DIGITAL PAYMENT CHANNELS FACILITATORS AND FINANCIAL INCLUSION: MEDIATING EFFECT OF FINANCIAL LITERACY AMONG SMALL SCALE BUSINESS OWNERS IN NIGER STATE

Idris Ibrahim
Department of Business Administration,
Faculty of Management and Social Sciences,
Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria
idristaya@gmail.com

Shuaib Ndagi Sayedi (Prof)
Department of Business Administration,
Faculty of Management and Social Sciences,
Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria
ssndagi@gmail.com

Kolo Ibrahim Ph.D
Department of Business Administration,
Faculty of Management and Social Sciences,
Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria
ibrahimkolo83@gmail.com

Corresponding Author: idristaya@gmail.com
DOI: https://doi.org/10.57233/ijamer.v2i3.04

Article History: Received: 13 July 2026 | **Revised:** 20 August 2026 | **Accepted:** 25 August 2026 | **Published:** 25 September 2026

How to Cite This Article :
Ibrahim, I., Sayedi, S. N., & Kolo, I. (2026). Digital payment channels facilitators and financial inclusion: Mediating effect of financial literacy among small scale business owners in Niger State. *International Journal of Accounting, Management and Economic Review, 2*(3). https://doi.org/10.57233/ijamer.v2i3.04

Abstract
Despite the growing landscape of digital payment channels, the extent to which their specific attributes drive financial inclusion among Small-Scale Enterprises (SSEs) in developing regions like Niger State, Nigeria, remains underexplored. This study investigated the effect of digital payment channel attributes on financial inclusion among SMEs, specifically examining the mediating role of financial literacy. The study applied a cross-sectional survey method. The population comprised 304 registered Small-Scale Enterprises in Niger State, Nigeria, from which a sample of 172 was selected using a purposive sampling technique. A total of 143 responses were retrieved and analysed using PLS-SEM with bootstrapping. The results reveal that Agent Trust significantly and positively impacted financial inclusion, underscoring the critical role of human intermediaries. Perceived Risk also revealed a significant positive influence, indicating a nuanced dynamic where risk awareness might drive adoption of formal financial services. Conversely, neither Service Charges nor Service Trust showed statistically significant direct effects on financial inclusion. Again, Financial Knowledge was found not to significantly mediate any of the tested relationships between the digital payment channel attributes and financial inclusion. Based on these findings, the research recommends that stakeholders prioritize investing in robust agent networks, leverage perceived risk awareness to encourage formal financial engagement, and focus interventions on direct trust-building and practical benefits, rather than solely relying on financial knowledge as an indirect pathway to inclusion.

Keywords: Financial inclusion, financial knowledge, perceived risk, service charges, service trust.

1.0 Introduction

Financial inclusion has gained growing attention as a crucial strategy for fostering economic development, reducing poverty, and enhancing access to financial services among small-scale enterprises (SSEs). In developing economies like Nigeria, SSEs remain largely excluded from formal financial systems due to structural and institutional barriers, thereby limiting their growth and operational efficiency (Okeke, et al., 2023). Financial inclusion ensures that SSEs gain access to affordable, timely, and adequate financial services essential for their sustainability. In Niger StateNigeria's largest state by landmass, characterized by dispersed agrarian communities and vibrant commercial centres like Minna, Bida, Suleja, and Kontagorathe integration of inclusive financial systems is vital for enterprise survival. However, a significant majority of local small business operators remain severely underserved, relying heavily on informal cash transactions due to limited physical banking branch networks across rural Local Government Areas (Ogunleye, 2022). Addressing this persistent financial exclusion through appropriate digital mechanisms could significantly enhance formal financial access and participation for these enterprises.

Digital payment channels (DPCs) represent a transformative tool in driving financial inclusion, especially among unbanked and rural commercial populations (Ozili, 2018). These channels encompassing mobile banking, USSD codes, Point of Sale (POS) agent banking, and digital wallets offer innovative means through which small business operators in Niger State can conduct daily transactions without relying on traditional brick-and-mortar bank branches (Adebayo, 2022). Despite the expanding presence of mobile network operators and fintech agents across the state, the empirical problem lies in the low conversion rate of digital channel access into actual, sustained financial inclusion among SSEs. In Niger State, adoption is severely hampered by localized operational bottlenecks, including frequent network downtime in semi-urban markets, high transaction failure rates during peak market days, and widespread security concerns (Moghavvemi et al., 2021). Consequently, examining the effect of DPCs in improving financial inclusiveness among SSEs in Niger State is necessary to unpack the specific drivers and structural barriers governing this digital transition.

One key determinant of the success of digital payment channels among SSEs in Niger State is perceived risk, which refers to users' expectations of potential financial losses or uncertainties associated with digital channels (Olaniyi & Salako, 2021). Small-scale business owners in local markets often operate on modest daily cash flows; thus, concerns over unauthorized debits, delayed fund reversals during failed transfers, and sophisticated POS fraud create deep hesitation. The inclusion of perceived risk in this study is justified because high risk perception directly deters Niger State SSE operators from keeping capital within digital accounts, forcing them back into cash-dominated trade.

Another vital proxy is agent trust, which captures the level of confidence that SSE operators place in local banking agents who facilitate cash-in/cash-out operations. Given the geographical vastness of Niger State and the absence of commercial banks in many remote LGAs, agent banking serves as the primary gateway to digital finance. However, instances of agent misconduct, liquidity shortages, and unauthorized surcharge deductions have compromised user confidence (Ibrahim & Yusuf, 2023). Agent trust is a critical construct in this study as it directly determines whether small business owners feel secure using local intermediaries to deposit business revenues and access credit.

Service trust, which refers to confidence in the overall operational reliability, cybersecurity, and uptime of digital payment networks, also plays a decisive role in shaping adoption. Frequent network downtime on USSD platforms and mobile apps during weekly market transactions severely disrupts SSE cash flows in Niger State (Ahmed, 2022). This proxy is appropriate because high service trust reassures small business owners that digital transactions will settle accurately, encouraging them to move away from cash reserves and integrate into the formal digital ecosystem.

Service charges, or the transaction fees associated with using POS terminals, USSD codes, and bank transfers, significantly affect daily usage decisions. Operating on narrow profit margins, SSE owners in Niger State are highly sensitive to cumulative transaction costs, such as stamp duties, transfer charges, and agent withdrawal markups (Nwachukwu & Uduji, 2023). Evaluating service charges as a proxy provides empirical insight into how fee structures act as financial barriers that discourage small vendors from using digital channels for micro-transactions.

Financial literacy is broadly defined as the combination of awareness, knowledge, skills, attitudes, and behaviours necessary to make sound financial decisions and achieve individual financial well-being (OECD, 2023). According to Abdulkadir et al., (2025), financial literacy is a multi-dimensional construct often measured through distinct proxies, including financial behaviour (e.g., budgeting and saving habits), financial attitude (e.g., orientation toward money management and risk preference), and financial knowledge (e.g., understanding of basic financial concepts and products).

In this study, financial literacy is proxied specifically by financial knowledge, which serves as the fundamental cognitive building block of the broader financial literacy construct. Financial knowledge reflects an individual's understanding of key financial terms, products, fee structures, interest mechanisms, and digital security protocols. The justification for adopting financial knowledge as the principal proxy lies in empirical research demonstrating that factual and technical understanding directly dictates practical execution among micro- and small-scale entrepreneurs (Edeh, 2022). For small business owners in Niger State, baseline financial knowledge equips operators with the requisite technical competence to verify transaction receipts, evaluate transfer costs, protect personal identification numbers (PINs), and leverage digital transaction histories to establish formal creditworthiness. Including financial knowledge as a proxy and mediating variable is further justified because structural access to digital payment channels (DPCs) does not automatically produce financial inclusion; without foundational financial knowledge, SSE operators remain unable to safely evaluate operational risks or effectively navigate complex digital platforms, resulting in high error rates, vulnerability to fraud, and persistent financial exclusion.

The relationship between these core drivers perceived risk, agent trust, service trust, and service charges and the ultimate goal of financial inclusion is fundamentally shaped by the financial literacy (proxied by financial knowledge) of SSE operators. While favourable service charges or agent availability provide the external structural environment for digital adoption, they do not automatically lead to long-term financial inclusion without the internal mechanism of financial knowledge. For instance, an SSE operator in Minna may have access to a reliable POS agent and low transaction charges, but without adequate financial knowledge, they may fail to utilize digital record-keeping features or avoid basic transaction fraud (Edeh, 2022). Consequently, financial knowledge acts as the essential underlying bridge that converts trust and affordability in digital channels into sustained, meaningful participation in the formal financial system.

In summary, this study explores how perceived risk, agent trust, service trust, and service charges influence financial inclusion through the mediating effect of financial literacy (proxied by financial knowledge) among SSEs in Niger State. By addressing the specific empirical realities of Niger State's small business sector, the study aims to uncover the mechanisms through which digital payment channels empower small enterprises. The findings will provide actionable insights for policymakers, regulatory bodies, and financial service providers seeking to foster inclusive digital economies across semi-urban and rural Nigerian markets.

In practice, the transition from traditional cash-based transactions to digital platforms in Niger State is hampered by severe infrastructural and structural deficits. Many SSE operators in semi-urban and rural areas struggle with inconsistent network connectivity and frequent power outages, which lead to transaction failures and "trapped" funds practical issues that heighten the sense of vulnerability among small business owners (Nwakoby et al., 2023). These technical instabilities often result in "failed-but-debited" transactions, which, without efficient dispute resolution mechanisms, diminish the reliability of digital payment channels and reinforce a preference for physical cash for immediate business liquidity (Okoye et al., 2022).

Furthermore, the "last-mile" delivery of financial services through agent banking while theoretically sound faces real-world hurdles regarding liquidity management and security. SSEs often find that local agents lack sufficient cash reserves to meet withdrawal demands or, conversely, lack the digital float to accept large deposits, creating a "liquidity mismatch" that stalls business operations (Adaba et al., 2024). This operational uncertainty is compounded by a rise in sophisticated mobile-based fraud and social engineering tactics targeting less tech-savvy entrepreneurs. Without adequate financial literacy to distinguish between legitimate service prompts and fraudulent attempts, SSE owners often perceive the digital ecosystem as an inherent risk rather than a utility, leading to "forced" exclusion despite having physical access to the technology (Kalu & Enene, 2023).

Despite the significant strides in expanding financial services through digital payment channels, Small-Scale Enterprises (SSEs) in Niger State continue to face substantial barriers to full financial inclusion (Olasupo & Agboola, 2022). While the potential of digital payments to drive SSE growth is widely acknowledged, a comprehensive understanding of the specific factors that influence their adoption and usage, and how financial literacy mediates this relationship, remains limited in the existing literature (Babajide et al., 2021).

