International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 10 Issue 1, Jan-Feb 2026 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Digital Literacy and Operational Efficiency of SMES in Anambra State, Nigeria

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ABSTRACT

Digital literacy is the ability to understand and us information in multiple formats from a wide range of sources when it is presented via computers and its impact on operational efficiency of Small and Medium-sized Enterprises (SMEs) remains a critical area of investigation. This study evaluates the effect of Digital Literacy and Operational Efficiency of SMEs in Anambra State, Nigeria. Specifically, the study examines the effect of digital skills proficiency, e-commerce and digital payments on operational of Small and Medium-sized Enterprises (SMEs) in Anambra State, Nigeria. The study was anchored on Diffusion of Innovations Theory (DIT), proposed by Everett Rogers in (1962). The population of the study was 1,504 which consist of registered SMEs in Anambra State, from which a sample size of 316 was selected. Out 316 questionnaires shared 276 was retrieved. Data was generated using a structured questionnaire. Descriptive statics and multiple linear regressions were used to test the hypotheses. The findings revealed that the components of digital literacy collectively explained 53.0% of the variance in operational efficiency ($R^2 = .530$, $F(3, 272) = 102.396$, $p < .001$). Specifically, digital payment systems usage was the strongest significant predictor ($\beta = .416$, $p < .001$), followed by digital skills proficiency ($\beta = .341$, $p < .001$). However, e-commerce adoption was found to have no statistically significant effect on operational efficiency ($\beta = .089$, $p = .093$). The study concludes that while digital literacy is a vital driver of SME operational efficiency, its benefits are unevenly realized, and the full potential of e-commerce is currently constrained by implementation and integration challenges, whereas digital payment systems and foundational skills proficiency provide the most immediate and significant operational gains. The study therefore recommended that SMEs should adopt a holistic digital strategy that prioritizes continuous skills development and the seamless integration of technologies to maximize performance.

How to cite this paper: Kekeocha, Mary Ezinne | Ugwu Sunday Emmanuel | Azike Oluchukwu Malachy | Okudo Amarachi Cathrine "Digital Literacy and Operational Efficiency of SMES in Anambra State, Nigeria" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-10 | Issue-1, February 2026, pp.739-750, URL: www.ijtsrd.com/papers/ijtsrd100080.pdf

IJTSRD100080

KEYWORDS: *Digital Literacy, Operational Efficiency, SMEs, E-commerce, Digital Payments, Nigeria.*

INTRODUCTION

Background to the Study

Small and Medium-sized Enterprises (SMEs) are universally recognized as the engine of economic growth, and their role in the Nigerian economy is particularly profound. According to Ayoungman, Shawon, Ahmed, Khan and Islam, (2023), these enterprises form the backbone of the nation's economic framework, contributing significantly to wealth creation and poverty alleviation. Their importance is further underscored by their substantial contribution to the country's Gross Domestic Product (GDP). For instance, a report by the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) and the National Bureau of Statistics (NBS) (2017) revealed that SMEs account for about 48% of the national GDP (Okoli and Ezedebego, 2025). Beyond their macroeconomic impact,

Ogunjimi, (2021) asserts that SMEs are the primary drivers of employment, absorbing a significant portion of the labor force and thus mitigating the challenges of unemployment. In a dynamic and increasingly competitive business environment, the survival and growth of these enterprises are paramount. Al Najjar and Qandeel, (2025) argue that for these businesses to thrive, they must continuously seek ways to enhance their operational efficiency. This has become a critical determinant of success, setting the stage for an exploration of the factors that influence it in the contemporary era. The ability of SMEs to innovate and adapt, as noted by Rees,(2021), is directly linked to their capacity to operate efficiently and respond to market changes, making operational efficiency not just a goal but a necessity for sustainability.

The global economy has witnessed a seismic shift towards digitalization, a phenomenon that has fundamentally reshaped the landscape of commerce. This digital revolution, as described by Caliskan, ÖzkanÖzen and Ozturkoglu, (2021), has altered traditional business models, processes, communication channels, and strategies for market engagement. Businesses, regardless of their size or sector, are now compelled to integrate digital technologies into their operations to remain relevant and competitive. This transition has given rise to what Wu, (2024) terms the "digital society," where proficiency in using digital tools is no longer optional but essential. In this context, the umbrella concept of digital literacy has emerged as an indispensable competency for modern businesses. Campanozzi, Gibelli, Bailo, Nittari, Sirignano and Ricci, (2023), posits that digital literacy is the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers. This is more than just technical know-how; it involves a deeper cognitive ability to navigate, evaluate, and create information using digital platforms. Consequently, digital literacy is no longer a niche skill but a fundamental requirement for navigating the current economic landscape, directly influencing how businesses operate, innovate, and compete in the global marketplace (Mohammed, Shanthi and Mathiyarasan, 2024).

