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EFFECT OF POINT-OF-SALE TECHNOLOGY ADOPTION ON THE PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES IN SOKOTO METROPOLIS, SOKOTO STATE-NIGERIA

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ABSTRACT

This paper investigated the effect of point-of-sale technology adoption on small and medium enterprises in Sokoto Metropolis, Sokoto State-Nigeria. The study population consisted of 3,370 registered SMEs operating in Sokoto Metropolis (Sokoto Small and Medium Enterprises Development Agency, 2024). A sample size of 347 was drawn using Krejcie and Morgan Sample Determination Table. A survey research design was adopted with multi-stage sampling techniques consisting of stratified and purposive sampling. The study's hypotheses were tested using PLS-SEM. Results indicate that point-of-sale technological innovation has positive and significant effect on the performance of SMEs in Sokoto State, Nigeria. Based on the findings, the paper recommends that the use of POS for sales processing, payment collection, record keeping, and customer service should be encouraged. In addition, subsidies or tax incentives should be considered for the acquisition of foundational business technologies like POS systems and accounting software.

Keywords: Small and Medium Enterprises, SMEs' performance, Technology adoption, Technological innovations.

1. INTRODUCTION

Globally, the growth of Small and Medium Enterprises (SMEs) and the rise of entrepreneurship are recognized as tools for achieving economic development and growth as well as appealing engagement opportunities. The Nigerian SMEs are acknowledged as the solid backbone of the country's economy and serve as more than just a catalyst for economic growth and development. SMEs constitute one of the primary drivers of economic growth in Nigeria. Indeed, SMEs are acknowledged as the driving force behind rapid employment, improved living standards, the creation of value-added goods and services, and the primary creator of robust economies (Adewale and Afolabi, 2020). Thus, SMEs are crucial to the nation's long-term economic growth, and its significance can be appropriately viewed in light of the Nigerian economy's structure, which has produced numerous innovative products and technological advancements (Ibrahim et al., 2023).

Considerably, the importance of technology in modern business operations cannot be overstated. For SMEs in Sokoto State, adopting technology can lead to significant improvements in efficiency and competitiveness. Digital tools and platforms can streamline operations, reduce costs, and enhance customer service. For instance, e-commerce platforms enable SMEs to reach a broader customer base, while digital payment systems facilitate smoother transactions. Moreover, the relationship between financial access and technology adoption is critical for the performance of SMEs. Conversely,

adopting technology can improve financial management and make SMEs more attractive to lenders. For instance, SMEs that utilize accounting software can maintain better financial records and improving their credibility with financial institutions. This, in turn, can enhance their chances of securing loans for further investment. A study by Müller et al. (2018) indicate that SMEs that embrace technology are better positioned to access financial resources, as they can demonstrate their operational capabilities and potential for growth.

Despite the fact that technology adoption is undoubtedly considered as a critical factor enhancing the performance of SMEs, many SMEs in Sokoto Metropolis struggle to adopt and integrate new technologies into their operations. Approximately 70% of SMEs report that they lack the necessary skills to effectively implement and utilize technology in their businesses (Müller et al., 2018). Most existing studies on POS technology adoption have been conducted in urban commercial centers such as Lagos, Abuja, and Port Harcourt (Adewale & Afolabi, 2020; Eze & Chibueze, 2021). There is limited empirical evidence on how POS adoption influences SME performance in the northern region, particularly in Sokoto Metropolis. SMEs in the North operate under different socio-economic, infrastructural, and cultural conditions, implying that findings from southern Nigeria may not be generalizable.

Consequently, many entrepreneurs continue to operate using traditional methods, hindering their growth and ability to compete in the market. The high costs associated with acquiring new technologies, coupled with a lack of technical expertise and limited access to training, create significant hurdles for SMEs. Although, current literature tends to focus broadly on digital financial technology (fintech), mobile money, e-payment systems, and e-banking without isolating POS technology as a distinct technological resource with unique operational and strategic implications for SMEs (Olayinka & Ekhareafo, 2019), studies that specifically examine POS systems as an individual technological capability remain limited. However, Existing research often focuses on the availability or adoption of POS technology, but few studies examine the extent of utilization including training, integration with accounting systems, and strategic use for decision-making. POS adoption without effective utilization may not yield performance benefits, yet this nuance is scarcely addressed in the literature (Afolayan, 2021).