Previous studies have attempted to investigate the relationship between DPC and financial inclusion with mixed findings. Studies by Abdullahi *et al.* (2025) and Khalid and Rasheed (2023) highlight the crucial role of financial technology (FinTech) and financial literacy in promoting financial inclusion among SMEs and individuals respectively in Nigeria. However, their conceptualization of "financial technology" or "FinTech" is broad, encompassing various innovations beyond the specific "digital payment channels" of interest in this study. More importantly, while Abdullahi *et al.* (2025) focus on SMEs in FCT Abuja, their findings may not be directly transferable to Niger State, which possesses a distinct socio-economic and infrastructural landscape. Neither study disaggregates the specific elements of digital payment channels (e.g., perceived risk, trust in agents/services, service charges) that significantly influence adoption by SMEs. This leaves a gap in understanding the challenges and facilitators of digital payment adoption from the SME perspective.

Shehadeh *et al.* (2024) used PLS-SEM to investigate digital financial literacy and usage of cashless payments in Jordan with gender as moderator.The study's findings revealed that digital financial awareness, experience, and skills are key drivers for the use of cashless payments among the surveyed population. Conversely, the digital legal framework and subjective financial knowledge were not found to have a notable influence. A gender-specific difference was also observed, with a stronger correlation between digital financial experience and cashless payment usage for women.

Minarni (2025) and Yuko *et al.* (2025) underscore the positive impact of digital payment systems on financial inclusion for small businesses and in rural areas. While these studies affirm the general benefits, their methodologies (qualitative literature review and broad quantitative survey, respectively) do not delve into the specific perceived attributes of digital payment channels that act as barriers or enablers for SMEs. They highlight general challenges like "limited digital literacy" and "inadequate infrastructure," but do not empirically investigate how specific perceptions of risk, trust, or charges influence adoption, nor do they detail the mediating role of financial knowledge in overcoming these perceptions for SMEs. This limits the ability to formulate precise, targeted interventions.

Nambie, *et al.* (2025) observed that the growing use of digital payment platforms and greater access to financial services have changed the financial system, which in turn affects exchange rates. Their research found that electronic payment systems boost transactional efficiency, decrease dependence on physical cash, and help formalize how money is sent home from abroad.These contribute to stabilizing forex market demand in Ghana from 2012 to 2023. Nevertheless, the study cautioned that realizing these benefits is contingent upon the presence of robust infrastructure, adequate financial literacy among the populace, and effective regulatory frameworks.

Consequently, while prior literature treats digital payment adoption as a monolithic process or focuses on broad, macro-level FinTech indicators, a fundamental theoretical and empirical deficit remains. Extant research fails to account for how micro-level operational friction specifically the interaction between risk exposure, agent vulnerability, platform instability, and cost burdens collectively creates "forced" financial exclusion among small business operators in semi-urban contexts. By disaggregating digital payment channels into these four distinct operational dimensions, this study advances technology adoption literature beyond simple "access vs. usage" models to evaluate how structural friction actively Shapes adoption resistance. Furthermore, this study offers a substantive theoretical contribution by introducing financial knowledge not merely as a passive control variable, but as an active cognitive mediator under Information Asymmetry Theory. It empirically tests whether baseline financial knowledge can override real-world infrastructural and operational deterrents (such as POS liquidity mismatches, fraudulent prompts, and transaction fees) to translate digital channel exposure into meaningful financial inclusion for Small-Scale Enterprises in Niger State. Without this integrated mechanism, policymakers and financial service providers lack the empirical precision needed to design targeted structural and educational interventions that foster sustainable enterprise inclusion.

Aim and Objectives of the Study

The general aim of this research is to examine the mediating effect of financial literacy on the relationship between digital payment channels influencers and financial inclusion among Small-Scale business owners in Niger State. The Specific Objectivesof the study include**:**

i. To examine the effect of perceived risk of digital payment channels on financial inclusion among Small-Scale business owners in Niger State.
ii. To investigate the effect of agent trust in digital payment channels on financial inclusion among Small-Scale business owners in Niger State.
iii. To determine the effect of service trust in digital payment channels on financial inclusion among Small-Scale business owners in Niger State.
iv. To assess the effect of service charges of digital payment channels on financial inclusion among Small-Scale business owners in Niger State.
v. To examine the effect of financial knowledge on financial inclusion among Small-Scale business owners in Niger State.
vi. To ascertain the mediating effect of financial knowledge on the relationship between perceived risk, agent trust, service trust and service charges of digital payment channels and financial inclusion among Small-Scale business owners in Niger State.

Research Hypotheses

This study intends to test the following null hypotheses:

Ho_1: Perceived risk of digital payment channels has no significant effect on financial inclusion among Small-Scale business owners in Niger State.
Ho_2: Agent trust in digital payment channels has no significant effect on financial inclusion among Small-Scale business owners in Niger State.
Ho_3: Service trust in digital payment channels has no significant effect on financial inclusion among Small-Scale business owners in Niger State.
Ho_4: Service charges of digital payment channels has no significant effect on financial inclusion among Small-Scale business owners in Niger State.
Ho_5: Financial knowledge has no significant effect on financial inclusion among Small-Scale business owners in Niger State.
Ho_6: Financial knowledge has no significant mediating effect on the relationship between perceived risk, agent trust, service trust, and service charges of digital payment channels and financial inclusion among Small-Scale business owners in Niger State.

2.0 Literature Review and Theoretical Framework

This chapter review existing scholarly literature pertinent to the study's core variables: digital payment channels, financial inclusion, and financial literacy. It critically examines empirical studies, theoretical perspectives, and conceptual frameworks that have investigated the relationships between these constructs, highlighting key findings, methodologies, and identified research gaps. Furthermore, the chapter establishes the theoretical underpinnings of this study by outlining and justifying the chosen theories that guide the investigation into the mediating role of financial literacy in the relationship between digital payment channels and financial inclusion of Small-Scale Enterprises in Niger State.

Concept of Financial Inclusion

Financial inclusion is widely recognized as a critical enabler of economic empowerment, poverty reduction, and sustainable development among small-scale enterprises (SSEs) in developing economies. Historically conceptualized around physical access to brick-and-mortar banking infrastructure, the construct has undergone a paradigm shift driven by digital innovation. Scholars largely agree that modern financial inclusion extends beyond nominal account

ownership to encompass meaningful usage, affordability, and digital accessibility (Khalid & Rasheed, 2023; Yuko et al., 2025).

A critical synthesis of contemporary literature reveals two main thematic perspectives on how digital financial inclusion is conceptualized. The first school of thought emphasizes structural access and systemic integration, defining inclusion as the removal of traditional institutional barriers to enable historical unbanked populations to participate in formal financial networks (Khalid & Rasheed, 2023; Yuko et al., 2025). Conversely, a second school of thought focuses on operational utility and transformational outcome, arguing that true financial inclusion occurs only when digital channels actively enhance enterprise transaction efficiency, lower operational friction, and facilitate business growth (Minarni, 2025; Shehadeh et al., 2024).

Despite this broad consensus on the multi-dimensional nature of digital inclusion, an empirical gap persists in how these theoretical definitions translate to rural and semi-urban commercial settings. While existing studies frequently evaluate financial inclusion as a direct byproduct of digital payment availability, they often treat adoption as a uniform process, overlooking how localized infrastructural failures, user perceptions, and cognitive capabilities alter actual usage intensity among small business operators.

For the purpose of this study, financial inclusion for Small Scale Enterprises (SMEs) in Niger State will be operationally defined as the extent to which these businesses have accessibility to and are actively using affordable, reliable, and needs-meeting digital financial products and services, primarily digital payment channels, within the formal financial system**.** This definition is constructed by drawing directly from the insights provided by the reviewed literature. Specifically, it incorporates the dual emphasis on both accessibility and usage of financial services, a core element highlighted (Waleed Khalid & Abdul Rasheed, 2023).

Concept of Digital Payment Channels

Digital payment channels (DPCs) have become integral components of modern financial ecosystems, serving as technological conduits that replace cash-dominated and branch-dependent banking systems. A critical evaluation of contemporary literature reveals that while scholars universally view DPCs as catalysts for financial modernization, their conceptualizations diverge based on whether they evaluate these channels from a macroeconomic ecosystem perspective or a micro-enterprise operational perspective.

The macroeconomic perspective conceptualizes DPCs as systemic infrastructure designed to formalize financial flows, enhance transaction speed across national payment networks, and streamline regional remittances (Nambie et al., 2025). Under this view, digital channels serve primarily as broad technological bridges that increase overall access to formal banking resources (Khalid & Rasheed, 2023). Conversely, the micro-enterprise operational perspective evaluates DPCs through the direct user experience of small businesses, defining them as electronic interfaces such as mobile wallets, Point-of-Sale (POS) terminals, online portals, and USSD platforms that eliminate cash dependency, reduce transaction friction, and optimize daily cash-flow management (Minarni, 2025; Shehadeh et al., 2024; Yuko et al., 2025).

While both schools of thought converge on the premise that DPCs lower barriers to financial access, a conceptual limitation in existing literature is the tendency to treat digital payment adoption as a seamless infrastructural transition. In semi-urban and agrarian environments, technological availability alone does not capture how operational attributes such as network

downtime, agent reliability, and transaction fee structures shape real-world usage among enterprise operators.

Integrating these complementary theoretical dimensions, this study operationally defines digital payment channels among Small-Scale Enterprises (SSEs) in Niger State as the suite of technology-driven platforms (specifically encompassing POS agent banking, mobile banking applications, USSD codes, and digital wallets) that enable small business operators to execute commercial transactions, store value, and access formal financial services electronically without relying on physical cash or traditional brick-and-mortar bank branches.

Dimensions of Digital Payment Channels Influencers

The dimensions of digital payment channels represent critical factors that determine how small-scale enterprises (SSEs) perceive, adopt, and effectively use digital financial services (Adebayo, 2022). These dimensions according to Asif, *et al.* 2023 are perceived risk, agent trust, service trust, and service chargesserve as proxies for understanding the effectiveness of digital payment channels in enhancing financial inclusion. These variables influence users' willingness to engage with digital platforms and help explain the success or failure of digital financial systems among marginalized business owners, especially in developing regions like Niger State, Nigeria.

