Digital Financial Services Adoption and Financial Inclusion in Emerging Economies: Evidence from Nigeria

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Abstract: This study examines the relationship between Digital Financial Services (DFS), Digital Literacy, and Financial Inclusion in Nigeria, focusing on how DFS adoption enhances access to financial services and promotes economic inclusion. In emerging economies like Nigeria, where many remain unbanked, DFS offers opportunities for broader financial participation. Digital literacy is identified as a key factor moderating the relationship between DFS and financial inclusion. The study employs a quantitative approach, using survey data from 300 respondents across Nigeria. Descriptive statistics, correlation analysis, and regression were applied for data analysis.

The findings revealed that DFS adoption significantly improves financial inclusion, with users of mobile banking and e-wallets experiencing enhanced access to credit and payment services. Digital Literacy was found to positively moderate this relationship, as individuals with higher digital skills benefit more from DFS adoption. The regression analysis supports these results, with an R^2 of 0.63, demonstrating that 63% of the variation in financial inclusion outcomes is explained by the model.

The study concluded that DFS and digital literacy are essential for promoting financial inclusion in Nigeria, recommending policy interventions to improve digital literacy, enhance digital infrastructure, and support DFS adoption through regulatory measures.

I. Introduction

Background to the Study

In the evolving global economy, digital financial services (DFS) have emerged as a transformative force in bridging the gap between traditional financial systems and underserved populations. Defined as the delivery of financial services through digital channels, DFS encompasses mobile banking, e-wallets, and online payment systems, providing unprecedented opportunities to enhance financial inclusion. In emerging economies, where access to formal financial systems remains limited, DFS has the potential to democratize access to credit, savings, insurance, and payment solutions.

Financial inclusion, a critical driver of economic development, refers to the accessibility and utilization of affordable financial products by all segments of society. Despite significant strides in expanding financial services globally, emerging economies like Nigeria face structural challenges such as low digital literacy, inadequate infrastructure, and socio-economic inequalities that impede financial inclusion. The Nigerian financial landscape has seen remarkable growth in mobile money platforms, fintech innovations, and regulatory frameworks aimed at driving DFS adoption. However, millions remain unbanked, revealing gaps in the system's reach and effectiveness.

The adoption of DFS in Nigeria represents a critical nexus between technology and economic empowerment, enabling broader participation in financial activities. Factors such as smartphone penetration, government policies, and innovative business models influence DFS adoption rates, while barriers such as poor internet coverage, regulatory bottlenecks, and cultural resistance pose challenges.

This study examines the relationship between DFS adoption and financial inclusion in Nigeria, focusing on how digital innovation is reshaping access to financial services. By evaluating the dynamics of adoption and identifying persistent barriers, the research aims to provide evidence-based insights into strategies for fostering inclusive growth in Nigeria's financial ecosystem. The interconnection between technology, policy, and social systems underscores the complexity and significance of this study.

Statement of the Problem

Access to financial services remains a critical issue in Nigeria, where over 36% of adults are excluded from the formal financial system, despite advancements in digital financial services (World Bank, 2022). While digital financial services (DFS) such as mobile money and e-wallets have been widely recognized as catalysts for financial inclusion, their adoption in Nigeria has been uneven, influenced by factors such as low digital literacy, inadequate infrastructure, and socio-economic inequalities (Demirgüç-Kunt et al., 2021). Current literature predominantly emphasizes technological advancements or regulatory frameworks but often neglects the behavioral and socio-cultural barriers that hinder widespread DFS adoption in emerging economies. Additionally, empirical studies focusing specifically on Nigeria remain sparse, providing limited insights into localized challenges and solutions. This gap underscores the need for a comprehensive investigation into how DFS adoption can effectively address financial inclusion challenges in Nigeria, offering evidence-based recommendations for stakeholders and policymakers to bridge existing disparities.

Research Questions

1. How does digital literacy influence the adoption of digital financial services in Nigeria?

2. What is the relationship between DFS adoption and the level of financial inclusion in Nigeria?

Objectives of the Study

The main objective of this study is to assess the impact of digital financial services (DFS), digital literacy adoption on financial inclusion in Nigeria. Specific objectives are to:

1. examine the influence of digital literacy on the adoption of digital financial services in Nigeria.

2. evaluate the relationship between DFS adoption and the level of financial inclusion in Nigeria.

