International Journal of Management Technology, 12 (5), 33-47, 2025
Print ISSN: ISSN 2055-0847(Print)
Online ISSN: ISSN 2055-0855(Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

Impact of Digital Tool Adoption on Operational Efficiency of Small and Medium-Scale Enterprises (SMEs) in Abuja

[1]Onesi Jude Oketta, [2]Sonia Sim Joshua, [3]Dare Joseph Bada, [4]Bukola Monsurat Abdulrahman
[1,2,3,4]Department of Business Administration and Entrepreneurship, Nile University of Nigeria, Jabi Abuja FCT.

doi: https://doi.org/10.37745/ijmt.2013/vol12n53347 Published September 16, 2025

Citation: Oketta O.J., Joshua S.S., Bada D.J., and Abdulrahman B.M. (2025) Impact of Digital Tool Adoption on Operational Efficiency of Small and Medium-Scale Enterprises (SMEs) in Abuja, *International Journal of Management Technology*, 12 (5), 33-47

Abstract: *The adoption of digital tools by SMEs has become essential to drive operational efficiency. Especially within the Abuja Metropolis. This study examined the impact of digital tool adoption on the operational efficiency of SMEs in Abuja, focusing specifically on cloud-based applications, data analytics tools, and automated inventory systems, and their influence on turnaround time. Employing a quantitative cross-sectional research design, the sample size was calculated using Taro Yamane's formula due to the large nature of the population at a 95% confidence level and a 5% margin of error. The theoretical framework was anchored on the Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), which provides the most suitable framework for examining how digital tool adoption influences operational efficiency of SMEs in Abuja.. Data analysis was conducted using multiple regression analysis. Results indicated a significant positive relationship between digital tool adoption and operational efficiency. The study recommends that SMEs should adopt digital tools to enhance turnaround time and ultimately operational efficiency.*

Keywords: digital tool adoption, operational efficiency, cloud-based applications, data analytics tools, and automated inventory systems

INTRODUCTION

In the evolving global economy, digital transformation has emerged as a powerful catalyst for enterprise growth, process improvement, and sustained competitiveness. This shift is especially critical for developing economies like Nigeria, where small and medium enterprises (SMEs) form the backbone of economic activity. As the primary drivers of job creation and innovation, SMEs in Nigeria contribute significantly to national output and account for over 80% of employment (Okonkwo & Ibrahim, 2024). Despite their importance, many SMEs continue to

struggle with inefficiencies, low productivity, and limited scalability, largely due to the absence of modern operational structures and digital systems (Obi & Ogundele, 2023).

A key concern for these enterprises is operational efficiency, defined as the ability to optimize processes, reduce resource wastage, and achieve greater output with minimal input. A widely accepted proxy for operational efficiency is turnaround time, which measures how long it takes a firm to complete core business processes from initiation to delivery. A reduction in turnaround time often reflects improved workflows, stronger customer responsiveness, and increased profitability (Oladimeji & Musa, 2022). For Nigerian SMEs operating in resource-constrained environments, improving operational efficiency is not only desirable but necessary for business continuity and competitive advantage. Yet, the operational practices of many SMEs remain dominated by paper-based documentation, manual inventory tracking, and isolated workflows, which often lead to bottlenecks, delayed service delivery, and rising operational costs. These limitations have been closely linked to low adoption of digital technologies and a general reluctance to invest in innovation (Adepoju et al., 2021).

To overcome these challenges, the adoption of digital tools—particularly cloud-based enterprise applications and automated inventory systems—has gained prominence as a viable solution. Cloud technologies offer scalable, cost-effective platforms for managing accounting, document sharing, and workflow collaboration. Automated inventory systems enable real-time tracking of stock, prevent overstocking or understocking, and reduce the likelihood of human error in stock management (Okonkwo & Ibrahim, 2024). Together, these tools promise not only to simplify business operations but also to significantly improve process efficiency and customer satisfaction.

However, several barriers continue to impede their widespread use. Infrastructural deficits, low digital literacy, cybersecurity concerns, and uncertain return on investment have made many SME operators hesitant to embrace digital transformation fully (Obi & Ogundele, 2023). Consequently, these businesses are unable to take full advantage of process automation and data-driven management practices. Although practitioner observations and anecdotal evidence highlight the potential of digital tools in enhancing business performance, there is still a noticeable gap in empirical research, particularly in the Nigerian context, examining the relationship between the adoption of specific digital technologies and measurable operational outcomes. Most existing studies lack the granularity to evaluate how particular tools influence distinct performance indicators like turnaround time.

This study, therefore, will seek to investigate the impact of digital tool adoption, specifically cloud-based enterprise applications and automated inventory systems, on turnaround time reduction, which will serve as a proxy for operational efficiency. Through this inquiry, the study will aim to generate evidence-based insights that can inform SME digitalisation policies and support Nigerian SMEs in achieving greater performance through strategic technology integration. The following null hypotheses were formulated to guide the study.

