



FinTech Solutions and Financial Inclusion: Prospects and challenges in Northern Nigeria

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Abstract

This study investigates the potential of fintech to improve financial inclusion in Northern Nigeria, where high exclusion rates persist due to infrastructural, regulatory, and socio-cultural barriers. Employing thematic analysis, the research categorizes existing literature and field data into themes such as "Regulatory Hurdles," "Cultural Resistance," "Infrastructural Gaps," and "Digital Literacy Barriers." Findings reveal systemic issues like poor digital infrastructure, restrictive regulations, and cultural norms particularly gender biases and language barriers limit fintech adoption among underserved populations. The analysis emphasized that addressing systemic and socio-cultural challenges is crucial for leveraging fintech's full potential. Strengths include increasing mobile phone penetration and interest in digital finance, while weaknesses involve infrastructural deficits and regulatory uncertainties. Opportunities exist in expanding mobile money platforms, improving financial literacy, and developing voice-based or offline services tailored to local contexts. Threats such as cybersecurity risks and cultural mistrust must also be managed. Comparing Nigeria's landscape with successful models highlights the need for supportive policies, simplified KYC procedures and culturally sensitive solutions, such as Hausa-language interfaces, to foster inclusive financial growth. Ultimately, a strategic approach combining regulatory reform, infrastructural investment, and culturally tailored fintech products is vital to bridging regional financial gaps and promoting sustainable economic development.

I. Introduction

Financial inclusion is imperative to banks as it enables them to expand their customer base by onboarding previously unbanked or underbanked individuals, thereby increasing deposit mobilization and diversifying their funding sources at a lower cost (Ozili, 2025). By reaching new customers, especially in underserved rural and low-income areas, banks can grow their market share and enhance profitability through increased lending and

transaction volumes (Arun & Kamath, 2015; Brei et al., 2020). Additionally, it facilitates safer banking relationships as customers gain access to regulated financial services that protect their funds, which in turn strengthens banks' liquidity and stability (Morgan & Pontines, 2018; Pennacchi, 2006). This symbiotic relationship allows banks to generate interest income from loans funded by these deposits, pay dividends to shareholders, and invest in business expansion, creating value for all stakeholders involved (Ozili, 2025).

For other stakeholders including customers, depositors, government, and regulators, financial inclusion enhances value by fostering economic empowerment and financial security. Customers benefit from affordable access to credit, savings, and payment services that improve their financial resilience and economic opportunities (World Bank, 2025). Depositors gain safety through deposit insurance and regulated banking environments, reducing risks associated with informal financial channels (CBN, 2012). Governments and regulators see financial inclusion as a policy tool to promote economic growth, reduce poverty, and enhance financial stability by broadening the formal financial system's reach (CBN, 2012; International Journal of Business and Management, 2022). Empirical studies in Nigeria and other countries confirm that financial inclusion positively affects stakeholders' value by improving access to financial products and services, which supports sustainable development and inclusive growth (Ozili, 2025).

Financial inclusion been the provision of affordable, accessible, and relevant financial services to all segments of society remains a critical development challenge in Nigeria, particularly in the northern region. It gives access to the use of formal financial services by all segments of society which is a critical driver of economic development and poverty reduction, particularly in emerging economies like Nigeria (Central Bank of Nigeria, 2020). Despite its global progress, with Nigeria's financial inclusion rate rising to 74% in 2023, the northern region remains significantly underserved, with exclusion rates as high as 38% in the North East and 47% in the North West (A2F, 2023). This



disparity is rooted in a complex interplay of geographical, socio-cultural, and economic factors, including limited access to financial infrastructure, lower literacy levels, and prevailing gender norms that further disadvantage women (AFI, 2012; ADFI, 2024).

With the emergence of financial technology (fintech), it is assumed that it will be a promising prospect for bridging these gaps. Fintech solutions such as mobile banking, agent networks, and digital payment platforms have the potential to expand financial access in remote and underserved communities by lowering transaction costs and overcoming physical barriers (IMF, 2023; Academia.edu, 2020). However, the adoption and impact of fintech in northern Nigeria face notable challenges, including inadequate digital infrastructure, low digital and financial literacy, and regulatory hurdles (IMF, 2023; KPMG, 2020). Addressing these challenges and leveraging fintech innovations effectively will be key to achieving inclusive growth and economic empowerment in northern Nigeria.

