

FINANCIAL TECHNOLOGY AS A CATALYST FOR DIGITAL FINANCIAL INCLUSION AMONG SMES IN ABUJA, NIGERIA

ODEH, Job Adah *¹, and EZEKIEL, Rose ²

Department of Business Administration

University of Abuja, Nigeria

Email: odeh.jobadah@gmail.com

ABSTRACT

The rapid expansion of financial technology (fintech) has significantly transformed the global financial landscape, offering substantial opportunities to enhance financial inclusion. Specifically, point-of-sale (POS) systems and Automated Teller Machines (ATMs) have played a pivotal role in improving access to financial services, particularly for Small and Medium Enterprises (SMEs). This research explores how financial technologies, such as mobile banking, contribute to the financial inclusion of SMEs in Abuja, Nigeria. The primary aim of the study was to examine how these tools improve SMEs' access to, usage of, and quality of financial services. Using a descriptive survey research design, the study focused on a population of 10,265 SMEs, from which a sample size of 385 was calculated using the Yamane formula. A cluster sampling technique was employed to ensure a representative sample. Data was collected through a structured questionnaire, and the hypotheses were tested using linear regression with Statistical Package for the Social Sciences (SPSS) version 27.0. The results indicated that POS services have a significant positive impact on SMEs' access to financial services, as reflected in an R^2 value of 0.695. The study concluded that POS services play a crucial role in bridging the gap between SMEs and financial institutions. Based on these findings, the study recommends that policymakers and financial institutions invest in user-friendly, accessible mobile banking platforms designed to meet the unique needs of SMEs. Additionally, it suggests implementing comprehensive customer education programs to improve digital literacy and foster greater adoption of mobile banking for account management. Furthermore, collaboration between mobile network providers and financial institutions should be prioritized to enhance network coverage and ensure uninterrupted service.

Keywords: Financial Technology, Small and Medium Enterprises Financial Inclusion

INTRODUCTION

The global financial landscape has experienced a profound transformation over the past decade, driven largely by the emergence and rapid adoption of financial technology (FinTech). FinTech has redefined the delivery of financial services, enabling

faster, cheaper, and more inclusive financial transactions across diverse markets. From advanced economies to developing nations, FinTech solutions have played a critical role in bridging financial access gaps, particularly for previously underserved populations such as small and medium enterprises (SMEs). According to the World Bank (2022), digital

financial services have the potential to expand formal financial access to over 1.6 billion adults and millions of small businesses globally. As traditional banking channels prove inadequate or inaccessible for many entrepreneurs, FinTech is increasingly recognized as a pivotal enabler of inclusive financial ecosystems.

Financial technology refers to the integration of digital innovations into financial service delivery, including tools and platforms that facilitate transactions, credit access, savings, investments, and insurance through technology-driven solutions. For SMEs that are often constrained by lack of collateral, poor credit history, and bureaucratic lending procedures—FinTech offers an alternative route to accessing critical financial resources. Scholars have identified three major dimensions of FinTech relevant to SME financial inclusion: mobile banking platforms, point-of-sale (POS) innovations, and internet/web-based payment systems (Omar & Musa, 2022; Adegbite & Ayinde, 2023).

Mobile banking platforms enable entrepreneurs to conduct transactions, check balances, and access credit services using mobile phones without relying on physical bank branches. POS innovations allow small businesses to accept digital payments in real-time, improving cash flow, customer service, and formalization. Meanwhile, internet/web-based payment systems such as web banking portals, fintech apps, and third-party digital wallets (e.g., Paystack, Flutterwave) facilitate faster and safer financial transactions across different geographies and time zones. Each of these dimensions plays a unique role in widening financial access and operational efficiency for SMEs.

Financial inclusion, in this context, refers to the ability of SMEs to access and effectively

use formal financial services at affordable costs. In Nigeria, and particularly within Abuja's SME ecosystem, financial inclusion remains an important yet unevenly distributed economic goal. SMEs constitute over 90% of Nigeria's enterprises and contribute more than 45% of its GDP (SMEDAN, 2021), yet many remain financially excluded or underserved. This study adopts four dimensions of financial inclusion to examine its impact on SMEs: account ownership, access to credit, usage of financial services, and perceived quality of financial services.

Account ownership refers to SMEs having and maintaining operational bank or mobile money accounts. Access to credit denotes the availability of loans or credit facilities tailored to small business needs. Usage of financial services captures the frequency and diversity of financial tools being utilized, such as savings, transfers, or insurance products. Lastly, perceived quality of financial services reflects SME owners' assessment of service reliability, affordability, and relevance to their business operations.

Although FinTech adoption is expanding across Nigeria, the extent to which it enhances financial inclusion for SMEs in Abuja remains uncertain. The interplay between FinTech innovations and financial inclusion outcomes may vary depending on infrastructural readiness, regulatory environment, digital literacy levels, and business size or sector. For instance, while mobile banking may increase account ownership, it may not automatically guarantee access to credit or improve perceived service quality. Likewise, a business's ability to benefit from POS or web-based platforms could be influenced by internet connectivity, consumer trust, or transaction charges. These varying dynamics

suggest that the relationship between FinTech and SME financial inclusion in Abuja warrants deeper empirical exploration.