Perceived risk refers to the expectation of potential loss or negative outcomes when using digital payment services. For small business owners, concerns such as transaction errors, cybersecurity breaches, and fraudulent activities heighten their reluctance to adopt digital platforms (Olaniyi & Salako, 2021). When users perceive high levels of financial or privacy risk, they are less likely to participate in digital financial services, thereby widening the financial exclusion gap. This dimension is critical to this study because it reflects the psychological barrier that digital payment systems must overcome to promote adoption and sustainable use among SSEs.

Agent trust is the confidence that SSE operators have in banking agents or intermediaries who facilitate digital transactions in areas with limited banking infrastructure. In many rural and semi-urban regions, financial service agents act as the face of digital banking. A lack of trust in their competence, honesty, or reliability can significantly deter business owners from engaging in digital payment transactions (Ibrahim & Yusuf, 2023). Trust in these agents enhances the credibility of the financial service delivery process and plays a fundamental role in bridging the formal-informal financial divide. Thus, agent trust is a relevant dimension for evaluating the real-world functionality of digital payment channels.

Service trust involves users' belief in the reliability, security, and consistency of the digital platforms they interact with. SSEs must trust that digital systems will execute transactions correctly, maintain privacy, and deliver services without unnecessary delays or malfunctions. If the platforms fail to meet these expectations, trust is eroded, leading to disuse or complete abandonment of the channels (Ahmed, 2022). This proxy is essential to the study because a reliable digital infrastructure that meets users' expectations encourages continued use and deepens financial inclusion among micro and small businesses.

Service charges are the transaction or usage fees imposed on users of digital payment channels. These charges can significantly influence the decision-making process for small business owners, many of whom operate on slim profit margins. High or unclear service fees can deter adoption, especially when the perceived cost outweighs the convenience or benefit of using the platform (Nwachukwu & Uduji, 2023). Conversely, affordable and transparent service charges encourage

regular use, making digital payment channels more accessible and inclusive. Hence, this dimension is crucial in assessing the financial burden and value proposition digital platforms offer to SSEs.

Concept of Financial Literacy

Financial literacy as conceptualized in various studies, encompasses the comprehension and practical application of financial information. For instance, Abdullahi, *et al.* (2025) define financial literacy through its moderating role, suggesting it equips SME owners with the "necessary knowledge and skills to maximize the benefits of FinTech solutions" and significantly impacts financial inclusion. Similarly, Khalid and Abdul Rasheed (2023) highlight financial literacy's mediating function, arguing that "individuals with greater financial knowledge often gain more advantages from technological advancements and banking services," implying an understanding that translates into effective utilization.

Shehadeh, *et al.*(2024), while focusing on digital financial literacy, emphasize components like experience, awareness and skills as basis for cashless payment adoption, indicating that financial literacy involves both cognitive understanding and practical competence in digital financial environments. Minarni (2025) underscores the challenge of "limited digital literacy" as a barrier to the full potential of digital payment systems, reinforcing that financial literacy includes the capacity to navigate and utilize digital financial tools. Collectively, these perspectives suggest financial literacy is more than just knowledge; it is an empowering understanding that drives effective engagement with financial services.The inclusion of financial literacy as a mediating variable in this study is strongly justified by its pivotal role in bridging the gap between the availability of digital payment channels and their effective utilization by SMEs for financial inclusion.

Financial Knowledge as Predictor of Financial Literacy

Financial literacy is widely recognized as a multi-dimensional construct encompassing awareness, attitude, behaviour, and knowledge. In empirical research, financial knowledge serves as the primary cognitive proxy and fundamental building block of financial literacy, as actionable financial behaviour and decision-making depend directly on baseline factual understanding (Edeh, 2022). As highlighted by Khalid and Abdul Rasheed (2023), financial literacy acts as a crucial underlying mechanism in the interaction between financial technology (including digital payment channels), formal banking access, and broader financial inclusion. Corroborating this perspective, Abdulkadir et al. (2025) emphasize that financial knowledge directly conditions an enterprise owner’s ability to process financial information, evaluate risk parameters, and engage purposefully with formal financial structures.

An SSE operator with higher financial knowledge is better equipped to comprehend the operational mechanics, cost structures, and security protocols associated with digital payment channels (DPCs). Specifically, baseline financial knowledge enables small business owners to accurately evaluate perceived risks, distinguish between trustworthy and fraudulent transaction agents, assess service platform reliability, and compute the true cost of cumulative service charges (Abdullahi et al., 2025; Minarni, 2025). This technical understanding empowers business owners in Niger State to overcome operational hesitations, mitigate transaction errors, and safely adopt digital platforms for routine business transactions. Without adequate financial knowledge, SSE operators remain incapable of fully leveraging DPCs, even when infrastructure is accessible and fees are relatively low (Abdulkadir et al., 2025). Consequently, financial literacy (proxied by

financial knowledge) is not merely a passive background variable, but an active mediating mechanism through which the structural features of digital payment channels translate into sustained financial inclusion.

Conceptual Framework

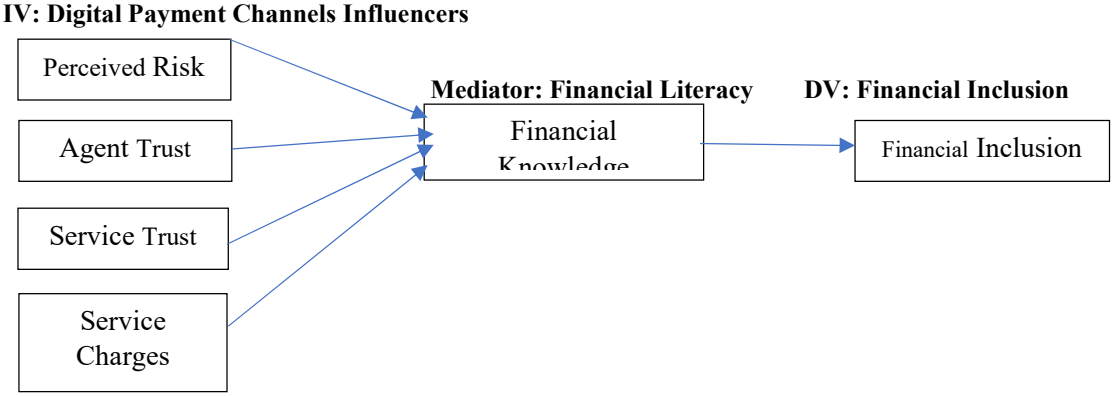
The conceptual framework posits that the adoption and utilization of digital payment channels significantly enhance financial inclusion among small-scale enterprises (SSEs) in Niger State through both direct structural mechanisms and indirect cognitive pathways mediated by financial literacy. The independent variable, digital payment channels, is operationalized through four core dimensions: perceived risk, agent trust, service trust, and service charges. Perceived risk reflects the uncertainties and threat of financial loss experienced by operators; agent trust captures user confidence in local point-of-sale or agency banking intermediaries; service trust measures confidence in system reliability and platform security; and service charges represent the fee burden associated with digital transactions. These structural dimensions form the primary external environment that shapes how small businesses interact with formal financial technologies.

The central mechanism translating these channel attributes into sustained participation is the mediating variable, financial literacy, which is proxied in this study by financial knowledge. Financial knowledge represents the baseline cognitive capability of SSE owners to comprehend financial concepts, evaluate transaction costs, execute security measures, and process digital financial information. The ultimate outcome, financial inclusion, measures the extent to which SSEs actively access, utilize, and benefit from formal financial products and services to sustain and grow their enterprises. Rather than assuming that access alone drives adoption, the framework recognizes that structural channel characteristics directly influence both the acquisition of financial knowledge and direct participation in formal financial systems.

To empirically evaluate these interactions, the framework outlines three distinct structural pathways. First, direct paths (H_{o1} through H_{o4}) establish the unmediated impact of perceived risk, agent trust, service trust, and service charges on financial inclusion, while a fifth direct path (H_{o5}) tests the independent effect of financial knowledge on financial inclusion. Second, first-stage paths evaluate how the four digital payment channel dimensions directly influence the level of financial knowledge possessed by enterprise operators.

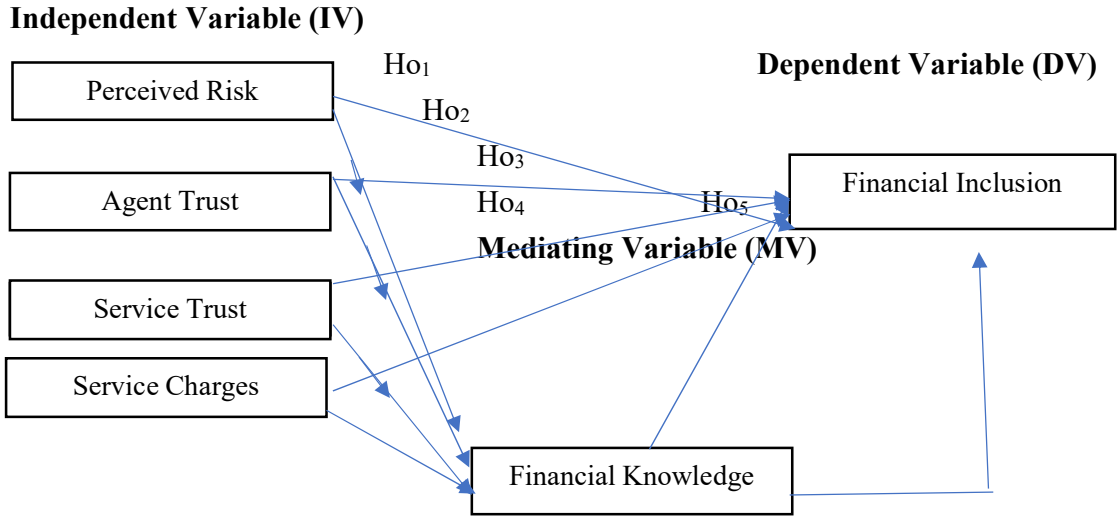
Indirect paths test the core mediating hypothesis (H_{o6}), examining how financial knowledge bridges each of the four digital channel antecedents to financial inclusion. In this mediated process, low perceived risk, high agent and service trust, and affordable service charges encourage operators to acquire and activate financial knowledge, which in turn leads to effective, long-term financial inclusion. By structuring these direct, first-stage, and indirect pathways separately, the conceptual framework provides a robust foundation for testing both the immediate effects of digital payment channels and the explanatory role of financial knowledge among small-scale businesses in Niger State.

Figure 2.1: Showing Mediating Relationship among the Study Variables (Main objective)



Source: Author's Conceptualization, 2025.

Figure 2.2: Showing Relationship between IV, MV and DV (Specific objectives)



Source: Author's Conceptualization, 2025.