Similarly, it has been also observed that despite significant efforts and the rapid growth of the fintech sector, the northern states continue to experience disproportionately high levels of financial exclusion, with millions of adults lacking access to formal banking and financial services. According to the Central Bank of Nigeria (CBN), the revised National Financial Inclusion Strategy (NFIS 2.0) specifically identifies northern Nigeria as a priority area, emphasizing the need for targeted interventions such as the expansion of agent networks, simplification of Know Your Customer (KYC) requirements, and aggressive promotion of digital financial services.

Fintech innovations have been widely recognized as transformative tools for advancing financial inclusion, leveraging technology to deliver banking, payments, savings, and credit solutions to previously underserved populations. In Nigeria, fintechs have introduced a range of products mobile wallets, instant lending platforms, and digital savings schemes—that promise to bridge the gap left by traditional banks, especially in remote and rural communities. However, evidence suggests that while fintech has made notable strides, its impact on deepening financial inclusion in northern Nigeria remains limited. Many fintech products still require users to have a bank account or a Bank Verification Number (BVN), inadvertently excluding large segments of the unbanked population.

With the perspective on the critical importance of financial inclusion as a catalyst for

economic development, stability, and stakeholder value within Nigeria's banking sector, expanding access to affordable, regulated financial services particularly through innovative fintech solutions banks and policymakers can address persistent regional disparities. Notably in northern Nigeria, where high exclusion rates hinder broader economic progress. The findings of this study was conducted highlighting that fintech presents promising opportunities to bridge financial gaps, substantial challenges such as infrastructural deficits, low digital literacy, and regulatory barriers must be systematically addressed to realize its full potential. Ultimately, advancing financial inclusion not only enhances the resilience and profitability of banks but also fosters economic empowerment, poverty reduction, and inclusive growth for all segments of society, aligning with Nigeria's broader development objectives. This research therefore emphasized the necessity for targeted, collaborative efforts to harness technological innovations effectively, ensuring that financial services reach the underserved and contribute meaningfully to sustainable national development.

II. Literature Review

Conceptual Perspectives

Financial Inclusion is defined as the process of ensuring individuals and businesses have access to affordable financial products and services that meet their needs, such as payments, savings, credit, and insurance, delivered in a responsible and sustainable way (World Bank, n.d.). It targets the unbanked and underbanked populations, particularly in rural and low-income areas, to integrate them into the formal financial system. Financial inclusion is the process of ensuring that individuals and businesses have access to useful, affordable, and timely financial products and services that meet their needs, including transactions, payments, savings, credit, and insurance (World Bank, n.d.; World Bank, 2021). It goes beyond merely having access to a bank account to encompass the actual use of a broad range of financial services delivered in a responsible and sustainable way (World Bank, 2021; World Bank, n.d.).

The concept targets underserved and excluded groups such as microenterprises, poor households, women, and other marginalized populations who traditionally face barriers in accessing financial services (World Bank Independent Evaluation Group, 2022; Wikipedia, 2024). Financial inclusion aims to reduce poverty and promote shared prosperity by enabling these groups to better manage income, invest in education



and health, start or expand businesses, and cope with financial shocks (World Bank, n.d.).

Financial inclusion is linked to multiple United Nations Sustainable Development Goals, including no poverty, gender equality, economic growth, and reduced inequalities, highlighting its broad social and economic importance (World Bank, 2021; World Bank Independent Evaluation Group, 2022). The World Bank Group supports financial inclusion through integrated strategies involving modernization of payment systems, leveraging financial technology (FinTech), enhancing consumer protection, and improving financial literacy (World Bank, 2021).

Financial Technology (FinTech) refers to the use of modern technological innovations to improve and automate the delivery and use of financial services. FinTech encompasses a broad range of applications including digital payments, mobile banking, online lending, blockchain, and insurance technology, aiming to make financial services more efficient, accessible, and personalized (Ozili, 2018). Financial Technology, commonly known as FinTech, refers to the application of innovative digital technologies to enhance, automate, and streamline the delivery and use of financial services. It encompasses a wide range of software, mobile applications, and platforms that enable individuals and businesses to access, manage, and transact their finances digitally (IBM, n.d.).

Originally, the term FinTech was used to describe technology applied primarily to the backend systems of established financial institutions. However, since around 2018, the focus has shifted toward consumer-oriented services, expanding to sectors such as retail banking, investment management, fundraising, and education. FinTech includes technologies like robo-advisors, peer-to-peer lending, digital payment apps, and cryptocurrencies such as Bitcoin.