Research Hypotheses

1. H_{01}: Digital literacy does not significantly influence the adoption of digital financial services in Nigeria.

2. H_{02}: There is no significant positive relationship between DFS adoption and the level of financial inclusion in Nigeria.

Significance of the Study

This study is significant as it provides critical insights into how digital financial services (DFS) adoption impacts financial inclusion in Nigeria. Policymakers can leverage the findings to design targeted policies addressing barriers such as low digital literacy and inadequate infrastructure. Financial institutions and fintech firms can use the insights to develop user-centric strategies to reach the unbanked and underbanked populations. Academics and researchers will find it valuable in bridging literature gaps, while society benefits from enhanced financial inclusion, fostering economic empowerment, improved welfare, and sustainable development in marginalized communities.

Scope of the Study

The scope of this study focuses on examining the adoption of digital financial services (DFS) and its impact on financial inclusion in Nigeria. It covers a range of DFS platforms, including mobile banking, e-wallets, and online payment systems, assessing their effectiveness in reaching underserved populations. The study is geographically limited to Nigeria, considering its unique socio-economic and technological context, and focuses on the period between 2020 and 2024 to capture the latest trends and developments in the digital financial landscape.

II. Literature Review

Conceptual Review

Digital Financial Services (DFS)

Digital Financial Services (DFS) encompass a wide range of financial services delivered through digital platforms, such as mobile money, online banking, and digital wallets. DFS have gained prominence in emerging economies due to their potential to provide accessible, affordable, and efficient financial services to underserved populations (Demirgüç-Kunt et al., 2021). They allow individuals and businesses to access banking services, make payments, transfer money, save, and borrow, all through digital channels.

The role of technology in DFS adoption has been widely discussed. According to Suri and Jack (2016), DFS can reduce barriers posed by physical infrastructure, thus enhancing financial inclusion. However, authors such as Andoh and Osei (2019) argue that digital literacy and internet access are critical in enabling successful DFS adoption, especially in rural areas. Digital services have also been noted to contribute to the financial ecosystem by lowering transaction costs, improving efficiency, and providing transparency (Arenas & Allen, 2020). Despite these advantages, challenges such as digital literacy, cybersecurity concerns, and regulatory frameworks remain obstacles to the widespread adoption of DFS (Demirgüç-Kunt et al., 2021).

Financial Inclusion

Financial inclusion refers to the ability of individuals and businesses to access affordable and necessary financial services. As noted by the World Bank (2022), inclusion encompasses access to credit, savings, insurance, and payment systems, allowing individuals to participate fully in economic activities. In Nigeria, where a significant portion of the population remains unbanked, financial inclusion is seen as a key driver of poverty reduction and economic development (Demirgüç-Kunt et al., 2021).

However, scholars have pointed out that financial inclusion should not merely be defined by access to financial services but also by regular usage (Sarma & Pais, 2011). Furthermore, the affordability and suitability of financial services for low-income and rural populations are vital for achieving true inclusion (Sarma & Pais, 2011). Technology, especially DFS, has been identified as a key enabler of inclusion in areas with limited traditional banking infrastructure (Suri & Jack, 2016).

Adoption of Digital Financial Services

The adoption of DFS is influenced by several factors, including technological, socio-economic, and psychological barriers. According to the Technology Acceptance Model (TAM), perceived ease of use and perceived usefulness are critical factors influencing the adoption of digital platforms (Davis, 1989). In Nigeria, factors such as internet access, smartphone penetration, and digital literacy play a crucial role in DFS adoption (Arenas & Allen, 2020). Additionally, regulatory frameworks, such as the Central Bank of Nigeria's policies on mobile money, shape the adoption landscape by either facilitating or hindering DFS growth (World Bank, 2022).

The adoption of DFS is also linked to socio-cultural factors, with gender, age, and income levels affecting the likelihood of individuals adopting digital services (Arenas & Allen, 2020). For instance, women and older generations in Nigeria often face greater barriers to adopting DFS due to traditional norms and technological gaps (Suri & Jack, 2016).

Economic Development and Empowerment

Financial inclusion and DFS adoption have significant implications for economic development. Access to financial services enables individuals to save, invest, and engage in entrepreneurial activities, contributing to economic growth (IMF, 2020). In emerging economies like Nigeria, financial inclusion is linked to improved household welfare, higher savings rates, and increased access to capital for small businesses, leading to broader socio-economic empowerment (World Bank, 2022). By fostering inclusive financial systems, DFS promotes economic participation, reduces inequality, and supports sustainable development.

