The Moderating Role of Fintech on the Relationship Between Financial Inclusion and SME Growth in North-Central States of Nigeria

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ABSTRACT

Regardless of the growing availability of digital financial technologies, achieving full financial inclusion for Small and Medium Enterprises (SMEs) remains a major challenge in many developing economies, including the North Central States of Nigeria. In response, this study evaluates the factors influencing FinTech adoption by examining the effects of Perceived Ease of Use, Perceived Usefulness, Perceived Security, and Trust on SMEs' financial inclusion, while also analyzing the moderating roles of Digital Financial Literacy (DFL) and Perceived Regulatory Support (PRS). A purposive sample of 200 SME owners and managers with prior exposure to FinTech services participated in the study. Data were collected using structured questionnaires, and statistical techniques including descriptive analysis, correlation, regression, and PROCESS macro were applied to test the research model. The results indicate that although DFL and regulatory support are valuable elements in the FinTech ecosystem, they do not meaningfully alter the relationship between FinTech adoption and SMEs' financial inclusion within the study context. Overall, the study confirms that FinTech adoption serves as a strong catalyst for improving access to financial services among SMEs in the region. The outcomes provide practical implications for FinTech providers, regulators, and SME stakeholders, emphasizing the need for user-friendly and secure digital platforms and initiatives that better engage underserved communities. Enhancing these elements can further accelerate financial inclusion efforts across rural and semi-urban areas of the North Central States of Nigeria.

Keywords: Fintech, Financial Inclusion, SME, Digital Finance, Growth

INTRODUCTION AND PROBLEM STATEMENT

Small and Medium Enterprises (SMEs) contribute disproportionately to job creation, innovation, and GDP across countries. Yet many SMEs face persistent constraints[1] [2]. This is mostly due to the limited financial services available. Despite the provision as well as the promotion of financial inclusion, which focuses on the access to and usage of financial products and services, there is complexity in the relationship between SME growth and financial inclusion. In most cases, it requires institutional quality, firm capabilities, and financial suitability of products to mediate between SME and financial inclusion [3]. Firm performance by reducing financing gaps and smoothing cash flows is linked to financial inclusion [4]. However, there have been some limitations, such as information asymmetry, high transaction costs, and collateral requirements. These barriers limit smaller firms from benefiting from financial inclusion. Fintech solutions, such as lower transaction costs and geographical expansion, provide an alternative credit assessment [5]. The emergence of Financial

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Technology (Fintech) as a disruptive force offers new opportunities, such as digital credit, mobile wallet, and invoice financing products, combined with new risk-assessment approaches such as machine learning and alternative data. (alternative data, machine learning) [6]. This study aims to ask the question: Does fintech adoption strengthen the positive relationship between financial inclusion and SME growth? Understanding these moderating roles will assist policymakers in designing interventions that go beyond expanding access to ensure inclusive financial services translate into measurable, firm-level growth.

Research Questions and Hypotheses

- What is the impact of Perceived Ease of Use on Financial Inclusion among SMEs in North Central States in Nigeria?
- How does Perceived Usefulness influence Financial Inclusion among SMEs in North Central States in Nigeria?
- To what extent does Perceived Security affect Financial Inclusion among SMEs in North Central States in Nigeria?
- What is the effect of Trust on Financial Inclusion among SMEs in North Central States in Nigeria?

Research Scope

This research investigates the influence of FinTech adoption on the financial inclusion of SMEs in the North Central States of Nigeria. Specifically, the study examines how Perceived Ease of Use, Perceived Usefulness, Perceived Security, and Trust contribute to SMEs' financial inclusion while also exploring the mediating and moderating roles of Digital Financial Literacy (DFL) and Perceived Regulatory Support (PRS). The research focuses on registered SMEs across multiple sectors, including agriculture, trade, manufacturing, and services, and adopts a cross-sectional design to capture the current state of FinTech usage and financial inclusion in the region. The findings are expected to provide region-specific insights into how FinTech can enhance access to financial services and support the growth and sustainability of SMEs in the North Central States of Nigeria, which include six states: Kwara, Kogi, Niger, Nasarawa, Benue, and Plateau.

