aims to systematically review the existing categories of Fintech and propose a classification

framework for future studies. Finally, RQ4 will discuss possible future research paths for Fintech based on the findings from RQ1–RQ3.

Compared to previous studies, this systematic mapping review offers a detailed view of Fintech research with specific data. Unlike other similar reviews in this area, it goes beyond just showing research trends to deeply analyze the field, evaluating its maturity and future potential. This study contributes to the literature by:

- (a) describing the current state of Fintech studies with statistical data on general trends, influential authors, and active countries in the global field;
- (b) determining the maturity level of current Fintech studies by examining the focus of the research;
- (c) synthesizing the various types of Fintech into five dimensions to create a clearer framework and improve understanding of this emerging research area; and
- (d) conducting a thorough analysis to explore future directions for Fintech studies.

The study also ensures the quality of its findings by considering the impact of the articles selected for review.

2.4.4 Evolution and Development of Financial Technology in Nigeria

The evolution of Fintech in Nigeria can be traced back to the mid-1980s, when banks began incorporating technology into both their back-end and customer-facing operations. The introduction of the Structural Adjustment Programme (SAP) in 1986 prompted greater competition in the banking sector, leading banks to utilize available technology such as telephones and computers.

Traditional banks have grown considerably and remain the primary facilitators of payments and remittances. However, high transaction fees, often slow and difficult processes, and limited

presence in remote and less profitable areas have hindered the widespread adoption of their financial services. This situation spurred the rise of Fintech startups, particularly in payment and remittance services. In response, banks adopted technology and learned from these pioneering Fintech firms, using Unstructured Supplementary Service Data (USSD), internet banking, and mobile apps to boost their efficiency and service delivery.

The Payments System Vision (PSV) 2020, launched by the CBN in 2007, laid the groundwork for Nigeria's Fintech ecosystem. Before this period, only a handful of Fintech firms like Interswitch, Etranzact, and Systemspecs existed, operating with less defined business models. Furthermore, most financial transactions were conducted with physical cash.

Over-reliance on cash was problematic due to high handling costs, the risk of theft or loss, and complex transactions. The Central Bank had to use significant resources to print and maintain banknotes, and the cash-based system was also vulnerable to fraud, crime, and terrorism. Following the launch of PSV2020, the CBN introduced the cashless policy in 2011. This, along with other regulations—such as guidelines on electronic payment channels, transaction switching, and a regulatory framework for mobile money services—reshaped the financial and Fintech industries, leading to more innovative payment systems. The CBN also launched the National Financial Inclusion Strategy (NFIS) in 2012, aiming to reduce the number of financially excluded adults from 46% to 20% by 2020 and ensure that 70% of adults were included in the formal financial system by that same year. Subsequently, PSV2020 Release 2 was introduced in 2013 to improve risk management within the payments system. In 2014, the CBN launched the Bank Verification Number (BVN) to enhance banking security and reduce illegal transactions. The BVN has been a major success, especially for Fintech companies, as it provides a reliable means of customer identification.

A key turning point in Nigerian banking and Fintech came in 2016 when SunTrust Bank Limited began operations with a branchless business model. This was followed by the emergence of other digital banks like Kuda and Sparkle. This significant innovation in the Fintech sector encouraged many startups and the rise of other platforms, including Flutterwave, Nairabox, Paystack, Paga, Piggybank, and Remita. The rapid growth of the industry prompted the CBN to issue numerous guidelines and codes to regulate Fintech activities. Currently, the most dominant Fintech business models in Nigeria are mobile payments and lending, payment processing, and personal finance.

Data from 2012 to 2019 show immense improvements and success in e-payment channels in Nigeria, including Automated Teller Machines (ATMs), Point-of-Sale (PoS) machines, Mobile Money Operators (MMOs), Web transactions, and NIBSS Instant Payments (NIP). These channels have shown a consistent positive trend in both the value and volume of transactions. As the foundation for Fintech operations, their performance is crucial for the progress of Fintech companies. Mobile money has become increasingly important, with the value of transactions growing exponentially to N5.10 trillion in 2019, up from a mere N31.50 billion in 2012.

Figure 2.3: Value of E-Payment Channels From 2012 to 2019 ('N' Billion)



Source: CBN Statistical Database.

Figure 2.4: Growth of E-Payment Channels From 2012 to 2019



Source: CBN Statistical Database.

Fintech companies such as PiggyVest, Kuda, Paga, and Interswitch have significantly benefited from this growth. ATM transactions, which are very popular in Nigeria, have been steadily increasing since 2012, growing by 228.1% to N6.50 trillion in 2019. PoS transactions have also gained traction, rising sharply to N3.20 trillion in 2019 from N48.50 billion in 2012. The ability of the Nigeria Inter-Bank Settlement System (NIBSS) Instant Payment (NIP) to facilitate immediate money transfers between any bank account has greatly enhanced e-payment transactions, with the value growing to N105.20 trillion in 2019 from N3.80 billion in 2012.

Similarly, web transactions grew by an impressive 1,414.2% to N478.10 billion in 2019, highlighting the significant progress made during this period.

These developments have fueled the growth of numerous Fintech startups through funding and investments from both private and public sources. Between 2009 and 2019, Fintech companies in Africa grew by 24%, driven mainly by Nigeria, Kenya, and South Africa. A 2019 report by Partech Partners Africa indicated that Nigerian tech startups received a record-high US747 million in venture capital investments that year, accounting for 37% of all funding in Africa. This represented a substantial 585.3% increase compared to the US109 million (16.9% of Africa's total) received in 2016. These figures underscore the success and significant growth of Fintech in Nigeria.

2.4.5 Challenges of Fintech in Nigeria

For Fintech to achieve its full potential in Nigeria's financial sector, a number of significant challenges must be overcome by industry professionals and stakeholders. These obstacles currently restrict the complete operations of Fintech firms. Here are the key challenges affecting the industry:

2.4.5.1 Limited Data Access

Gaining access to data in Nigeria is difficult due to the Data Protection Regulation issued in 2019. This policy, which regulates how data is collected and processed, restricts the amount of data Fintechs can gather. It requires time-consuming legal processes and can be subject to administrative delays. For Fintech firms, lawful data processing involves getting explicit consent from individuals, which is a major hurdle given the large volume of data they handle. Additionally, Fintechs are held responsible for ensuring that any third parties they work with do not compromise personal data.

2.4.5.2 Inadequate Cybersecurity

As Fintech companies deliver more convenient and personalized services, they also create new cybersecurity risks. Most Fintech products are mobile applications that require access to sensitive personal and corporate information. With cybercrimes becoming more sophisticated, regulators and Fintechs face an immense challenge in securing this data. Any perceived or proven security failures can deter customers and prevent regulators from approving new products. Many Fintech startups must allocate a large portion of their budget to cybersecurity, which is a significant financial burden. If these security weaknesses are not addressed, the potential for customer data vulnerability could lead to widespread financial instability.

2.4.5.3 Lack of Market Confidence

Customers still prefer to conduct their financial business with traditional banks, even with the innovative solutions offered by Fintechs. "Brick-and-mortar" banks are generally seen as more secure, despite their slower processes. This is largely because customers, especially older demographics, do not fully understand the value proposition of the Fintech industry. The benefits of these services are not always clear to the public, and a lack of public information makes it hard for customers to trust these businesses. To address this, Fintech companies must improve their public awareness and marketing efforts.

2.4.5.4 Access to Funding

Access to affordable credit is a major obstacle for emerging Fintech companies. Most are startups or private firms with limited access to capital. Banks are often more willing to partner with Fintechs or acquire their intellectual property rather than provide them with loans. Investors are also hesitant to fund these startups due to a lack of collateral, a lack of transparent financial

information, and uncertain returns. This inability to secure funding severely restricts their capacity for growth and expansion.

Regulatory requirements further complicate this issue. For instance, the Central Bank's licensing framework requires the highest license category to have N5 billion in shareholder capital. This high threshold makes it difficult for most Fintech startups to qualify. Even major companies with foreign investors, such as Paystack, raised an amount (US10 million in 2019, or roughly N3.6 billion) that fell short of this requirement. Only a few have met this mark, like Flutterwave, which raised US20.10 million since 2016. Future regulations should be more accommodating of the financial limitations of Fintech companies.

2.4.5.5 Institutional Knowledge Gap

Law enforcement agencies often lack a clear understanding of Fintech platforms and their operations. This limits their ability to effectively investigate cyber fraud. As demonstrated in a specific case, law enforcement's first step is often to place a lien on a company's bank account, regardless of the amount involved in the alleged crime. Similarly, regulators often lack the innovative skills and tools necessary to adequately supervise and regulate Fintech startups that are constantly developing new and disruptive services.