Figure 1 and 2 are conceptual framework that suggests four components of digital payment channels (perceived risk, agent trust, service trust, and service charges) collectively affect the financial inclusion of SSEs. However, the presence of financial literacy(financial knowledge) may strengthen or explain this relationship by equipping business owners with the knowledge and confidence to use digital tools effectively. In essence, without adequate financial literacy, access to digital payment infrastructure alone may not guarantee financial inclusion.

Empirical Literature Review

Empirical literature provides substantial evidence on the growing role of financial technology, digital payment systems, and financial literacy in enhancing financial inclusion. These studies span diverse contexts from India and Nigeria to Jordan and Ghana each offering insights into how digital financial tools affect access, usage, and the broader financial ecosystem. The reviewed empirical works also highlight methodological variations, theoretical frameworks, and

key determinants that shape the financial inclusion landscape across individuals, enterprises, and economies.Senyo and Ellis (2020) investigated how advancements in financial technology could foster financial inclusion by identifying the underlying drivers of this relationship. Their study underscored the critical importance of understanding these influencing factors to achieve improved financial inclusion outcomes. The researchers analysed survey data from 294 participants using PLS-SEM. The results indicated that users' intention to adopt mobile money services was significantly influenced by effort expectancy and performance expectancy. Conversely, other variables, including perceived risk, price value, hedonic motivation, and social influence, did not show a meaningful effect on either the intention or the actual use of mobile money. It is noteworthy that the study's reliance on a non-probability sampling method implies that the generalizability of its findings might be limited.

Asif,*et al*. (2023) explored digital financial services on financial inclusiveness within the Indian context. The researchers adopted both survey and quantitative research designs, gathering responses from a total of 400 participants, although the sampling method for determining this number was not specified. The study utilized PLS-SEM to test hypotheses. Findings revealed that agent trust, service charges, and service trust significantly influenced financial inclusion. Perceived risk was also identified as a key determinant. Furthermore, the study highlighted the importance of behavioural intention to adopt FinTech solutions and the role of social influence. Among the examined factors, usability emerged as the most impactful variable affecting financial inclusion.Goswami, *et al.* (2023) conducted a quantitative study examining the influence of financial technology on financial inclusion among rural dwellers in India. The research involved a substantial sample of 6,050 respondents, selected through a non-probability sampling technique. The research used SEM. The result shown that various factors contributing to social influence positively impacted the behavioural intention of rural Indians to utilize financial technology. Furthermore, an end-user's habitual engagement with financial technology systems and services demonstrated a positive association with their behavioural intention to use them. Perceived ease of use towards financial technology also positively correlated with the system’s overall usability. However, the study did not specify the formula employed for determining its considerable sample size.

Abdullahi, *et al.*(2025) carried out a study that explored the moderating influence of financial literacy on FT and FI among SMEs in Nigeria. The study's data were gathered from 302 respondents, who were owners or managers of registered SMEs within the Federal Capital Territory (FCT), Abuja. These respondents were systematically chosen from a total population of 1,460 registered SMEs. The initial data analysis involved descriptive statistics and correlation techniques, followed by more in-depth insights derived from SEM. The findings indicated that both financial technology and financial literacy exerted a significant impact on the financial inclusion of SME owners. Crucially, the study also revealed that financial literacy played a vital moderating role, strengthening the relationship between financial technology and financial inclusion. Based on these significant outcomes, the authors recommended that policymakers and financial institutions prioritize the adoption and promotion of financial technology tools specifically tailored for SME owners. Furthermore, they advised the implementation of targeted financial literacy programs to equip SME owners with the necessary knowledge and skills to optimally leverage the benefits offered by FinTech solutions.

The empirical literature reviewed reveals a consistent and growing body of evidence highlighting the critical role of financial technology, digital payment systems, and financial literacy in

promoting financial inclusion across diverse contexts. Studies from India, Nigeria, Jordan, and Ghana underscore that variables such as agent trust, usability, performance expectancy, and digital skills significantly influence the adoption and effective use of digital financial services. Moreover, financial literacy emerges as both a direct enabler and a moderating factor that strengthens the relationship between technology adoption and financial inclusion. While the benefits of digital finance are well-documentedranging from improved accessibility to enhanced operational efficiencybarriers such as limited digital knowledge, infrastructural gaps, and regulatory challenges persist. Collectively, the literature suggests that the advancement of financial inclusion, particularly for SMEs and underserved populations, depends not only on technological availability but also on supportive policy frameworks, user-centric innovations, and targeted educational initiatives.

Theoretical Framework

The theoretical foundation of this study is built upon an integration of the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and Information Asymmetry Theory (Akerlof, 1970; Stiglitz, 2002). While UTAUT explains how the structural attributes of digital payment channels (DPCs) directly shape adoption and usage behaviour, Information Asymmetry Theory illuminates the cognitive mechanisms through which business owners evaluate those attributes. Merging these two theoretical perspectives yields a comprehensive framework that explicitly generates both the direct structural pathways (H_{o1} through H_{o5}) and the indirect mediating mechanisms (H_{o6}) formulated in this study.

UTAUT establishes that technology adoption is determined by performance expectancy, effort expectancy, facilitating conditions, and cost-benefit trade-offs, which map directly onto the four specific dimensions of digital payment channels to generate hypotheses H_{o1} through H_{o4}. Perceived risk (H_{o1}) acts as a negative determinant of performance and effort expectancy, as concerns over fraud, delayed fund reversals, and transaction errors directly discourage small-scale enterprise (SSE) operators from using digital channels. Agent trust (H_{o2}) and service trust (H_{o3}) function as crucial facilitating conditions and manifestations of social and structural support; in environments like Niger State where physical bank branches are sparse, trust in local point-of-sale (POS) agents and system network uptime minimizes operational friction and directly drives continuous digital participation. Finally, service charges (H_{o4}) directly alter the economic performance expectancy of DPCs, as high transaction fees and surcharges erode narrow profit margins, creating a direct financial barrier to adoption.

Complementing UTAUT, Information Asymmetry Theory explains the direct role of financial knowledge (H_{o5}) and its mediating function (H_{o6}). In digital financial ecosystems, small business operators frequently face severe information gaps regarding complex transaction fee structures, hidden charges, dynamic interest terms, and digital security protocols. Financial knowledge serving as the primary proxy for financial literacy reduces this information asymmetry by equipping SSE owners with the technical capability to verify transaction receipts, evaluate real transfer costs, protect personal identification numbers (PINs), and utilize digital transaction histories to establish creditworthiness. Consequently, as information asymmetry is minimized through higher financial knowledge, the direct willingness of operators to participate in formal financial systems increases (H_{o5}).

Synthesizing both theories provides the exact theoretical mechanism required to justify the mediating hypotheses ((H_{o6}). UTAUT identifies the external channel attributes (perceived risk,

agent trust, service trust, and service charges) that influence adoption intentions, while Information Asymmetry Theory explains how financial knowledge acts as an internal cognitive filter that processes those attributes. High service trust or low service charges alone do not automatically guarantee financial inclusion unless the SSE operator possesses the financial knowledge needed to evaluate tariffs, verify agent transactions, and navigate digital platforms safely. Financial knowledge thus mediates the relationship by enabling operators to accurately assess risks, audit trusted intermediaries, and optimize transaction costs, ultimately translating structural digital payment availability into sustained, meaningful financial inclusion for small businesses in Niger State.

3.0 Methodology

The research applied cross-sectional survey method because they are appropriate for collecting data at a single point in time and for capturing the perceptions and experiences of a large population. The study population includes owners and/or managers of SSEs operating in Niger State, which is situated in the North Central geopolitical zone of Nigeria. These respondents were selected due to their direct engagement with digital payment systems and their relevance to the study's focus on financial inclusion. According to data from the Niger Chamber of Commerce, Industry, Mines and Agriculture, the state has 304 registered SSEs (NCCIMA, 2024). The sample size was selected using a purposive sampling technique.

The target sample size for this study was set at 172 respondents, determined in accordance with the sample size estimation table of Krejcie and Morgan (1970). Out of the 172 structured questionnaires administered to small-scale enterprise owners in Niger State, 143 were retrieved fully completed and deemed valid for analysis, representing an effective response rate of 83.14%. This high response rate exceeds the 50% threshold recommended for empirical field surveys (Babbie, 2021). The final sample of $n = 143$ observations provides robust statistical power for hypothesis testing via Partial Least Squares Structural Equation Modeling (PLS-SEM). According to the minimum sample size rules in PLS-SEM (Hair et al., 2021), a sample size of 143 substantially surpasses both the traditional "10-times rule" (which requires ten times the maximum number of structural paths directed at a latent construct; $10 \times 5 = 50$) and Cohen's (1992) power requirements for detecting a medium effect size ($f^2 = 0.15$) at a significance level of $\alpha = 0.05$ with 80% statistical power.

Primary data were gathered using a structured questionnaire organized into two key parts: Section A captured respondents' demographic and business profile characteristics, while Section B measured the core study variables using closed-ended statements scored on a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree").

The independent variable was measured using four determinants: perceived risk, agent trust, service trust and service charges. The perceived risk scale is made up of 5 items adapted from the works ofAsif *et al*. (2023); Goswami (2023); and Senyo, and Osabutey (2020). The agent trust scale is made up of 5 items adapted from the works of Senyo, and Osabutey (2020); Asif et al. (2023); Goswami (2023).The service trust scale is made up of 5 items adapted from the works of Asif *et al.* (2023); Senyo, and Osabutey (2020); and Goswami (2023). The service charges scale is made up of 5 items adapted from the works of Goswami (2023); Asif et al. (2023). The fintech use for financial inclusion (dependent variable) scale is also made up of 5 items and adapted from the works of Abdullahi, *et al.,*(2025); Asif et al. (2023). The mediating variable – financial literacy scale is made up of 5 items adapted from the study of Abdullahi, *et al.,*(2025).

The regression model is adapted from the studies of Asif *et al.,* (2023) and Abdullahi et al. (2025) which is given below:

$FI = \beta_0 + \beta_1 PR_i + \beta_2 AT_i + \beta_3 ST_i + \beta_4 SC_i + \beta_5 FK_i + \beta_6 FK_i PR_i * AT_i * ST_i * SC_i + e_i$

Where:

FI –financial inclusion; β_0 = constant; $\beta_1 PR_i$ = Perceived Risk coefficients; $\beta_2 AT_i$ = Agent Trust coefficients; $\beta_3 ST_i$ = Service Trust coefficients; $\beta_4 SC_i$ = Service Charges coefficients; $\beta_5 FK_i$ = Financial Knowledge; e - error term.