Despite the potential of FinTech, many Nigerian SMEs continue to grapple with financial exclusion. Limited digital infrastructure, erratic power supply, weak internet penetration, and regulatory uncertainties remain persistent barriers. Moreover, a significant portion of SME operators lack adequate digital literacy, preventing them from adopting or fully utilizing available FinTech solutions (CBN, 2023). High service fees, complex user interfaces, and low trust in digital systems further exacerbate the problem. Regulatory frameworks also struggle to keep pace with innovation, sometimes creating compliance burdens or uncertainties that discourage adoption by small business owners.

In light of these realities, it is imperative to undertake this study. The current economic environment in Nigeria—characterized by inflationary pressures, currency devaluation, and rising unemployment—demands that policy makers and financial institutions prioritize inclusive growth. Understanding how financial technology affects the financial inclusion of SMEs in Abuja is critical for designing interventions that not only expand access to finance but also strengthen the economic resilience of the country's most vital enterprise segment. This study therefore aims to generate evidence-based insights that will inform technology adoption strategies, regulatory frameworks, and inclusive financial policies in Nigeria. The following research questions were formulated to guide this study:

- i. What is the impact of POS services on SMEs' access to financial services in Abuja?

- ii. How does ATM availability influence the usage of financial services by SMEs in Abuja?

LITERATURE REVIEW

Conceptual Framework

Concept of Financial Technology

Financial technology, widely known as FinTech, refers to the innovative use of technology to enhance or streamline financial services and operations. This field integrates cutting-edge software, algorithms, and digital platforms to transform financial transactions, lending, insurance, and wealth management processes. FinTech is at the forefront of modernizing and democratizing the financial sector, driven by advancements in the digital economy. It introduces more accessible, efficient, and cost-effective alternatives to traditional financial systems. Examples of FinTech applications include blockchain, digital currencies, mobile payment solutions, peer-to-peer lending platforms, and robo-advisors, all designed to bridge the gap between consumers and financial institutions (Hua & Huang, 2020).

One of the most transformative FinTech innovations is mobile banking, which allows users to access banking services conveniently through their smartphones. This technology has revolutionized financial management, particularly in developing regions with limited access to traditional banking infrastructure. As mobile networks expand, mobile banking is credited with promoting financial inclusion by enabling previously unbanked individuals to open accounts, make payments, transfer funds, and access loans without requiring physical bank branches (Rahadjeng et al., 2023). Likewise, web-based payment systems and Point of Sale (POS) technologies have significantly facilitated secure and convenient

transactions, benefiting small and medium-sized enterprises (SMEs) by improving financial accessibility and enabling economic growth (Nugraha et al., 2022).

Additionally, Automated Teller Machines (ATMs) have redefined how customers interact with banks by offering 24/7 access to essential services such as cash withdrawals, deposits, and account inquiries. This accessibility reduces transaction time and cost while contributing to a more efficient banking experience. FinTech's ability to integrate these technologies into cohesive ecosystems enhances customer experience and satisfaction by providing personalized and user-friendly financial solutions (Zhang et al., 2023).

The rise of FinTech has not only broadened access to financial services but has also elevated the quality of these services. By leveraging digital platforms, consumers can now enjoy faster, more transparent, and customized financial experiences. The convenience of real-time transactions and reduced costs has set new standards for customer expectations. FinTech thus plays a pivotal role in improving financial service delivery, ensuring that financial inclusion emphasizes both accessibility and quality (Coffie et al., 2020).

In summary, financial technology encompasses a diverse array of innovative solutions aimed at revolutionizing financial systems. By modernizing traditional banking practices, FinTech fosters financial inclusion, particularly in underserved areas, empowering individuals and businesses to participate more actively in the economy. Innovations such as mobile banking, POS systems, ATMs, and web payment platforms continue to shape the financial landscape, enhancing accessibility and service quality

while creating new opportunities for economic growth.

Point of Sale (POS)

The Point of Sale (POS) system enables electronic payment for goods and services at the location where transactions occur, serving as a key component of the digital payment ecosystem. POS systems allow merchants to process credit and debit card payments seamlessly through physical terminals or mobile applications, ensuring fast and secure financial transactions. They support diverse payment methods, including card-based transactions, mobile wallets, and contactless payments, thereby improving commercial efficiency and customer convenience (Chen & Zhang, 2022).

POS technology is particularly crucial in advancing financial inclusion, especially in developing economies where access to traditional banking is limited. By enabling SMEs to accept digital payments, POS systems integrate them into the formal economy, allowing businesses to offer cashless transaction options. Research by Sani and Raji (2023) highlights how the widespread adoption of POS systems in Africa has expanded SMEs' customer bases, boosted sales, and improved financial recordkeeping. Moreover, POS systems enhance customer experiences by enabling quicker, more secure payments while reducing reliance on physical cash and mitigating theft and fraud risks (Khan & Yousuf, 2021).

For underserved populations, POS terminals provide an accessible gateway to financial services without requiring a bank account or physical bank visits. This accessibility fosters greater participation in the financial ecosystem, particularly among marginalized groups such as women and low-income households (Alhassan & Obuobi, 2022). The

technology also helps SMEs improve operational efficiency, manage cash flow, and reduce costs, enabling businesses to grow sustainably and provide better customer service (Olufemi & Akintoye, 2020).

In conclusion, POS systems have revolutionized payment processing by enhancing convenience, promoting financial inclusion, and supporting SME growth. As POS adoption continues to expand, it plays a vital role in advancing the transition to cashless economies, improving transaction efficiency, and fostering economic development.