Significance of the Study

This study is highly significant as it reveals how FinTech adoption can enhance financial inclusion among Small and Medium Enterprises (SMEs) in the North Central States of Nigeria, a region where access to traditional financial services remains limited. By examining the effects of Perceived Ease of Use, Perceived Usefulness, Perceived Security, and Trust, along with the mediating and moderating roles of Digital Financial Literacy (DFL) and Perceived Regulatory Support (PRS), this study identifies the key factors that either facilitate or hinder the adoption of FinTech among SMEs. The findings are expected to assist policymakers, regulatory bodies, and financial institutions in making informed decisions and creating an enabling environment that supports wider adoption of digital financial solutions.

Furthermore, the study contributes valuable insights to the academic discourse on FinTech adoption and financial inclusion in developing economies. It provides a contextual perspective relevant to the North Central States of Nigeria and similar socio-economic settings, offering a foundation for future empirical investigations and practical initiatives aimed at strengthening financial access for SMEs.

LITERATURE REVIEW

This section presents a brief review of financial technology. It mentioned some of the theories and models for Fintech empirical studies of the impacts of Fintech on the growth of SMEs.

The advancement in Information technology (IT) has made it possible to create new financial services referred to as financial technology or Fintech [7]. It simply means money and technology; it is also referred to as the

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delivery of novel financial agreements known as FinTech [8]. Fintech results from the creation of new financial programs capable of impacting an established system entirely [9].

As administrative needs reduced operating costs, international monetary and other monetary institutions sought industrial transformation through innovative business development. Several companies have started to implement online innovations, such as Fintech, to improve their performance and delivery of their financial services[10]. Financial services and products, such as improved wallets, offer higher efficiency with cheaper costs and great convenience by adopting Fintech [11]. Fintech also reduces access limitations by providing mechanical competencies and merging. Fintech allows new entrants the possibility of setting themselves up, presenting modern-day offerings and goods in fee chains [12].

In summary, several empirical studies have shown that Fintech improves microcredit uptake and payment system inclusion. While some studies suggest fintech only benefits firms that are digitally capable, which can lead to a wide gap between the digitally capable firms and the less digitally capable firms [13]. This proposal builds on these streams by explicitly modeling fintech as a moderator and investigating heterogeneity across firm size, sector, and digital readiness.

Financial Inclusion and Perceived Ease of Use

Perceived Ease of Use (PEOU) plays a crucial role in FinTech adoption among SMEs, particularly in situations where limited digital skills and time constraints pose significant challenges. Users are more willing to adopt a technology when they consider it easy to operate, a finding consistently supported across empirical studies [14], [15]. Evidence from the COVID-19 period also demonstrated that ease of use, together with perceived usefulness and system support, was essential for technology adoption among SMEs. PEOU has shown strong influence on behavioral intention, continued usage, and trust in contexts such as Islamic FinTech, P2P lending, and QRIS payment systems [16]. Several studies further suggest that ease of use may even exert a stronger or independent effect compared to perceived usefulness [17]. Additionally, usability has been linked to behavioral intention, satisfaction, and user enjoyment in digital payments and e-money services, especially when supported by adequate literacy and trust levels [18]. Overall, the literature consistently reaffirms that usability remains a central determinant of FinTech adoption across different platforms and geographical contexts [19].

Financial Inclusion, Perceived Usefulness, Perceived Security (PS) Trust (T), Digital Financial Literacy (DFL), and Perceived Regulatory Support (PRS)

Perceived Usefulness (PU) remains one of the most influential predictors of technology adoption, as users are more inclined to embrace digital financial services when they see clear value in improving business performance and operational efficiency[14]. Studies have consistently demonstrated that FinTech solutions are adopted when SMEs believe these technologies enhance financial accessibility, reduce costs, and streamline business transactions. PU also shapes users' confidence in the long-term benefits of using digital platforms, strengthening behavioural intention in contexts such as digital payments, e-banking, and mobile finance [16]. Thus, SMEs that recognize FinTech as a tool for growth and competitiveness are more likely to adopt and continue using such technologies.