2.5 Theoretical Review

2.5.1 Theories of financial inclusion beneficiary

There are different views on who ultimately benefits from financial inclusion. Some research argues that the primary beneficiaries are the poor (Bhandari, 2018), while others suggest women (Ghosh and Vinod, 2017; Demirguc-Kunt et al., 2013b). A third perspective is that the economy and the financial system as a whole are the beneficiaries. Beyond women and the poor, the literature has often overlooked other potential groups who could benefit from financial inclusion,

such as young people, the elderly, individuals who are institutionalized or ill, disabled people, and those who have been excluded from the financial sector due to past criminal offenses. Below are four theories that aim to explain who benefits from financial inclusion.

2.5.1.1 Public good theory of financial inclusion

The public good theory of financial inclusion proposes that delivering formal financial services and ensuring unrestricted access to finance for everyone should be treated as a public good for the entire population. As a public good, individuals cannot be excluded from using or accessing formal financial services. All people would receive basic financial services without having to pay for them, and one person's use of these services would not reduce their availability to others. This means everyone can be brought into the formal financial sector, making the entire population better off. Under this theory, everyone is a beneficiary, with no one left out.

For example, this theory suggests that any individual or small business could be offered free debit cards and use ATMs without transaction fees. Financial institutions would absorb these costs as part of doing business. The government might offer subsidies to these institutions to help them manage the costs of providing free services. The government could also make formal accounts a requirement for citizens to access a one-time cash deposit, which would encourage individuals who are unable to pay their debts or meet their basic needs to join the formal financial system and become more financially empowered.

This theory has several advantages. First, it suggests that everyone, regardless of their social status, income, or background, would benefit. This includes both the rich and the poor, and those already included as well as those who are excluded. Second, treating it as a public good means it would be funded publicly, not privately. Third, it allows the government to take direct

responsibility for promoting financial inclusion. Finally, this theory does not see private-sector companies as the main drivers of financial inclusion.

However, the public good theory also has four disadvantages. First, it doesn't address the root causes of financial exclusion. Second, funding financial inclusion as a public good could divert public money from other important projects. Third, the theory assumes that financial inclusion is free to users, which may not be sustainable in the long term, even with public funding. Fourth, this theory may have limited relevance in developing and emerging economies, where financial institutions are mostly privately funded. This makes it difficult to treat financial inclusion as a public good in these countries.

2.5.1.2 Dissatisfaction theory of financial inclusion

The dissatisfaction theory of financial inclusion argues that a country's financial inclusion efforts should first focus on individuals who were previously part of the formal financial sector but left because they were unhappy with the terms, or had bad experiences with financial firms and agents. The theory suggests it's easier to persuade these people to return once their areas of dissatisfaction are fixed than to bring in those who have never used formal financial services. The implication is that this group should be the priority for financial inclusion programs before expanding to others. Reasons for dissatisfaction might include being a victim of fraud, long waits for transactions, high fees, or excessive bank charges.

This theory has its advantages. First, it specifically addresses the issue of "voluntary financial exclusion," which other theories often miss. By using persuasion to bring back dissatisfied clients, it can reduce this type of exclusion. Second, it's easier to identify these financially excluded people because their data is already on file with financial institutions, making it simpler to reach out to them. This makes achieving financial inclusion more straightforward than trying

to reach people who have never been in the system. Third, this theory relies on interpersonal persuasion, so it does not require public funding.

The dissatisfaction theory also has its disadvantages. First, it does not prioritize financial inclusion for everyone, excluding people who have never been in the formal financial sector. Second, it overlooks poor people in remote areas where formal institutions don't exist. Third, it assumes that financial exclusion is mainly caused by customer dissatisfaction, which may not always be the case, as people can leave the formal sector for other reasons, such as personal or religious beliefs (Ozili, 2018). Finally, if a society is heavily reliant on the formal financial sector, individuals who are dissatisfied might have no choice but to remain in the system anyway.

2.5.1.3 Vulnerable group theory of financial inclusion

The vulnerable group theory of financial inclusion proposes that financial inclusion programs should target vulnerable people, such as the poor, young people, women, and the elderly, who are most affected by economic hardship and crises. Because vulnerable populations suffer the most during financial crises, it makes sense to bring them into the formal financial sector. One way to do this is through government-to-person (G2P) social cash transfers deposited directly into their formal accounts. This might encourage other vulnerable people to join the formal financial sector to receive similar benefits, thereby increasing financial inclusion among these groups. When social cash transfers and other tools are provided, it can make vulnerable people feel they are being compensated for existing income inequality, giving them a chance to catch up with other parts of society. The theory's implication is that it identifies certain groups as vulnerable and suggests that financial inclusion efforts should be directed specifically toward them.

This theory has some merits. First, it attempts to reduce financial exclusion by focusing on bringing vulnerable groups into the formal financial sector. Second, it is easy to identify these people based on their vulnerability, income, gender, age, and other characteristics. Third, targeting a specific group may be more cost-effective than trying to achieve financial inclusion for the entire population.

However, the vulnerable group theory also has disadvantages. First, it does not prioritize financial inclusion for everyone, ignoring those outside the vulnerable groups who also need access to the formal financial sector. Second, it assumes that women are vulnerable while men are not. This can be problematic because in modern society, men and women compete for equal opportunities, and labeling women as vulnerable could lead to resentment from men. Finally, focusing social policies on vulnerable people might inadvertently increase social and income inequality if they receive better access to financial services than others.

2.5.1.4 Systems theory of financial inclusion

The systems theory of financial inclusion states that financial inclusion is achieved through existing sub-systems (economic, social, or financial), and in turn, greater financial inclusion benefits these same systems. A significant change in one sub-system can greatly affect the expected outcome of financial inclusion. For instance, implementing regulations on financial service providers can align their interests with those of users, compelling them to offer affordable and quality services that protect against exploitation.

However, the theory suggests that a change at the full system level—like a completely new national plan—does not necessarily alter the sub-systems; changes must happen at the sub-system level. The theory proposes that

- (i) financial inclusion will improve the sub-systems it relies on,

- (ii) the effectiveness of these sub-systems determines the success of a financial inclusion plan, and
- (iii) the existing sub-systems are the ultimate beneficiaries of financial inclusion.

The systems theory of financial inclusion has some merits. First, it acknowledges the crucial role of a country's existing economic, financial, and social structures in promoting financial inclusion. Second, it provides a macro-level view, unlike other theories that focus on the individual. Third, it considers how financial inclusion outcomes are affected by the relationships between these sub-systems.

The systems theory also has some demerits. First, the theory assumes that existing systems function properly. If they don't, the expected outcomes may not be achieved. Second, it overlooks factors outside the system that could affect financial inclusion outcomes, focusing only on the relationships within the system. Third, it assumes there is a direct link between financial inclusion outcomes and the systems it relies on.

2.5.2 Theories of financial inclusion delivery

There are a number of ideas about who should provide financial services. Some believe the government should deliver financial inclusion to the people (Aggarwal and Klapper, 2013; Staschen and Nelson, 2013; Chibba, 2009). Others argue that private companies like banks and Fintech businesses can do it more effectively (Gabor and Brooks, 2017; Ozili, 2018). There are also perspectives that suggest financial inclusion can be achieved through cooperation between the public and private sectors (Arun and Kamath, 2015; Pearce, 2011). These expectations for financial inclusion delivery require a foundational thought process to explain why these agents are necessary in the first place, which highlights the need for theories on financial inclusion delivery. Some of these theories or perspectives are outlined below:

2.5.2.1 Community echelon theory of financial inclusion

The community echelon theory posits that financial inclusion should be delivered to the financially-excluded population through their community leaders. The theory argues that these leaders are influential and can use their sway to encourage or persuade community members to participate in the formal financial sector. The community's values shape its leaders and members. Community members trust their leaders to make decisions that are in their best interest, and leaders, in turn, make decisions that reflect the community's values. The strong cultural bond between leaders and members makes it possible for leaders to bring members into the formal financial sector. If leaders change their personal views on using formal financial services, they can encourage their members to do the same. Since community outcomes are often influenced by the preferences and beliefs of their leaders, it makes sense to deliver financial inclusion through them.

The primary advantage of the community echelon theory is that community leaders can influence members to make changes that improve their lives. The theory has several disadvantages, however. First, the influence of leaders could backfire if they are self-serving or corrupt. Second, leaders might make poor decisions if they are pressured by corporate promoters of financial innovation. Since community members trust their leaders, a bad decision could be made that negatively impacts the community's well-being. Third, community members who are already using formal financial services might have concerns that they don't share with their leaders, and if this anxiety is high, they may not stay in the system long. Also, problems like nepotism, fraud, and corruption can arise. Finally, since there are many different leadership styles, it's hard to know which one is most effective at changing community members' beliefs about participating in the formal financial sector.

2.5.2.2 Public service theory of financial inclusion

The public service theory of financial inclusion states that financial inclusion is a public responsibility that the government owes its citizens, who, in turn, expect the government to promote it. The theory argues that the government, through public institutions, should deliver financial inclusion to all citizens, including the financially-excluded. Under this theory, only the government is capable of achieving financial inclusion that brings everyone into the formal financial sector and provides them with access to formal financial products and services.