Automated Teller Machine (ATM)

The Automated Teller Machine (ATM) is a cornerstone of the modern financial system, offering automated, round-the-clock access to banking services. Initially designed for cash withdrawals, ATMs now provide additional services such as deposits, fund transfers, bill payments, and balance inquiries. This convenience eliminates the need for customers to visit a bank branch during working hours, significantly improving accessibility and operational efficiency in the banking sector (Singh & Kumar, 2022).

ATMs have played a critical role in advancing financial inclusion by bridging the gap between unbanked populations and the formal financial system, particularly in regions with limited banking infrastructure. They enable individuals to perform essential transactions such as cash withdrawals and transfers, which are vital for managing daily finances (Mohiuddin & Khatun, 2022).

For SMEs, ATMs are indispensable for ensuring smooth operations. They provide easy access to cash for daily transactions, payroll, and working capital, reducing the time and cost of conducting financial

activities (Zhao & Wang, 2023). Additionally, ATMs enhance security by reducing cash handling and lowering the risk of theft, which is especially valuable for small businesses with limited resources for security measures (Oladeji & Adeyemi, 2021).

Integration with digital platforms has further extended the utility of ATMs, allowing customers to access their accounts from multiple locations and enabling real-time financial management. This flexibility benefits SMEs, ensuring they can make swift financial decisions to sustain operations and growth (Khan & Qureshi, 2023).

In summary, ATMs remain a critical technology in modern banking, enhancing convenience, accessibility, and security. Their role in supporting SMEs and underserved populations underscores their importance in promoting financial inclusion and driving economic participation in the digital era.

Financial Inclusion

Financial inclusion refers to the provision of accessible and affordable financial services to individuals and businesses, regardless of their income level, location, or economic status. This concept plays a vital role in promoting economic growth and addressing inequality by enabling access to essential financial products like savings accounts, credit, insurance, and payment services (Sarma, 2020). The underlying principle of financial inclusion is that access to these services empowers individuals and small enterprises to enhance their financial well-being, invest in opportunities, and mitigate risks. This is especially significant in developing economies, where many people are excluded from formal financial systems due to barriers like geographic isolation,

illiteracy, and distrust of financial institutions (Kiptum & Ngunjiri, 2021).

Beyond the basic provision of financial services, financial inclusion fosters economic empowerment for marginalized groups, including low-income individuals, women, rural residents, and small businesses. By providing greater access to credit, savings, and insurance, financial inclusion helps reduce poverty, encourage entrepreneurship, and facilitate wealth accumulation (Andrianova & Naydenova, 2022). It also enables better financial management, preparation for financial shocks, and investment in long-term goals such as education, healthcare, and housing (Zhang et al., 2023). For small and medium-sized enterprises (SMEs), financial inclusion offers improved access to capital, which is often a significant barrier to growth. SMEs with access to financial services are more likely to expand, create jobs, and drive local economic development (Olaniran et al., 2020).

The emergence of financial technologies (FinTech) has transformed financial inclusion, especially in developing countries. Innovations like digital platforms, mobile banking, and point-of-sale (POS) systems have made financial services more accessible to underserved populations by reducing the dependence on physical bank branches. These technologies offer cost-effective and efficient ways of delivering financial services, allowing low-income households and small businesses to participate in formal financial systems (Hua & Huang, 2020). Additionally, alternative credit scoring models enabled by FinTech have made it possible to evaluate creditworthiness without traditional collateral or financial history (Rahadjeng et al., 2023).

However, achieving comprehensive financial inclusion still faces obstacles, particularly in

developing regions. Challenges such as limited digital literacy, distrust of digital platforms, inadequate regulatory frameworks, and the persistence of high costs for financial services hinder widespread adoption. Moreover, the digital divide prevents some populations from benefiting fully from FinTech solutions. Concerns about data security and privacy also discourage engagement with digital financial services (Nugraha et al., 2022).

Financial inclusion remains a cornerstone of economic development and poverty reduction, providing tools that enhance financial security and growth for individuals and businesses. While technological advancements have expanded access, addressing the remaining challenges is critical to achieving universal financial inclusion, particularly in regions like Africa. By improving accessibility, affordability, and security, financial inclusion can significantly contribute to sustainable development and foster greater economic equality.

Access to Financial Services

Access to financial services refers to the ability of individuals, households, and businesses to obtain various financial products and services, such as savings accounts, loans, insurance, and payment systems, from formal financial institutions (Kimenyi & Mbaku, 2021). It is a fundamental element of financial inclusion, enabling people to manage their money, mitigate risks, and achieve financial goals. For SMEs, access to financial services is vital for growth and sustainability, facilitating access to capital, efficient transactions, and effective risk management.

In developing countries, access to financial services has historically been limited. Financial institutions are often concentrated in urban areas, leaving rural populations

underserved. High costs, including travel expenses and minimum balance requirements, further exacerbate these challenges, particularly for marginalized communities (Rahadjeng et al., 2023). For SMEs, limited access to financial services can restrict growth and hinder their potential to contribute to economic development.

The advent of financial technologies has significantly improved access to financial services. Mobile banking, POS systems, and digital payment platforms have bridged gaps in traditional banking infrastructure, particularly in rural areas. These innovations provide services like mobile money transfers, bill payments, and loan disbursements, making financial products more accessible to underserved populations (Adesina & Alabi, 2019). Regulatory reforms, including relaxed Know Your Customer (KYC) requirements and digital financial literacy initiatives, have further improved access for excluded groups (Zhang et al., 2023).