H_{01}: Cloud-based applications have no significant impact on turnaround time in Nigerian Small and medium enterprises in Nigeria.

H_{02}: There is no significant impact of data analysis tools on turnaround time in small and medium enterprises in Nigeria.

H_{03}: Automated inventory systems do not have any positive impact on turnaround time in Nigerian Small and Medium Enterprises in Nigeria.

LITERATURE REVIEW

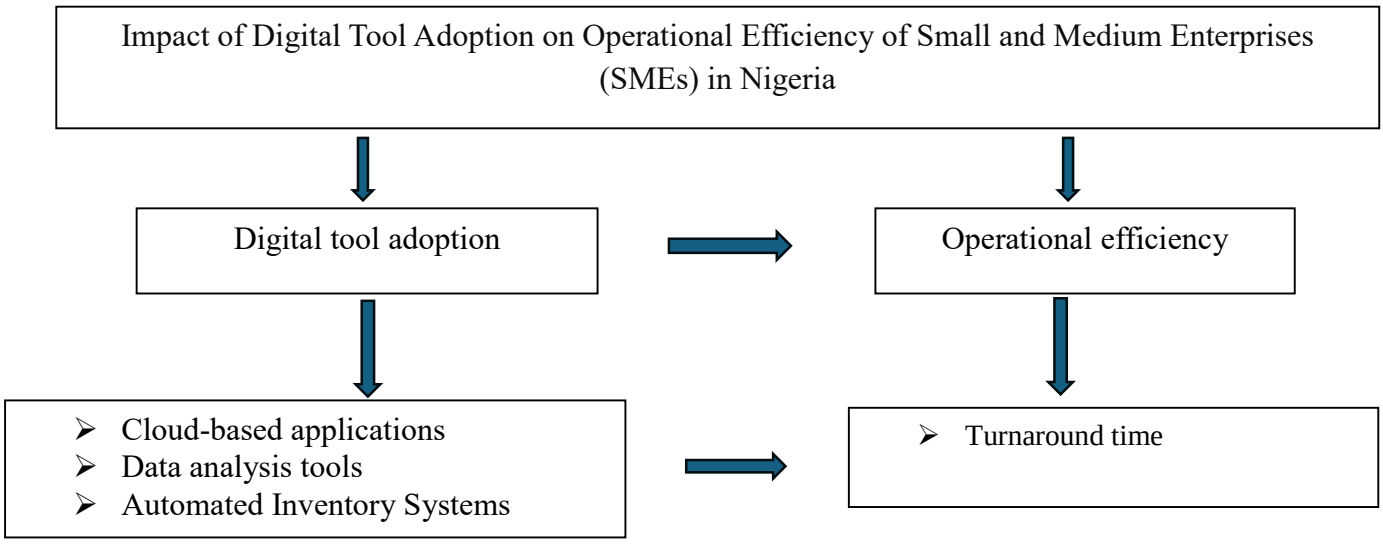
Conceptual Clarification

In today's competitive global economy, operational efficiency has become a vital objective for enterprises, particularly for Small and Medium Enterprises (SMEs) in resource-constrained environments like Nigeria. Operational efficiency refers to the ability of an organization to reduce waste, minimize delays, and optimize internal processes to deliver products or services effectively. For SMEs, this efficiency is often measured using indicators such as cost reduction, service quality, and turnaround time—the latter being a key proxy for assessing how swiftly a business can complete its service or production cycle (Nwachukwu & Adeyemi, 2024; Afolabi & Omole, 2023).

However, many Nigerian SMEs face structural inefficiencies due to manual processes, lack of integration, and limited access to real-time data (Olowu et al., 2022; Ojo & Bassey, 2022). This has highlighted the need for digital transformation, particularly through the adoption of modern digital tools. These tools, ranging from cloud-based applications to automated inventory systems, have been shown to improve business speed and accuracy, ultimately enhancing operational outcomes (Bello & Adebayo, 2024; Adebayo & Fashola, 2023). Cloud-based tools such as QuickBooks, Zoho CRM, and Google Workspace allow SMEs to manage operations remotely, improve collaboration, and reduce infrastructure costs, contributing to shorter turnaround times (Egbetokun et al., 2023; Ahmed & Musa, 2024). Automated inventory systems further enhance efficiency by enabling real-time stock tracking, reducing human errors, and optimizing supply chains (Okafor & Adekunle, 2022; Obi & Ogundele, 2023).

Despite these advantages, digital tool adoption among Nigerian SMEs remains limited due to barriers such as high implementation costs, poor digital literacy, weak infrastructure, and cybersecurity concerns (Akande & Eze, 2023; Ugwu & Ibrahim, 2022). This digital divide constrains SMEs from achieving optimal efficiency and limits their competitiveness. SMEs in Nigeria, as defined by the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), are businesses with 10 to 199 employees and annual turnover between ₦5 million and ₦500 million (SMEDAN & NBS, 2021). As of the last national MSME survey, there were over 39.6 million MSMEs in Nigeria, accounting for 96.7% of all businesses and contributing 46.31% to GDP and 86.3% to employment (SMEDAN & NBS, 2021).