Furthermore, the COVID-19 pandemic has highlighted the importance of technology in ensuring business continuity. SMEs that had previously adopted digital tools were better positioned to navigate the challenges posed by the pandemic, than those that had not faced significant disruptions (McKinsey & Company, 2021). This disparity underscores the urgent need for SMEs in Sokoto State to embrace technology to enhance their resilience and adaptability in an increasingly volatile economic environment. Therefore, the concern of this paper is to determine the extent to which point-of-sale technology adoption affect the performance of SMEs in Sokoto State. To achieve this, the paper hypothesized that technology adoption has no significant effect on the performance of SMEs in Sokoto metropolis.

2. LITERATURE REVIEW

Small and Medium Enterprises (SMEs) are widely recognized as the backbone of both developed and developing economies. They contribute significantly to capacity building, employment generation, innovation, poverty alleviation, and boost overall economic development. In Nigeria, SMEs play a critical economic role. According to SMEDAN (2021), the Nigerian definition of SMEs classifies small enterprises as those employing 10-49 people with an annual turnover of N5M to N100M; medium enterprises as those with 50-199 employees and with an annual turnover of N100M to N500M.

Performance for Small and Medium Enterprises (SMEs) has to do with the outcome of efforts made in the form of business enterprise activities, including strategy and operational activities as well as management of all business enterprise segments, including marketing, finance, production, and human resource capacity (Onugu, 2019). SMEs performance is the amount of effort made to achieve stated objectives, which include increasing employment, profitability, sales growth, customer and employee satisfaction, and societal satisfaction. Therefore, the performance of SMEs can be defined as actual output compared to expected output (Oba & Onuoha, 2019). According to Bello (2020), SMEs' performance also involves how well the enterprise is managed in terms of the value that customers perceive the organization to be providing, and other stakeholders should be considered when defining performance. SMEs performance depends on many factors among which is their capacity to innovate or adopt technology.

Adoption of new technology by an enterprise determines its competitive advantage. Angbazo and Iyimoga (2022) emphasized that the firm's ability to acquire, create, and utilize technological knowledge assets is essential to attaining distinct levels of profitability. Similarly, Voola et al. (2012) asserts that a firm's ability to adopt new technology determines its competitive advantage. According to Liman, Burah and Jibir (2021), technological changes have the potential to impact prices, quality, and encourage more creativity, innovation, and competition. Technology has the power to increase productivity, quality, and speed. The rate of technological change and diffusion, new methods of

producing goods and services, the use of new machinery and processes, the transfer of foreign technology, its cost, quality, and value chain are the primary elements of the technological environment (Adudu, Osisanya, & Adebanjo, 2021). Businesses that employ outdated technology are unable to compete on a global scale (Adudu, et al., 2021). Therefore, improving technological development is essential to making business firms more competitive.

Whereas several empirical studies have explored the relationship between technology adoption and the performance of SMEs, some had mixed findings. For example, Indrawati (2020) investigates the barriers to technological innovation in SMEs within Riau Province, Indonesia. Utilizing a mixed-method approach, the study identifies five key inhibiting factors: government support, quality of human resources, funding for technological innovation, economic conditions, and business partnerships. Among these, funding emerges as the most significant barrier. The study highlights the necessity for SMEs to independently finance technological innovations to ensure business sustainability. Again, the study suggests that supportive institutions, including government bodies and financial institutions, are crucial for fostering technological innovation in SMEs. Again, Nasution (2021) explores the impact of financial technology on the income of SMEs in Medan, Indonesia. The study employs accidental sampling to gather data from 100 SMEs and uses regression analysis to assess the relationship between financial technology application and income levels. The results indicate that the application of financial technology significantly influences SME income, highlighting the importance of digital financial solutions in enhancing revenue generation.

Moreover, Feng et al. (2022) incorporate financing and Research and Development (R&D) activities into the evaluation of innovation efficiency in technology-based SMEs in China. Their study employs a three-stage dynamic DDF-DEA model to assess overall innovation efficiency and the efficiency at each stage- financing, R&D, and operation. The findings indicate that non-coastal regions exhibit higher overall innovation efficiency compared to coastal areas, particularly in financing and operational stages. The study suggests that strengthening financial regulation could enhance both financing and R&D efficiency, providing valuable insights for policymakers aiming to improve innovation outcomes.