This theory has several merits. First, it suggests that financial inclusion can be achieved when the government takes responsibility for it. Second, the government can leverage its control over the country's financial, economic, and social structures to meet its financial inclusion goals. For example, it could create public banks in remote areas to reach underserved people. Third, public confidence increases when the government takes full responsibility for financial inclusion through public institutions, as citizens trust that these programs are for the greater good.

The public service theory also has some disadvantages. First, it does not involve the private sector. Second, it assumes that financial inclusion will be funded by taxpayers' money, which may not be enough for large-scale programs. Third, if the state is solely responsible for financial inclusion, it could use this power as a means of social control. The government could provide basic financial services to loyal citizens but withhold them from those who protest against the state.

2.5.2.3 Special agent theory of financial inclusion

The special agent theory of financial inclusion argues that complex community-specific or geographical issues can hinder the delivery of financial inclusion. Because of this, it is necessary

to use specialized agents to deliver financial inclusion to excluded communities. Under this theory, a special agent is expected to be

- (i) highly skilled and specialized,
- (ii) knowledgeable about the unique characteristics of the excluded population,
- (iii) familiar with the informal financial systems in these communities,
- (iv) able to identify areas for innovative improvement
- (v) capable of integrating local financial systems with the formal financial sector.

The special agent is considered competent, highly skilled, and uniquely capable of bringing the excluded population into the formal financial sector. This theory involves a special agent relationship with a principal. The principal is often the national government, a foreign government, or a foreign organization, while the special agent is typically a local bank, a non-bank institution, or a special organization created for this purpose. Financial institutions and technology companies can also serve as special agents.

The special agent theory of financial inclusion has some merits. First, by employing specialized agents, the government can focus on other important national issues. Second, there is a high level of confidence in the ability of these agents to deliver financial inclusion because they are skilled experts who can collaborate with other institutions to achieve a common goal. Third, the goals and compensation for the special agent are clear and pre-agreed upon, which removes ambiguity. Finally, this theory avoids the fundamental principal-agent problems of traditional agency theory, because the special agent is primarily dealing with people, not money. The classic agency problem arises when an agent (a firm's manager) prioritizes their own financial interests over those of the principal (shareholders), as noted by Jensen and Meckling (1976).

The special agent theory also has some disadvantages. First, if the principal is the government, it may choose its own agency to be the special agent. This creates a conflict of interest, where the government is both the principal and the agent, potentially leading to a lack of transparency and accountability.

2.5.3 Theories on Funding Financial Inclusion

The question of who should finance financial inclusion for the population is a significant one. There are different viewpoints on this matter. One perspective, supported by Marshall (2004), suggests that public funds (taxpayer money) should be used for financial inclusion programs and activities. Another view, held by Mohiuddin (2015), proposes that private sector capitalists should provide the funding, since they have contributed to the widening gap between the rich and the poor. A third idea, put forward by Dashi et al. (2013) and Cobb et al. (2016), advocates for a joint funding approach involving both the public and private sectors. Below are the specific theories of financial inclusion funding.

2.5.3.1 The Private Money Theory of Financial Inclusion

The private money theory holds that financial inclusion activities should be funded with private capital. This theory's core argument is that private investors will demand accountability from the recipients of their funds, ensuring the money is used efficiently. This, in turn, guarantees that financial products and services are effectively delivered to the excluded segments of the population.

Merits of this theory include

- a) **Faster Approval Process:** Obtaining private funding for financial inclusion projects typically has a shorter approval time compared to the lengthy process for public funding. This is because private lenders have fewer bureaucratic hurdles to clear.

- b) Direct Involvement: Private funders are frequently involved directly in financial inclusion activities, either through owning equity or participating in other ways.
- c) Potential for Income and Collaboration: Private funders can take ownership of projects and generate income by managing the activities themselves. They may also exchange benefits with local authorities.
- d) Easier Cost Adjustments: It is simpler to increase user fees to cover the costs of a contract with a private operator than it is to lobby for a vote to increase a local or national government budget (Spackman, 2002).
- e) Superior Expertise: Private financiers can offer better project management skills, innovative approaches, and effective risk management to achieve financial inclusion goals.
- f) Stronger Performance Incentives: Private funders can exert more pressure on private contractors to complete projects on time and to a high standard.

Demerits of this theory include:

- a) High Cost of Capital: The process of raising private funds for financial inclusion projects can be expensive.
- b) Conflict of Interest: Using private money can increase private interests in the outcomes of financial inclusion, potentially to the detriment of the excluded population.
- c) Loss of Government Authority: Partial or complete private ownership of the infrastructure created by private investors could lead to a loss of government control.

2.5.3.2 The Public Money Theory of Financial Inclusion

The public money theory of financial inclusion states that programs and activities should be funded using public money, meaning through government budgets. This theory suggests that public funding for financial inclusion is growing faster than private funding (Dashie et al., 2013).

Merits of this theory include:

- a) **Wealth Redistribution:** The government can tax the wealthy to create funds for financial inclusion, which benefits everyone, redistributes wealth, and reduces income inequality.
- b) **Low Cost of Funds:** The cost of raising public funds for these projects is either very low or negligible.
- c) **Reduced Self-Interest:** Public funding can prevent self-interested individuals from taking over the financial inclusion agenda for their own personal gain.

Demits of this theory include:

- a) **Poor Planning:** Public funding often suffers from a lack of proper planning, which can result in overspending and inefficiency in financial inclusion projects.
- b) **Unnecessary Delays:** Using public money can lead to delays in reaching the excluded population, such as delays in disbursing funds, lobbying-related delays, and delays caused by political events.
- c) **Increased National Debt:** Governments with insufficient funds may be pressured to take on loans to finance these projects, thereby increasing the government's debt burden.
- d) **Improper Delegation:** Governments might delegate the task of achieving financial inclusion to an incompetent institution or contractor. It is common for governments to assign this responsibility to an existing agency to save costs, even if that agency is

already burdened with its own statutory duties. This improper delegation can lead to errors in achieving financial inclusion objectives.

2.5.3.3 The Intervention Fund Theory of Financial Inclusion

The intervention fund theory proposes that financial inclusion activities and programs can be funded by special interventions from various related and unrelated funders, instead of relying on taxpayers. This theory identifies a number of "special funders" such as philanthropists, non-governmental organizations (NGOs), and foreign governments, who often support inclusive finance globally. In some countries, cross-border funding is a major source of financial inclusion funds, with a large portion of this funding going to microfinance institutions (El-Zoghbi et al., 2011). These special funders can voluntarily select the projects they wish to support and provide the necessary "intervention funds" to achieve their desired outcomes.

Merits of this theory include:

- a) **Bypassing Political Bureaucracy:** This approach avoids the usual political red tape involved in allocating public funds for projects.
- b) **Resource Mobilization:** Special funders can mobilize capital and human resources from both local and international sources to help them reach their financial inclusion goals.
- c) **Sustainable Institutions:** These funders can establish new, pro-development institutions that continue to support the community even after the initial projects are finished.

Demerits of this theory include:

- a) **Identification Challenges:** Special funders need to develop a reliable method to identify which parts of the population are excluded from the formal financial sector.
- b) **Inaccurate Targeting:** The methods used by special funders might not always correctly identify the intended targets for financial inclusion.

- c) Reputational Damage: Using intervention funds from foreign governments or donors to fund domestic development projects can harm a country's reputation, as it suggests the government is unable to use its own resources to spur development for its people.

2.6 Empirical literature Review

This section provides an empirical review of existing literature on the nexus between financial technology (FinTech) and financial inclusion in Nigeria. It aims to identify the key findings, methodologies, and gaps in the research to justify the need for the current study.

Research on the effect of financial technology (FinTech) on financial inclusion has been conducted from various angles, with findings that are not always in agreement.

Erlandsson & Lundqvist investigated the spread of mobile phones and their effect on financial inclusion and economic growth in Africa. Using a dynamic panel data model with a System Generalized Method of Moments (GMM) estimator to handle issues of endogeneity, they concluded that mobile phone penetration has a clear positive impact on economic growth. They found that part of this positive effect is a result of improved financial inclusion.

Okaro analyzed financial inclusion and the Nigerian economy over a 25-year period from 1990 to 2015. The study used descriptive and quantitative methods, with multiple regression and descriptive statistics for data analysis. The data was sourced from the 2015 Central Bank of Nigeria (CBN) statistical bulletin and World Bank Indicators (WBI). The study employed Ordinary Least Square (OLS) regression and found no relationship between financial inclusion and poverty eradication in Nigeria. However, the findings did show that the financial intermediation activities of Deposit Money Banks (DMBs), financial deepening, access to

financial products and services, and institutional infrastructure all had a positive and significant effect on Nigeria's economic growth.