While global research has affirmed the role of digital technology in improving firm performance, there is a gap in localized studies addressing how specific digital tools impact operational efficiency in Nigerian SMEs. This study seeks to bridge that gap by investigating the role of cloud-based data analytics and inventory automation systems in enhancing turnaround time and overall operational efficiency.



Source: Author's Concept, 2025

Figure 1.0: Showing the relationship between the independent and dependent variables.

The diagram above illustrates the relationship between the independent variable (Digital tool adoption) and the dependent variable (operational efficiency). As shown in the diagram, the independent variable can be assessed using proxies (cloud-based applications, data analysis tools, and automated inventory systems) and how it influences the dependent variable's proxy (turnaround time).

Theoretical Review

The Unified Theory of Acceptance and Use of Technology (UTAUT)**,** developed by Venkatesh et al. (2003), provides the most suitable framework for examining how digital tool adoption influences operational efficiency in Nigerian SMEs. UTAUT identifies four determinants of adoption: performance expectancy, effort expectancy, social influence, and facilitating conditionsmoderated by user and contextual factors (Ojeme & Odiase, 2024).

In this study, digital tool adoption is reflected in the use of cloud-based enterprise applications, data analytics platforms, and digital communication systems. These align with UTAUT's performance expectancy, as SMEs believe such tools improve decision-making and streamline processes (Roman & Rusu, 2022), and effort expectancy, which relates to ease of integration into daily operations in resource-limited settings (Distanont & Khongmalai, 2022). Similarly, operational efficiency, measured by process cycle time reduction, connects to facilitating conditions since efficiency gains rely on infrastructure and technical support (Ashiru et al., 2023). Compared to the Technology Acceptance Model (TAM), which focuses mainly on usefulness and ease of use (Davis, 1989), and the Technology–Organization–Environment (TOE) framework, which emphasizes readiness without fully addressing behavioral factors (Tornatzky & Fleischer, 1990), UTAUT offers a more holistic explanation by integrating psychological and contextual influences. This makes it particularly relevant for understanding why and under what conditions SMEs adopt digital tools and achieve efficiency gains in Nigeria.

International Journal of Management Technology, 12 (5), 33-47, 2025
Print ISSN: ISSN 2055-0847(Print)
Online ISSN: ISSN 2055-0855(Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

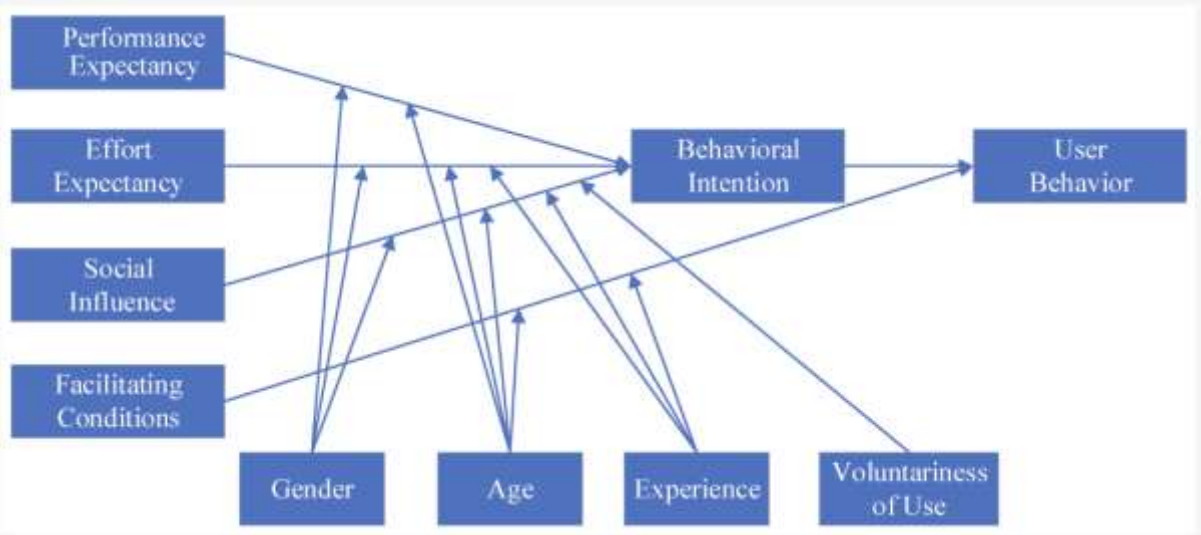


Figure 2.0 The unified theory of acceptance and use of technology (UTAUT) model.