Key features of FinTech include user-centric interfaces that simplify complex financial transactions, automation through artificial intelligence and machine learning, enhanced security protocols like biometric authentication and blockchain, real-time data processing, and extensive use of data analytics for personalized financial services (Stripe, 2024). Additionally, FinTech companies often provide APIs for seamless integration with other financial systems, enabling a more interconnected financial ecosystem (Stripe, 2024).

FinTech is distinguished from traditional financial technology by its innovative and agile

nature, often disrupting existing business models and creating new financial products and services. It is characterized by its focus on customer-centricity, especially targeting millennials and digital-native generations, and by its ability to serve both business-to-consumer (B2C) and business-to-business (B2B) markets (Ali, 2018; Michigan Tech, 2025). Moreover, FinTech is not just about technology itself but also involves changing financial processes and educating users to effectively utilize these new tools. Successful FinTech innovations often transition from being "bleeding edge" technologies to becoming mainstream financial practices (Michigan Tech, 2025). Generally, FinTech represents a dynamic and evolving ecosystem that leverages digital technologies to improve financial services' accessibility, efficiency, and personalization, fundamentally transforming how financial operations are conducted globally.

Relationship between FinTech and Financial Inclusion

FinTech acts as a significant enabler of financial inclusion by leveraging digital technologies to overcome traditional barriers such as high transaction costs, lack of physical banking infrastructure, and limited financial literacy (Neelam & Bhattacharya, 2020). For example, mobile money platforms like M-Pesa in Kenya have dramatically increased access to financial services for millions, particularly in remote areas, by facilitating affordable, convenient, and secure transactions via mobile phones (Mbiti & Weil, 2011; Suri & Jack, 2016).

FinTech solutions reduce operational costs and eliminate the need for physical presence of financial intermediaries, making financial services more accessible to low-income and rural populations (Ozili, 2018). These technologies also allow for better personalization of financial products to meet specific needs of individuals and households, enhancing user experience and adoption.

Impact and Challenges in Northern Nigeria

FinTech innovations have expanded access to financial services for underserved populations in Northern Nigeria, where traditional banking infrastructure is sparse. For example, mobile money operators like MTN Mobile Money and Airtel Money leverage extensive telecom networks and agent partnerships to deliver digital financial services to remote and rural areas, enabling millions to perform transactions without visiting bank branches (Nigerian Patriot, 2025). Platforms such as



Fintava Pay have adopted localized strategies by enabling microfinance banks and agent networks to offer customized banking services in local languages like Hausa, addressing language and literacy barriers (Naijapreneur, 2025). This approach has facilitated onboarding of previously unbanked individuals by using familiar, trusted local agents and alternative verification methods suitable for users without smartphones.

These advances in northern Nigeria posits persistent challenges that hinder broader financial inclusion. First, limited physical banking infrastructure remains a barrier; only about 32% of Nigeria's commercial bank branches are located in the North, leaving large rural populations reliant on informal or agent-based services (Naijapreneur, 2025). Low digital literacy and limited smartphone penetration further restrict the adoption of digital financial services, increasing users' vulnerability to fraud and scams, especially when sensitive information like Bank Verification Numbers (BVN) is mishandled (Naijapreneur, 2025).

Cultural and religious factors also play a significant role. Many Northern Nigerians avoid traditional banks due to the association with interest-based transactions, which conflict with Islamic finance principles. FinTech providers have had to innovate by partnering with trusted local agents and offering Sharia-compliant alternatives to gain acceptance (Naijapreneur, 2025).

Regulatory and infrastructural deficits, such as inconsistent internet connectivity and limited electricity access, further complicate the delivery and scalability of FinTech solutions in the region (Udo & Jacob, 2025). Moreover, while mobile penetration exceeds 80% nationally, the quality and affordability of internet services in Northern Nigeria lag behind, limiting the full potential of digital financial inclusion (Nigerian Patriot, 2025).

FinTech is a transformative force driving financial inclusion by making financial services more accessible, affordable, and tailored to the needs of underserved populations. While the benefits are clear, addressing challenges related to regulation, infrastructure, cybersecurity, and financial literacy is essential for sustainable and inclusive financial ecosystems.

Empirical Perspectives.

With the rapid emergence of financial technology (fintech) as a pivotal driver of financial inclusion worldwide, this empirical review aims to examine the existing evidence on the impact of fintech on financial inclusion in developing and African contexts, highlighting key trends, successes,

and hurdles. Through this analysis, we seek to deepen understanding of how technological advancements are shaping financial access and fostering economic empowerment in these regions.