In the context of digital finance evolution, Gu et al. (2023) discuss the continuous evolution of digital finance, emphasizing its implications for SMEs. Analyzing a dataset from 2011 to 2021, the study employs fixed effects models to investigate the impact of digital inclusive finance on SME innovation activities. The results affirm that inclusive finance alleviates longstanding financing constraints, particularly benefiting non-state-owned and high-tech SMEs. The findings provide strategic insights for governments aiming to enhance digital finance initiatives and foster innovation within the SME sector. Although most recent studies such as Alkhawaldeh et al. (2023) indicate that technology significantly influences performance but do not thoroughly investigate how SMEs can effectively leverage technology. A deeper exploration of technological adoption processes is necessary to understand how SMEs in Sokoto State can integrate new technologies into their operations and improve their performance.

The study hinges on the Resource-Based View (RBV). The RBV posits that firms achieve superior performance and sustainable competitive advantage when they possess and effectively utilize resources that are valuable, rare, inimitable, and non-substitutable (VRIN). According to Barney (1991), internal resources whether tangible, intangible, or organizational capabilities form the basis for firm competitiveness.

In the context of SMEs, technology has become a critical strategic resource. The adoption of POS technology represents a technological capability that enhances operational efficiency, improves customer experience, and strengthens financial transparency. These capabilities are central to SMEs' ability to compete, particularly in dynamic environments such as retail, distribution, hospitality, and financial-service–related small businesses in Sokoto Metropolis.

From the RBV perspective, POS technology can be understood as an intangible technological resource. When deployed effectively, it allows SMEs to process transactions faster, minimize cash-handling risks, maintain accurate sales records, and generate real-time financial data for decision-making. These outcomes collectively increase internal efficiency, which the RBV highlights as a pathway to performance improvement (Grant, 1996). Furthermore, firms that use POS systems effectively may develop technology-driven capabilities that competitors without such systems cannot easily replicate.

POS technology also enhances customer service capabilities by reducing waiting time, enabling electronic payments, and supporting loyalty programs. These capabilities are valuable and difficult to imitate, especially for SMEs lacking technological competence or financial capacity (Wernerfelt, 1984). Thus, RBV suggests that SMEs leveraging POS technology can achieve better sales performance, improved customer satisfaction, and enhanced competitive positioning.

Additionally, the integration of POS systems with inventory management, accounting, and reporting tools creates unique organizational routines and knowledge systems that enhance strategic flexibility. This aligns with the RBV notion that firms can build superior performance through internal learning, adaptability, and resource configuration.

Therefore, within the RBV theoretical lens, POS adoption in SMEs is conceptualized as a technological resource and strategic capability that drives competitive advantage and performance improvement. The firm's ability to effectively deploy POS technology will determine the extent to which it gains operational benefits and outperforms non-adopting competitors. SMEs in Sokoto Metropolis that strategically invest in POS infrastructure, staff training, and digital transaction systems are therefore more likely to achieve higher profitability, market share growth, and long-term sustainability.

3. METHODOLOGY

This paper employed a survey research design. The study population consisted of 3,370 registered SMEs operating in Sokoto metropolis (Sokoto Small and Medium Enterprises Development Agency, 2024). A sample size of 347 was drawn using Krejcie and Morgan (1970). The paper used multi-stage sampling techniques. At the first stage, SMEs were selected using stratified sampling technique because of the heterogeneity associated with different SMEs in Sokoto metropolis. For instance, there are differences in the way SMEs operate their businesses and their service to their customers and also differ in terms of size and capital base. At the second stage, purposive sampling technique was employed in the selection of respondents (Owners and/or Managers) for the study. This is because, SMEs Owners or Managers have the required knowledge and understanding about their own business more than any other person. Therefore, in the course of selecting the targeted respondents, Owners and Managers invariably become part of the sample.

Primary data was employed through structured questionnaire in a closed-ended pattern. Both descriptive and inferential statistics were used in the study to analyze the information gathered from respondents. The demographic characteristics of the respondents were described using descriptive statistics such as Mean, Median, Mode and frequency distribution table. Technology Adoption Scale (Independent Variable) with seven items, five measurement scales (likert) from "very frequently used" to "not use at all," as adapted from Awa et al. (2015) was used. These measurement scales used are: use of POS systems, use of mobile banking/USSD applications, use of e-commerce platforms, use of digital marketing tools, use of accounting/bookkeeping software, use of inventory management systems, and use of CRM tools.

In addition, with SME Performance Scale (Dependent Variable), SME performance indicator used a multi-dimensional Balanced Scorecard approach (Kaplan & Norton, 1996), with 14 items across four dimensions: financial performance including net profit, customer performance, internal operations, and growth/market performance, and five measurement scale (likert) from "Strong improvement" to "Strong decline."