Empirical Review

In a recent study on The Impact of Digital Transformation on Nigerian Small and Medium-Sized Enterprises (SMEs) in the Global Business Landscape, Unegbu et al (2024) examined how firm-level digital transformation relates to competitiveness outcomes among Nigerian SMEs. The study adopted a quantitative survey design, drawing on questionnaire data from a diverse cross-industry population of Nigerian SMEs, and it reported analyses based on ANOVA to test relationships between the extent of digitalization and performance indicators (Unegbu et al., 2024). In operational terms, digital transformation, customer satisfaction, market access, innovation, cost savings, and process streamlining served as the key variables; the sample frame covered firms varying by industry, size, location, revenue, and years in operation, and the analysis established a significant effect of digital transformation on SME competitiveness (e.g., $F = 8.14$, $p = .001$), thereby indicating measurable gains in global reach, market share, and brand visibility.

Subsequently, the question, Do we consider sustainability when we measure SMEs' performance passing through digital transformation?" was asked by Costa Melo (2023). In their study, they pursued a systematic conceptual review rather than primary data collection, and it foregrounded the measurement problem: the proliferation of digital metrics had not been matched by a consistent approach to sustainability-oriented performance in SMEs (Costa Melo et al., 2023). The paper synthesized prior studies to argue that SMEs' performance during digital transformation ought to be evaluated across three interdependent dimensions: economic, environmental, and social, and it proposed an integrated framework that researchers could empirically test (Costa Melo et al., 2023). This review thus emphasized variables such as revenue growth and efficiency (economic), resource use and emissions (environmental), and labor well-being or community impact (social), and it pointed to literature databases as the source of evidence and qualitative synthesis as the analytic method.

In another study, Adapting emerging digital communication technologies for firm resilience: evidence from Nigerian SMEs. Ashiru et al. (2023) adopted a qualitative approach using interviews to explore how emerging communication technologies (e.g., collaboration platforms, social channels) supported SMEs' resilience during disruption. Grounded in resource-based and contingency perspectives, the study engaged 42 SME operators across sectors and Nigerian regions as its population and sample, using interview data as the primary source and interpretive, qualitative analysis to derive themes on operational continuity, customer acquisition, and internal coordination (Ashiru et al., 2023). The findings suggested that digital communication capabilities functioned as adaptable, firm-specific resources that bolstered resilience while exposing context-specific constraints such as skill gaps and infrastructure bottlenecks.

Furthermore, Roman and Rusu (2022), in their study Digital technologies and the performance of small and medium enterprises: Empirical evidence from Finland, reported a cross-sectional survey of 218 Finnish SMEs and estimated models, including ordinary least squares, quantile regressions, and logistic regressions, to test how digital technology adoption related to firm performance. The independent variables reflected the extent of technology use, while the dependent variables captured performance outcomes; the analysis indicated positive and statistically significant associations between digital adoption and performance across the distribution, and it highlighted heterogeneous gains among firms. Data were collected via structured questionnaires from SME decision makers, and the inferential strategy enabled robustness checks across model specifications.

Likewise, a study by Truong (2022), Adopting digital transformation in small and medium enterprises: An empirical model of influencing factors based on TOE–TAM combined exploratory qualitative work (a group discussion with 11 participants) and a cross-sectional survey of 346 SMEs in Vietnam to estimate an integrated TOE–TAM model. The study operationalized technological, organizational, and environmental drivers—including relative advantage, perceived benefits, compatibility, security concerns, competitive pressure, vendor support, top management support, investment readiness, perceived usefulness, and attitudes as predictors of adoption (Truong, 2022). Using questionnaire data as the source and structural modeling to examine relations, the research reported that these factors significantly shaped adoption intentions and behaviors, offering both policy and managerial implications for scaling digital change among SMEs.

Additionally, the role of information technology in improving the competitiveness of small and medium enterprises in Gowa District by Radjab and Tjambolang (2022) employed a quantitative design with a population of 139 SMEs and a sample of 58 respondents selected via simple random sampling to test how IT adoption affected competitiveness. Drawing on questionnaire data and using path analysis as the method of data analysis, the study reported a large, positive, and significant path coefficient from IT to competitiveness ($\beta = 0.782$, $p < .05$), thus indicating substantial performance leverage from even incremental digital uptake. The results underscored the salience of IT capability as a near-term lever for rural or district-level SME ecosystems.

In a similar study titled Small and Medium Enterprises (SMEs) facing an evolving technological era: A systematic literature review on the adoption of technologies in SMEs" by Zamani (2022), 349 peer-reviewed articles were reviewed through a systematic literature review to map influential concept categories that shape technology adoption in SMEs. The study described a transparent protocol for keyword development, database selection, inclusion/exclusion criteria, and time-bounded search, and conducted both quantitative and qualitative analyses of the literature. It identified 11 categories of influential concepts (including strategy, resources, infrastructure, and regulation) and argued for process-oriented frameworks that acknowledge adoption as dynamic, thereby providing a structured agenda for future empirical testing.

Conversely, The Digital Transformation and Its Impact on Small and Medium-Sized Enterprises by Kyurova (2022) functioned as a literature review, not an empirical survey, and it examined how SMEs pursued digitalization through digital artifacts, infrastructures, and platforms while navigating resource constraints. The paper reviewed the building blocks and staged pathways to digital maturity, emphasizing planning, self-assessment, execution, and consolidation, and it argued that strategic alignment underpinned performance benefits from digital transformation. As such, variables were conceptual technology building blocks and capabilities, while data sources were secondary literature, and the analysis was narrative synthesis.