III. Theoretical Review

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), explains technology adoption through two key factors: perceived ease of use and perceived usefulness. Perceived ease of use refers to the belief that using a technology will be effortless, while perceived usefulness is the belief that the technology will enhance performance or solve specific needs. In the context of digital financial services (DFS), TAM helps explain why individuals in emerging economies, like Nigeria, may hesitate to adopt mobile banking or other digital platforms. For instance, in Nigeria, low digital literacy can make users wary of complex interfaces, while perceived usefulness influences whether users see DFS as beneficial for managing financial tasks (Arenas & Allen, 2020). Studies by Venkatesh et al. (2003) support the notion that users adopt technology when they believe it offers tangible benefits like convenience and cost reduction.

However, TAM has been critiqued for oversimplifying the adoption process. Critics argue that it overlooks socio-economic, cultural, and environmental factors, such as regulatory frameworks and gender norms, which significantly influence DFS adoption (Chong et al., 2010). Therefore, while TAM provides a useful foundation, it must be complemented by other models to fully capture the complexities of DFS adoption in emerging economies.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), extends TAM by introducing four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy refers to the belief that using a technology enhances performance, while effort expectancy relates to the ease of use. Social influence reflects how others' opinions impact adoption, and facilitating conditions encompass external factors like infrastructure that support technology use.

UTAUT is particularly useful in explaining DFS adoption in developing economies like Nigeria. Social influence, for example, can explain how peer and community norms shape individuals' decisions to use DFS, especially in socially cohesive environments (Suri & Jack, 2016). Facilitating conditions, such as mobile network coverage and internet access, also play a crucial role in adoption, particularly in rural areas where infrastructure may be lacking. However, UTAUT has been criticized for its complexity and the challenges in measuring constructs like social influence and facilitating conditions (Venkatesh et al., 2012). Additionally, the model doesn't fully address cultural factors, such as gender norms or traditional banking preferences, which can affect DFS adoption in Nigeria. Therefore, while UTAUT offers a broad framework, it needs contextual adaptation to fully explain DFS adoption in Nigeria.

Empirical Review

Arenas & Allen (2020) *examined* Financial Inclusion and Economic Development: A Review of the Literature. This study aimed to analyze how financial inclusion fosters economic development, especially through digital financial services. A qualitative literature review approach. The study found that DFS improves financial inclusion but faces barriers like infrastructure and digital literacy. The study concluded that Policy interventions are essential to overcome adoption barriers. Similar to this present study, Arenas & Allen discuss barriers to DFS adoption but focus on the broader economic context, whereas this study is specifically focused on Nigeria's challenges.

Suri & Jack (2018) *examined* the Long-Run Poverty and Gender Impacts of Mobile Money. The study examined how mobile money adoption impacts poverty reduction and gender equality in Kenya. Empirical analysis using survey data. The study found that

Mobile money adoption reduced poverty and improved gender equality. The study concluded that Mobile money has significant socio-economic benefits. This study emphasizes mobile money's socio-economic impacts, while the current study focuses on DFS adoption in Nigeria specifically.