Tiony (2024) investigates the role of fintech innovations such as mobile money, digital banking, and blockchain in enhancing financial inclusion and driving economic growth in Kenya. Using a mixed-methods approach that combines surveys, case studies, and secondary data analysis, the study examines the adoption of fintech among Kenyans, including unbanked populations and SMEs. The findings reveal that fintech, particularly mobile money platforms like M-Pesa, has substantially increased financial access and contributed to economic development through SME growth and job creation. However, challenges such as regulatory obstacles and infrastructure deficiencies limit its full potential. The study recommends establishing supportive regulatory frameworks, improving rural infrastructure, and addressing cybersecurity concerns to maximize the benefits of fintech for inclusive growth.

Azmeh et al. (2024) investigated the impact of fintech and financial inclusion on economic growth and human development in developing Asian countries using panel regression analysis. Their study found that the adoption of fintech, when supported by robust institutional frameworks, positively influences both human development and economic growth, as measured by the Human Development Index (HDI). The authors recommend strengthening institutional support and improving fintech infrastructure to enhance inclusive growth and maximize the benefits of financial technology in developing nations.

The SCIRP (2024) study investigates the role of financial technology in advancing financial inclusion and economic growth in Kenya, with a particular focus on mobile money and digital banking. Utilizing a mixed-methods approach that combines surveys and secondary data analysis, the research examines the experiences of the Kenyan population, SMEs, and unbanked individuals. Findings reveal that mobile money platforms are significant catalysts for expanding financial access and stimulating economic activity, although challenges such as regulatory hurdles and inadequate infrastructure persist. The study recommends that policymakers prioritize regulatory support, infrastructure development, and cybersecurity measures to enhance fintech's impact and foster inclusive economic growth in Kenya.

Adewuyi and Awolusi (2024) conducted an empirical study across 46 Sub-Saharan African



countries to examine the causal relationship between financial technology (fintech) and financial inclusion, employing a dynamic panel bootstrap causality test to account for endogeneity and heterogeneity. Their findings revealed a bidirectional causal relationship in some countries, while in many West African nations, causality was either unidirectional or nonexistent. Based on these results, they recommend developing tailored, country-specific policies to effectively leverage fintech's potential for advancing financial inclusion in the region.

Olayinka and Oladipo (2022) conducted a study in rural communities near Enugu, Nigeria, to examine the impact of financial technology (fintech) on financial inclusion among rural dwellers. Using a survey research design with questionnaires administered to 300 residents selected through judgmental sampling, they employed descriptive statistics such as percentages and pie charts for analysis. The study found that fintech significantly improves financial inclusion in rural Nigeria by facilitating easier access to financial services. Based on these findings, they recommend expanding fintech infrastructure and increasing financial education in rural areas to further enhance inclusion.

Yakubu and Bunyaminu (2021) examined the impact of financial inclusion on economic growth in ten ECOWAS countries between 2010 and 2017, using econometric analysis with EGLS regression. Their findings reveal that financial inclusion significantly and positively influences economic growth both directly and through enhancing financial openness, while inflation has a negative effect on growth. The study recommends policies aimed at improving access to financial services, particularly for rural populations, to promote inclusive economic development across the region.

Agyekum et al. (2016) conducted a qualitative study in Ghana to evaluate how mobile money services impact financial inclusion among previously unbanked populations. Through the review of secondary data and thematic analysis of usage patterns, the study found that mobile money significantly improves access to affordable and convenient financial services across different income levels, social classes, and age groups. The researchers recommended increasing mobile phone penetration and internet access to further support and expand digital financial inclusion in Ghana.

Sangare et al. (2021) examined the key determinants of financial inclusion across eight WAEMU countries from 2004 to 2017, employing panel data econometric regression analysis using a

synthetic financial inclusion index (SIFI). Their findings reveal that higher real GDP, increased mobile phone penetration, and improved literacy rates positively impact financial inclusion, while rural population weight and interbank credit have negative effects. Based on these results, the study recommends enhancing mobile technology access, promoting literacy—particularly in rural areas—and implementing financial sector reforms to foster greater financial inclusion in the region.