In a different study, enhancing digital transformation and technological capability of Thai SMEs: Lessons learned from the COVID-19 crisis, Distanont and Khongmalai (2022) were explicitly labeled as a viewpoint, drawing on expert analysis rather than original datasets to interpret how Thai SMEs could bolster technological capability post-crisis. The article highlighted strategic levers—capability upgrading, process digitalization, and innovation partnerships and framed them as practice-oriented directions for future empirical validation. While it did not report a population, sample size, or inferential statistics, its contribution lay in codifying actionable domains that subsequent studies could operationalize and test.

Finally, in a similar study to that of Distanont and Khongmalai (2022), Nurcaya (2022) in his study The Effect of Information Technology on the Performance of Micro, Small, and Medium Enterprises (MSMEs) During the Covid-19 Pandemic, conducted a literature study that surveyed prior evidence on how IT use related to MSME performance under pandemic conditions. The review's variables centered on IT utilization (e.g., digital tools, online platforms) and performance outcomes (e.g., sales continuity, process efficiency), and its sources were existing studies rather than primary field data; the method was narrative synthesis. The article concluded that IT adoption supported MSME performance during COVID-19 by enabling business continuity and customer access, thus reinforcing the importance of low-cost, accessible digital infrastructure for micro- and small-scale firms.

In summary, prior work linked digital tools to better SME outcomes but mostly measured perceptions rather than objective, process-level efficiency, and it relied on single-source, cross-sectional surveys that left causality unclear. Moreover, studies rarely mapped specific tools (e.g., e-invoicing, POS analytics, CRM, ERP, workflow apps) to concrete operational

bottlenecks, so the mechanism from adoption to efficiency remained under-specified. Likewise, mediating processes (such as process automation and data/analytics capability) and moderating frictions (skills, financing, infrastructure, and regulation) were seldom integrated within one Nigeria-appropriate model. Furthermore, aggregate analyses obscured within-firm changes and sectoral or size-based differences. Therefore, the gap is for a Nigeria-focused, mechanism-rich study that uses auditable process KPIs and multi-source (ideally longitudinal) data, tests mediation by process automation and moderation by contextual frictions, and unpacks heterogeneity across size, sector, and formality to deliver causal and actionable evidence.

METHODOLOGY

This study employed a quantitative cross-sectional survey design to investigate the impact of digital tool adoption on the operational efficiency of small and medium-sized enterprises (SMEs) in Abuja. The choice of this design will be based on its suitability for collecting data from a large population at a single point in time, thereby enabling the researcher to evaluate relationships between variables without altering the research environment (Creswell & Creswell, 2018). This approach will align with the study's objective of testing theoretical assumptions drawn from the Unified Theory of Acceptance and Use of Technology (UTAUT) in the SME context.

The population of the study consists of all formally registered SMEs in Abuja, estimated at 38,000 enterprises according to the most recent SMEDAN/NBS data cited in the World Bank policy note (World Bank, 2022). This study adopted the total number of registered SMEs in Abuja as its population. A sample size of 385 SMEs was determined using Yamane's (1967) formula at a 95% confidence level and a 5% margin of error. To enhance representativeness, a multi-stage sampling technique was adopted. This will involve stratifying SMEs by sector, allocating proportional quotas, and then selecting respondents through simple random sampling within each sector (Etikan & Bala, 2017). Data was collected using a structured online questionnaire distributed to SME owners or operational managers.

The questionnaire was divided into two sections. The first section will capture demographic and firm characteristics. The second will assess digital tool adoption using three proxies: cloud-based enterprise applications, data analytics platforms, and automated inventory systems. This section also measured operational efficiency through the proxy of turnaround time. All responses will be recorded using a 5-point Likert scale, ranging from strongly disagree to strongly agree. Data was analyzed using SPSS and Stata software. Descriptive statistics will summarize the data, while Cronbach's alpha (1951) was used to test the reliability of the instrument. Relationships between variables were examined using correlation analysis, and multiple linear regression will be applied to determine the extent to which digital tool adoption predicts operational efficiency (Field, 2018). The study will specify the following regression model:

$$OE_i = \beta_0 + \beta_1 CBEA_i + \beta_2 DAP_i + \beta_3 AIS_i + \epsilon_i$$

Where:

- OE = Operational Efficiency
- $CBEA$ = Cloud-Based Enterprise Applications
- DAP = Data Analytics Platforms
- AIS = Automated Inventory Systems
- ϵ = Error term

This model will be adapted from the UTAUT framework (Venkatesh et al., 2003) and will enable the study to quantify the influence of each digital tool category on operational performance outcomes among SMEs.