Method of Data Analysis

The collected data was analysed using PLS-SEM, a variance-based approach deemed suitable for its ability to handle complex models, predictive focus, and robustness with non-normal data (Hair *et al.*, 2017). All PLS-SEM analyses will be performed using SmartPLS software. Hypotheses will be tested at a 5% significance level ($p < 0.05$) via bootstrapping, a non-parametric resampling procedure that generates standard errors and t-values. The significance of direct and indirect effects will be determined by comparing their p-values to the 0.05 threshold, with significant indirect effects indicating mediation, further classified as full or partial based on the direct effect's significance.

4.0 Result And Discussions

This section presents the results obtained from the data analysis and provides an in-depth discussion of the findings in relation to the study objectives and hypotheses. The analysis includes descriptive statistics, reliability tests, correlation results, and regression outputs relevant to the variables under investigation. The discussions are anchored on the theoretical framework and empirical literature previously reviewed, offering interpretations that link the statistical results to practical and conceptual implications.

Measurement (Outer) Model

Before evaluating the study's structural model, the measurement model (also known as the outer model in PLS-SEM) was assessed to confirm the reliability and validity of the constructs and their respective indicators (Hair et al., 2017). As depicted in Figure 1 (the provided SmartPLS diagram), the study includes six first-order constructs: Perceived Risk (PR), Agent Trust (AT), Service Trust (ST), Service Charges (SC), Financial Knowledge (FK), and Financial Inclusion (FI). Each of these constructs is measured directly by their respective reflective items.

The assessment of the measurement model involved examining the factor loadings of all indicators, which represent the strength of the relationship between an indicator and its underlying construct. The results revealed that while most factor loadings met the commonly accepted threshold of 0.50 for reflective indicators in PLS-SEM (Fornell & Larcker, 1981, Hair et al., 2017), some initial items were below this threshold or contributed negatively to the constructs' reliability and validity. Consequently, any item with factor loading below required threshold by Fornell and Larcker (1981) will be deleted from the model. Theitems that fall below the study adopted threshold of 0.5(PR5, AT4, AT5, and SC2) were deleted from the model to achieve an optimal measurement model(Fornell & Larcker, 1981). As shown in Figure 1 and table 4.1, the retained items for each construct are: Perceived Risk (PR1, PR2, PR3, PR4), Agent Trust (AT1, AT2, AT3), Service Trust (ST1, ST2, ST3, ST4, ST5), Service Charges (SC1, SC3, SC4, SC5), Financial Knowledge (FK1, FK2, FK3, FK4, FK5), and Financial Inclusion (FI1, FI2, FI3, FI4, FI5). All these retained scale items exhibit factor loadings well above the 0.50

threshold, reflecting the refinement to the measurement model. Subsequent analyses of composite reliability and Average Variance Extracted (AVE) would further confirm the internal consistency and convergent validity of these remaining constructs, along with the assessment of discriminant validity.

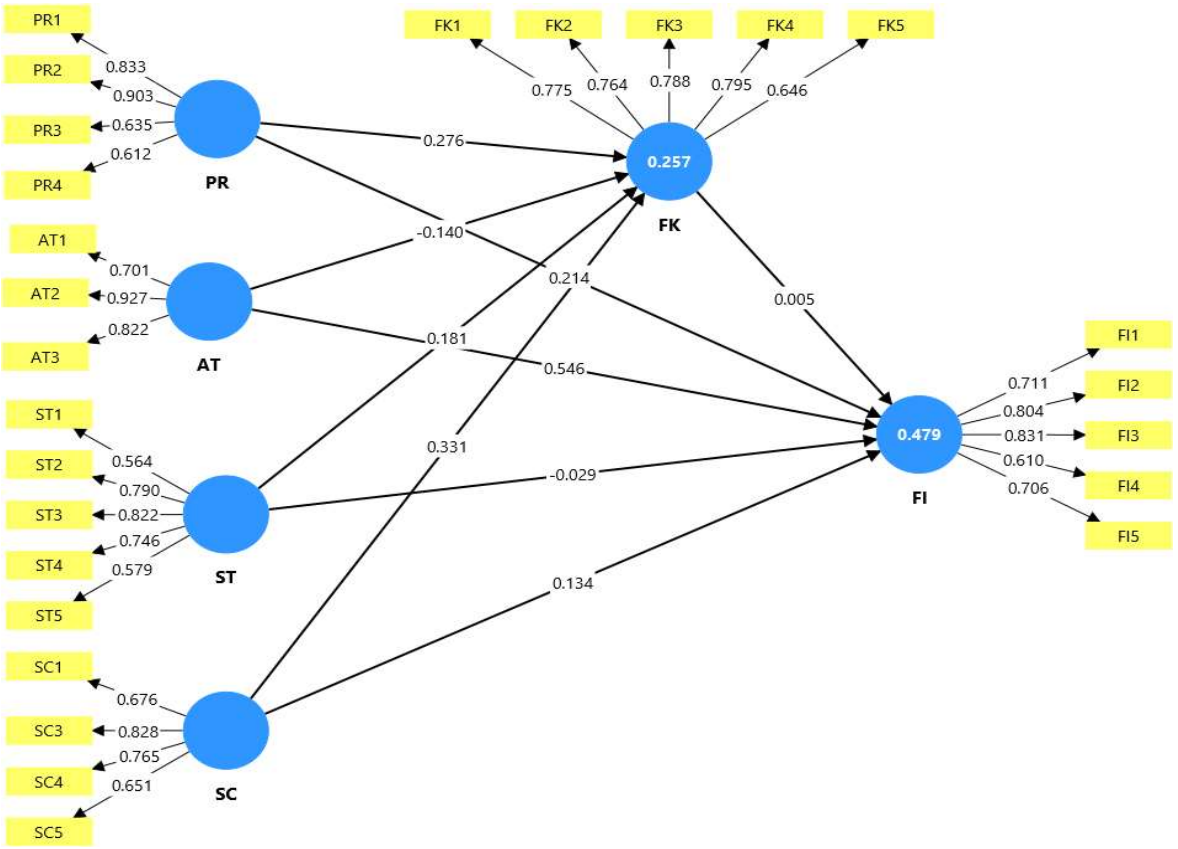


Table 1:

Factor Loadings

Scale Items	Outer loadings
AT1 <- AT	0.701
AT2 <- AT	0.927
AT3 <- AT	0.822
FI1 <- FI	0.711
FI2 <- FI	0.804
FI3 <- FI	0.831
FI4 <- FI	0.610
FI5 <- FI	0.706
FK1 <- FK	0.775
FK2 <- FK	0.764
FK3 <- FK	0.788
FK4 <- FK	0.795
FK5 <- FK	0.646
PR1 <- PR	0.833
PR2 <- PR	0.903

PR3 <- PR	0.635
PR4 <- PR	0.612
SC1 <- SC	0.676
SC3 <- SC	0.828
SC4 <- SC	0.765
SC5 <- SC	0.651
ST1 <- ST	0.564
ST2 <- ST	0.790
ST3 <- ST	0.822
ST4 <- ST	0.746
ST5 <- ST	0.579

Source: Author's Computation (2025) using PLS-SEM Software

Model Fit Indices

Following the CFA, the study evaluated the model's goodness of fit to the data. Table 1 presents the indices applied in assessing the model fit.

Table 2:
Model Fit

	Saturated model	Estimated model
SRMR	0.098	0.098
d_ULS	3.379	3.379
d_G	1.081	1.081
Chi-square	977.089	977.089
NFI	0.556	0.556

Source: Author's Computation (2026) using PLS-SEM Software

The overall model fit, as indicated by various indices, shows identical values for both the saturated and estimated models. The SRMR value is 0.098, which is slightly above the strict guideline of 0.08 but can sometimes be considered marginally acceptable for PLS-SEM in certain contexts (Hair *et al.,* 2017). The d_ULS and d_G values are 3.379 and 1.081 respectively, serving as absolute fit measures that indicate the discrepancy between empirical and model-implied covariance matrices, though their interpretation typically requires comparison against bootstrap confidence intervals derived from a reference distribution (Hair et al., 2017). The Chi-square value is 977.089, which is relatively high, but this index is often inflated in PLS-SEM with large sample sizes and is thus not a primary indicator of model fit.

Reliability and Convergent Validity Test

The used Cronbach's Alpha (CA), Composite Reliability (CR) and the Average Variance Extracted (AVE) to test the study reliability and convergent validity(Hair *et al.*, 2017).

Table 3:
Reliability and Convergent Validity Test

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
AT	.758	.860	.675
FI	.787	.854	.543
FK	.811	.869	.571
PR	.740	.838	.572
SC	.708	.822	.538
ST	.744	.831	.502

Source: Author's Computation (2026) using PLS-SEM Software

Table 3 presents the results of the reliability and convergent validity tests for all constructs in the study. As shown, all constructs demonstrate robust reliability, with Cronbach's Alpha values ranging from 0.708 (for Service Charges) to 0.811 (for Financial Knowledge), and Composite Reliability values consistently above 0.820, comfortably exceeding the recommended 0.70 threshold for both measures. Furthermore, convergent validity is also well-established across all constructs, as indicated by Average Variance Extracted (AVE) values ranging from 0.502 (for Service Trust) to 0.675 (for Agent Trust), all surpassing the minimum acceptable threshold of 0.50. These results collectively confirm the internal consistency and adequate explained variance of the indicators for their respective constructs, indicating that the measurement model is reliable and valid for further analysis.

Discriminant Validity- Fornell and Larcker Criteria

The assessment of discriminant validity, crucial for ensuring that constructs are empirically distinct from one another, was conducted using the Fornell and Larcker (1981) criterion. This criterion mandates that the square root of the AVE for each variable must be higher than its correlations with any other variable in the model. This condition confirms that each construct shares more variance with its own reflective indicators than with other constructs, thereby establishing its unique identity.

Table 4:
Fornell and Larcker Criterion

	AT	FI	FK	PR	SC	ST
AT	0.822					
FI	0.649	0.737				
FK	0.055	0.143	0.755			
PR	0.443	0.466	0.308	0.756		
SC	0.108	0.217	0.384	0.131	0.733	
ST	0.202	0.167	0.290	0.280	0.181	0.709

Source: Author Computation (2026) using PLS-SEM Software

As observed in Table 4, for every construct, its square root of AVE significantly exceeds all corresponding inter-construct correlations. For instance, the square root of AVE for Agent Trust (AT) is 0.822, which is greater than all its correlations with other constructs (e.g., 0.649 with FI, 0.055 with FK). This pattern consistently holds true across all constructs (FI, FK, PR, SC, and ST), thereby confirming that each latent variable shares more variance with its own indicators than with other constructs. These results unequivocally establish discriminant validity according

to the Fornell and Larcker criterion, indicating that the constructs in the model are empirically distinct.