To understand its impact on business operations, the broad concept of digital literacy must be deconstructed into specific, measurable components. The first of these is digital skills proficiency, which Bonina, Koskinen, Eaton and Gawer,(2021) define as the practical ability of individuals to operate digital tools, software, and platforms effectively to achieve specific goals. For SME owners and employees, this translates to the capacity to manage digital records, communicate via email and social media, and utilize productivity software to streamline workflows. A second critical component is e-commerce adoption. Chen, Huang and Sung, (2021) frame this not merely as creating a website but as the strategic integration of internet-based technologies to conduct business transactions. Adopting e-commerce allows SMEs to transcend geographical limitations, access wider markets, and engage with customers on a global scale, thereby transforming their operational scope (Huang and Kumarasinghe, 2024). Finally, the use of digital payment systems represents another crucial facet of digital literacy. As argued by Adeolu, Salamntuand Paschal, (2024), the integration of systems like mobile money, online bank transfers, and point-of-sale (POS) terminals streamlines financial transactions, enhances security, and improves customer convenience. These three elements digital skills proficiency, e-commerce adoption, and digital payment systems usage are therefore posited as key indicators of digital literacy that are hypothesized to have a direct and significant impact on the operational efficiency of SMEs (Suryani, Arief, Bramantoro and Hamsal, 2022).

While the benefits of digitalization are generally accepted, there remains a noticeable scarcity of focused empirical research that specifically investigates how digital skills proficiency, e-commerce adoption, and the use of digital payment systems collectively and individually affect the operational efficiency of SMEs within the unique economic environment of Anambra State. This study, therefore, aims to fill this research gap by providing a comprehensive analysis of the relationship between these specific digital literacy components and the operational performance of SMEs in this particular state.

Statement of the Problem

Small and Medium-sized Enterprises (SMEs) are fundamental to Nigeria's economic stability, yet their high failure rate, driven by low operational efficiency, poses a significant threat. In the contemporary business environment, survival is increasingly dependent on successfully navigating the global shift towards digitalization. While digital technologies present a clear pathway to enhancing efficiency, their effective adoption is not guaranteed. Many SMEs struggle to translate digital tools into tangible performance improvements, creating a critical challenge to their sustainability and growth.

The core problem is a significant gap in empirical understanding. Despite the general acceptance that digitalization is beneficial, there is a scarcity of

focused research that holistically investigates how the distinct components of digital literacy—specifically, digital skills proficiency, e-commerce adoption, and digital payment systems usage—collectively and individually impact the operational efficiency of SMEs within the unique commercial context of Anambra State, Nigeria. This lack of an integrated, evidence-based model hinders the formulation of targeted policies and effective business strategies, leaving SMEs ill-equipped to leverage digitalization for survival.

Objectives of the Study

The broad objective of this study is to evaluate the effect of digital Literacy on the operational efficiency of SMEs in Anambra State, Nigeria. Specifically, this study seeks to:

1. examine the effect of digital skills proficiency on operational efficiency of SMEs in Anambra State, Nigeria.
2. determine the effect of e-commerce adoption on operational efficiency of SMEs in Anambra State, Nigeria.
3. investigate the effect of digital payment systems usage on operational efficiency of SMEs in Anambra State, Nigeria.

Research Questions

The following research questions guided this study

1. What effect does digital skills proficiency has on operational efficiency of SMEs in Anambra State, Nigeria?
2. Does e-commerce adoption have effect on operational efficiency of SMEs in Anambra State, Nigeria?
3. To what extent does a digital payment system usage affects on operational efficiency of SMEs in Anambra State, Nigeria?

Research Hypotheses

The following hypotheses were tested at a 0.05 level of significance

1. **H_{01}:** Digital skills proficiency has no significant effect on operational efficiency of SMEs in Anambra State, Nigeria.
2. **H_{02}:** E-commerce adoption has no significant effect on operational efficiency of SMEs in Anambra State, Nigeria.
3. **H_{03}:** Digital payment systems usage has no significant effect on operational efficiency of SMEs in Anambra State, Nigeria.