Despite these advancements, challenges persist. Financial literacy remains a critical issue, as many individuals and SMEs struggle to understand and utilize digital financial tools effectively. Concerns about the security and reliability of digital platforms also limit engagement. For SMEs, additional barriers include stringent lending requirements, high-interest rates, and the lack of tailored financial products (Ojo & Oye, 2018).

Enhancing access to financial services is crucial for promoting financial inclusion and economic development. By addressing these barriers, particularly in underserved regions, more individuals and businesses can leverage the benefits of formal financial systems to improve their financial stability and growth.

Usage of Financial Services

Usage of financial services refers to the extent to which individuals or businesses actively engage with available financial products, such as savings accounts, loans, insurance, and digital payment systems. While access focuses on availability, usage emphasizes the frequency and effectiveness of interaction with these services (Ojo & Oye, 2018). Effective usage of financial services is essential for financial inclusion, as it enables individuals and SMEs to manage risks, build savings, and invest in opportunities.

Several factors influence the usage of financial services, including financial literacy, ease of access, and perceived benefits. In developing economies, even when financial services are accessible, usage often remains low due to barriers such as limited understanding of digital tools, high transaction costs, and distrust of formal financial systems (Coffie et al., 2020). This gap undermines the potential of financial inclusion, as individuals and SMEs may not fully utilize these services to improve their financial well-being or achieve growth.

For SMEs, the active use of financial services is particularly critical for operational efficiency and sustainability. Engaging with financial products like mobile banking for transactions, credit for expansion, and insurance for risk management allows SMEs to manage cash flow, expand operations, and protect against financial risks. However, barriers such as inadequate technological infrastructure, high fees, and limited digital literacy often hinder adoption (Ene & Adaji, 2022).

The rise of financial technologies has provided significant opportunities to enhance the usage of financial services. Mobile banking and digital payment platforms have made it more convenient for individuals and businesses to access their accounts, make

payments, and transfer funds. Financial literacy initiatives and user-friendly platforms are essential to encourage adoption and maximize the benefits of digital financial services (Nugraha et al., 2022).

Usage of financial services is a critical component of financial inclusion, determining how effectively individuals and SMEs can benefit from available financial products. Overcoming barriers such as financial illiteracy, trust issues, and lack of tailored products is essential for increasing engagement and ensuring that financial technologies fulfill their potential to drive economic growth and inclusion.

Theoretical Framework

This study is anchored on the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh, Morris, Davis, and Davis in 2003. UTAUT is a robust model that integrates elements from eight previously established technology adoption theories, such as the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), and the Diffusion of Innovation Theory. The central assumption of UTAUT is that user behaviour toward technology adoption is determined by four primary constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. These factors are moderated by variables such as age, gender, experience, and voluntariness of use.

The strength of UTAUT lies in its comprehensiveness and empirical validation, as it has been found to explain up to 70% of the variance in behavioural intention to use technology. This makes it particularly suitable for examining how SMEs in Abuja accept and utilize FinTech tools. However, the model has been criticized for its complexity and the over-dependence on contextual factors, which may not be

uniformly applicable across different environments. Moreover, it does not directly account for post-adoption behaviours such as continued use or innovation resistance, which may be relevant in the context of small businesses.

Applying UTAUT to this study, the model provides a useful lens for understanding why SMEs adopt financial technology platforms and how such adoption influences their financial inclusion outcomes. Performance expectancy can be seen in SMEs' expectations that FinTech will enhance their financial operations. Effort expectancy reflects how easy or difficult they perceive the tools to be. Social influence relates to how peers and business networks encourage technology use, while facilitating conditions include infrastructure, internet access, and regulatory support. By using UTAUT, the study gains theoretical grounding to assess the complex relationship between technology and inclusion in the SME context.

Empirical Review

Chakraborty and Saha (2022) conducted a study in rural India to examine how Automated Teller Machines (ATMs) contribute to financial inclusion. Using a mixed-methods design, they collected data from 300 rural residents who use ATMs, selected through stratified random sampling. Both structured questionnaires and interviews were used to gather quantitative and qualitative data, which were analyzed through descriptive statistics and thematic analysis. The findings indicated that ATMs improve access to financial services, such as cash withdrawals, thereby increasing banking participation in rural areas. However, the study's limitations included potential biases in self-reported data and a sample that may not fully represent all rural demographics. Future research could expand the sample size

and incorporate longitudinal studies to observe the long-term impact on financial inclusion.

Chen and Li (2021) examined the role of ATMs in promoting financial inclusion in developing countries. They employed a quantitative design and surveyed 400 ATM users in selected regions with limited banking access, using stratified random sampling. Data collection included structured questionnaires assessing ATM usage and its effects on financial inclusion, which were analyzed using descriptive statistics and regression analysis. Their findings revealed that ATMs significantly enhance financial access, bridging gaps for underserved populations. However, limitations included potential self-report biases and the focus on specific regions, which may not represent the broader experiences of developing countries. Future studies could benefit from a mixed-methods approach combining both quantitative and qualitative data.

Adesina and Alabi (2019) studied the relationship between financial inclusion and the sustainability of small and medium enterprises (SMEs) in Nigeria, using a mixed-methods design. Their sample of 150 businesses was selected purposively. They used structured questionnaires and semi-structured interviews to gather data, which were analyzed using descriptive statistics and thematic analysis. The findings suggested that financial inclusion is crucial for SME sustainability, enhancing access to capital and improving operational efficiency. However, the study faced limitations in its reliance on self-reported data and its narrow geographical focus. Future research could employ a larger, more diverse sample and incorporate longitudinal studies to assess long-term effects.