In addition to usefulness, security and trust are foundational to the acceptance of FinTech, particularly among SMEs that frequently handle sensitive financial information [20]. Perceived Security (PS) helps reduce concerns over fraud, data breaches, and transactional threats, enabling users to engage more confidently with digital systems [21]. Trust (T), often built through positive service experiences, transparent processes, and credible regulations, reinforces individuals' willingness to rely on technology-enabled financial services. The literature reveals that trust not only supports adoption but also sustains continued usage and confidence in evolving financial technologies across different regions and financial environments.

Digital Financial Literacy (DFL) and Perceived Regulatory Support (PRS) further determine the extent to which SMEs can meaningfully adopt FinTech solutions [22]. Higher financial literacy enables business owners to comprehend the risks, benefits, and operational mechanisms of digital financial tools, thereby enhancing their

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informed adoption decisions [23]. Meanwhile, supportive regulatory frameworks, including consumer protection policies, financial compliance structures, and stable digital infrastructures, help build legitimacy and safeguard usage experiences. DFL and PRS, therefore, act as key facilitators that enhance the effectiveness of PEOU, PU, PS, and trust, enabling SMEs to effectively leverage FinTech for improved financial access and participation.

Conceptual Framework

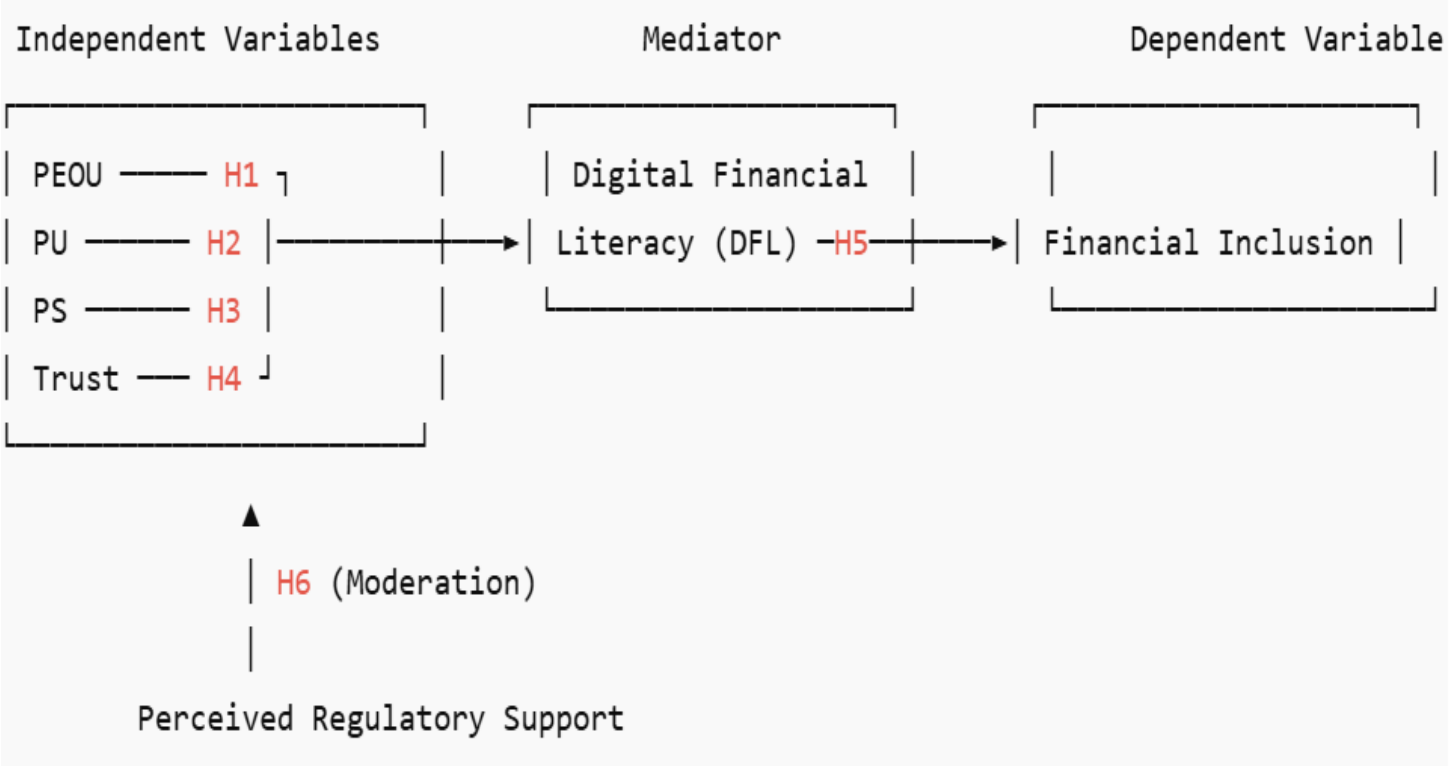

Figure 1: The overall architecture of the conceptual framework

METHODOLOGY

Research Design

The study is grounded in a positivist research paradigm, which emphasizes empirical testing, objective measurement, and hypothesis-driven inquiry. This philosophical stance aligns well with the study's focus on quantitative constructs such as FinTech adoption, digital financial literacy (DFL), and Public Relations Services (PRS). By employing validated questionnaires, the research aims to produce generalizable and replicable results that enhance understanding of the role of FinTech among Nigerian SMEs. Moreover, the positivist approach supports systematic investigation of cause-and-effect relationships, which is vital for informing effective FinTech policies and practices.

Research Approach and Design

This research employs a deductive methodology, beginning with the formulation of hypotheses based on well-established theoretical models and prior empirical studies. These theories are examined through the collection and analysis of primary data obtained from small and medium-sized enterprises in Nigeria's North Central States, which include Benue, Kogi, Kwara, Nasarawa, Niger, Plateau, and the Federal Capital Territory (FCT). A cross-sectional design, enabling data collection at a single point in time, was adopted due to constraints related to time and accessibility. Although this approach limits the ability to infer causality, it remains appropriate for identifying correlations and patterns among variables.