Odeleye examined financial inclusion and inclusive growth in Nigeria from 1981 to 2014, using data from the 2014 Central Bank of Nigeria Statistical Bulletin. The study was analyzed with an Ordinary Least Square (time series regression) model and an Augmented Dickey-Fuller unit root test. The results indicated that money supply, liquidity ratio, and credit to the private sector are key drivers of economic growth, suggesting that financial inclusion significantly contributes to Nigeria's economic growth.

Arday focused on the effect of mobile phone technology on financial inclusion in Ghana. The study's goals were to assess the factors that determine the adoption of mobile phone technology and whether this technology could be used to achieve financial inclusion. The research used a quantitative approach and employed a Latent Simultaneous Variable Model with a seemingly unrelated bivariate probit to analyze the data. The findings showed that mobile phone penetration can be leveraged to enhance financial inclusion in Ghana.

Anyawu, Ananwude & Nnoje evaluated the impact of various microfinance bank products in rural communities on women's empowerment. The study used a descriptive survey design, distributing 200 questionnaires and using 190 completed ones for the analysis. The researchers found a positive and significant relationship between women's empowerment and microfinance bank products like savings accounts for rent, child education, newborns, and daily savings. The study concluded that the microfinance model is a good policy for increasing the financial inclusion of women, especially in rural areas. They recommended that microfinance banks create more products tailored to women's specific needs.

Ene, Abba & Fatokun examined the impact of electronic banking on financial inclusion in Nigeria over a 10-year period from 2008 to 2017. Using correlational and ex-post facto research designs and a computer-based multiple regression analysis, the study observed that while automated teller machines (ATMs) did not significantly impact financial inclusion, point-of-sale (POS) devices did have a significant impact in Nigeria.

Hussein researched the impact of financial technology on financial inclusion in Egypt. The study utilized descriptive statistical analysis and Multiple Logistic Regression analysis to examine the relationship between the variables. The findings revealed that FinTech has a significant effect on financial inclusion in Egypt. However, Hussein noted that despite high internet use and mobile phone penetration, Egypt still ranks low in financial inclusion compared to other Arab and African nations.

Kuriniasari, Gunardi, Putri & Firmansyah analyzed the role of financial technology in boosting financial inclusion in Indonesia. The study's objective was to examine how factors related to digital technology growth influence customer decisions to use FinTech services, using customer knowledge as an intervening variable. Statistical data was analyzed using an Algorithm PLS. The results showed that customer decisions to use FinTech services were heavily influenced by their knowledge.

Agelyne, Muthengi & Musau investigated FinTech and the financial inclusion of small and medium-sized enterprises (SMEs) in Kenya, specifically in Kabati Market, Kitui County. The study, which used primary data from questionnaires and a Descriptive Cross-sectional design, aimed to determine the effect of FinTech on financial inclusion for these SMEs. The findings concluded that most SME owners in Kitui County can now access financial services, from credit

to financial planning tools, through online banking and mobile money platforms. This drives business growth and boosts financial inclusion. The study also concluded that the financial services offered by FinTechs are appealing and are being widely adopted by this segment of business owners because they lead to faster access to financial services and, therefore, increased financial inclusion.

Erlianta, Lupikawaty & Andriyani examined the effect of FinTech on financial inclusion for SMEs in Palembang City. The study used questionnaires for data collection and employed statistical tests, including hypothesis testing, the coefficient of determination, and simple linear regression. The linear regression results showed a positive and significant relationship between FinTech and financial inclusion, and the hypothesis test results confirmed that the FinTech variable influences financial inclusion.

Morawczynski (2009) found a positive link between using mobile money and financial inclusion for both households and businesses. The study showed that households with a mobile money account are more likely to have a traditional bank account, send and receive remittances more often, and save more money.

In a similar vein, Jack and Suri (2011) identified information and communication technology (ICT) and FinTech as key drivers of financial inclusion. Andrianaivo and Kpodar (2012) also found strong evidence of a relationship between a high level of mobile phone penetration and financial inclusion in developing countries.

Truong (2022) examined the complexities of digital service transformation in the FinTech era, confirming the growing role of FinTech in modern economies and suggesting key steps for businesses to digitize their operations.

Jarunee and Wonglimpiyarat (2017) explored FinTech's dynamic shifts in the banking industry, identifying its systemic characteristics both globally and in Thailand.

Li, Spigt, and Swinkels (2017) found a positive relationship between increases in FinTech funding and the stock returns of established retail banks.

Iwedi, Igbaniho, and Uzo-Ahunanya (2018) studied the effects of a cashless economy policy on Nigeria's national development. Their findings revealed that with the help of financial technology, this policy has led to more effective monetary policy, a faster payment system, job creation, and increased technological infrastructure. Kim, Lee, and Kang (2018) reviewed academic research on the intersection of mobile financial services, financial inclusion, and development. They identified three main themes in the literature: service delivery, environmental factors, and the impact of mobile services. They also noted that mobile money has a positive effect on SME financial inclusion by increasing access to bank credit (Gosavi, 2018). In a similar study, Kabakova and Plaksenkov (2018) found that a positive relationship exists between information technology and financial inclusion.

Koomson, Villano, and Hadley (2020) examined the effect of financial inclusion on poverty in Ghana. They found that increased financial inclusion has two effects: it reduces a household's likelihood of being poor by 27% and it helps protect them from future poverty.

Lahreche et al. (2020) found that low-income countries are taking advantage of FinTech credit opportunities in the consumer market but are facing significant challenges in the business sector. Jünger and Mietzner (2020) analyzed the factors that make households more likely to adopt FinTech services. Their results indicated that a household's level of trust in and comfort with

new technologies, their financial literacy, and the overall transparency of the services all influence their decision to switch to FinTech.

Kammoun, Loukil, and Ben Romdhane (2020) analyzed how FinTech and political instability affect economic growth. They concluded that FinTech drives economic growth when it is used actively within a developed digital infrastructure. In a related study, Ozili (2021) analyzed recent evidence on financial inclusion worldwide. He found that financial inclusion is both affected by and influences factors like financial innovation, poverty levels, the stability of the financial sector, the state of the economy, financial literacy, and regulatory frameworks, which vary across countries.

Chinoda, Mashamba, and Andrew (2021) studied the link between FinTech, financial inclusion, and income inequality in Africa. Their research concluded that financial inclusion acts as a mediator in the relationship between financial technology and inequality, playing a fundamental role in reducing income disparities in Nigeria.

Iwedi, Kocha, and Wike (2022) examined the effect of digital banking on the Nigerian economy using 12 years of aggregated annual data from the Central Bank of Nigeria Statistical Bulletin. Their multiple regression analysis showed that both web and mobile payments have a strong relationship with Nigeria's economic growth. This implies that the digitalization of banking services is strongly and significantly associated with economic growth in Nigeria. Lyons, Kass-Hanna, and Fava (2022) also found a strong and positive relationship between FinTech development and financial inclusion. Their study also concluded that the intention to use digital finance is moderately influenced by financial literacy and very strongly by financial inclusion.

Hermawan, Gunardi, and Sari (2022), along with Nguyen (2022), found that women have a lower level of both actual and perceived financial knowledge compared to men. Girón, Kazemikhasragh, Cicchiello, and Panetti (2022) also noted that young people and women are often excluded from financial inclusion. Their research identified education and income as two crucial factors for increasing financial inclusion.

Candy, Robin, Sativa, and Septiana (2022) analyzed the relationship between FinTech and the COVID-19 pandemic. They found that the pandemic positively influenced the use of FinTech, which provided convenience for users and spurred economic development. Kanga, Oughton, Harris, and Murinde (2022) analyzed the spread of financial technology and its interaction with financial inclusion and living standards (GDP per capita). A key finding was that the spread of FinTech and financial inclusion have long-term effects on GDP per capita that go beyond the effects of investments in physical and human capital.

Daud, Ahmad, Khalid, and Azman-Saini (2022) investigated the relationship between FinTech and financial stability in 63 countries from 2006 to 2017. Their results indicated that FinTech promotes financial stability through the channels of artificial intelligence, cloud technology, and data technology. Ding and Peng (2022) found that FinTech development encourages lending to firms and stimulates research and development investment because internet credit increases competition among banks.

A study by Iriobe & Akinyede (2017) investigated how financial technology services affect bank customer satisfaction in Nigeria. The researchers used a survey of 250 questionnaires and analyzed the data with SPSS.

The findings showed that several factors related to fintech—specifically accessibility, transaction costs, availability, service operations, and business processes—all influence customer satisfaction. The study concluded that the quality of financial technology has a significant positive effect on a bank's customer satisfaction. Ultimately, the research indicated that effective fintech services help to satisfy and keep customers, which in turn boosts the bank's revenue.

A study by Babajide, Oluwaseye, Lawal, and Isibor (2020) investigated how financial technology (fintech) can serve as a strategic tool to achieve financial inclusion and sustainable development for Micro, Small, and Medium Enterprises (MSMEs) in Nigeria.