Agarwal and Kumar (2022) explored the impact of web payment systems on SMEs in India. Using a quantitative design and stratified random sampling, they surveyed 200 SMEs to assess the benefits and challenges of adopting digital payment solutions. Their findings indicated that web payment systems improve efficiency, customer satisfaction, and market reach, though challenges such as security concerns and technological barriers remain. The study's reliance on self-reported data posed a potential bias, and future research could integrate qualitative methods to better understand the challenges SMEs face with web payments.

Muriithi and Gikandi (2021) investigated how security and reliability in mobile banking impact consumer trust in Kenya. Using a quantitative approach, they surveyed 400 mobile banking users through stratified random sampling. Data were analyzed using descriptive statistics and regression analysis, revealing that security and reliability are crucial for consumer trust, with security concerns being the most significant factor. Limitations included potential biases from self-reported data and the cross-sectional nature of the study. Future research could adopt a longitudinal approach and qualitative methods to deepen the understanding of trust dynamics in mobile banking.

Ali and Yasir (2022) explored security measures in web payment systems and their role in building trust in digital transactions, using a qualitative design. Their sample of 150 respondents was selected purposively, and data were gathered through semi-structured interviews and focus group discussions. The findings emphasized that effective security measures, such as encryption and two-factor authentication, are key to enhancing trust in digital transactions. However, the study's reliance on qualitative

data may not fully reflect the views of the broader population, and future research could employ a mixed-methods approach for a more comprehensive understanding.

Kimenyi and Mbaku (2021) studied the impact of access to financial services on the economic empowerment of SMEs across various African countries. Using a quantitative approach and stratified random sampling, they surveyed 500 SMEs. Their findings showed that improved access to financial services boosts economic empowerment by supporting investment, expanding operations, and enhancing productivity. The study's limitations included self-report biases and its cross-sectional nature, which restricts long-term insights. Future research could employ a longitudinal design and integrate qualitative methods to better understand the long-term effects of financial service access on economic empowerment.

Literature Gaps

The existing literature highlights several gaps regarding the impact of financial technology on financial inclusion and the performance of SMEs, especially in Nigeria. Studies such as those by Chakraborty and Saha (2022) and Chen and Li (2021) underscore the role of ATMs in improving financial access but rely on self-reported data, which can introduce bias and limit the applicability of the findings. Research by Adesina and Alabi (2019) on financial inclusion and SME sustainability is geographically limited, potentially overlooking broader implications. Additionally, while Agarwal and Kumar (2022) highlight the benefits of web payment systems for SMEs, they also note challenges such as security concerns and technological barriers. Moreover, there is a lack of longitudinal studies that explore the long-term effects of financial technology on

financial inclusion and business performance. Future research should adopt mixed methods approaches to combine quantitative data with qualitative insights for a deeper understanding of these issues within Nigeria's dynamic economic environment.

METHODOLOGY

The methodology for this study focused on assessing the impact of financial technology on the financial inclusion of small and medium-sized enterprises (SMEs) in Nigeria's Federal Capital Territory (FCT), specifically in Abuja. The research encompassed the six administrative councils of Abuja: AMAC, Bwari, Gwagwalada, Kuje, Kwali, and Abaji, covering an area of approximately 7,315 square kilometers. Utilizing a descriptive survey design, the study examined how fintech tools such as Point of Sale (POS) systems and Automated Teller Machines (ATMs) influenced SMEs' access to financial services and their usage patterns. The study population consisted of 10,265 registered SMEs in Abuja, from which a sample size of 462 was calculated using Yamane's formula with an added 20% safety margin. Cluster sampling was implemented to ensure representative coverage across different geographical areas and business sectors. Data collection involved distributing structured questionnaires to SME owners and managers, which included demographic questions and a 5-point Likert scale to evaluate the impact of fintech. The analytical approach combined descriptive statistics with inferential techniques, particularly Ordinary Least Squares Regression Analysis. The study's validity was confirmed through expert review and factor analysis, while reliability was assessed using Cronbach's Alpha testing. All

variables—POS systems, ATMs, access to financial services, and usage of financial services—demonstrated satisfactory internal consistency values ranging from 0.79 to 0.83, exceeding the acceptable threshold of 0.70.

RESULTS AND DISCUSSIONS

This section presents the analysis and interpretation of the data collected in the study. It includes descriptive statistics that provide an overview of the sample's demographic characteristics, followed by inferential statistics to assess the impact of financial technology (independent variables: mobile banking,) on financial inclusion outcomes for SMEs in Abuja (dependent variables: account opening). The data analysis is structured according to the research objectives, using Ordinary Least Squares (OLS) to test the formulated hypotheses. The findings are presented with relevant tables, and their implications are

discussed in alignment with previous literature to provide a comprehensive understanding of the impact of financial technology on SMEs' financial inclusion in the region.

Out of 462 distributed copies of questionnaire, 398 were successfully returned, yielding a response rate of 86%. Conversely, 64 copies of questionnaire were unreturned, accounting for 14% of the total. The high response rate of 86% suggests a robust level of participation from the respondents, which enhances the reliability and generalizability of the data collected. This strong response rate provides a solid foundation for data analysis, as it reflects a broad range of views and experiences regarding the impact of financial technology on SMEs' financial inclusion in Abuja. Additionally, the low non-response rate minimizes the likelihood of non-response bias, thereby supporting the validity of the study's findings.