Discriminant Validity –Heterotrait-Monotrait Ratio Criterion

Discriminant validity was assessed using the Heterotrait-Monotrait ratio of correlations (HTMT) criterion, which offers a superior, more sensitive evaluation of construct distinctiveness compared to traditional metrics. To establish discriminant validity, all pairwise HTMT values must fall strictly below the conservative threshold of 0.85, and the associated 90% bias-corrected bootstrap confidence intervals must not contain the value of 1.00 (Hair et al., 2017). The empirical results confirmed that all construct pairs met these criteria, demonstrating that Perceived Risk, Agent Trust, Service Trust, Service Charges, Financial Knowledge, and Financial Inclusion possess sufficient empirical uniqueness for structural model evaluation.

Table 5:
Heterotrait-Monotrait Ratio Criterion

	AT	FI	FK	PR	SC	ST
AT						
FI	0.809					
FK	0.142	0.202				
PR	0.559	0.604	0.403			
SC	0.152	0.300	0.487	0.212		
ST	0.264	0.220	0.373	0.364	0.299	

Source: Author's Computation (2026) using PLS-SEM Software

Table 5 presents the results of the HTMT criterion, a more rigorous test for assessing discriminant validity, ensuring that constructs are empirically distinct. According to established guidelines, HTMT values should ideally be below 0.85 (or sometimes 0.90 for conceptually similar constructs) to confirm discriminant validity (Hair et al., 2017). As evidenced in Table 5 the highest HTMT value observed is 0.809 (between AT and FI), with all other inter-construct HTMT values falling significantly below this figure. Since all calculated HTMT values are below the conservative 0.85 threshold, these results confirm that discriminant validity is well-established among all the latent constructs in the model. This indicates that each construct is indeed measuring a unique phenomenon, providing further confidence in the reliability and validity of the measurement model.

Evaluation Of Structural (Inner) Model

Collinearity Problem

Collinearity among predictor variables was assessed using the Variance Inflation Factor (VIF) values, as presented in Table 5. VIF values measure the extent to which the variance of an estimated regression coefficient is inflated due to collinearity with other predictors in the model.

Table 6:
Collinearity Test

	VIF
AT -> FI	1.283
AT -> FK	1.256
FK -> FI	1.346
PR -> FI	1.413

PR -> FK	1.310
SC -> FI	1.191
SC -> FK	1.044
ST -> FI	1.162
ST -> FK	1.118

Source: Author Computation (2026) using PLS-SEM Software

According to established guidelines for PLS-SEM, VIF values should ideally be below 5, indicating no significant multicollinearity issues that could bias the path coefficients or their standard errors (Hair et al., 2017). As shown in Table 5, all VIF values for the latent constructs range from a minimum of 1.044 (SC -> FK) to a maximum of 1.413 (PR -> FI). Since all VIF values are well below the critical threshold of 5, it is confirmed that multicollinearity is not a concern among the predictor constructs in this study, ensuring the reliability of the estimated path coefficients.

Coefficient of determination R^2

The R^2 value quantifies the amount of variance in an endogenous variable that can be explained or predicted by the exogenous variables within a model. This value is vital for evaluating the explanatory power of the model, with its strength typically interpreted using specific thresholds: an R^2 of 0.19 shows weak influence, 0.33 suggests a moderate influence, and 0.67 signifies a strong influence (Fauzi, 2022). Consequently, a higher R^2 value denotes a greater explanatory fitness of the independent variables, pointing to a more robust and effective model.

Table 7:
R-square value

	R-square	R-square adjusted
FI	0.479	0.463
FK	0.257	0.239

Source: Author Computation (2026) using PLS-SEM Software

Table 7 presents the coefficient of determination (R^2) values for the endogenous constructs, Financial Inclusion (FI) and Financial Knowledge (FK), alongside their adjusted R^2 values. For Financial Inclusion (FI), the R^2 value is 0.479, demonstrating that around 47.9% of the change in Financial Inclusion can be accounted by the predictor variables in the model. According to Chen (as cited in Fauzi, 2022), this R^2 value is considered moderate to substantial, as it significantly surpasses the 0.33 threshold for moderate effects. The adjusted R^2 for FI, which accounts for model complexity, is slightly lower at 0.463. For Financial Knowledge (FK), the R^2 value is 0.257, signifying that approximately 25.7% of its variance is explained by its predictors. This value falls into the weak to moderate range, being above the 0.19 threshold for weak effects but below the 0.33 threshold for moderate effects. The adjusted R^2 for FK is 0.239. Collectively, these R^2 values indicate that the model possesses a moderate to substantial explanatory power for Financial Inclusion, while demonstrating a weak to moderate explanatory power for Financial Knowledge.

Effect size f-square analysis

Effect size is a statistical measure that re-calculates the R^2 value to quantify the magnitude of influence exerted by one or more exogenous constructs on an endogenous construct within a model. This procedure is vital for understanding the practical significance of relationships

between latent variables, as it reveals the extent to which an independent variable contributes to explaining the variance in a dependent variable. Consequently, effect size provides a more nuanced insight into the model's dynamics by indicating not just the presence, but also the substantiality of the relationships.

Table 8:
Effect size f^2

	f-square
AT -> FI	0.446
AT -> FK	0.021
FK -> FI	0.000
PR -> FI	0.062
PR -> FK	0.079
SC -> FI	0.029
SC -> FK	0.141
ST -> FI	0.001
ST -> FK	0.039

Source: Author Computation (2026) using PLS-SEM Software

Table 8 presents the f^2 effect sizes, which quantify the practical significance of each exogenous construct's contribution to the R^2 of its respective endogenous construct. Following Cohen's (1988) guidelines, an f^2 value of 0.02 indicates a small effect, 0.15 a medium effect, and 0.35 a large effect. As shown, Agent Trust (AT) exhibits a large effect ($f^2 = 0.446$) on Financial Inclusion (FI), indicating its substantial practical importance. Service Charges (SC) shows a small to medium effect on Financial Knowledge (FK) ($f^2 = 0.141$), nearly reaching the medium effect threshold. Perceived Risk (PR) demonstrates small effects on both FI ($f^2 = 0.062$) and FK ($f^2 = 0.079$). Similarly, Agent Trust (AT) has a small effect on FK ($f^2 = 0.021$), Service Charges (SC) a small effect on FI ($f^2 = 0.029$), and Service Trust (ST) a small effect on FK ($f^2 = 0.039$). Notably, the effects of Financial Knowledge (FK) on Financial Inclusion (FI) ($f^2 = 0.000$) and Service Trust (ST) on Financial Inclusion (FI) ($f^2 = 0.001$) are negligible, indicating their very limited practical importance in explaining the variance in FI within this model.

Predictive Relevance Q^2 Analysis

Table 9 presents the Q^2 analysis.

Table 9:
LV Prediction Summary

	Q^2predict	RMSE	MAE
FI	0.444	0.762	0.639
FK	0.140	0.964	0.706

Source: Author Computation (2026) using PLS-SEM Software

For Financial Inclusion (FI), the Q^2 value is 0.444, which is significantly above zero and indicates a large predictive relevance, suggesting that the model has substantial power in predicting Financial Inclusion. The associated Root Mean Square Error (RMSE) of 0.762 and Mean Absolute Error (MAE) of 0.639 further quantify the prediction accuracy for FI. For Financial Knowledge (FK), the Q2 value is 0.140, also positive, indicating a small predictive relevance. The RMSE for FK is 0.964 and MAE is 0.706. Overall, these results confirm the

model's capacity to predict the endogenous variables, with particularly strong predictive power for Financial Inclusion.

Bootstrapping Procedure

To test the study hypotheses, a bootstrapping procedure involving 5,000 resamples was utilized. The outcomes of this bootstrapping analysis, which serve to evaluate the significance of the proposed relationships, are presented in Table 4.9 and 4.10. As per the established decision rule, a relationship is deemed to have a significant effect if its t-statistic value surpasses 1.96 and its corresponding p-value is below 0.05. These predefined thresholds signify that the effect is statistically significant at the 5% level, strongly suggesting that the observed relationships are authentic and not merely a result of random chance. This comprehensive methodological approach ensures the dependability of the research findings and supports the validity of the hypotheses under investigation.

Test of Hypothesis (Direct Effect)

This section presents the results of the direct effect hypotheses testing, evaluating the immediate relationships between the independent variables (Agent Trust, Perceived Risk, Service Charges, and Service Trust) and the dependent variable (Financial Inclusion). Table 9 summarizes the path coefficients, standard errors, t-statistics, and p-values obtained from the bootstrapping analysis. According to the established decision rule, a direct effect is considered statistically significant at the 5% level if its t-statistic is greater than 1.96 and its p-value is less than 0.05.

Table 10:
Path Coefficient (Direct Effect)

	Co-efficient	Standard Error (SE)	T statistics	P values
AT -> FI	0.546	0.089	6.156	0.000
PR -> FI	0.214	0.081	2.645	0.008
SC -> FI	0.134	0.070	1.899	0.058
ST -> FI	-0.029	0.064	0.452	0.651
FK -> FI	0.005	0.070	0.065	0.948

Source: Author Computation (2026) using PLS-SEM Software

Agent Trust (AT) → Financial Inclusion (FI)

The direct effect of Agent Trust on Financial Inclusion was found to be statistically significant and positive (Coefficient = 0.546, SE = 0.089, T = 6.156, p = 0.000). With a t-statistic well above the 1.96 threshold and a p-value of 0.000 (which is less than 0.05), the hypothesis positing a significant positive relationship between Agent Trust and Financial Inclusion is strongly supported. This indicates that a higher level of trust in agents of digital payment channels significantly contributes to increased financial inclusion among SMEs.

Perceived Risk (PR) → Financial Inclusion (FI)

The direct effect of Perceived Risk on Financial Inclusion also showed a statistically significant positive relationship (Coefficient = 0.214, SE = 0.081, T = 2.645, p = 0.008). The t-statistic of 2.645 exceeds 1.96, and the p-value of 0.008 is less than 0.05, confirming the significance of this path. This finding suggests that, contrary to some expectations, an increase in perceived risk is associated with a positive, albeit weaker, influence on financial inclusion. This might imply that awareness or a certain level of acknowledged risk could, in specific contexts, drive users towards

more formal or inclusive financial behaviours, though further qualitative insights might be needed to fully unravel this.