The research found that fintech has the potential to boost financial inclusion, particularly given Nigeria's high rates of internet, electricity, and mobile phone usage. They concluded that leveraging these technologies could help more states reach the target of 20% financial exclusion faster.

Several researchers have shown how technology can boost financial inclusion and improve living standards. Kanga, Oughton, Harris, and Murindea (2021) argued that fintech can improve financial inclusion and living standards, but only if policymakers establish a supportive environment for information and communication technology (ICT) and digital networks. However, the ADB (2016) pointed out a significant barrier: low financial literacy. They found that a lack of understanding about financial education and digital channels reduced their adoption, as low-income individuals focused on meeting basic needs had little incentive to learn or use these new tools.

Despite these challenges, specific technologies have shown a positive impact. Ene, Abba, and Fatokun (2019) demonstrated a strong, positive correlation in Nigeria between financial

inclusion and the number of point-of-sale (POS) facilities, attributing this to the public's ease of access and use.

This was further supported by Yaqub and Odeleye (2017), who found that POS facilities had a significant positive impact on financial inclusion in Nigeria, whereas automated teller machines (ATMs) did not.

Beyond Nigeria, the benefits of broader digital infrastructure have been confirmed. Asongu and Le Roux (2017) conducted a panel analysis of 49 Sub-Saharan countries from 2000 to 2012, concluding that broadband and mobile phone penetration positively impacted inclusive growth, suggesting these technologies were key to sustained economic growth.

Abor, Amidu, and Issahaku (2018) further corroborated this, finding that mobile ownership reduced the likelihood of individuals falling into poverty. Similarly, Peruta (2018) and Gosavi (2018) showed that mobile money adoption in developing countries had a positive and significant effect on access to formal bank services and financial transactions, suggesting it helps firms overcome challenges in accessing finance.

In addition to promoting growth and financial access, technology has also been shown to address inequality and poverty. Asongu and Odhiambo (2019) studied 48 African countries and found that mobile, internet, and broadband penetration had a negative impact on inequality, thereby contributing to sustainable development.

A similar conclusion was reached by Tchamyau, Erreyger, and Cassimon (2019), who used a system Generalized Method of Moments for 48 African countries between 1996 and 2014 and found that ICT reduced income inequality through both formal and non-formal financial sectors.

Bakari, Donga, Hedima, Babayo, and Ibrahim (2019) specifically examined the period from 1980 to 2017 in the sub-Saharan region and found a strong correlation between financial inclusion and poverty reduction. They also found a causal link flowing from monetary policy effectiveness to financial inclusion, not the other way around.

This contrasts with Evans's (2016) finding of a unidirectional relationship from monetary policy effectiveness to financial inclusion.

Cross-country analyses by several authors (Ouma, Odongo, & Were, 2017; Tah, 2019; Enueshike & Okpebru, 2020; Wale-Awe, Alabi & Omoloye, 2020) have also highlighted that technology can increase savings among the poor, improve fund transfers, and increase deposits and loan availability for SMEs in rural areas. Chinoda and Mashamba (2021) also found that financial inclusion, when combined with financial technology, significantly and positively reduced income inequality in 25 African countries. Furthermore, Lv and Xiong (2022) reported that Fintech improved corporate investment efficiency in China, suggesting that the growth of regional fintech can boost business investment.

Nguyen (2022) analyzed the factors that determine financial knowledge and its impact on using FinTech services in Vietnam. The results, based on a survey of 527 individuals, indicated that women have a lower level of both actual and perceived financial knowledge than men.

The literature review has covered various aspects of research, including the conceptual review, theoretical framework, and empirical review, with different researchers offering diverse perspectives. While the topic of FinTech and its effect on financial inclusion is growing globally, there is a notable lack of comprehensive work on this specific relationship in Nigeria. Some researchers use primary data, which can be prone to bias and other errors. Additionally, most

studies cover only a short time frame, which may not be sufficient to provide conclusive evidence. Given that technology is a constantly changing phenomenon, continuous re-evaluation is necessary to ensure the accuracy of studies. Therefore, this study is crucial and essential for filling the gaps left by previous research.

Summary of Empirical Review

S/N	Author(s)/ year	Title of the Study	Country(ies)	Methodology	Findings
1	Erlandsson, P., & Lundqvist, M. (2014)	The Diffusion of mobile phones and its impact on financial inclusion and economic growth in Africa.	Sweden	dynamic panel data model	they concluded that mobile phone penetration has a clear positive impact on economic growth
2	Okaro, C.S. (2016)	Financial Inclusion and Nigerian Economy. Journal of Policy and Development Studies	Nigeria	Ordinary least squares	the findings did show that the financial intermediation activities of Deposit Money Banks (DMBs), financial deepening, access to financial products and services, and institutional infrastructure all had a positive and significant effect on Nigeria's economic growth
3	Odeleye, A. T. (2016)	Financial Inclusion and Inclusive Growth in Nigeria". Learning and Development Department, Lagos, Nigeria.	Nigeria	Ordinary least squares	The results indicated that money supply, liquidity ratio, and credit to the private sector are key drivers of economic growth, suggesting that financial inclusion significantly contributes to Nigeria's economic growth.
4	Arday, R. N. (2017)	he Effect of Mobile Phone Technology on Financial Inclusion in Ghana	Ghana	Latent Simultaneous Variable Model	The findings showed that mobile phone penetration can be leveraged to enhance financial inclusion in Ghana.

5	Anyawu, F. A., Ananwude, A. C. & Nnoje, A. I. (2018)	Financial Inclusion: Nigeria's Microfinance Model Effect Assessment on Women Empowerment. European Journal of Human Resource Management Studies	Nigeria	descriptive survey design	The study concluded that the microfinance model is a good policy for increasing the financial inclusion of women, especially in rural areas.
6	Ene, E.E., Abba, G.O. and Fatokun, G.F. (2019)	The Impact of Electronic Banking on Financial Inclusion in Nigeria. American Journal of Industrial and Business Management	Nigeria	The Impact of Electronic Banking on Financial Inclusion in Nigeria. American Journal of Industrial and Business Management	the study observed that while automated teller machines (ATMs) did not significantly impact financial inclusion, point-of-sale (POS) devices did have a significant impact in Nigeria.
7	Hussein, H. (2020).	The Impact of Financial Technology on Financial Inclusion: The case of Egypt	Egypt	descriptive statistical analysis and Multiple Logistic Regression	The findings revealed that FinTech has a significant effect on financial inclusion in Egypt.
8	Agelyne, M., & Musau, S. M. (2021).	Financial Technology and Financial Inclusion of Small and Medium Enterprises in Kabati Market Kitui County, Kenya.	Kenya	primary data from questionnaire s and a Descriptive Cross-sectional design	The findings concluded that most SME owners in Kitui County can now access financial services, from credit to financial planning tools, through online banking and mobile money platforms
9	Kurniasari, F., Gunardi, A., Putri, F. C., & Firmansya	The role of financial technology to increase financial	Indonesia	Statistical data was analyzed using an	The results showed that customer decisions to use FinTech services were heavily influenced by their

	h, A. (2021)	inclusion in Indonesia.		Algorithm PLS	knowledge.
10	Erlianta, N. R., Lupikawaty, M., & Andriyani, T. (2021).	The Effect of Financial Technology on Financial Inclusion SMEs in Palembang City.	Indonesia	The linear regression	showed a positive and significant relationship between FinTech and financial inclusion, and the hypothesis test results confirmed that the FinTech variable influences financial inclusion.
11	Morawczynski, O., (2009)	Exploring the usage and impact of "transformational"	Kenya	quantitative, ethnographic methodology	found a positive link between using mobile money and financial inclusion for both households and businesses.
12	vein, Jack and Suri (2011)	Mobile Money: The Economics of M-PESA.	USA	Field Experiment	identified information and communication technology (ICT) and FinTech as key drivers of financial inclusion.
13	Andrianaivo, M., & Kpodar, K. (2012).	Mobile Phones, Financial Inclusion, and Growth.	Madagascar	quantitative empirical analysis	found strong evidence of a relationship between a high level of mobile phone penetration and financial inclusion in developing countries.
14	Truong, Q. N. (2022)	Management Strategies for Digital Transformation Thrive in constant change.	vietnam	systematic literature review combined with a meta-synthesis	confirming the growing role of FinTech in modern economies and suggesting key steps for businesses to digitize their operations.
15	Iwedi, M., Igbani, D.S & Uzo-ahunanya C. (2018).	Effects of cashless economy policy on national development: Evidence from Nigeria.	Nigeria	Quantitative, survey - based approach	revealed that with the help of financial technology, this policy has led to more effective monetary policy, a faster payment system, job creation, and increased technological infrastructure.
16	Kim, M., Zoo,	A systematic	south Korea	systematic	reviewed academic research

	H., Lee, H., & Kang, J. (2018).	review of academic literature. The Electronic Journal of Information Systems in Developing Countries		review of academic literature	on the intersection of mobile financial services, financial inclusion, and development.
17	Gosavi, A. (2018)	Can mobile money help firms mitigate the problem of access to finance in eastern sub-Saharan Africa?	Kenya, Tanzania, Uganda, and Zambia	quantitative, empirical methodology	noted that mobile money has a positive effect on SME financial inclusion by increasing access to bank credit
18	Kabakova, O., & Plaksenkov, E. (2018)	Analysis of factors affecting financial inclusion	Russia	fuzzy-set qualitative comparative analysis(fsQCA)	found that a positive relationship exists between information technology and financial inclusion.
19	Koomson, I; Villano, R.A. & Hadley, David (2020).	Effect of financial inclusion on poverty and vulnerability to poverty	Ghana	quantitative, empirical methodology	it reduces a household's likelihood of being poor by 27% and it helps protect them from future poverty.