Content validity was ensured through expert review and adoption of validated scales. Reliability is examined using Cronbach Alpha (Nunnally, 1978), with $\alpha \geq 0.70$ considered acceptable. Partial Least Square structural equation modeling (PLS-SEM) was used to determine the effect of point-of-sale technology adoption on SMEs' performance.

4. RESULTS AND DISCUSSION

In this section, a PLS-SEM approach was used to test the measurement model, which include analyses of discriminant validity, convergent validity, internal consistent reliability, and indicator reliability. The hypotheses of the study were also tested using the structural model.

4.1 Demographic Profile of Respondents

In this section, the frequency distribution of participants is presented based on their demographic characteristics. Particularly, the demographic variables examined in this study include the school level of the respondents, gender of the respondents, marital status as well as the age of the respondents. Table 4.1 indicates the missing values in terms of these characteristics. However, these frequencies as well as percentages of the participants based on the aforementioned characteristics are presented in Table 4.1.

Table 4.1: Demographic Profile of the Respondents: Frequency Distribution

GENDER	Frequency	Percent
Male	326	93.9
Female	21	6.1
Total	347	100
AGE	**Frequency**	**Percent**
25-30	89	25.6
31-36	53	15.3
37-41	115	33.1
>41	88	25.4
Total	345	99.4

Missing	2	0.6
Total	347	100
POSITION	**Frequency**	**Percent**
Owner	183	52.7
Manager	164	47.3
Total	347	100
BUSINESSTYPE	**Frequency**	**Percent**
Micro	102	29.4
Small	199	57.3
Medium	45	13
Total	346	99.7
Missing	1	0.3
Total	347	100
QUALIFICATION	**Frequency**	**Percent**
First School Leaving Cert	25	7.2
Secondary School Cert	25	7.2
Degree or Equivalent	120	34.6
OTHERS, Masters and Doctoral Degrees	177	51
Total	347	100
YEARS	**Frequency**	**Percent**
5-10	110	31.7
11-16	109	31.4
17-21	86	24.8
>21	41	11.8
Total	346	99.7
Missing	1	0.3
Total	**347**	**100**

Source: Field Survey, 2024

Table 4.1 provides a detailed demographic breakdown of the respondents across various categories, such as gender, age, position, business type, qualifications, and years of experience. In terms of gender, the vast majority of respondents were male, accounting for 93.9% of the total sample. Female respondents, on the other hand, constituted only 6.1% of the sample. This indicates a significant gender disparity, with men overwhelmingly dominating the SMEs in Sokoto metropolis.

The age distribution shows a more balanced representation across different age groups. The largest age group consisted of individuals between 37 and 41 years old, representing 33.1% of the respondents. The second-largest group, at 25.6%, were between 25 and 30 years old, while those over 41 years made up 25.4%. The smallest group, consisting of respondents aged 31 to 36, comprised 15.3%. Notably, two respondents did not report their age, representing 0.6% of the total respondents.

In terms of positions, 52.7% of the respondents identified themselves as owners of their businesses, while 47.3% were managers. This suggests a relatively even split between business owners and managers in the sample, with a slight majority being owners. Regarding business type, most respondents (57.3%) were involved in small businesses. Micro enterprises made up 29.4%, while medium-sized businesses accounted for 13%. One respondent did not specify their business type, representing 0.3% of the total respondents.

When it comes to qualifications, a significant portion of respondents (51%) held qualifications classified as "others," while 34.6% had degrees or equivalent. A smaller percentage, 7.2% each, held either primary or secondary certificates, indicating that the respondent pool was highly educated, with a large number having advanced degrees or other forms of higher education.

Finally, the years of experience of the respondents were distributed across various categories, with the largest group (31.7%) having between 5 and 10 years of experience. This was closely followed by those with 11 to 16 years of experience (31.4%). Respondents with 17 to 21 years of experience made up 24.8% while those with more than 21 years accounted for 11.8%. Only one respondent did not provide information about their years of experience (0.3%).

4.2 Structural Model

The structural model is assessed once the requirements of the measurement model are met. Analyzing theoretical relationships is the first step in assessing structural models. More specifically, the significance of path coefficients for the correlations was ascertained using a standard bootstrap on a sampled instance of 330 (Hair et al. 2017).