Ojo and Ibrahim (2023) examined the impact of fintech on traditional banking systems and financial inclusion in selected West African countries using a mixed-method approach that combined surveys and secondary data analysis. Their study focused on bank customers and fintech users, employing descriptive and inferential statistics to analyze the data. The findings revealed that fintech disrupts conventional banking by enhancing access and convenience, thereby fostering financial inclusion, although challenges such as regulatory gaps and infrastructural deficits hinder its full potential. The authors recommend strengthening regulatory frameworks and infrastructure to better integrate fintech with traditional banking, promoting inclusive growth across the region.

Adeleke et al. (2024) critically examined the role of mobile money as a fintech innovation in advancing financial inclusion across West Africa, focusing on unbanked and rural populations. Through a literature review and thematic qualitative analysis, the study found that mobile money services have significantly improved financial access by overcoming traditional banking barriers and reaching underserved communities. The authors recommend promoting mobile money innovations and implementing supportive policies to further deepen financial inclusion and enhance economic participation in the region.

The above reviewed studies collectively affirm that fintech innovations particularly mobile money, digital banking, and blockchain are key drivers of financial inclusion in developing and African contexts. A common theme is that fintech enhances access to financial services for previously unbanked and rural populations, fostering economic development, SME growth, and poverty alleviation. Many studies highlight that when supported by adequate infrastructure and favorable regulatory environments, fintech can significantly promote inclusive growth.

However, disparities emerge regarding the extent and consistency of these impacts. While some countries like Kenya and Nigeria demonstrate



substantial success with initiatives such as mobile money platforms, other regions face persistent challenges like regulatory hurdles, infrastructural deficits, and low digital literacy. The regional analyses show heterogeneity in fintech adoption and effectiveness, often influenced by institutional strength, economic conditions, and policy frameworks.

In summary, despite shared recognition of fintech's positive role in advancing financial inclusion, its success varies across countries due to differences in infrastructure, regulation, and socio-economic contexts. Tailored, country-specific strategies are essential to maximize fintech's potential to foster inclusive economic growth in these regions.

Financial Technology and Financial Inclusion in developed economies:

The rapid advancement of financial technology (fintech) has significantly reshaped the landscape of financial services across the globe, with particular implications for promoting financial inclusion. While much attention has been given to fintech's potential in emerging markets, developed countries are also experiencing notable shifts in how financial services are delivered and accessed. In these mature economies, fintech innovations such as digital payments, peer-to-peer lending, robo-advisors, and mobile banking offer new pathways to reach underserved populations and reduce traditional barriers to financial access. This empirical review aims to synthesize existing research on the relationship between fintech developments and financial inclusion in developed countries, examining how these technological innovations influence access, usage, and quality of financial services. By critically analyzing empirical evidence, the review seeks to identify key drivers, challenges, and policy considerations relevant to leveraging fintech for inclusive growth in advanced economies.

Niankara (2023) examined the role of FinTech in promoting financial inclusion across developed GCC countries such as the UAE, Saudi Arabia, and Bahrain, utilizing a mixed-methods approach that includes literature review and comparative case studies. The research focuses on digital payments, lending, insurance, and wealth management, analyzing adult populations highlighting that FinTech solutions like mobile money, digital wallets, and eKYC have notably expanded access to financial services, especially among women, youth, SMEs, and migrant workers. Regulatory initiatives and improvements in digital infrastructure have further facilitated this growth.

The study recommends that policymakers develop supportive regulations and privacy frameworks to maximize FinTech's potential in enhancing financial inclusion while safeguarding consumer interests.

Al-Smadi (2023) examines how digital financial services, particularly digital payments and mobile money platforms, enhance financial inclusion for low-income and underserved populations in developed countries with advanced digital ecosystems. Using empirical analysis of national survey data and financial inclusion indices, the study finds that these digital platforms lower access barriers and improve transaction convenience, thereby fostering deeper financial inclusion. The research recommends expanding mobile money services and creating user-friendly digital wallets specifically tailored to the needs of low-income users to further promote inclusive financial access.

Demirguc-Kunt, Klapper, and Singer (2024) conducted a study assessing the impact of FinTech innovations on financial inclusion and economic development in high-income countries within the OECD. Using panel regression analysis of data from 2010 to 2021 across 22 nations, they found a positive correlation between FinTech adoption such as ATM density and internet access and improved financial inclusion, which supports higher Human Development Index (HDI) scores. Their results also indicated that inflation negatively impacts economic development. The study recommends that policymakers focus on enhancing digital infrastructure and financial literacy to further promote financial inclusion and foster sustainable economic growth.