Review of Related Literature

Conceptual Review

Digital Literacy

Digital literacy is a multifaceted concept that extends beyond the basic ability to use a computer, encompassing essential competencies for survival and growth in today's business environment. Bishop (2023) defines it as the capability to understand and utilize information in various formats from diverse sources presented through computers, emphasizing both technical skills and cognitive processing abilities. Vuorikari, Kluzer, and Punie (2022) further elaborate that digital literacy is the proficient use of digital technologies to generate and convey solutions, in any Small and Medium-sized enterprises (SMEs), especially in Nigeria, and this is not merely theoretical; it is a fundamental requirement for optimizing operational performance.

In the Nigerian context, where SMEs play a crucial role in the economy, a lack of digital literacy creates significant barriers to competitiveness. Omrani et al. (2022) highlight that many SME owners and employees may not fully understand the benefits of digital technologies, leading to hesitance in investing in necessary tools and training. This results in a "skills gap" that hampers their ability to effectively leverage digital platforms. Therefore, digital literacy is conceptualized in this study as an ongoing process of learning and adaptation, critical for enhancing operational capabilities and navigating the modern business landscape, particularly for SMEs in Anambra State, Nigeria.

Digital Skills Proficiency

Digital skills proficiency is the practical, hands-on component of digital literacy. It refers to the ability of SME owners and their employees to confidently and effectively use digital devices, communication applications, and networks to manage information and achieve business objectives (Musungu, 2021). This proficiency extends beyond basic computer operations to include a range of competencies that are directly applicable to business functions. Based on frameworks like the European Digital Competence (DigComp), are skills that can be categorized into several key areas relevant to SMEs (Vuorikari, Kluzer and Punie, 2022).

These include information and data literacy (the ability to find, evaluate, and manage digital information), communication and collaboration (using digital tools for internal and external communication, such as email, social media, and collaborative platforms), digital content creation (producing marketing materials, reports, or website content), and safety (protecting devices, data, and privacy). For Nigerian SMEs, specific proficiencies in areas like social media marketing, basic website management, online content creation, and cyber security are particularly vital for reaching customers and protecting business assets (Onatuyeh, Oghorodi, Okpako, Ojei, Osakwe, Chinedu and Nwankwo,

2025). Lack of these skills are obstacle to digital transformation, as it means that even when SMEs invest in technology, they may lack the knowledge to utilize it to its full potential, leading to underperformance.

E-commerce Adoption

E-commerce adoption is a strategic application of digital literacy, representing the integration of internet-based technologies to conduct business transactions, including marketing, sales, and customer relationship management (Suryani, Arief, Bramantoro and Hamsal, 2022). For SMEs, e-commerce offers a powerful pathway to overcome traditional limitations of size and geographical location, providing access to wider, even global, markets (Raji, Olawore and Osahor, 2023). By establishing an online presence, SMEs can automate order processing, streamline inventory management, and reduce administrative overheads, leading to significant improvements in efficiency.

However, in developing countries like Nigeria, the adoption of e-commerce by SMEs is filled with challenges. Research consistently points to a number of significant barriers. These include; infrastructural deficits, such as unreliable electricity and poor internet connectivity, which are fundamental to running an online business (Ifere, Nyuur, Amankwah-Amoah and Ochie, 2022). Another major hurdle is the lack of trust and security in online transactions, which deters both businesses and customers due to fears of fraud (Lestari, Adawiyah, Alhamidi, Prayogi and Haryanto, 2024). Furthermore, the high cost of setting up and maintaining e-commerce systems, coupled with a lack of technical skills and an inadequate legal and regulatory framework, creates a formidable set of obstacles (Li and Zhang, 2024). Studies specific to Anambra State confirm that while the government recognizes the importance of e-commerce, adoption rates remain relatively low due to these very factors, limiting the ability of local SMEs to compete effectively (Amornkitvikai, Tham, Harvie and Buachoom, 2022).

Digital Payment Systems Usage

The usage of digital payment systems is another critical facet of digital literacy, involving the adoption of electronic methods for financial transactions (Hussain, Gupta and Bhardwaj, 2025). In Nigeria, the push towards a cashless economy has been driven by the proliferation of platforms such as Point-of-Sale (POS) terminals, mobile banking apps, online bank transfers, and Unstructured Supplementary Service Data (USSD) codes. For SMEs, these systems offer profound benefits that directly enhance operational efficiency. The primary advantage is the streamlining of the transaction process, making it faster and more convenient for customers, which can lead to increased sales and loyalty (Islam, 2024).