Reliability and Validity

The Cronbach's Alpha (1951) Test is a frequently employed test to assess the internal reliability and consistency of the variables according to Bryman and Bell (2007:164) and Hair et al. (2000:652). To test for the reliability of the instrument, Cronbach's Alpha was used to test the reliability of the research instrument, and the outcome is expected to be between P = 0.70 & P = 0.96, showing that there is consistency in the items of the survey. The study checked the reliability of the scales by Cronbach's Alpha coefficient. Based on Table 1, all observed variables achieved Cronbach's Alpha values from 0.745 to 0.878, respectively.

Table 1.0 Cronbach Alpha test result

Reliability Statistics		
Scale	**Cronbach's Alpha**	**Items**
Cloud based application	0.745	7
Data analytics tool	0.878	5
Automated inventory systems	0.793	6
Turnaround time	0.769	5

Source: Google Online Survey Data 2025.

RESULTS AND DISCUSSIONS

This section analyzes data collected through an online questionnaire structured via Google Forms. The questionnaire had two sections: Section A covered respondent demographics, while Section B contained questions on digital tool adoption, aligned with three thematic areas addressing the impact of digital tool adoption on operational efficiency of registered SMEs in Abuja. 385 completed questionnaires were analyzed using Statistical Packages for the Social Sciences (SPSS version 22). The section rigorously examines and interprets this data, providing empirical evidence that supports hypothesis testing and subsequent discussions.

International Journal of Management Technology, 12 (5), 33-47, 2025
Print ISSN: ISSN 2055-0847(Print)
Online ISSN: ISSN 2055-0855(Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

Table 2.0 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CBA	385	2.60	4.70	4.0565	0.35054	0.284	0.125	0.891	0.248
DAT	385	2.80	4.70	3.9339	0.38183	0.006	0.125	-0.592	0.248
AIS	385	2.00	5.00	3.4669	0.74933	0.227	0.125	-0.798	0.248
TAT	385	2.30	5.00	4.0620	0.44165	-0.138	0.125	0.334	0.248
Valid N (listwise)	385								

Source: Google online Survey Data 2024 and SPSS 22 version.

Table 1.0 presents descriptive statistics for Digital tool adoptions and its selected variables and operational efficiency, and its variable cloud-based applications (CBA), Digital analytics tool (DAT), Automated inventory systems (AIS), and Turnaround time (TAT), based on a sample size of 385 respondents. CBA shows a mean value of 4.0565 with the lowest variability indicated by a standard deviation of 0.35054. DAT has a mean of 3.9339 and moderate dispersion (SD = 0.38183), with slight positive skewness (0.006) and negative kurtosis (-0.592). AIS reports a mean of 3.4669 and the highest variability (SD = 0.74933), with positive skewness (0.227) and negative kurtosis (-0.798). Lastly, TAT has a mean of 4.0620 and moderate dispersion (SD = 0.44165), with negative skewness (-0.138) and positive kurtosis (0.334). Overall, AIS demonstrates the greatest variability among these factors, suggesting diverse consumer responses, while CBA shows consistent performance as an indicator of consumer purchasing behavior.

Table 3.0 Multiple Linear Regression Results

Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	0.239	0.095		2.516	0.012	0.052	0.425		
	CBA	0.596	0.019	0.649	31.902	0.049	0.000	0.559	0.843	1.186
	DAT	0.838	0.015	0.930	54.701	0.000	0.808	0.869	0.875	1.143
	TAT	0.491	0.032	0.618	15.383	0.000	0.428	0.554	0.491	1.135

Source: SPSS 22.0 and Author's Compilation 2025.

International Journal of Management Technology, 12 (5), 33-47, 2025
Print ISSN: ISSN 2055-0847(Print)
Online ISSN: ISSN 2055-0855(Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

Table 4.0 Summary of Regression Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.948	0.898	0.897	0.11641	0.898	887.965	5	384	0.000	2.001

Source: SPSS 22.0 and Author's Compilation 2025.

Tables 3 and 4 present results from a multiple linear regression analysis conducted at a 95% confidence interval, examining the impact of digital tool adoption on operational efficiency of SMEs in Abuja. The standardized coefficients for CBA were positive (0.596) and statistically significant (p-value = 0.049), aligning with previous research by Suleiman et al. (2021) and Junaidi et al. (2020). Hence, hypothesis one was rejected, indicating a positive and significant impact of cloud-based applications on operational efficiency.

Similarly, DAT showed positive (0.838) and significant results (p-value = 0.000), consistent with Onyango (2019) and Suleiman et al. (2021), leading to rejection of hypothesis two. AIS also exhibited positive (0.491) and significant coefficients (p-value = 0.000), supporting findings by Chen (2021), Suleiman et al. (2021), and Onyango (2019), thus rejecting hypothesis three.

Overall, the proxies of the independent variables CBA, DAT, and AIS positively influenced operational efficiency at the 5% significance level. The F-change value (887.965) was statistically significant (p-value = 0.000), indicating joint significance of these variables. The model's R^2 of 0.89 (89%) and adjusted R^2 (0.89) suggested a strong explanatory power, with 89% of operational efficiency variation explained by these variables. A Durbin-Watson statistic (2.001) indicated no positive serial correlation, and variance inflation factors (VIF) suggested no multicollinearity.