Brei et al. (2020) examined how financial inclusion driven by FinTech influences bank profitability and stability in developed markets in Europe and North America. Using quantitative analysis of bank-level data and inclusion metrics, their study found that higher levels of financial inclusion are associated with improved bank profitability and reduced risk, primarily by diversifying customer portfolios. The authors recommend that banks invest in digital platforms aimed at underserved segments to maintain and enhance growth in these markets.

Lukonga (2021) investigated the role of FinTech in promoting financial inclusion through affordable cross-border remittances in developed countries with large migrant populations, such as the UAE and USA. Using a combination of case studies and surveys of migrant workers and their families, the study employs qualitative interviews and quantitative transaction data analysis to assess how



digital remittance platforms reduce costs and improve transaction speed. The findings demonstrate that digital remittance services significantly enhance financial access for migrant communities by making remittance transfers more affordable and efficient. The study recommends fostering partnerships between FinTech firms and traditional banks to further expand remittance access and support financial inclusion for migrant populations.

Naz et al. (2022) conducted a survey-based quantitative study in developed countries within the GCC and Europe to analyze the demographic groups benefiting most from FinTech-enabled financial inclusion. Focusing on women, youth, SMEs, and rural populations, the research found that women and youth have experienced substantial improvements in access to financial services through digital wallets and lending platforms. The study emphasizes the importance of tailoring FinTech products to meet the unique needs of these underserved groups to enhance their financial inclusion effectively.

Schilirò (2021) examines how electronic Know Your Customer (eKYC) technologies facilitate financial inclusion in developed countries with advanced digital ID systems, such as the UAE and Singapore. Through a comparative case study analysis, the research evaluates policy and technological frameworks to assess their effectiveness in reducing onboarding barriers. The findings reveal that eKYC significantly minimizes paperwork and physical presence requirements, thereby increasing account ownership among previously excluded populations. The study recommends that governments actively promote eKYC adoption while ensuring robust data privacy safeguards to maximize its benefits for financial inclusion.

Emara and Mohieldin (2021) examined how regulatory frameworks, particularly sandboxes and policies, influence FinTech innovation and financial inclusion in developed economies such as GCC countries and OECD nations. Through policy analysis and review of inclusion metrics, their study focused on FinTech startups, consumers, and regulators, employing qualitative methods to assess regulatory impacts on FinTech adoption. The findings indicate that supportive regulations facilitate faster FinTech growth and broader financial inclusion by balancing innovation with consumer protection. They recommend developing proportionate regulations and sandbox environments to foster FinTech development while safeguarding

user interests, thereby promoting sustainable financial inclusion.

The reviews on Fintech and financial inclusion taken in developed economies highlighted that fintech innovations such as digital payments, mobile money, eKYC, and cross-border remittances are significantly improving financial inclusion. Key drivers observed include advances in digital infrastructure, supportive regulatory frameworks, and tailored products for underserved groups like women, youth, and migrant populations. While fintech enhances access, convenience, and financial stability, challenges related to regulation, privacy, and digital literacy remain. Overall, strategic policy support and technological innovation are essential to fully harness fintech's potential for inclusive growth in advanced economies.

With the studies focusing on developing economies, such as those examining countries like Nigeria, Kenya, and various African nations, emphasize fintech's transformative role in expanding financial access to previously unbanked and rural populations. These studies often highlight how mobile money platforms, digital banking, and innovative microfinance solutions have been instrumental in reducing traditional barriers to financial inclusion, such as lack of infrastructure, limited banking services, and low financial literacy. The primary drivers identified include infrastructural development, regulatory reforms, and the proliferation of affordable mobile devices, which together facilitate broad-based adoption of fintech solutions. Challenges in these contexts often relate to infrastructural gaps, regulatory uncertainties, and issues of digital literacy, which can hinder the scalability and sustainability of fintech initiatives.

In contrast, research on developed economies, including countries within the OECD, GCC, and European regions, underscores how fintech innovations like digital payments, eKYC, cross-border remittances, and robo-advisors serve to deepen financial inclusion among specific underserved groups such as women, youth, migrant workers, and low-income populations. The focus here is often on enhancing the quality and convenience of financial services, leveraging advanced digital infrastructure, and establishing supportive regulatory environments. These studies highlight that in mature markets, the primary benefits of fintech are in reducing onboarding barriers, lowering transaction costs, and improving access for groups already somewhat integrated into the financial system but still facing exclusion barriers.