Furthermore, digital payments significantly reduce the risks and inefficiencies associated with handling cash, such as theft, loss, and the time-consuming process of manual reconciliation (Prakash Raju Kantheti and Bvuma, 2024). A key benefit highlighted in the literature is the improvement in financial management and accountability. Digital transactions create a clear, traceable, and electronic record, allowing SME owners to monitor cash flow, track sales history, and manage their finances more effectively (Hendayani, Muzakir, Yuliana, Asir and Wahab, 2022). This automated record-keeping is also crucial for building a formal financial history, which can improve an SME's ability to access credit and other financial services. A study by Nnabugwu, Onyekwelu and Okeke, (2024) on MSMEs in Anambra State found a positive and significant effect of electronic payment systems on their performance, confirming that these tools facilitate quicker and more secure financial transactions that improve business operations.

Operational Efficiency

Operational efficiency is a measure of an organization's ability to deliver its products or services in the most cost-effective manner possible while maintaining or improving quality (Obiki-Osafiele, Efunniyi, Abhulimen, Osundare, Agu and Adeniran, 2024). It is fundamentally a ratio of input to output; a business is considered operationally efficient when it can produce a desired outcome with minimal waste of time, effort, and resources. For SMEs, which often operate with significant resource constraints, achieving a high level of operational efficiency is not merely a competitive advantage but a fundamental necessity for survival and sustainability (Korry and Wijayanti, 2024).

Operational efficiency can be measured through various key performance indicators (KPIs). These include productivity metrics (such as output per employee or sales per employee), cost metrics (like operating expense ratio or cost per unit produced), time-based metrics (such as process cycle time or on-time delivery rate), and quality metrics (including customer satisfaction scores or defect rates) (Venkatesh Sundarraman and Mohamed Mustafa, 2024). The adoption of digital technology is consistently identified as a primary driver of operational efficiency. By integrating digital tools, SMEs can automate manual tasks, streamline complex workflows, optimize resource allocation, and gain data-driven insights for better decision-

making, all of which contribute to a more efficient and profitable operation.

Theoretical Review

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Fred Davis in 1989 to explain how users come to accept and use technology. The model posits that perceived usefulness (PU) and perceived ease of use (PEOU) are the primary factors influencing an individual's intention to use a technology. If users believe that a technology will enhance their job performance and that it is easy to use, they are more likely to adopt it. This theory is directly applicable to the present study, as the decision of an SME owner in Anambra State to adopt the components of digital literacy can be effectively explained through the lens of TAM. For instance, the adoption of e-commerce platforms or digital payment systems will be heavily influenced by the owner's perception of how useful these tools are for increasing sales and efficiency (PU), and how straightforward they are to implement and manage without significant technical or financial hurdles (PEOU). Similarly, the motivation to invest in acquiring digital skills proficiency depends on the belief that these skills will be useful for improving business performance and are not prohibitively difficult to learn. By applying TAM, this study can better understand the underlying perceptual factors that drive the adoption of these digital literacy components, which in turn is hypothesized to lead to enhanced operational efficiency.

Diffusion of Innovations Theory (DOT)

The Diffusion of Innovations Theory, proposed by Everett Rogers in 1962, explains how new ideas and technologies spread within a social system. It identifies several stages in the adoption process: knowledge, persuasion, decision, implementation, and confirmation. The theory emphasizes the role of communication channels, social systems, and the perceived attributes of innovations (such as relative advantage, compatibility, complexity, trial ability, and observe-ability) in the diffusion process. This theory is pertinent to the investigation of digital literacy in SMEs, as it highlights the social and contextual factors influencing the adoption of digital technologies. In Anambra State, understanding how innovations like e-commerce and digital payment systems are perceived and adopted can provide insights into the operational challenges faced by SMEs. By applying DOT, the study can assess how these innovations can be effectively integrated into business practices, ultimately enhancing operational efficiency and contributing to the overall economic development of the region.

Empirical Review

Umetiti, Nwafor, Arachie, and Ifeme (2025) conducted a study to examine the performance dynamics of digital literacy within the context of Small and Medium Enterprises (SMEs) in Southeast Nigeria. The broad objective was to determine the relationship between digital literacy and the performance of these SMEs, grounding the research in the Diffusion of Innovation Theory. The study's methodology involved surveying a population of 1321 SMEs, from which a sample size of 289 was selected. Data was gathered using a structured questionnaire that was validated for reliability and analyzed using both descriptive and inferential statistics, with hypotheses tested at a 5% significance level. The result shows a statistically significant positive relationship between the variables, with an R-value of .778 and an R-Square of .605. This indicates that approximately 61% of the variation in the performance of SMEs can be explained by changes in their digital literacy levels. The F-statistic was a robust 371.545 with a p-value of less than .05. They concluded that a strong, positive, and statistically significant relationship exists between digital literacy and the performance of SMEs in Southeast Nigeria, recommending that business owners must ensure their operations achieve a certain level of digital literacy to enhance workflow and protect against cyber threats.