SPSS was selected as the primary analytical tool because of its robustness with small to moderate sample sizes, its support for regression and correlation analyses, and its capacity to test mediation and moderation effects

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simultaneously. Overall, the chosen methodology ensures scientific rigour while remaining sensitive to the contextual limitations associated with data collection in Nigeria.

Population and sampling

The target population for this study comprises Small and Medium Enterprise (SME) owners and managers in the North Central States of Nigeria who are either actively engaged with, or possess substantial knowledge of, FinTech services. A purposive sampling technique was employed to ensure the inclusion of participants who are well-informed and experienced in using digital financial systems. This approach enhances the validity and relevance of the data collected.

The optimal sample size was determined through a G*Power analysis, which indicated that a minimum of 200 responses would be required to detect medium effect sizes with 96% statistical power. This sampling strategy maintains methodological rigour while accommodating the practical constraints of conducting research in a region with logistical and infrastructural challenges, thereby supporting both the feasibility and robustness of the analysis.

Construct Measurement, Indicators, and Sources

This section outlines the measurement instruments used for each construct, the corresponding indicators, and the established scholarly sources from which they were adapted. Validated measurement instruments were employed in this study, with each construct assessed using multiple items adapted from reputable and widely cited sources. Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) were measured following the framework established by Davis (1989). Trust (T) was assessed using items drawn from [24] and [25]. Perceived Security (PS) was measured based on [26], with additional guidance provided by [23] on operationalizing this construct. FinTech Use was evaluated using the measurement approach of [27]. Financial Inclusion (FI) items were adopted from [28], and Digital Financial Literacy (DFL) was measured using scales developed by [29]. Finally, Perceived Risk (PRS) was assessed using items adapted from [25].

Research Instrument

A structured questionnaire served as the primary data collection instrument, designed to capture the study's key constructs, including FinTech usage, PEOU, PU, PS, T, and the dependent variable, FI, as well as the moderating and mediating variables, PRS and DFL. Each construct was operationalised using multiple items measured on a five-point Likert scale ranging from "strongly disagree" to "strongly agree." To ensure content validity, all items were adapted from established and widely validated measurement scales.

Prior to the main data collection, a pilot study involving 30 SME respondents was conducted to assess the clarity, reliability, and cultural appropriateness of the questionnaire items. A few revisions were made based on the feedback received, thereby enhancing the overall validity and suitability of the instrument for the study context.