The differences observed between these two sets of studies can be attributed to the varying stages of financial infrastructure development, economic maturity, and regulatory environments across these regions. Developing economies typically face infrastructural deficits, lower levels of digital literacy, and greater barriers to traditional banking, making fintech a critical tool for inclusion. Conversely, in developed economies, the financial system is already well-established, and fintech serves more to address specific gaps, improve service quality, and foster innovation within an advanced financial ecosystem. Additionally, the economic priorities and demographic profiles differ: developing countries often emphasize broad access and poverty reduction, while developed countries focus on inclusivity for vulnerable populations and enhancing service efficiency. These contextual differences justify the varied focus and findings across the studies.

Theoretical Perspectives

Two prominent theories that explain the relationship between FinTech and financial inclusion are the **Vulnerable Group Theory of Financial Inclusion** and the **Digital Agency Theory of Financial Inclusion**.

Vulnerable Group Theory of Financial Inclusion

Proposed by Peterson K. Ozili in 2024, it was initiated from the premise that vulnerable groups such as the poor, women, rural populations, and other marginalized communities are often excluded from formal financial systems and suffer disproportionately during economic crises (Ozili, 2024). The theory argues that financial inclusion efforts should explicitly target these vulnerable groups to provide them access to formal financial services.

By integrating vulnerable people into the formal financial sector, they gain access to essential financial products and services that can help them generate income, build assets, and ultimately reduce their vulnerability (Ozili, 2024). The theory also introduces a "vulnerability grid" to identify and categorize groups most in need of inclusion.

Conditions:

Financial inclusion initiatives must be tailored to the specific needs of vulnerable groups.

Access alone is insufficient; services must be affordable, accessible, and appropriate.

Supportive policies and infrastructure are necessary to reach these groups effectively.

Critics and Limitations

While the theory emphasizes targeting vulnerable groups, critics argue that it may oversimplify the

complexity of financial exclusion, which can also be systemic and structural beyond individual vulnerabilities (Ozili, 2024). Additionally, the theory does not fully address how technological barriers or digital literacy impact the ability of vulnerable groups to benefit from FinTech solutions.

Digital Agency Theory of Financial Inclusion

Also developed by Ozili (2024), the Digital Agency Theory focuses on the role of digital agents' entities that deploy and manage digital financial technologies in shaping financial inclusion outcomes. It builds on the idea that digital agents act as intermediaries between financial inclusion principals (governments, NGOs, financial institutions) and end-users.

The theory posits that digital agents have significant influence over the success or failure of financial inclusion initiatives because of their control over technology deployment, pricing, and service design (Ozili, 2024). Their self-interest and operational decisions can either facilitate or hinder access to FinTech services for marginalized populations.

Conditions:

Alignment of incentives between digital agents and inclusion goals is critical.

Regulatory frameworks must ensure digital agents act in ways that promote inclusion rather than exclusion.

Transparency and accountability mechanisms are necessary to monitor agent behavior.

Critics and Limitations

The theory is relatively new and has been critiqued for focusing heavily on the agency of digital intermediaries, potentially underestimating the agency and adaptability of end-users themselves (Ozili, 2024). Furthermore, it requires empirical validation across diverse contexts to assess its generalizability.

The Vulnerable Group Theory emphasizes the socio-economic characteristics and needs of excluded populations, advocating targeted inclusion strategies. In contrast, the Digital Agency Theory highlights the institutional and technological intermediaries' role in shaping financial inclusion outcomes through FinTech. Together, these theories provide complementary lenses to understand and improve the FinTech–financial inclusion nexus.

III. Methodology

This study adopts a critical conceptual method to analyze the relationship between FinTech and financial inclusion in Northern Nigeria. This approach involved:



- i. Theoretical critique of existing frameworks (e.g., Vulnerable Group Theory, Digital Agency Theory).
- ii. Normative evaluation of policies, socio-cultural barriers, and infrastructural gaps.
- iii. Proposal of alternative solutions to enhance FinTech-driven inclusion.