Aina and Wepukhulu (2025) studied the effect of e-commerce adoption on the operating profitability of 250 small and medium-scale fashion retailers in Lagos, Nigeria. The objective of the study was to quantify the performance differences between businesses with varying levels of e-commerce integration (physical-only, hybrid, and e-commerce-only), using the Resource-Based View (RBV) framework as a theoretical lens. The methodology involved analyzing 2024 financial data using regression and ANOVA. The result shows that e-commerce adopters achieved significantly higher operating profit margins, outperforming physical stores by 24.1% ($p = 0.0003$), while hybrid models also outperformed traditional retail by 13.2% ($p = 0.0018$). The analysis also revealed a strong positive correlation between digital marketing expenditure and profitability ($\beta = +1.20$, $p = 0.0016$), whereas logistics costs were identified as a significant negative factor ($\beta = -0.75$, $p = 0.0012$). They concluded that maximizing profitability in the fashion retail sector requires more than just digital adoption; it necessitates a balanced and strategic integration of digital infrastructure with cost-efficient logistics and targeted marketing to achieve optimal returns.

Mustapha, Onimole, and Adebusoye (2025) investigated the effect of electronic payment system (EPS) usage on the performance of small and medium enterprises in Ilorin Metropolis, Kwara State. The study's objective was to determine how the adoption of EPS impacts various dimensions of SME performance, particularly operational efficiency and return on investment (ROI). A survey research design was employed; targeting all SMEs in the area, with data collected via a structured questionnaire and analyzed using descriptive statistics and chi-square tests. The result shows a significant positive effect of EPS usage on SME performance. Specifically, the findings revealed that EPS usage significantly enhances operational efficiency, which registered a grand mean of 3.82, and also boosts the return on investment (ROI) of the SMEs, with a grand mean of 3.76. They concluded that the adoption of electronic payment systems is a crucial driver for improving transaction efficiency, reducing cash-handling risks, and ultimately enhancing the overall performance of SMEs. The study recommended that stakeholders should promote training and awareness campaigns to help SMEs optimize the benefits of EPS.

Edokobi, Okoli, and Ugochukwu (2024) analyzed the effect of e-commerce utilization on the performance of SMEs in Anambra State. The study's main objective was to assess the impact of various e-commerce components—specifically online sales, digital marketing, e-payment systems, website quality, and social media engagement—on the operational efficiency of these enterprises. The researchers employed a Vector Auto Regression (VAR) model and other econometric regression techniques to analyze data collected from a representative sample of SMEs across the state. The result shows that online sales ($\beta = 0.28$, $p < 0.01$) and digital marketing ($\beta = 0.33$, $p < 0.01$) have a statistically significant and strong positive impact on operational efficiency. Furthermore, e-payment systems ($\beta = 0.21$, $p < 0.05$) and website quality ($\beta = 0.25$, $p < 0.05$) also demonstrated a significant positive effect. However, social media engagement showed a non-significant relationship ($\beta = 0.12$, $p > 0.05$). They concluded that strategic investment in e-commerce infrastructure, particularly in online sales platforms and digital marketing, is crucial for enhancing the operational efficiency of SMEs in Anambra State.

Ojobo, Orga, and Okechukwu (2023) carried out a study on the impact of digital literacy on the performance of small-scale businesses in Enugu State, Nigeria. The primary objective was to examine how digital literacy affects both the volume of business transactions and the cost of services for these enterprises. Utilizing a descriptive survey design, the researchers targeted a population of 366 owners of small-scale businesses with over five years of operational history, from which 322 accurately completed questionnaires were collected and analyzed, representing an 88% response rate. The methodology involved analyzing the collected data with mean scores and standard deviation, while the hypotheses were tested using a Z-test statistic tool. The result shows that digital literacy had a significant positive impact on the volume of business transactions, with a calculated Z-score of 7.885 being less than the critical value of 9.557 at a p-value of less than .05. Similarly, digital literacy was found to have a significant positive impact on the cost of services, yielding a Z-score of 8.248, which was less than the critical value of 12.037 ($p < .05$). They concluded that digital literacy is a critical factor that positively influences both transactional volume and service costs for small-scale businesses in Enugu State and recommended that government agencies should work to improve the digital knowledge of business owners.