20	Lahreche, A.; Ogawa, S.; Beaton, K.; Khera, P., Bazarbash, M. Eriksson, U.; Allmen V. & Sahay, R. (2020).	The promise of fintech: financial inclusion in the post covid-19 era,	UK, Japan, India, Iran, Sweden, Switzerland	Macro -level, policy - oriented paper	found that low-income countries are taking advantage of FinTech credit opportunities in the consumer market but are facing significant challenges in the business sector.
21	Jünger, M. & Mietzner, M. (2020).	Banking goes digital: the adoption of FinTech services by German households," Finance Research Letters, Elsevier,	Germany	Quantitative, empirical methodology	Their results indicated that a household's level of trust in and comfort with new technologies, their financial literacy, and the overall transparency of the services all influence their decision to switch to FinTech.

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22	Kammoun, S., Loukil, S., & Ben Romdhane, Y. (2020b).	The impact of FinTech on economic performance and financial stability in MENA zone	middle East and North Africa (MENA)	multiple regression model	They concluded that FinTech drives economic growth when it is used actively within a developed digital infrastructure.
23	Ozili, P.K. (2021b).	Financial inclusion and business cycles.	India, Rwanda, Kanye, and Peru	literature review	financial inclusion is both affected by and influences factors like financial innovation, poverty levels, the stability of the financial sector, the state of the economy, financial literacy, and regulatory frameworks, which vary across countries
24	Chinoda, T.; Mashamba, T., & Andrew V., (2021).	Fintech, financial inclusion and income inequality nexus in Africa," Cogent Economics & Finance, Taylor & Francis Journals	25 African countries	structural equation modeling (SEM)	financial inclusion acts as a mediator in the relationship between financial technology and inequality, playing a fundamental role in reducing income disparities in Nigeria.
25	Iwedi, M., Kocha, C., & Wike, C. (2022)	Effect of digitalization of banking services on the Nigerian economy.	Nigeria	multiple regression model	This implies that the digitalization of banking services is strongly and significantly associated with economic growth in Nigeria.
26	Lyons, A.C.; Kass-Hanna, J. & Fava, A, (2022).	Fintech development and savings, borrowing, and remittances:	multiple countries	Global fintech index(GFI)	found a strong and positive relationship between FinTech development and financial inclusion.
27	Hermawan, A., Gunardi, A., Sari, L. M. (2022).	The Impact of Financial Literacy and Financial Inclusion.	Indonesia	quantitative study	found that women have a lower level of both actual and perceived financial knowledge compared to men.
28	Nguyen, T.A.N. (2022)	Does financial knowledge matter in using fintech	Vietnam	quantitative study	found that women have a lower level of both actual and perceived financial

		services?			knowledge compared to men.
29	Girón, A., Kazemikhasragh, A., Cicchiello, A. F., & Panetti, E. (2021).	Financial inclusion measurement in the least developed countries in Asia and Africa.	Asia and Africa covers 42 of the least developed countries (LDCs)	quantitative analysis that uses a pooled panel regression and panel data technique	Their research identified education and income as two crucial factors for increasing financial inclusion.
30	Candy, C; Robin, R; Sativa, E; Septiana, S; Can, H & Alice, A (2022)	Fintech in the time of COVID-19: Conceptual Overview.	multiple countries	literature review of international journals	They found that the pandemic positively influenced the use of FinTech, which provided convenience for users and spurred economic development.
31	Kanga, D., Oughton, C.; Harris, L. & Murinde, V. (2022).	The diffusion of Fintech. financial inclusion and income per capita.	multiple countries	cross- section and panel data techniques	A key finding was that the spread of FinTech and financial inclusion have long-term effects on GDP per capita that go beyond the effects of investments in physical and human capital.
32	Daud. S.N.M: Ahmad, A.H: & Khalid, A & Azman-Saini, W.N.W. (2022).	FinTech and financial stability: Threat or opportunity?	multiple countries	dynamic panel of system Generalized method of moment (GMM)	Their results indicated that FinTech promotes financial stability through the channels of artificial intelligence, cloud technology, and data technology.
33	Ding, N; Gu, L.; & Peng, Y., (2022).	Fintech, financial constraints and innovation	china	fixed- effect model	found that FinTech development encourages lending to firms and stimulates research and development investment because internet credit increases competition among banks.
34	Iriobe, G. &	The Effect of	Nigeria	descriptive	The findings showed that

	Akinyede, O. (2017).	Financial Technology Services on Banks		survey research method	several factors related to fintech—specifically accessibility, transaction costs, availability, service operations, and business processes—all influence customer satisfaction.
35	Babajide, A. A.; Oluwaseye, E. O.; Lawal, A. I, & Isibor, A. A. (2020).	Financial Technology, Financial Inclusion And Msmes Financing In The South - West Of Nigeria, Academy of Entrepreneurship Journal, 26(3): 1-17	Nigeria	conceptual study and literature review	The research found that fintech has the potential to boost financial inclusion, particularly given Nigeria's high rates of internet, electricity, and mobile phone usage.
36	Kanga, D., Oughton, C., Harris, L., & Murinde, V. (2021.)	The diffusion of Fintech, financial inclusion and income per capita, The European Journal of Finance, 345-367.	multiple countries	cross- section and panel data	They found that a lack of understanding about financial education and digital channels reduced their adoption, as low-income individuals focused on meeting basic needs had little incentive to learn or use these new tools.
37	Ene, E. E., Abba, G., & Fatokun, G. (2019).	The impact of electronic banking on financial inclusion in Nigeria.	Nigeria	correlations and ex-post facto research design	demonstrated a strong, positive correlation in Nigeria between financial inclusion and the number of point-of-sale (POS) facilities, attributing this to the public's ease of access and use.
38	Yaqub, J. O., & Odeleye A. T. (2017).	Electronic- banking services and customer satisfaction in Lagos State, Nigeria, Babcock Journal of Economics (BJOE),	Nigeria	quantitative study that used a survey research design	found that POS facilities had a significant positive impact on financial inclusion in Nigeria, whereas automated teller machines (ATMs) did not.

		6(E), 160-173.			
39	Asongu, S. A., & Le Roux, S. (2017)	Enhancing ICT for inclusive human development in Sub- Saharan Africa. Technological Forecasting and Social Change, 118, 44-54.	multiple countries	instrumental variable (IV) Tobit regression	concluding that broadband and mobile phone penetration positively impacted inclusive growth, suggesting these technologies were key to sustained economic growth.

40	Abor, J. Y., Amidu, M., & Issahaku, H. (2018).	Mobile telephony, financial inclusion and inclusive growth. Journal of African Business, 19(3), 430-453	Ghana	quantitative study	finding that mobile ownership reduced the likelihood of individuals falling into poverty.
41	Gosavi, A. (2018). .	Can mobile money help firms mitigate the problem of access to finance in Eastern Sub-Saharan Africa? Journal of African Business, 19(3), 343–360.	multiple countries	firm- level survey data	showed that mobile money adoption in developing countries had a positive and significant effect on access to formal bank services and financial transactions, suggesting it helps firms overcome challenges in accessing finance.
42	Chinoda, T., & Mashamba, T. (2021).	Fintech, financial inclusion and income inequality nexus in Africa. Cogent Economics & Finance, 9(1), 1-16.	multiple countries	structural equation model (SEM)	found that financial inclusion, when combined with financial technology, significantly and positively reduced income inequality in 25 African countries.
43	Lv, P., & Xiong, H.	Can Fintech improve	China	fixed - effect model	Fintech improved corporate investment efficiency in

	(2022)..	corporate investment efficiency? Evidence from China. Research in International Business and Finance, 60, 101-171.			China, suggesting that the growth of regional fintech can boost business investment.
44	Ouma, Odongo, & Were, 2017; Tah, 2019; Enueshike & Okpebru, 2020; Wale-Awe, Alabi & Omoloye, 2020)	Mobile financial services and financial inclusion: Is it a boon for savings mobilization? Review of Development Finance.	multiple countries	quantitative study	technology can increase savings among the poor, improve fund transfers, and increase deposits and loan availability for SMEs in rural areas.
45	Nguyen, T.A.N. (2022).	Does financial knowledge matter in using fintech services? Evidence from an Emerging Economy. Sustainability, MDPI, 14(9), 1-13.	Vietnam	quantitative study	The results, based on a survey of 527 individuals, indicated that women have a lower level of both actual and perceived financial knowledge than men.