Data Collection and Analysis

Data were collected using questionnaires made available in both digital and physical formats to maximize accessibility and participation. Descriptive statistics were generated using SPSS version 27 to provide an overview of the respondents and the characteristics of the dataset. Reliability and internal consistency of the measurement scales were assessed using Cronbach's alpha, while correlation analysis was conducted to identify relationships among the variables.

Subsequently, regression analysis was performed to determine the extent to which the independent variables contributed to financial inclusion. A bootstrapping procedure with 5,000 subsamples was employed to evaluate the statistical significance of model parameters. This included mediation analysis for Digital Financial Literacy (DFL) and moderation analysis for Perceived Regulatory Support (PRS), providing deeper insights into the dynamics among the study's variables. Table 1 shows the respondent demographic profile

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RESULT AND DATA ANALYSIS

Table 1 shows the demographic profile of the respondents. The table consists of the variable, category, frequency percentage, valid percentage, and cumulative percentage.

Table 1: Demographic Profile of the Respondents

Variable	Category	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	120	60.0	60.0	60.0
	Female	80	40.0	40.0	100.0
	Total	200	100.0	100.0	
Age	Below 25	40	20.0	20.0	20.0
	26–35	55	27.5	27.5	47.5
	36–45	55	27.5	27.5	75.0
	Above 45	50	25.0	25.0	100.0
	Total	200	100.0	100.0	
Education	Primary	35	17.5	17.5	17.5
	Secondary	67	33.5	33.5	51.0
	Bachelor's Degree	63	31.5	31.5	82.5
	Master's Degree	30	15.0	15.0	97.5
	PhD	5	2.5	2.5	100.0
	Total	200	100.0	100.0	
Business Sector	Agricultural	70	35.0	35.0	35.0
	Manufacturing	51	25.5	25.5	60.5
	Information Technology (IT)	48	24.0	24.0	84.5
	Others	21	10.5	10.5	95.0
	Total	200	100.0	100.0	
Size of Industry	Micro Enterprise (1–9 employees)	35	17.5	17.5	17.5
	Small Enterprise (10–49 employees)	76	38.0	38.0	55.5
	Medium Enterprise (50–249 employees)	44	22.0	22.0	77.5
	Large Enterprise (250+ employees)	45	22.5	22.5	100.0
	Total	200	100.0	100.0	

The demographic profile shows that the study had a total of 200 SME respondents. A majority of respondents were male (60%), while females accounted for 40%. In terms of age distribution, the respondents were fairly spread across different age groups, with the largest proportion falling within the 26–35 and 36–45 brackets (27.5% each). Respondents aged above 45 constituted 25%, and those below 25 represented 20%, indicating that participants were predominantly adults with varying levels of business experience.

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Regarding educational attainment, most respondents possessed at least a secondary education qualification (33.5%) or a bachelor's degree (31.5%). A further 15% held a master's degree and 2.5% had attained a PhD. Meanwhile, 17.5% reported having only primary education. This distribution indicates that the sample included a well-educated group of SME owners and managers, supporting their capability to understand and utilize technological innovations such as FinTech

Business profile findings reveal that 35% of SMEs operate in the agricultural sector, followed by 25.5% in manufacturing, 24% in information technology, and 10.5% in other sectors. With respect to size, the highest proportion of SMEs were small enterprises with 10–49 employees (38%), followed by medium-sized enterprises (22%) and large enterprises (22.5%), while micro businesses represented 17.5% of the sample. This shows a diverse business environment, with a strong representation of growth-oriented enterprises that are positioned to adopt digital financial solutions.

Urinative Analysis

Table 2 shows the descriptive statistics of the research variables.