The data collection will primarily rely on secondary sources such as peer-reviewed journals like Ozili (2024) and reports from organizations such as the World Bank, providing in-depth insights into fintech developments and financial inclusion. Empirical case studies on successful fintech implementations in Africa, for example M-Pesa in Kenya and The study employs a **three-tier critical lens**:

| Tier | Focus | Application to Northern Nigeria |
|-------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Structural Critique | Systemic barriers (e.g., infrastructure, regulation). | Assess CBN policies, telecom coverage, and electricity access. |
| Cultural Critique | Socio-religious norms (e.g., distrust in digital finance, gender biases). | Analyze Sharia-compliance demands and low female FinTech adoption. |
| Technological Critique | FinTech design flaws (e.g., BVN dependency, language barriers). | Evaluate usability of apps like Paga or Opay for rural, non-literate users. |

The Vulnerable Group Theory (Ozili, 2024) emphasizes that certain demographics such as women, rural poor, and SMEs are systematically excluded from formal financial services. While FinTech offers promise, many solutions overlook their specific needs, for instance by not providing Hausa-language interfaces or culturally relevant features, which perpetuates exclusion. Complementarily, the Digital Agency Theory (Ozili, 2024) examines how financial institutions and FinTech firms acting as "digital agents" often prioritize profit maximization over inclusion goals. To address this, incentive-alignment strategies like tiered KYC processes for rural or low-income users can be introduced, encouraging digital agents to serve underserved populations without compromising profitability.

The study will utilize thematic analysis to systematically categorize literature and field data into key themes such as "Regulatory Hurdles" and "Cultural Resistance," revealing patterns that explain persistent exclusion. SWOT analysis will evaluate the strengths, weaknesses, opportunities, and threats of FinTech initiatives in Northern Nigeria, highlighting infrastructural and socio-cultural factors affecting adoption. Additionally, policy gap analysis will compare Nigeria's current regulatory approaches with successful models like Kenya and other developed economies pinpointing best practices that could be adapted locally. Together, these tools provide a comprehensive framework to identify barriers, opportunities, and

Nigeria's mobile money adoption, will offer contextual evidence of impact. Optionally, primary data may be gathered through interviews with regulators, fintech executives, and bank representatives to obtain expert perspectives on challenges and opportunities, while stakeholder reports from firms like KPMG and EFINA will be thematically analyzed to enrich understanding of industry trends, stakeholder attitudes, and policy effectiveness, ensuring a comprehensive data foundation for the study.

The study employs a three-tier critical lens:

strategic interventions for fostering inclusive FinTech growth.

This critical conceptual methodology rigorously dissects FinTech's role in financial inclusion, exposing systemic inequities in Northern Nigeria while proposing actionable reforms. By merging theoretical critique with empirical insights, the study aims to bridge the gap between FinTech's potential and its real-world impact.

IV. Findings, Conclusion and Recommendations

Using thematic analysis, the study categorized the literature and field data into key themes such as "Regulatory Hurdles," "Cultural Resistance," "Infrastructural Gaps," and "Digital Literacy Barriers." The analysis revealed that in Northern Nigeria, systemic issues like poor digital infrastructure, restrictive regulations, and socio-cultural norms such as gender biases and language barriers significantly limit fintech adoption among underserved groups. For example, the absence of Hausa-language interfaces and low levels of digital literacy exclude many rural and marginalized populations from benefiting from fintech innovations. This was in line to the findings of studies like Olayinka and Oladipo (2022) and Yakubu and Bunyaminu (2021). Conversely, successful models like Kenya's M-Pesa demonstrate that supportive regulatory frameworks, localized solutions, and agent networks are crucial for expanding financial inclusion (as revealed in studies



such as Tiony (2024) and Azmeh et al. (2024). These findings emphasize that addressing both systemic and socio-cultural factors is essential for leveraging fintech to bridge regional financial gaps.

The overall analysis highlights that while fintech presents promising opportunities to enhance financial inclusion in Northern Nigeria, realizing its full potential requires a comprehensive approach. Strengths include increasing mobile phone usage and growing interest in digital finance; weaknesses involve infrastructural deficits, regulatory uncertainties, and cultural mistrust. Opportunities lie in expanding mobile money platforms, improving financial literacy, and developing offline or voice-based digital services tailored to local needs. Threats such as cyber-security risks and resistance to change must also be managed. Comparing Nigeria's situation with successful models like Kenya's M-Pesa underscores the importance of supportive policies, simplified KYC procedures, and culturally sensitive technological solutions. Ultimately, the findings suggest that a strategic combination of regulatory reform, infrastructural investment, and develop culturally sensitive fintech products such as targeted policy reforms to simplify regulation, promote digital literacy, Hausa-language interfaces to enhance adoption among underserved groups. These will be appropriate for fintech innovations is vital to fostering inclusive financial growth in Northern Nigeria.

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