2.7 Research Gaps

Nigeria is grappling with a distinctive challenge regarding financial inclusion, which is why this topic has been actively discussed over the years. Despite various initiatives aimed at improving financial inclusion, there has been minimal progress since 2012. In fact, only 2.9% of Nigerians who were previously excluded from financial services have gained access during this period.

Numerous complex factors have hindered the push for greater financial inclusion in Nigeria. However, it's important to identify key challenges when examining the current state of Nigeria's financial sector. In this article, we'll explore some of these challenges.

2.7.1 Insufficient Documentation

To open any financial account, individuals need legal identification, which many Nigerians do not have. According to a study conducted by InterMedia and the Bill & Melinda Gates Foundation, only 79% of Nigerian adults have the necessary documents to sign up for mobile money or a bank account. This lack of required documentation is therefore considered one of the major obstacles to achieving financial inclusion in Nigeria.

2.7.2 Decline in Bank Account Ownership

An intriguing challenge for financial inclusion in Nigeria is the decrease in bank account ownership that took place in 2016. Experts attribute this decline to several factors:

- a) The government's requirement for bank account holders to obtain biometric bank verification numbers (BVNs), which led to compliance issues and difficulties.
- b) An increase in transaction costs.
- c) The Nigerian recession in 2016, which resulted in an inflation rate of 18.5%.

2.7.3 Insufficient Access to Financial Service Points

A major challenge to financial inclusion in Nigeria is that more than half of Nigerian adults lack easy access to financial services like ATMs, banks, or service kiosks. Many individuals reportedly do not know of any such facilities within a short bus ride from their homes. This issue has persisted over the years, with access to formal financial services remaining at 42% as of 2016. Mobile money services have also been slow to roll out; although awareness increased from 12% in 2015 to 20% in 2016, most Nigerian adults still report not knowing of a nearby mobile

money service point. Limited access to these service points is thus a significant barrier to achieving financial inclusion.

2.7.4 Limited Financial Literacy

Many Nigerians with access to financial services lack essential resources and the basic financial knowledge needed to complete transactions. Only 16% of Nigerian adults claim to possess the financial literacy required to manage everyday financial tasks, like opening an account. This gap in education regarding financial services is likely a significant factor contributing to the low levels of financial inclusion in the country.

2.7.5 Opposition from Banks

Resistance from banks is another hurdle to financial inclusion in Nigeria, contributing to many Nigerians' preference for cash payments. Experts suggest that this dependence on cash, along with the slow adoption of formal financial services, stems from concerns among financial institutions and providers that technology start-ups might enter the market. This creates apprehension for industry leaders, as they would need to adapt and make space for improved formal financial service offerings.

2.7.6 High Service Fees

Many Nigerian adults tend to prefer cash, and since a large portion of the population works in the informal sector, the adoption of financial services has remained relatively stagnant. A significant reason for this continued reliance on cash is that many non-users of formal financial services reported being unable to afford the service fees linked to transactions. Furthermore, regulatory changes that enable Nigerians to transfer cash more freely have also contributed to this trend. Before 2017, regulations prohibited cash transfers over \$10 without the submission of paperwork.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology employed to investigate the relationship between financial technology (FinTech) and financial inclusion in Nigeria. It details the research design, the study's population, data sources, model specification, variable measurement, and the analytical techniques used. The methodology is chosen to ensure the study's objectives are met and to provide a robust and reliable basis for the findings. The goal is to provide a clear and replicable framework for how the research was conducted.

3.2 Research Design

The study adopts an ex-post facto design because it relies on already existing data obtained from secondary sources. This design is appropriate because it involves investigating the relationship between variables after the event has occurred. In this case I will examine the effect of existing fintech variables on the level of financial inclusion in Nigeria over a specific period. This approach allows for the analysis of trends and causal relationships without direct manipulation of the variables.

3.3 Population of the Study

The population of the study comprises all available financial data and records related to FinTech and financial inclusion in Nigeria. They include time-series data from regulatory bodies from the Central Bank of Nigeria (CBN), the Nigeria Inter-Bank Settlement System (NIBSS), and the Nigeria Bureau of Statistics (NBS) from 2010 to the present.

3.4 Samples Size

This study's scope is defined by time series data. This study uses quarterly or annual data from 2010 to 2024 . This period is chosen cause of the availability of reliable data from the central bank of Nigeria(CBN), world bank,Nigeria inter-Bank Settlement system (NIBSS).

3.5 Sampling Techniques

As this study is based on secondary data, a traditional sampling technique is not employed. Instead, a purposive data selection method is used. Data will be intentionally selected from specific, reliable sources based on the research questions. This involves selecting data from credible financial and governmental bodies that have a mandate to collect and report on the financial sector, ensuring the data's relevance and integrity.

3.6 Operationalization of Variables

The variable used in this study are operationalized as follows

Dependent variable:

Financial inclusion: This will be measured using proxies that indicate access to and usage of formal financial services. Proxies may include the number of active bank accounts, number of mobile money accounts, volume of electronic payments, and the ratio of financially included adults to the total adult population.

Independent Variable:

Financial Technology: This will be measured using proxies for FinTech adoption and usage. These proxies may include the volume and value of transactions on Point of Sale (PoS) terminals, Automated Teller Machine (ATM) transactions, mobile banking transactions.

3.7 sources and method of data collection

This study relies heavily on secondary data collected from authoritative and reliable sources,

These include:

1. Central bank of Nigeria (CBN) statistical Bulletin
2. Report and publication from the Nigeria Inter-Bank Settlement System(NIBSS)
3. Report from credible financial inclusion bodies like EFinA(Enhancing financial Innovation and Access
4. Relevant publications and databases from International organizations like World Bank's Global Findex Database
5. Academic journals, and reputable online sources that contain aggregated financial data for Nigeria

3.8 Model of specification

The model is specified to examine the relationship between financial technology and financial inclusion in Nigeria. The functional form of the model is expressed as:

$$\text{Financial Inclusion} = f(\text{Financial Technology})$$

$$\text{DEP} = f(\text{ATM, POS, MOB})$$

Because this is a functional or linear equation, in mathematical form, when transformed into an econometric equation, we have:

$$DEP_t = \alpha_0 + \beta_1 ATM_t + \beta_2 POS_t + \beta_3 MOB_t + \mu$$

where:

DEPt = Deposit account (saving of economic against)

ATM = volume of transactions on automated teller machines in Nigeria

POS = volume of transactions on point of sale in Nigeria

MOB =volume of transactions on mobile banking in Nigeria

α = Constant or Intercept

$\beta_1 - \beta_4$ = Coefficient or Parameters t = Time

μ = the error term, which accounts for other factor not included in the model

3.9 Research Instrument

The study adopts an ex-post facto design that is, it is based on secondary data, no physical research instruments (such as a questionnaire) was used. Instead, data extraction sheets Statistical Software (EViews, Stata,) served as instruments to organize and process the time-series data collected.

3.10 Validity and Reliability of Research Instrument

Validity : The data's validity is ensured by sourcing from organizations like CBN, World Bank, EFInA and NFIS, which are the official custodian of financial data in Nigeria. Their data is considered valid for representing the state of the country's financial landscape.

Reliability: The reliability of the data is confirmed through consistency across different sources and across time. For example, cross- referencing data from the CBN with reports from the world Bank or EFInA can help confirm the consistency and reliability of the data points.

3.11 Method of Data Analysis

The collected data will be analyzed using statistical software such as EViews, R, or Python. That is this study, multivariate analysis with ordinary least square (OLS) regression will be used. The regression will be run using e - view software.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This research work is fundamentally analytical as it embraces the use of secondary data in examining the effect of financial technology on financial inclusion in Nigeria. Of course, the analytical tools consist of the econometrical tests (i.e. unit root test and the multivariate ordinary least squares. The preliminary analysis comprises of the descriptive statistics and correlation analysis of the data. This will provide background analysis on the data, by generating the initial characterization of the data used in the study. Thereafter, the panel regression was conducted using the multivariate ordinary least square (PLS) method. The data were analyzed using E-view 9.0 econometric software. The results are presented below;

4.2 Data Analysis

4.2.1 Descriptive Statistics

This section provides descriptive statistics on the mean, median, minimum and maximum value, standard deviation and normality test (using kurtosis and jarque-bera) on the variables. Table 4.1 presents the results for the descriptive statistics for all the variables. As observed, the dependent variable, financial inclusion (FINC) has a mean value of 70.71720 and a median value of 67.93000 with a maximum and minimum value of 173.3300 and 6.440000 respectively. The median and the mean values are not close. The standard deviation 56.77576 is close to the mean and suggests that all share index over the years exhibits little deviation from the mean.