Table 4.2: Hypothesis test for direct relationship

Relationship	Beta Values	Standard Deviation	T Statistics	P Values
Technology adoption -> SMEs Performance	0.23	0.06	4.21	0.00

Table 4.2 presents the results of the hypothesis tests for the direct relationships between technology adoption and SMEs' performance. These relationship is evaluated

using Beta values, Standard Deviation, T-statistics of 4.21 and P-values to assess the strength and significance of technology adoption on SMEs' performance. Thus, Technological Factors -> SMEs Performance has a Beta value of 0.23, indicating a moderately strong positive relationship between the adoption of technological factors and SMEs' performance. The T-statistic of 4.2 and a P-value of 0.00 indicate that this effect is statistically significant. This result suggests that the use of technology significantly contributes to improving SMEs' performance in Sokoto State, Nigeria, demonstrating the critical role of technological advancements in business growth, success and stability.

Table 4.3: Coefficient of Determination (R^2)

Constructs	R Square	R Square Adjusted
SMEs Performance	0.634	0.63

Table 4.3 presents the Coefficient of Determination (R^2) for the construct of SMEs' Performance. The R^2 value of 0.634 indicates that approximately 63.4% of the variance in SMEs' performance can be explained by the independent variable analyzed in the model as technological factors. The high explanatory power of our model ($R^2 = 0.63$) likely reflects the central role of POS systems in the day-to-day transactional efficiency of the surveyed SMEs. However, it may also indicate that our performance measure (net profit) is closely to single operational technology.

Table 4.4. Assessment of Effect size (f2)

Constructs	SMEs Performance	Effect Size
Technological Factors	0.061	Small

Table 4.4 depicts assessment of effect size (f^2) for technology adoption enhancing SMEs' performance. Thus, technology adoption (0.061) is one most important determinant of SMEs performance. While Cohen (1988) emphasized the benchmark for determining small effect size value to be 0.02, however Chin et al. (1998) emphasized the importance of considering even the smallest effect size of an exogenous variable, as it may still have an impact on the endogenous variables. In addition, while the relationship is statistically significant, the small effect size ($f^2 = 0.061$) suggests that point-of-sale technology adoption, though important, is just one of several factors driving SME performance. Other factors such as access to finance, managerial skills, and market conditions likely play a greater combined role.

Table 4.5: Predictive relevance on endogenous variables: Q-square

Construct	**SSO**	**SSE**	**Q^2 (=1-SSE/SSO)**
SMEs performance	1750	1114.576	0.363

Table 4.5 represent the blindfolding result of the cross-validated redundancy (Q^2) of the endogenous latent variable of this model. As the cross-validated redundancy (Q^2) is greater than zero which clearly indicates that there is a path model predictive relevance on firm performance.

4.4 Discussion of Result

The results obtained through Partial Least Square Structural Equation Modelling (PLS-SEM) analysis shed light on the extent to which technology adoption enhances SMEs' performance. Thus, the result shows a moderate strong and positive effect between the adoption of technological factors (POS) and SMEs' performance. The T-statistic of 4.21 and a P-value of 0.00 indicate that this effect is statistically significant. These findings align with the research of Adudu, Osisanya, and Adebanjo, (2021); Angbazo and Iyimoga, (2022) which indicate a positive significant relationship between technological factors and SMEs' performance. For example, investing in inventory management software can help businesses optimize their stock levels and reduce waste. Similarly, utilizing customer relationship management (CRM) systems can enhance customer engagement and improve service delivery. As SMEs adopt these technologies, they can operate more efficiently, leading to improved performance. Technology adoption can also enhance the competitiveness of SMEs in Sokoto State. By leveraging digital tools, SMEs can differentiate themselves in the market and offer unique value propositions to their customers. E-commerce platforms enable SMEs to reach a wider audience, while digital marketing strategies can

enhance brand visibility. This increased competitiveness can lead to higher sales and market share.

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings of this paper, it is concluded that technology adoption is indeed a critical determinant of SMEs' performance. Although it is well documented in the extant literature that other factors such as access to finance, government regulations, and human resource capacity have strong and positive effect on SMEs' performance, technology adoption ensures business growth, survival and stability. In light of this conclusion, the following broad-based policy recommendations are offered:

Expand the use of POS for sales processing, payment collection, record keeping, and customer service. In addition, subsidies or tax incentives should be considered for the acquisition of foundational business technologies like POS systems and accounting software. This will improve transaction speed, reduce cash-handling risks, and enhance accountability.

The overwhelming gender imbalance in our sample, while potentially reflective of SME ownership demographics in the region, limits the generalizability of our findings to female-led businesses and should be addressed in future research.

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