Service Charges (SC) → Financial Inclusion (FI)
The direct effect of Service Charges on Financial Inclusion was not found to be statistically significant (Coefficient = 0.134, SE = 0.070, T = 1.899, p = 0.058). While the t-statistic of 1.899 is close to the 1.96 threshold, the p-value of 0.058 is slightly above the 0.05 significance level. Therefore, the hypothesis suggesting a direct significant effect of Service Charges on Financial Inclusion is not supported by these results. This indicates that, within the observed context, the level of service charges does not have a statistically significant direct impact on the extent of financial inclusion.

Service Trust (ST) → Financial Inclusion (FI)
The direct effect of Service Trust on Financial Inclusion was found to be statistically insignificant (Coefficient = -0.029, SE = 0.064, T = 0.452, p = 0.651). With a t-statistic of 0.452, which is considerably lower than 1.96, and a p-value of 0.651, which is much higher than 0.05, the hypothesis regarding a significant direct effect of Service Trust on Financial Inclusion is not supported. Despite the negative sign of the coefficient, its lack of statistical significance means that Service Trust does not exert a meaningful direct influence on Financial Inclusion in this model.

Financial Knowledge (FK) → Financial Inclusion (FI)
The direct effect of financial knowledge on Financial Inclusion was found to be statistically insignificant (Coefficient = 0.005, SE = 0.070, T = 0.065, p = 0.948). With a t-statistic of 0.065, which is considerably lower than 1.96, and a p-value of 0.948, which is much higher than 0.05, the hypothesis regarding a significant direct effect of financial knowledge on Financial Inclusion is not supported.

Test of Hypothesis (Indirect Effect)
This section presents the results of the indirect effect hypotheses testing, specifically evaluating the mediating role of Financial Knowledge (FK) in the relationships between the digital payment channel attributes (Perceived Risk, Service Charges, Service Trust, Agent Trust) and the dependent variable (Financial Inclusion). Table 4.10 summarizes the path coefficients for these indirect effects, along with their standard deviations, t-statistics, and p-values obtained from the bootstrapping analysis. The same significance criterion applies: an indirect effect is considered statistically significant at the 5% level if its t-statistic is greater than 1.96 and its p-value is less than 0.05.

Table 11:
Path Coefficient (Indirect Effect)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
PR -> FK -> FI	0.001	-0.002	0.021	0.058	0.954
SC -> FK -> FI	0.001	-0.001	0.023	0.065	0.948
ST -> FK -> FI	0.001	-0.000	0.016	0.049	0.961
AT -> FK -> FI	-0.001	0.001	0.011	0.060	0.952

Source: Author Computation (2026) using PLS-SEM Software

Test of Hypothesis (Indirect Effect)

This section presents the results of the indirect effect hypotheses testing, specifically evaluating the mediating role of Financial Knowledge (FK) in the relationships between the digital payment channel attributes (Perceived Risk, Service Charges, Service Trust, Agent Trust) and the dependent variable (Financial Inclusion). Table 11 summarizes the path coefficients for these indirect effects, along with their standard deviations, t-statistics, and p-values obtained from the bootstrapping analysis. The same significance criterion applies: an indirect effect is considered statistically significant at the 5% level if its t-statistic is greater than 1.96 and its p-value is less than 0.05.

Perceived Risk (PR) → Financial Knowledge (FK) → Financial Inclusion (FI)

The indirect effect of Perceived Risk on Financial Inclusion, mediated by Financial Knowledge, was found to be statistically insignificant (Original Sample = 0.001, STDEV = 0.021, T = 0.058, p = 0.954). Given that the t-statistic is well below 1.96 and the p-value is considerably greater than 0.05, it indicates that Financial Knowledge does not play a significant mediating role in the relationship between Perceived Risk and Financial Inclusion.

Service Charges (SC) → Financial Knowledge (FK) → Financial Inclusion (FI)

Similarly, the indirect effect of Service Charges on Financial Inclusion, through Financial Knowledge, was also found to be statistically insignificant (Original Sample = 0.001, STDEV = 0.023, T = 0.065, p = 0.948). With a t-statistic of 0.065 and a p-value of 0.948, which are both far from the significance thresholds, this finding suggests that Financial Knowledge does not significantly mediate the relationship between Service Charges and Financial Inclusion.

Service Trust (ST) → Financial Knowledge (FK) → Financial Inclusion (FI)

The indirect effect linking Service Trust to Financial Inclusion via Financial Knowledge was likewise found to be statistically insignificant (Original Sample = 0.001, STDEV = 0.016, T = 0.049, p = 0.961). The very low t-statistic and high p-value indicate no statistically significant mediating role for Financial Knowledge in the relationship between Service Trust and Financial Inclusion.

Agent Trust (AT) → Financial Knowledge (FK) → Financial Inclusion (FI)

Finally, the indirect effect of Agent Trust on Financial Inclusion, mediated by Financial Knowledge, also proved to be statistically insignificant (Original Sample = -0.001, STDEV = 0.011, T = 0.060, p = 0.952). The results, with a t-statistic significantly below 1.96 and a p-value much higher than 0.05, confirm that Financial Knowledge does not mediate the relationship between Agent Trust and Financial Inclusion in this model.

Discussion Of Findings

The first hypothesis state that Agent Trust (AT) has no significant positive direct effect on Financial Inclusion (FI). The results from Table 9 indicate a strong positive and statistically significant direct effect of Agent Trust on Financial Inclusion (Coefficient = 0.546, T = 6.156, p = 0.000). Therefore, the null hypothesis, which posits no significant effect of Agent Trust on Financial Inclusion, is rejected. This finding aligns with the empirical work of Asif, et al. (2023), who similarly reported that agent trust significantly influenced financial inclusion. The strong positive relationship underscores the importance of trustworthy human intermediaries in fostering the adoption and usage of digital financial services, particularly in contexts where

direct interaction and reassurance are valued, thereby promoting greater financial inclusion among SMEs.

The second hypothesis state that Perceived Risk (PR) has no significant direct effect on Financial Inclusion (FI). As presented in Table 9, Perceived Risk was found to have a statistically significant positive direct effect on Financial Inclusion (Coefficient = 0.214, T = 2.645, p = 0.008). Consequently, the null hypothesis of no significant effect of Perceived Risk on Financial Inclusion is rejected. While perceived risk is often intuitively expected to negatively impact technology adoption and financial inclusion, this positive finding suggests a nuanced relationship. It could imply that an awareness of existing financial risks, or risks associated with traditional informal methods, might prompt SMEs to seek out more formal and inclusive financial services as a protective or risk-mitigation measure. This finding partially contrasts with Senyo and Ellis (2020), who found no meaningful effect of perceived risk on mobile money adoption or usage. However, Asif et al. (2023) did identify perceived risk as a "key determinant" of financial inclusion without specifying its direction, leaving room for this positive interpretation which warrants further qualitative exploration.

The third hypothesis state that Service Charges (SC) have no significant direct effect on Financial Inclusion (FI). The analysis presented in Table 9 revealed that the direct effect of Service Charges on Financial Inclusion is not statistically significant (Coefficient = 0.134, T = 1.899, p = 0.058). Therefore, the null hypothesis, which states that Service Charges have no significant effect on Financial Inclusion, is not rejected. This finding contrasts with the results of Asif et al. (2023), who reported that service charges significantly influenced financial inclusion. The current study's result suggests that while service charges are undoubtedly a factor SME owners consider, their direct impact on the ultimate decision or extent of financial inclusion is not statistically significant within this specific context, potentially due to other overriding factors, varying price elasticities, or the relative insignificance of charges compared to benefits or perceived necessity.

The fourth hypothesis state that Service Trust (ST) has no significant direct effect on Financial Inclusion (FI). Based on the results in Table 9, the direct effect of Service Trust on Financial Inclusion was found to be statistically insignificant (Coefficient = -0.029, T = 0.452, p = 0.651). Consequently, the null hypothesis, which posits no significant effect of Service Trust on Financial Inclusion, is not rejected. This finding is inconsistent with Asif et al. (2023), who identified service trust as a significant determinant of financial inclusion. The lack of statistical significance in this study suggests that while general trust in the overall digital payment service platform is important, it may not directly translate to changes in financial inclusion in the same way that trust in human agents (Agent Trust) does, or its effect might be channelled through other unobserved variables or indirect pathways not captured in the direct effect.

Indirect Effects on Financial Inclusion (Mediated by Financial Knowledge)

The analysis of indirect effects, as presented in Table 4.10, indicates that Financial Knowledge (FK) does not significantly mediate any of the tested relationships between the digital payment channel attributes (Perceived Risk, Service Charges, Service Trust, Agent Trust) and Financial Inclusion. For all indirect paths (PR → FK → FI, SC → FK → FI, ST → FK → FI, AT → FK → FI), the p-values were significantly greater than 0.05, and t-statistics were well below 1.96. Consequently, the respective null hypotheses for mediation are not rejected. This finding somewhat contradicts previous research emphasizing financial literacy's mediating or moderating

role in promoting financial inclusion. For instance, Abdullahi et al. (2025) found that financial literacy played a critical moderating role, strengthening the relationship between financial technology and financial inclusion. Similarly, Waleed Khalid and Abdul Rasheed (2023) identified a partial mediating function of financial literacy in the interaction between FinTech, banking access, and financial inclusion, concluding that higher financial literacy levels improved financial inclusion outcomes. The divergence in the current study's findings suggests that, in the context of Niger State SSEs, Financial Knowledge may not act as a significant intermediary for these specific digital payment channel attributes, implying that the direct effects (where significant) or other unmodeled factors might be more dominant in explaining financial inclusion.

Practical and theoretical Implication of Findings

The findings from this study present significant practical insights for policymakers, financial service providers, and SME support agencies aiming to enhance financial inclusion through digital payment channels in Niger State. The strong positive effect of *Agent Trust* on financial inclusion underscores the importance of reliable and credible human intermediaries in building user confidence, particularly in semi-formal business environments. Thus, enhancing agent training, accountability, and visibility could be an effective strategy to accelerate digital adoption among SSEs. Similarly, the unexpected positive relationship between *Perceived Risk* and financial inclusion suggests that SME owners who recognize financial or transactional risks might be more inclined to formalize their financial behaviour through secure digital platforms. This insight highlights a practical opportunity to use risk-awareness campaignsframed not as deterrents but as motivators to guide SMEs toward safer and more inclusive financial tools. However, the non-significance of *Service Charges* and *Service Trust* implies that, although these factors matter at the user perception level, they may not be decisive in influencing the actual uptake of digital financial services. Hence, interventions should focus less on reducing fees and more on trust-building measures and user education.