Test of Hypotheses

Hypothesis One

H₀₁: POS services do not have any significant impact on SMEs' access to financial services in Abuja.

$$AFSi = \beta_0 + \beta_1 POS_i + \varepsilon_i \dots\dots\dots 3.1$$

Table 1		Model Summary		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.834 ^a	.695	.694	.28801

a. Predictors: (Constant), POS

Source: SPSS Output Version 27.0

Table 1 presents the model summary for the regression analysis assessing the impact of POS services on SMEs' access to financial services (AFS) in Abuja. The R-value of 0.834 indicates a strong positive correlation

between POS services and access to financial services. The R Square value of 0.695 implies that 69.5% of the variation in SMEs' access to financial services can be explained by POS services, demonstrating a substantial

predictive capability. The adjusted R Square of 0.694 accounts for model complexity and confirms the robustness of the result. With a standard error of the estimate at 0.28801, the model exhibits a reasonable level of accuracy. These findings suggest that POS

services significantly contribute to SMEs' access to financial services. Consequently, the null hypothesis (H_{02}) is rejected, affirming the substantial impact of POS services on improving financial accessibility for SMEs in Abuja.

Table 2 ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	74.927	1	74.927	903.312	.000 ^b
	Residual	32.847	396	.083		
	Total	107.774	397			

a. Dependent Variable: AFS

b. Predictors: (Constant), POS

Source: SPSS Output Version 27.0

Table 2 displays the ANOVA results for the regression model examining the impact of POS services on SMEs' access to financial services (AFS) in Abuja. The analysis reveals a regression sum of squares (74.927) significantly larger than the residual sum of squares (32.847), indicating that the model explains a substantial portion of the variance in AFS. The F-statistic value of 903.312 is highly significant ($p = 0.000$), demonstrating

that the relationship between POS services and access to financial services is statistically significant. This result provides strong evidence to reject the null hypothesis (H_{02}), confirming that POS services have a significant impact on improving SMEs' access to financial services in Abuja. This highlights the importance of POS services as a critical financial inclusion tool for SMEs.

Table 3 Coefficients^a

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.155	.096		11.979	.000
	POS	.728	.024	.834	30.055	.000

a. Dependent Variable: AFS

Source: SPSS Output Version 27.0

Table 3 presents the coefficients for the regression model assessing the impact of POS services on SMEs' access to financial services (AFS) in Abuja. The unstandardized coefficient (B) for POS services is 0.728, indicating that for every unit increase in POS

usage, there is a 0.728-unit improvement in access to financial services. The standardized Beta coefficient of 0.834 signifies a strong positive relationship between POS services and AFS. The t-value (30.055) is highly significant ($p = 0.000$), confirming the

reliability of this relationship. Based on these results, the null hypothesis (H_{02}) is rejected, affirming that POS services significantly enhance SMEs' access to financial services in

Abuja. This underscores the critical role of POS services in fostering financial inclusion and supporting SMEs' operational capabilities.

Hypothesis Three

H₀₂: ATM availability does not significantly influence the usage of financial services by SMEs in Abuja.

$$U_{Fsi} = \beta_0 + \beta_1 A_{Tmi} + \epsilon_i \dots\dots\dots 3.2$$

Table 4 **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.736 ^a	.542	.541	.40504

a. Predictors: (Constant), ATM

Source: SPSS Output Version 27.0

Table 4 provides the model summary for the regression analysis evaluating the influence of ATM availability on the usage of financial services (UFS) by SMEs in Abuja. The R-value of 0.736 indicates a strong positive correlation between ATM availability and UFS. The R Square value of 0.542 implies that 54.2% of the variance in UFS is explained by ATM availability, suggesting a significant impact. The adjusted R Square of

0.541 confirms the model's robustness and reliability. Given this strong explanatory power, the results imply that ATM availability significantly influences SMEs' usage of financial services. This finding suggests that ATM services play a crucial role in promoting financial inclusion and accessibility for SMEs in Abuja, thereby providing grounds to reject the null hypothesis (H_{03}).

Table 5 **ANOVA^a**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.863	1	76.863	468.516	.000 ^b
	Residual	64.966	396	.164		
	Total	141.830	397			

a. Dependent Variable: UFS

b. Predictors: (Constant), ATM

Source: SPSS Output Version 27.0

Table 5 presents the ANOVA results for the regression model assessing the effect of ATM availability on the usage of financial services (UFS) by SMEs in Abuja. The F-value of 468.516 and the corresponding significance

level ($p = 0.000$) indicate that the model is statistically significant. This suggests that ATM availability contributes meaningfully to explaining variations in the usage of financial services. The low residual mean square

(0.164) further supports the model's fit. Based on these findings, the null hypothesis (H_{03}), which states that ATM availability does not significantly influence the usage of

financial services by SMEs, is rejected. This implies that ATM services are a critical factor in enhancing financial service usage among SMEs in Abuja.

Table 6 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.444	.157		2.825	.005
	ATM	.840	.039	.736	21.645	.000

a. Dependent Variable: UFS

Source: SPSS Output Version 27.0

Table 6 above presents the coefficients from a regression analysis examining the influence of ATM availability on the usage of financial services by SMEs in Abuja. The results show that the unstandardized coefficient for ATM availability is 0.840, with a standard error of 0.039, indicating a strong positive relationship between ATM availability and the usage of financial services (UFS). The standardized coefficient (Beta) is 0.736, which suggests that ATM availability accounts for a significant proportion of the variance in financial service usage. The t-value of 21.645 and a significance level (p-value) of 0.000 further confirm that this relationship is statistically significant.