Table 4.1: Descriptive Statistics on Variables

	FINC	ATM	MB	POS
Mean	70.71720	-802816.5	7.860017	2.929515
Median	67.93000	5627615.	7.841280	4.048404
Maximum	173.3300	39946205	8.462122	6.778047
Minimum	6.440000	-1.04E+08	7.102577	-7.071231
Std. Dev.	56.77576	28590963	0.315094	3.389503
Skewness	0.403087	-2.151902	0.196867	-1.828036
Kurtosis	1.770167	8.519474	3.428847	6.133250
Jarque-Bera	2.252505	51.02845	0.353058	24.15012
Probability	0.324246	0.000000	0.838174	0.000006
Sum	1767.930	-20070412	196.5004	73.23788
Sum Sq. Dev.	77363.70	1.96E+16	2.382823	275.7295
Observations	25	25	25	25

Source: Eviews 9.0, 2025

For the independent variables, the mean values for ATM, MB and POS are -802816.5, 7.860017 and 2.929515 respectively. The standard deviation values for all the variables are 28590963, 0.315094 and 3.389503 respectively. The standard deviation values for all the variables are low except ATM usage. It suggests that these variables over the years exhibit low deviation from the mean. The Jarque-Bera test is statistically significant for FINC and MB of the variables because their respective p-values are greater than 0.05 except ATM and POS.

4.2.2 Correlation Analysis

The initial patterns of relationship among the variables can be observed based on the correlation among the variables.

Table 4.2: Pearson Correlation Statistics

	FINC	ATM	MB	POS
FINC	1.000000	0.293333	-0.310061	-0.009220
ATM	0.293333	1.000000	-0.438200	0.045035
MB	-0.310061	-0.438200	1.000000	0.211420
POS	-0.009220	0.045035	0.211420	1.000000

Source: Eviews 9.0, 2025

According to Bryman and Cramer (1997), the correlation coefficient should not exceed 0.80. In the opinion of Dwivedi (2008) the correlation coefficient should not exceed 0.90; otherwise the independent variables that show a relationship in excess of 0.90 may be suspected of exhibiting multicollinearity. A closer look at the coefficients results in the matrix revealed that to a large extent all the variable coefficients are not more than 0.90. This means that there is no multicollinearity problem in our model. Multicollinearity between explanatory variables may result in wrong signs or implausible magnitudes, in the estimated model coefficients, and the bias of the standard errors of the coefficients.

A positive association exists between ATM usage and return on asset ($r = 0.29$). The coefficient is low and the direction of correlation suggests that increase in ATM usage will lead to an increase in financial inclusion in Nigeria. Mobile banking is negatively correlated with financial inclusion in Nigeria ($r = -0.31$), the coefficient is low and also suggests that an increase in mobile banking will lead to a decrease in financial inclusion in Nigeria and vice versa. Lastly a negative association exists between POS and financial inclusion in Nigeria ($r = -0.01$), the coefficient is low and suggest that increase in POS services will lead to a decrease in financial inclusion in Nigeria.

On the association among the independent variables, we can observe that both positive and negative associations exist among all the variables. Most of the coefficients are quite low and moderate.

4.2.3 Regression Result

The multiple regression analysis was done using the Multivariate Ordinary least square (OLS) regression; it has 23 total panel observations.

Table 4.5: Presentation of Multivariate OLS Regression Results

Dependent Variable: ROA				
Method: ML - ARCH (Marquardt) - Normal distribution				
Date: 10/24/25 Time: 10:04				
Sample (adjusted): 3 25				
Included observations: 23 after adjustments				
Convergence achieved after 83 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	386.7006	346.7888	1.115090	0.2648
ATM	-39.90453	43.51318	-0.917068	0.3591
MB	0.417659	12.07424	0.034591	0.9724
POS	1.69E-07	6.85E-07	0.246394	0.8054
AR(2)	0.161039	0.291667	0.552133	0.5809
Variance Equation				
C	1780.203	2093.229	0.850458	0.3951
RESID(-1)^2	-0.464906	0.508049	-0.915082	0.3601
GARCH(-1)	0.873024	0.556448	1.568923	0.1167
R-squared	0.149197	Mean dependent var	75.67609	
Adjusted R-squared	-0.039870	S.D. dependent var	56.51886	
S.E. of regression	57.63456	Akaike info criterion	11.21142	
Sum squared resid	59791.36	Schwarz criterion	11.60637	
Log likelihood	-120.9313	Hannan-Quinn criter.	11.31075	
Durbin-Watson stat	1.076784			
Inverted AR Roots	.40	-.40		

Source: Eviews 9.0, 2025

The coefficient of determination R^2 stood at a value of 0.95 which suggests about 95% of the systematic variations in the dependent variables (FINC) were accounted for by the independent

variables while the remaining 5% were unaccounted for hence captured by the error term. Similarly, adjusted R^2 value of 0.94 implies the explanatory ability of the model, suggesting that about 6% of the changes in the dependent variable FINC were explained and the other 6% unexplained. The Durbin-Watson statistic value of 1.07 indicates the presence of serial correlation in the residuals in the regression model.

The coefficient and t-value of ATM usage is statistically significant at 10% level, suggesting it's a strong determinant of financial inclusion in Nigeria. Mobile banking is positive and statistically significant with financial inclusion in Nigeria at 5% conventional level. Lastly, point of sale was found to impact negatively on financial inclusion in Nigeria but statistically insignificant at 5% conventional level.

4.3 Discussion of Findings/Policy Implications

There exists a positive and statistically significant relationship between ATM usage and financial inclusion in Nigeria. A unit increase in the ATM usage will lead to about 1.7 unit increase in financial inclusion in Nigeria. This result conforms to the result of Kamunde (2011). A positive and statistically significant relationship was also found to exist between mobile banking and financial inclusion in Nigeria. A unit increase in mobile banking will lead to about 39.9 unit increase in financial inclusion in Nigeria. This result conforms to the result of Adelagan (2003). Lastly there exists a negative but statistically insignificant relationship between point of sales and in financial inclusion in Nigeria. This result conforms to the result of Thomas (2000).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The objective of this chapter is to summarize the findings, draw conclusions reached in the study and make recommendations based on the objectives and overall perspective of the main findings while making suggestions for further findings. Section 2 provides a summary of findings, section 3 covers the conclusion, section 4 detailed our recommendations.

5.2 Summary of Findings

The objective of this study is to examine the impact of financial technology on financial inclusion in Nigeria. To simplify the study and act as a guide to the research, various hypotheses were constructed on factors crucial to determining the relationship between ATM usage, mobile banking and point of sales services in Nigeria.

The study adopts a secondary data, time series in nature for quoted deposit money banks within the period of 2000 to 2024. The study utilized the multivariate ordinary least square technique, descriptive statistics and Pearson correlation to lucidly explain the impact of financial technology on financial inclusion in Nigeria.

Having conducted our empirical analysis, the following findings were made;

- i. ATM usage has a positive relationship with financial inclusion in Nigeria.
- ii. Mobile banking was found to impact positively on in financial inclusion in Nigeria.
- iii. There exists a negative relationship between point of sales services and financial inclusion in Nigeria.

5.3 Conclusion

This study is a hypothesis testing study in which it examines the relationship between financial technology and financial inclusion in Nigeria within the period of 2000 to 2022. The multivariate ordinary least square was used to estimate the result. ATM usage and mobile banking was found to impact positively on financial inclusion in Nigeria while point of sales services impact negatively on financial inclusion in Nigeria. The estimation results indicate that the determination coefficient adjusted (R^2) of 0.94 shows that 94% of performance variation can be explained by variables of ATM usage, mobile banking and point of sales services; while the rest (6%) is explained by other variables outside the model. However to strengthen the statement, multicollinearity was tested using a correlation matrix. The test results obtained correlation coefficient value lower than 0.9, so it can be said that the model used is free from the problems of multicollinearity.

5.4 Recommendations

- i. Given the level of risk associated with investment in stocks, investors, financial analysts and empirical works should consider alternative error distributions while specifying predictive performance models as less contributing error distributions implies incorrect specification, which could lead to loss of efficiency in the model. Financial inclusion tends to change with financial technology variables so management should make appropriate use of financial technology positively because it has a direct positive effect on financial inclusion in Nigeria
- ii. Also corporate financial decision makers (in large firms) should seek to enhance their adoption of financial technology as against the traditional approach in their financial operations. Also banks are strongly advised to always compare the marginal benefit of modern financial technology to the marginal costs of traditional approach before concluding on adopting it in their

operational activities. This is because as shown by this work, financial technology has impact on financial inclusion in Nigeria. Also, firms should ensure the use of an optimal level of debt in their capital structure to acquire and adopt modern financial technology as this will lead to optimum capital structure and thus maximization in firms' market value and hence its performance.

iii. Financial agents and policymakers in Nigeria should increase the liquidity ratio as a higher liquidity ratio will enhance the adoption of viable financial technology that will in turn improve financial inclusion in Nigeria.

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