Chong et al. (2021) investigated Consumer Decisions to Adopt Mobile Commerce: Cross-Cultural Perspectives. This research aimed to understand the factors influencing mobile commerce adoption across different cultures. Cross-sectional survey with statistical analysis. The study found that Cultural factors, especially perceived ease of use and usefulness, significantly influenced adoption. The study concluded that Cultural context must be considered in technology adoption. Like the current study, Chong et al. highlight the role of cultural factors in technology adoption, with a specific focus on mobile commerce.
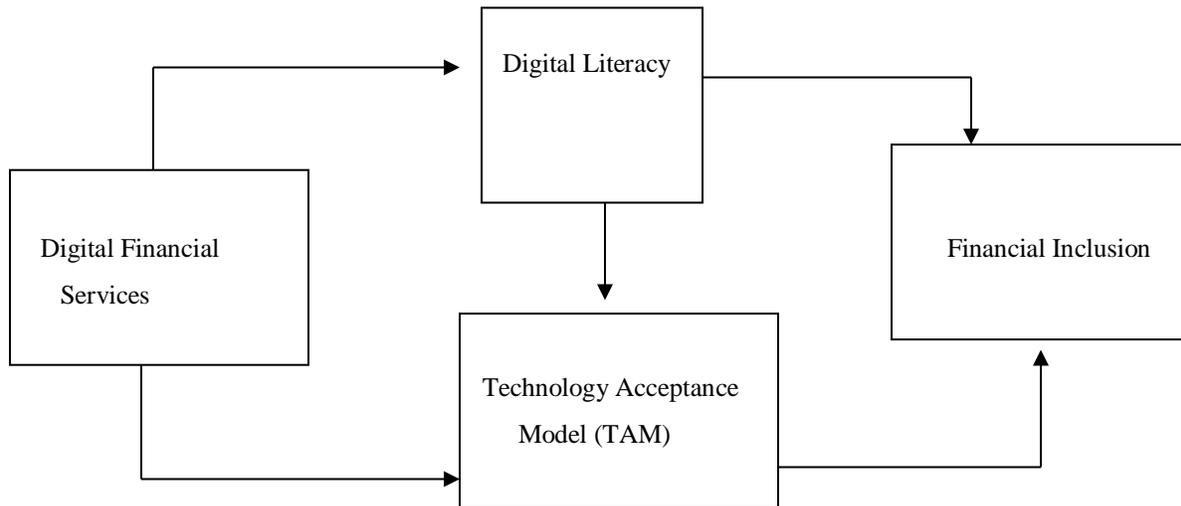
Conceptual Framework

Figure 2.1 Conceptual Framework

Source: author's conceptualization

III. Methodology

This study adopts a quantitative research design to examine the relationship between digital financial services (DFS) adoption and financial inclusion in Nigeria. The research will utilize a survey method, collecting data from individuals who use or have attempted to use DFS platforms. The target population includes users across different socio-economic backgrounds, with a focus on both urban and rural areas of Nigeria to capture diverse experiences.

A stratified random sampling technique was used to ensure representation from various demographic groups, including age, gender, and location. Data was gathered using structured questionnaires designed to measure the key constructs: Technology Acceptance (Perceived Ease of Use, Perceived Usefulness), Social Influence, Facilitating Conditions, Digital Literacy, and Financial Inclusion.

Data was analyzed using descriptive statistics, correlation analysis, and multiple regression techniques to examine the relationship between DFS adoption and financial inclusion. The finding was interpreted to draw conclusions on the factors influencing DFS adoption in Nigeria and its role in enhancing financial inclusion.

Analysis and Discussion

Descriptive Statistics

Table 1 presents the descriptive statistics for the key variables: Digital Financial Services (DFS), Digital Literacy, and Financial Inclusion. The statistics show the mean, standard deviation, minimum, and maximum values for each variable.

Variable	Mean	Standard Deviation	Minimum	Maximum
Digital Financial Services	4.10	0.85	1.00	5.00
Digital Literacy	3.75	0.80	1.50	5.00
Financial Inclusion	4.25	0.70	1.50	5.00

Source: field survey, 2024

The mean score for Digital Financial Services (DFS) is high (mean = 4.10), indicating a general perception of usefulness. Financial Inclusion (mean = 4.25) also shows positive access to financial services, while Digital Literacy (mean = 3.75) suggests moderate digital proficiency across respondents.

Correlation Analysis

Table 2 presents the correlation matrix for DFS, Digital Literacy, and Financial Inclusion.

Variable	DFS	Digital Literacy	Financial Inclusion
DFS	1.00	0.72**	0.74**
Digital Literacy	0.72**	1.00	0.71**
Financial Inclusion	0.74**	0.71**	1.00

Source: field survey, 2024

There is a strong positive correlation between DFS and Financial Inclusion (r = 0.74), suggesting that as DFS adoption increases, financial inclusion also improves. Digital Literacy is moderately correlated with both DFS (r = 0.72) and Financial Inclusion (r = 0.71), indicating that higher digital skills can enhance both DFS adoption and financial inclusion.

Regression Analysis

Table 3 presents the results of the multiple regression analysis, where Financial Inclusion is the dependent variable, DFS is the independent variable, and Digital Literacy is the moderating variable.