From a theoretical perspective, the results provide a nuanced application of the Unified Theory of Acceptance and Use of Technology (UTAUT) and Information Asymmetry Theory within the digital financial inclusion context. The strong, direct influence of *Agent Trust* aligns well with UTAUT's constructs of *social influence* and *facilitating conditions*, affirming the role of trusted networks and supportive infrastructure in shaping SMEs' digital behaviours. Likewise, the significance of *Perceived Risk* challenges conventional assumptions by revealing a context-dependent interpretation where acknowledgment of risk does not deter but rather encourages formal financial engagement potentially expanding the theoretical understanding of *performance expectancy* in risk-sensitive environments. However, the non-significant mediating role of *Financial Knowledge* weakens the explanatory power of Information Asymmetry Theory in this specific context, suggesting that financial knowledge alone may not bridge the trust or complexity gap between SMEs and digital platforms. This deviation from prior literature invites further refinement of models linking financial literacy to inclusion and points to the need for integrating other behavioural, contextual, or institutional factors when applying these theories to developing economies.

5.0 Conclusion

In conclusion, this study was motivated by the persistent challenge of low financial inclusion among Small-Scale Enterprises (SSEs) in Niger State, despite the growing availability of digital financial services. Titled *"Effect of Digital Payment Channels on Financial Inclusion of Small-Scale Enterprises in Niger State, Nigeria,"* the study sought to investigate how key attributes of

digital payment systems - such as Agent Trust, Perceived Risk, Service Charges, and Service Trust- affect financial inclusion, with Financial Knowledge examined as a potential mediator. The findings revealed that Agent Trust significantly and positively influences financial inclusion, emphasizing the role of reliable intermediaries in promoting the use of digital financial tools. Perceived Risk also had a significant and positive effect, indicating that awareness of risk may encourage SSEs to adopt safer, more formal financial practices. In contrast, Service Charges and Service Trust were not statistically significant predictors. Furthermore, Financial Knowledge was found not to mediate the relationship between digital payment channel attributes and financial inclusion. The major conclusion drawn from this study is that while building trust in agents and recognizing risk play critical roles in fostering financial inclusion, enhancing financial literacy alone may not be sufficient without addressing broader contextual or behavioural factors influencing SSEs' digital financial adoption.

Recommendation

In light of the empirical findings from this study, the following actionable recommendations are proposed to enhance financial inclusion among SSEs in Niger State:

i. Strengthen Agent Trust through Capacity Building and Regulation: Since Agent Trust significantly and positively influenced financial inclusion, stakeholders - particularly financial institutions and FinTech operators should prioritize rigorous training, monitoring, and certification of agents. This will enhance professionalism, build user confidence, and promote wider adoption of digital payment systems. Policies that ensure transparency and accountability in agent operations will further boost trust.

ii. Leverage Perceived Risk through Awareness and Behavioural Campaigns: Given the unexpected but significant positive effect of Perceived Risk, policymakers and financial literacy advocates should design campaigns that reframe the risks of informal financial practices (e.g., theft, lack of traceability) as motivations to switch to more secure and formal digital platforms. These awareness efforts should present formal financial services as safer, more reliable alternatives.

iii. Reassess the Impact of Service Charges and Service Trust: Although Service Charges and Service Trust were not statistically significant, stakeholders should not overlook them. Maintaining affordable service fees and basic trust in service operations remains essential to prevent barriers to entry or dissatisfaction. Transparent pricing and dependable customer service should still be part of institutional strategies to ensure inclusiveness and user retention.

iv. Rethink Financial Literacy Approaches: As Financial Knowledge did not significantly mediate the relationship between digital payment channel attributes and financial inclusion, standalone financial education programs may not be sufficient. Instead, stakeholders should consider contextualizing financial education within trusted agent interactions, practical demonstrations, or through embedded learning tools in digital platforms to enhance relevance and effectiveness.

v. Promote Direct Engagement and Value-Oriented Solutions: Since indirect routes like financial knowledge did not show strong effects, efforts should focus more on direct enablers of adoption - such as improving user interface design, speed of transactions, and clear value propositions of digital payment systems for small businesses. Emphasizing ease of use, benefits such as loan access, and business growth will likely yield better inclusion outcomes.

Suggestion for further Study

Future research can broaden the generalizability of these findings by expanding the geographical scope of the study to include SMEs in diverse regions within Nigeria or other developing economies, allowing for valuable cross-contextual comparisons. Additionally, to gain a more nuanced understanding of mediating mechanisms, future studies could explore alternative dimensions of financial literacy, such as financial attitude, financial behaviour, or financial risk tolerance, as potential mediators or moderators, to capture different psychological and behavioural aspects influencing financial inclusion beyond just factual knowledge.

Reference

Abdulkadir, U., Sayedi, S. N., & Sarkindaji, B. D. (2025). Nexus between financial literacy and graduate entrepreneurial intention among national youth service corps in selected States in North-central Nigeria. West Africa Dynamic *Journal of Humanities, Social and Management Sciences and Education: Department of Communications, University of Cape Coast, Ghana.* 6(1), 92 - 112.

Abdullahi, A. S., Ladan, A., Yusuf, A., & Salisu, M. (2025). Financial technology and financial inclusion: The role of financial literacy. *International Journal of Financial Research and Business Development*, *7*(7), 115-128.

Adebayo, S. O. (2022). Digital payment systems and financial inclusion in sub-Saharan Africa: Evidence from Nigeria. *Journal of Financial Innovation and Development*, *9*(2), 45-60

Ahmed, R. A. (2022). Service trust and digital finance adoption among small enterprises in Northern Nigeria. *International Journal of Business and Technological Advancement*, *6*(1), 112-123.

Aminu, M. A. (2022). Perceived risk and the reluctance of SMEs in adopting e-banking solutions in Northern Nigeria. *African Journal of Entrepreneurship and Digital Finance*, *5*(2), 90-101.

Anagreh, S., Al-Momani, A., Maabreh, H. M. A., Sharairi, J. A., Alrfai, M. M., Haija, A. A. A., Al-Hawary, S. I. S. (2024). Mobile payment and digital financial inclusion: A study in Jordanian banking sector using unified theory of acceptance and use of technology. In *Business analytical capabilities and artificial intelligence-enabled analytics: Applications and challenges in the digital era*, 1, 107-124.

Asif, M., Khan, M. N., Tiwari, A., Wani, S. K., & Alam, F. (2023). The impact of fintech and digital financial services on financial inclusion in India. *Journal of Risk and Financial Management*, *16*(2), 122-137. doi:10.3390/jrfm16020122

Azmeh, C. (2025). Bridging divides: The role of fintech and financial inclusion in reducing poverty and inequality in developing countries. *Innovation and Development*, 1-20.

Babajide, A. A., Adegboye, F. B., & Omankhanlen, A. E. (2021). Financial literacy and financial inclusion: The mediating role of digital financial services. *Information Resources Management Journal (IRMJ)*, 34(1), 20-38.

Babbie, E. R. (2021). *The practice of social research* (15th ed.). Cengage Learning.

Chukwu, J. A., & Okechukwu, U. I. (2021). Trust and adoption of digital financial services among small business owners in Nigeria. *Nigerian Journal of Banking and Finance*, *13*(3), 76-89.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159. https://doi.org/10.1037/0033-2909.112.1.155

Edeh, H. C. (2022). Financial literacy and inclusive finance: A study of SMEs in emerging economies. *Journal of Economic and Business Research*, *28*(3), 77-89.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. https://doi.org/10.1177/002224378101800104

Goswami, S., Sharma, R. B., & Chouhan, V. (2023). Impact of financial technology (Fintech) on financial inclusion (FI) in rural India. *Universal Journal of Accounting and Finance*, *10*(2), 483-497. doi:10.13189/ujaf.2022.100213

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE Publications.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). SAGE Publications.

Ibrahim, M. S., & Yusuf, A. L. (2023). Trust in agent banking and financial service usage among rural entrepreneurs in Nigeria. *African Journal of Banking and Finance*, *15*(4), 134-149.

Khalid, S. W., & Rasheed, A. A. (2023). Impact of financial technology, banking access on financial inclusion with mediating role of financial literacy. *Journal of Development and Social Sciences*, *4*(2), 779-792.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607-610.

Minarni, E. (2025). Impact of digital payment systems on financial inclusion and small business growth in developing economies. *International Journal of Innovation and Thinking*, *2*(1), 1-12.

Moghavvemi, S., Mei, T. X., Johar, M. G. M., Bin Mohd, I., & Hakimian, F. (2021). Determinants of user perception and adoption of mobile payment: A study in an emerging economy. *International Journal of Bank Marketing*. 1-12.

Nambie, N. B., Ocansey, E. O. N. D., & Amoh, J. K. (2025). Effect of electronic payment systems, and financial inclusion on the forex market in Ghana. *International Journal of Economic Perspectives*, *19*(1), 30-56.

Nwachukwu, C. C., & Uduji, J. I. (2023). The influence of service charges on mobile money adoption among informal businesses in Nigeria. *Journal of African Development Studies*, *14*(1), 95-110.

Ocharive, A., & Iworiso, J. (2024). The impact of digital financial services on financial inclusion: A panel data regression method. *International Journal of Data Science and Analysis*, *10*(2), 20-32.

Oguneleye, A. O. (2022). Expanding financial inclusion through digital banking in Nigeria: A review of small business access. *Nigerian Journal of Economic Development*, *11*(2), 59-73.

Okeke, M. N., Onyekwelu, U. L., & Ifediora, C. O. (2023). Financial inclusion and enterprise development in Nigeria: Challenges and policy directions. *Journal of Contemporary Development Issues*, *10*(1), 88-103.

Olaniyi, T. A., & Salako, O. S. (2021). Perceived risk and the usage of e-payment systems among SMEs in Nigeria. *Journal of Financial Risk and Compliance*, *13*(2), 54-68.

Olasupo, A., & Agboola, M. G. (2022). Digital financial inclusion and the growth of small and medium enterprises in Nigeria: Evidence from a developing economy. *Journal of African Business*, 23(3), 415-430.

Organisation for Economic Co-operation and Development. (2023). *OECD/INFE international survey of adult financial literacy competencies*. OECD Publishing.

Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329-340.

Senyo, P. K., & Osabutey, E. L. (2020). Unearthing antecedents to financial inclusion through FinTech innovations. *Technovation*, *98*, 102-155. doi:10.1016/j.technovation.2020.102155

Shehadeh, M., Dawood, H. M., & Hussainey, K. (2024). Digital financial literacy and usage of cashless payments in Jordan: The moderating role of gender. *International Journal of Accounting & Information Management*, *33*(2), 1-16.

Yuko, M., Suratin, M., & Sukresna, I. M. (2025). The impact of digital payments on financial inclusion in rural areas. *Research Horizon*, *5*(1), 117-124.