Table 2: Descriptive statistics of the research variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
PEOU	200	1.25	5.00	4.4542	0.58953
PU	200	1.25	5.00	4.4682	0.52837
PS	200	1.50	5.00	4.4335	0.55147
T	200	1.25	5.00	4.4072	0.52358
FI	200	1.25	5.00	4.5762	0.53151
DFL	200	1.00	5.00	4.4477	0.55003
PRS	200	1.50	5.00	4.5892	0.45986
Valid N(listwise)	200				

The descriptive statistics reveal that respondents reported high perceptions across all factors influencing FinTech adoption and financial inclusion. The mean values for Perceived Ease of Use (PEOU = 4.4542), Perceived Usefulness (PU = 4.4682), Perceived Security (PS = 4.4335), Trust (T = 4.4072), Financial Inclusion (FI = 4.5762), Digital Financial Literacy (DFL = 4.4477), and Perceived Regulatory Support (PRS = 4.5892) are all well above the midpoint of the 5-point Likert scale. This demonstrates that SME owners and managers generally view FinTech systems as highly usable, useful, secure, and trustworthy, while also indicating moderate to strong levels of financial inclusion and digital literacy, along with favourable perceptions of regulatory support.

Additionally, the standard deviation values (ranging from 0.45986 for PRS to 0.58953 for PEOU) indicate low variability among responses, suggesting strong agreement across participants. Overall, these findings suggest that SMEs in the North Central Province of Nigeria maintain positive attitudes toward adopting FinTech and its enabling factors, thereby reinforcing the need for further examination of how these variables contribute to enhanced financial inclusion.

CONCLUSION

The findings of this study highlight that FinTech adoption plays a critical role in advancing financial inclusion among Small and Medium Enterprises (SMEs) in the North Central States in Nigeria. Specifically, Perceived Ease of Use, Perceived Usefulness, Perceived Security, and Trust emerged as the key factors exerting a strong and positive influence on SMEs' engagement with FinTech services. This implies that when digital financial

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platforms are intuitive, deliver tangible value, ensure secure transactions, and maintain a credible reputation, SMEs are more inclined to adopt and depend on them for their financial operations.

Furthermore, the study revealed that the anticipated moderating effects of Digital Financial Literacy (DFL) and Perceived Regulatory Support (PRS) were not statistically significant. This suggests that the positive relationship between FinTech adoption and financial inclusion persists regardless of SMEs' levels of digital financial knowledge or their perceptions of the regulatory framework. This outcome underscores that the primary drivers of financial inclusion lie in the effectiveness, usability, and dependability of FinTech services themselves rather than in external or supportive conditions.

In addition, the research demonstrated FinTech's capacity to address long-standing financing challenges faced by SMEs, such as a lack of collateral, inadequate financial records, and restricted access to formal banking, by providing cost-effective, accessible, and scalable alternatives to traditional financial services. Overall, the study establishes FinTech as a significant catalyst for integrating SMEs into the formal financial system, enhancing operational efficiency, and stimulating economic development in Nigeria, particularly in rural and underserved areas that continue to rely on conventional financial inclusion mechanisms.

RECOMMENDATIONS

Based on the research findings, several recommendations can be proposed to enhance FinTech adoption while simultaneously promoting the financial inclusion of SMEs in the North Central States in Nigeria. First, FinTech developers and service providers should prioritize the design of platforms that are highly user-friendly, secure, and aligned with the operational needs of SMEs. This recommendation is consistent with the evidence showing that Perceived Ease of Use, Perceived Usefulness, Perceived Security, and Trust significantly influence adoption levels. Improving user interfaces, offering clear and simple guidance, and implementing robust security systems can encourage greater uptake, particularly among SMEs with limited prior exposure to digital financial services.

Second, although the relationship between Digital Financial Literacy (DFL) and SMEs' financial inclusion through FinTech adoption was not statistically significant, the importance of training and awareness initiatives should not be underestimated. Such programmes are essential to help SMEs navigate digital technologies effectively and to reduce risks associated with fraud, misuse of funds, or poor financial management arising from limited knowledge.

Furthermore, policymakers and regulatory authorities should continue to develop supportive, transparent, and consistent regulatory frameworks for FinTech, even though perceived regulatory support did not emerge as a strong moderating factor. A stable regulatory environment fosters long-term trust and confidence in digital financial services. At the same time, SMEs themselves should actively embrace FinTech solutions, stay informed about technological innovations, and progressively adopt digital payment, lending, and banking services to overcome persistent barriers associated with traditional finance.

If these stakeholders implement the proposed strategies collaboratively, they can strengthen financial inclusion, support SME development, and contribute to sustained economic growth in the unbanked and underserved areas of the North Central States in Nigeria.

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