The implications of these findings are substantial for the study, as they suggest that increased ATM availability significantly enhances the likelihood that SMEs will utilize financial services, thus supporting the notion that access to banking infrastructure is crucial for financial engagement among small and medium enterprises. Consequently, based on this evidence, we reject the null hypothesis (H_{03}) that states ATM availability does not significantly influence the usage of financial services by SMEs in Abuja. This indicates that improving ATM access could

be a key strategy for increasing financial service utilization among SMEs, ultimately contributing to their operational efficiency and growth.

Discussion of Findings

This section discusses the findings of the study in relation to each hypothesis, supported by empirical and theoretical perspectives. The study's findings are interpreted in the context of existing literature and theoretical frameworks, emphasizing the significance of financial technology in driving financial inclusion for SMEs in Abuja.

The analysis revealed that POS services significantly enhance SMEs' access to financial services, as evidenced by the R^2 value of 0.695. POS systems offer SMEs real-time transaction processing, improving their operational efficiency and financial accessibility. This aligns with Adesina and Alabi (2019), who observed that POS services facilitate financial inclusion by bridging the gap between SMEs and financial institutions. Furthermore, Agarwal and Kumar (2022) highlighted that POS technology reduces the dependency on cash-

based transactions, fostering access to broader financial services.

These findings resonate with the Diffusion of Innovation Theory, which explains the rapid adoption of innovative technologies such as POS by SMEs due to their perceived advantages. However, Muriithi and Gikandi (2021) caution that technical issues, such as unreliable network connectivity, may hinder POS efficiency, posing a challenge to their full adoption. Despite such constraints, POS services had a more significant impact than mobile banking in enhancing access to financial services, making them a critical enabler of financial inclusion for SMEs.

The study found that ATM availability significantly influences SMEs' usage of financial services, with an R^2 value of 0.542. ATMs provide SMEs with convenient access to cash, ensuring smooth financial operations. This finding is consistent with Ibrahim and Ibrahim (2021), who highlighted that ATMs serve as essential infrastructure for enhancing financial transactions among SMEs. Similarly, Ali and Yasir (2022) noted that ATM availability reduces transaction costs and fosters SME financial participation.

From a theoretical perspective, the Financial Intermediation Theory explains how ATMs act as intermediaries, facilitating financial transactions and improving service delivery for SMEs. However, Kimenyi and Mbaku (2021) argue that limited ATM coverage in rural areas poses a significant challenge to their effectiveness, slightly contradicting this study's findings. Nonetheless, ATMs demonstrated a moderate impact compared to POS services and web payment platforms, signifying their relevance in specific transactional contexts.

CONCLUSIONS AND RECOMMENDATIONS

The findings indicate that POS services significantly enhance SMEs' access to financial services, effectively bridging the gap between financial institutions and small businesses. The convenience and widespread adoption of POS technology make it an essential tool for SMEs aiming to improve their cash flow and customer financial interactions. Similarly, the availability of ATMs was found to have a substantial influence on the usage of financial services, underscoring their importance in providing reliable and efficient access to funds. This reinforces the role of ATMs as a complementary resource in promoting financial inclusion, especially in cash-dependent economies like Nigeria.

Based on the study's hypotheses and key insights, the following recommendations are proposed:

Enhancing Mobile Banking Services: Policymakers and financial institutions should invest in mobile banking platforms that are user-friendly, accessible, and tailored to the specific needs of SMEs. Efforts should include robust customer education initiatives to improve digital literacy and encourage the adoption of mobile banking as a primary channel for opening and managing accounts. Mobile network providers should collaborate with financial institutions to expand network coverage and ensure uninterrupted service.

Promoting the Deployment of POS Services: Financial institutions and fintech providers should focus on expanding the availability of POS terminals across SME clusters, particularly in underserved areas. Subsidies or grants should be provided to SMEs to offset the cost of acquiring and maintaining POS devices. Training programs on POS usage and maintenance should also

be organized to ensure optimal utilization and reliability.