DISCUSSION OF FINDINGS

The study on the impact of digital tool adoption on operational efficiency of SMEs in Abuja found that, there is a positive and significant impact of cloud-based applications on operational efficiency. It applies that as an organization adopts cloud-based tools to streamline and automate its operations, the more efficient it becomes. There is a positive and statistically significant impact on data analytics tools has a profound influence on operational efficiency by providing real insights into available data, which in turn transforms the process of decision making. Also, there is a positive and significant impact of automated inventory systems on the operational efficiency of SMEs in Abuja. This is in line with the findings of Roman & Diana. (2022) This means that through adequate investment in automated inventory systems, the error rate in stock taking or inventory analysis can be reduced to the barest minimum, thereby increasing the turnaround time it takes to analyse an inventory.

CONCLUSION AND RECOMMENDATIONS

This study was conducted to further understand how digital tool adoption aspects were evaluated in connection to operational efficiency of SMEs in Abujausing three independent variables and one dependent variable. The results indicated that all three dimensions of digital tool adoption are significant predictors of "On operational efficiency". As a result, the findings of this study show that the digital tool adoption dimensions and operational efficiency of SMEs in Abuja are positively associated. But future research could include a few more variables that could have a greater impact. Based on the findings of the research, the following recommendations are given:

SMEs in Abuja should adopt cloud-based applications to further strengthen their operational efficiency and reduce the turnaround time.
SMEs in Abuja should adopt data analytics tools to further strengthen their operational efficiency and decision-making processes.
SMEs in Abuja should adopt automated inventory systems to further strengthen their operational efficiency and reduce the turnaround time by reducing the error rate of taken inventory manually.

REFERENCES

Adepoju, A. T., Afolabi, A. O., & Eze, U. C. (2023). Digital readiness and SME performance in sub-Saharan Africa: A Nigerian perspective. *Journal of Small Business and Enterprise Development, 30*(2), 155–173. https://doi.org/10.1108/JSBED-03-2023-0123

Adebayo, A. T., & Fashola, S. M. (2023). Enhancing performance of SMEs through digitalization: Evidence from Nigeria. *African Journal of Business Innovation, 15*(1), 23–41.

Adeyemi, T. B., & Oladimeji, F. O. (2023). The digital readiness of Nigerian SMEs and its influence on organizational efficiency. *Journal of Digital Economy, 4*(2), 112–127.

Afolabi, S. M., & Omole, B. R. (2023). Operational agility and firm efficiency: An assessment of SMEs in Lagos. *West African Journal of Business Research, 12*(4), 65–79.

Ahmed, M. A., & Musa, K. O. (2024). Cloud-based solutions for business process optimization in emerging markets. *International Journal of Technology and Business Transformation, 9*(1), 77–91.

Akande, L. A., & Eze, C. I. (2023). Revisiting SME categorization in Nigeria: Size thresholds, performance, and funding needs. *Nigerian Journal of Development Studies, 19*(1), 85–102.

Ashiru, F., Nakpodia, F., & You, J. J. (2023). Adapting emerging digital communication technologies for resilience: Evidence from Nigerian SMEs. *Annals of Operations Research, 327*(1), 795–823. https://doi.org/10.1007/s10479-022-05049-9

Bello, O. R., & Adebayo, S. M. (2024). Digital transformation and performance outcomes in SMEs: Evidence from South-West Nigeria. *Journal of Small Enterprise Innovation, 12*(1), 45–63. https://doi.org/10.1177/2753984524123476

Costa Melo, I., Alves Junior, P. N., Queiroz, G. A., Yushimito, W., & Pereira, J. (2023). Do we consider sustainability when we measure small and medium enterprises' (SMEs') performance passing through digital transformation? *Sustainability, 15*(6), 4917. https://doi.org/10.3390/su15064917

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

Distanont, A., & Khongmalai, O. (2022). The adoption of digital technology in SMEs. In *Proceedings of the 18th European Conference on Management Leadership and Governance (ECMLG 2022)* (pp. 140–149). Academic Conferences International.

Egbetokun, A. A., Onwuegbuzie, N. E., & Bello, K. M. (2023). Drivers of digital tool adoption among SMEs in Nigeria. *Technological Forecasting and Social Change, 190*, 122438. https://doi.org/10.1016/j.techfore.2023.122438

Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal, 5*(6), 00149. https://doi.org/10.15406/bbij.2017.05.00149

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

Ibrahim, Y. T., & Danjuma, H. I. (2023). Efficiency measurement and digital uptake in Nigerian SMEs: A data envelopment analysis approach. *African Journal of Economic Policy, 30*(2), 117–134.

Ishola, R. A., Ayodeji, J. O., & Sanni, M. A. (2023). Digital capacity building and SME growth in sub-Saharan Africa: Insights from Nigeria. *Journal of African Digital Development, 6*(1), 55–70.