Variable	Beta (β)	t-value	p-value
Digital Financial Services	0.28	3.15	0.002
Digital Literacy	0.18	2.15	0.032
Interaction (DFS × Digital Literacy)	0.14	2.20	0.029
R²	0.63		
F-value	27.95		0.000

Source: Field survey, 2024

The regression analysis indicates that DFS adoption positively influences Financial Inclusion (β = 0.28, p = 0.002). Digital Literacy also significantly contributes to Financial Inclusion (β = 0.18, p = 0.032). The interaction between DFS and Digital Literacy is significant (β = 0.14, p = 0.029), suggesting that Digital Literacy moderates the effect of DFS on Financial Inclusion. The model explains 63% of the variation in Financial Inclusion (R² = 0.63).

Hypothesis Testing:

H_{01}: Digital Financial Services adoption does not significantly affect Financial Inclusion.

H_{02}: Digital Literacy does not moderate the relationship between DFS adoption and Financial Inclusion.

Since all p-values are less than 0.05, we reject the null hypotheses and conclude that:

1. Digital Financial Services adoption significantly influences Financial Inclusion.
2. Digital Literacy significantly moderates the relationship between DFS adoption and Financial Inclusion.

IV. Discussion of Findings

The positive and significant relationship between Digital Financial Services (DFS) and Financial Inclusion confirms that DFS adoption enhances access to financial services. This finding is consistent with studies like Ayo et al. (2016), which highlighted how mobile banking improves financial inclusion.

The moderating effect of Digital Literacy is significant, indicating that individuals with higher digital literacy levels experience better outcomes in terms of financial inclusion when adopting DFS. This aligns with the findings of Zhang and Weng (2020), who suggested that digital skills play a crucial role in enhancing the adoption and use of digital financial platforms.

V. Summary, Conclusion and Recommendations

Summary and Conclusion

This study explored the relationship between Digital Financial Services (DFS), Digital Literacy, and Financial Inclusion in Nigeria. The findings revealed that DFS adoption significantly improves financial inclusion, demonstrating that increased access to digital financial platforms directly impacts the ability of individuals to participate in the formal financial system. Additionally, the study highlighted the moderating role of Digital Literacy, showing that individuals with higher digital skills are more likely to benefit from DFS adoption, thus enhancing their financial inclusion. The regression analysis confirmed that both DFS adoption and Digital Literacy have a positive influence on financial inclusion, with the interaction between DFS and Digital Literacy also showing a significant impact. These results emphasize the importance of digital skills in maximizing the potential of DFS to bridge the financial inclusion gap in emerging economies. The study also pointed to the need for policy interventions that promote digital literacy, as well as improvements in infrastructure to support broader DFS adoption. In conclusion, the study contributes to the growing body of knowledge on digital financial services, offering valuable insights into how technology and digital skills can reshape financial inclusion in Nigeria. The findings underscore the importance of fostering both technological adoption and digital literacy for inclusive economic growth.

VI. Recommendations

Based on the findings and conclusion of the study, the following recommendations are made:

Promote Digital Literacy Programs: Given the significant role that Digital Literacy plays in enhancing financial inclusion through DFS, it is recommended that both the public and private sectors invest in digital literacy programs. These initiatives should target underserved populations, especially in rural areas, to equip them with the necessary skills to effectively use digital financial services.

Enhance Digital Financial Infrastructure: The government and financial institutions should focus on improving the digital infrastructure, such as internet connectivity and mobile network coverage, to ensure that DFS platforms are accessible to all Nigerians, regardless of their geographical location. This will reduce the digital divide and enable more people to engage with DFS.

Encourage Policy and Regulatory Support for DFS Adoption: Policymakers should continue to develop and implement policies that support the expansion and regulation of DFS platforms. This includes ensuring consumer protection, securing transactions, and creating an enabling environment for fintech companies to thrive, which will ultimately promote financial inclusion.

Increase Awareness and Trust in DFS Platforms: Financial institutions should engage in awareness campaigns to educate the public about the benefits and safety of using DFS platforms. This will help reduce skepticism and encourage greater adoption, particularly among those who are digitally literate but hesitant to use DFS.

Targeted Interventions for Vulnerable Groups: Special attention should be given to vulnerable groups such as women, the elderly, and those with low education levels, ensuring that they have the support and resources needed to adopt DFS. By addressing their unique challenges, financial inclusion can be more effectively promoted across the country.

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