REFERENCES

- Adedayo, S., Adekunle, T., & Afolabi, R. (2024). The Impact of Fintech Solutions on SMEs in Nigeria: A Case Study of Gwagwalada Area Council. *African Journal of Economic Studies*, 9(1), 25-40.
- Adegbite, S. A., & Ayinde, T. O. (2023). Financial technology (FinTech) adoption and inclusive financing for SMEs in Nigeria. *Journal of Financial Innovation and Development*, 5(2), 145–160. <https://doi.org/10.1016/j.fid.2023.03.004>
- Adeleke, T., & Yusuf, O. (2023). Fintech Innovations and Financial Inclusion in Sub-Saharan Africa. *Journal of Financial Technology and Development*, 18(3), 45-60.
- Adesina, A., & Alabi, T. (2019). Regulatory challenges and the future of financial technology in Nigeria. *African Journal of Financial Regulation*, 3(1), 25-42.
- Agarwal, R., & Kumar, A. (2022). The role of financial technology in enhancing financial inclusion in small businesses. *Journal of Digital Banking*, 8(2), 55-70.
- Alhassan, A., & Obuobi, J. (2022). The role of point-of-sale (POS) systems in enhancing financial inclusion in underserved areas. *Journal of Financial Inclusion*, 10(2), 45–60.
- Ali, M. H., & Yasir, M. (2022). Barriers to financial inclusion in small and medium enterprises (SMEs): A case study of Nigerian markets. *International Journal of Financial Technology*, 5(1), 39-52.
- Andrianova, L., & Naydenova, K. (2022). Financial inclusion and economic empowerment: A focus on marginalized groups.
- Arner, D. W., Barberis, J. N., & Buckley, R. P. (2016). *The evolution of FinTech: A new post-crisis paradigm?* Georgetown Journal of International Law, 47, 1271–1319. <https://ssrn.com/abstract=2676553>
- Central Bank of Nigeria. (2023). *Annual Report: Enhancing Financial Inclusion through Cashless Policies*. CBN Publications.
- Central Bank of Nigeria. (2023). *Financial inclusion in Nigeria: 2022 annual report*. https://www.cbn.gov.ng/out/2023/reports/financial_inclusion_annual_report_2022.pdf
- Chakraborty, S., & Saha, S. (2022). Enhancing financial inclusion through financial technologies: Opportunities and challenges for SMEs. *SME Development Journal*, 12(3), 100-118.
- Chen, W., & Li, J. (2021). Financial inclusion and its effect on small and medium enterprises (SMEs) in developing economies: A case of Nigeria.

- Journal of African Business Studies*, 16(4), 245-263.
- Chen, Y., & Zhang, L. (2022). The significance of point-of-sale (POS) technology in modern financial transactions. *International Journal of Payment Systems*, 8(1), 12–25.
- Coffie, W., & others. (2020). The impact of financial technology on service quality in the banking sector. *Financial Services Review*, 29(3), 123–140.
- Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2022). *The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19*. World Bank.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2022). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. World Bank Publications. <https://doi.org/10.1596/978-1-4648-1843-0>
- Hua, J., & Huang, Y. (2020). The transformative role of financial technology in enhancing financial inclusion. *Journal of Financial Technology*, 5(1), 30–50.
- Idris, A., & Akinola, O. (2023). Bridging the financial gap: The impact of POS systems on financial accessibility for marginalized groups. *African Journal of Economic Studies*, 15(1), 78–92.
- Khan, M., & Yousuf, A. (2021). Enhancing customer experience through POS technology: A study on SMEs. *Journal of Business Research*, 124, 456–463.
- Kimenyi, M. S., & Mbaku, J. M. (2021). Digital financial services and financial inclusion in sub-Saharan Africa: Addressing the challenges and opportunities. *Journal of Development Finance*, 15(2), 73-92.
- Kiptum, K., & Ngunjiri, J. (2021). Barriers to financial inclusion in developing economies: Insights and solutions.
- Liu, H., & Yang, X. (2021). The evolution of automated teller machines (ATMs) and their impact on banking services.
- Mohiuddin, M., & Khatun, R. (2022). ATMs as a tool for promoting financial inclusion in developing countries.
- Muriithi, M., & Gikandi, J. (2021). Financial inclusion through digital payments: The role of POS services and ATMs in Kenya and Nigeria. *International Journal of Banking and Finance*, 9(1), 44-60.
- Nugraha, D., & others. (2022). Financial inclusion through digital payments: The role of POS systems in Africa. *International Journal of Banking and Finance*, 14(3), 210–225.
- Okoye, E., Eze, C., & Onochie, I. (2021). ATM and POS Usage in Promoting SMEs' Growth in Nigeria. *Nigerian Journal of Banking and Finance*, 15(2), 78-95.
- Oladeji, S., & Adeyemi, O. (2021). The security implications of cash handling for small businesses.

- Olaniran, O., & others. (2020). Access to capital and the growth potential of small and medium-sized enterprises.
- Olufemi, A., & Akintoye, S. (2020). The influence of POS technology on cash flow management in small businesses. *Journal of Small Business Management*, 58(4), 789–805.
- Omar, M. A., & Musa, S. A. (2022). FinTech adoption and the performance of small businesses in sub-Saharan Africa: Evidence from Nigeria. *Journal of African Business*, 23(1), 101–119.
<https://doi.org/10.1080/15228916.2021.1898773>
- Rahadjeng, E., & others. (2023). Mobile banking and financial inclusion: Opportunities for unbanked populations. *Journal of Banking and Finance*, 45(2), 134–150.
- Sahay, R., Cihak, M., & N'Diaye, P. (2023). The Role of Fintech in Enhancing Financial Inclusion in Africa. *International Monetary Fund Working Paper*.
- Sani, M., & Raji, I. (2023). The proliferation of POS systems and its effects on small and medium enterprises in Africa. *African Journal of Business Management*, 17(4), 300–315.
- Sarma, M. (2020). Financial inclusion: Concepts and strategies for economic growth.
- Singh, R., & Kumar, A. (2022). Enhancing banking efficiency through ATMs: A global perspective.
- Small and Medium Enterprises Development Agency of Nigeria (SMEDAN). (2021). *National MSME survey report 2021*. <https://smedan.gov.ng>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.
<https://doi.org/10.2307/30036540>
- World Bank. (2022). *Financial Inclusion Overview*.
<https://www.worldbank.org/en/topic/financialinclusion/overview>
- Zhao, Y., & Wang, J. (2023). The role of ATMs in facilitating business operations for SMEs.