Kyurova, A. (2022). The digital transformation and its impact on small and medium-sized enterprises. *Entrepreneurship, 10*(1), 7–18. https://doi.org/10.37708/ep.swu.v10i1.1

Nurcaya, I. N., Rahyuda, I. K., Giantari, G. A. K., & Ekawati, N. W. (2022). The effect of information technology on the performance of MSMEs during the Covid-19 pandemic. *International Journal of Social Science and Business, 6*(2), 262–267. https://doi.org/10.23887/ijssb.v6i2.44260

Nwachukwu, U. S., & Adeyemi, K. A. (2024). Exploring the link between technology adoption and operational agility in Nigerian manufacturing SMEs. *Operations & Supply Chain Management Journal, 17*(1), 23–40. https://doi.org/10.1111/oscm.2024.17.1.002

Obi, C. J., & Ogundele, R. M. (2023). Barriers to digital adoption among SMEs in Nigeria: An exploratory analysis. *African Journal of Business and Economic Research, 18*(1), 45–62. https://doi.org/10.31920/ajber.18.1.2023.3

Ojo, A. M., & Bassey, E. E. (2022). SME innovation strategies and digital implementation challenges in Nigeria. *Journal of African Business Strategy, 10*(3), 133–149.

Okafor, G. I., & Adekunle, J. T. (2022). Inventory management automation and SME profitability in Lagos. *International Journal of SME Development, 11*(2), 71–89.

Okonkwo, K. N., & Ibrahim, M. T. (2024). Technology adoption and operational performance of Nigerian SMEs: The mediating role of digital capability. *International Journal of Innovation and Technology Management, 21*(1), 1–19. https://doi.org/10.1142/S0219877024500012

Okonkwo, K. N., Adebiyi, T. R., & Usman, I. M. (2023). Technology adoption and performance outcomes in Nigerian SMEs: An empirical review. *Global Journal of Business Analytics, 8*(1), 101–115.

Oladimeji, B. A., & Musa, Z. A. (2022). Assessing the operational efficiency of Nigerian SMEs in the digital age. *Journal of Entrepreneurship and Innovation in Emerging Economies, 8*(2), 112–128. https://doi.org/10.1177/23939575221110223

Olatunji, A. O., & Yusuf, B. A. (2022). Digital integration and competitiveness in sub-Saharan Africa's SME sector: Case of Nigeria. *Journal of Entrepreneurship in Emerging Economies, 14*(3), 413–430. https://doi.org/10.1108/JEEE-08-2021-0315

Olowu, M. K., Salami, A. B., & Gambo, A. M. (2022). Operational resilience and digital leverage among SMEs in Nigeria. *International Journal of Productivity and Performance Management, 71*(8), 2152–2171. https://doi.org/10.1108/IJPPM-05-2021-0258

Ojeme, M., & Odiase, M. (2024). The impact of conformity, effort and performance expectancies on SMEs' information technology adoption in Nigeria. *Information System and Smart City, 3*(1), 227. https://doi.org/10.59400/issc.v3i1.227

Radjab, E., & Tjambolang, T. A. (2022). The role of information technology in improving the competitiveness of small and medium enterprises in Gowa District. *MediaTrend, 17*(2), 460–470. http://dx.doi.org/10.21107/mediatrend.v17i1.17245

Roman, A., & Rusu, V. D. (2022). Digital technologies and the performance of small and medium enterprises. *Studies in Business and Economics, 17*(3), 190–206. https://doi.org/10.2478/sbe-2022-0055

SMEDAN & NBS. (2021). *National Survey of Micro, Small, and Medium Enterprises (MSMEs).* https://nigerianstat.gov.ng/elibrary

Sulaimon, F. O., Bakare, R. A., & Bello, A. M. (2022). Adoption of cloud-based solutions among Nigerian SMEs: Opportunities and risks. *International Review of Business and IT Research, 14*(2), 91–106.

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.

Truong, N. X. (2022). Adopting digital transformation in small and medium enterprises: An empirical model of influencing factors based on TOE–TAM integrated. *Journal of Finance – Marketing, 72*(6), 45–52. https://doi.org/10.52932/jfm.vi72.352

Ugwu, L. C., & Ibrahim, M. N. (2022). Cybersecurity awareness and technology acceptance among Nigerian SMEs. *Journal of Information Security in Africa, 9*(3), 120–137.

Unegbu, H., Yawas, D. S., & Dan-asabe, B. (2024). The impact of digital transformation on Nigerian small and medium-sized enterprises (SMEs) in the global business landscape. *Jurnal Mekanikal, 47*. https://doi.org/10.11113/jm.v47.478

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). *SME finance policy note: Nigeria*. https://documents1.worldbank.org/curated/en/099055202202331735/pdf/IDU0ff38186304ab204c9209dd1037aeeb43b3d8.pdf

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.

Zamani, S. Z. (2022). Small and medium enterprises (SMEs) facing an evolving technological era: A systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management, 25*(6), 735–757.