Methodology

This study adopted a descriptive survey research design to assess the relationship between digital literacy and the operational efficiency of Small and Medium-sized Enterprises (SMEs). The study was carried out in Anambra State, Nigeria, which is a major commercial and industrial hub in the southeastern region of the country. The population of the study consisted of all 1,504 registered SMEs in Anambra State as of 2025. Given the large size of the population, the Taro Yamane formula was employed to determine a representative sample size, which was calculated to be 316.

The instrument for data collection was a structured questionnaire which focused on the research questions and objectives, addressing variables such as digital skills proficiency, e-commerce adoption, digital payment systems usage, and operational efficiency. To ensure reliability, the researcher employed a pilot test and the data was analyzed using Cronbach's alpha, which yielded a reliability coefficient of 0.87, indicating high internal consistency. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while the hypotheses were tested using linear regression analysis at a 0.05 level of significance. All analyses were carried out using the Statistical Package for Social Sciences (SPSS) version 27.0.

Decision Rule: The decision in the analysis section is determined by the average of the responses of respondents.

Strongly Agreed (5 points), Agreed (4 points), Disagreed (3 points), Strongly Disagreed (2 points) and Undecided (1 point). The average of the responses:

$$\frac{(5 + 4 + 3 + 2 + 1)}{5} = 3.0$$

Therefore, a mean score below 3.0 would be considered rejected and a mean score of 3.0 and above would be considered accepted.

Research Question 1: What is the effect of digital skills proficiency on the operational efficiency of SMEs in Anambra State, Nigeria?

Table 1: Mean Ratings of Responses on the Effect of Digital Skills Proficiency on Operational Efficiency

S/N	Questionnaire Items	N	Mean	SD	Remark
1	Our employees have the necessary skills to effectively use computers and software for daily tasks.	276	3.81	1.011	Accepted
2	We are proficient in using digital communication tools (e.g., email, social media) to interact with customers and suppliers.	276	4.03	0.943	Accepted
3	Our firm has the capability to create and manage digital content (e.g., online adverts, social media posts) for marketing purposes.	276	3.54	1.121	Accepted
4	We regularly invest in training to improve the digital skills of our staff.	276	2.87	1.204	Rejected
5	Our business processes have become faster and more streamlined.	276	3.91	0.987	Accepted
6	We have experienced a noticeable reduction in our overall operational costs.	276	3.66	1.003	Accepted
7	The accuracy of our work and the quality of our output have improved.	276	3.88	0.992	Accepted
8	Overall, our firm's productivity has significantly increased.	276	4.11	0.913	Accepted
	Grand Mean	**276**	**3.73**	**1.022**	**Accepted**

Source: Field Survey, 2025

The analysis presented in Table 1 assesses the effect of digital skills proficiency on operational efficiency. The grand mean score of 3.73, which is above the 3.0 benchmark, indicates a general agreement among respondents that digital skills proficiency positively impacts operational efficiency. Specifically, Item 2 (mean = 4.03), Item 8 (mean = 4.11), and Item 5 (mean = 3.91) received the highest ratings, suggesting strong agreement that proficiency with communication tools significantly boosts productivity and streamlines processes. However, Item 4, which addresses regular investment in staff training, received a mean score of 2.87, falling below the acceptance threshold. This suggests that while SMEs recognize the benefits of digital skills, a significant number do not consistently invest in formal training, which was rejected by the decision rule.

Research Question 2: What is the effect of e-commerce adoption on the operational efficiency of SMEs in Anambra State, Nigeria?

Table 2: Mean and Standard Deviation of Responses on the Effect of E-commerce Adoption on Operational Efficiency

S/N	Questionnaire Items	N	Mean	SD	Remark
9	Our firm uses an online platform (e.g., website, social media store) to sell products or services.	276	3.48	1.301	Accepted
10	Adopting e-commerce has allowed us to reach a wider customer base beyond our physical location.	276	3.97	1.112	Accepted
11	Our online sales process is well-integrated with our inventory and order management systems.	276	2.76	1.254	Rejected
12	We actively use digital marketing strategies to drive traffic and sales to our e-commerce platform.	276	3.13	1.223	Accepted
13	Our business processes have become faster and more streamlined.	276	3.51	1.109	Accepted
14	We have experienced a noticeable reduction in our overall operational costs.	276	3.03	1.198	Accepted
15	The accuracy of our work and the quality of our output have improved.	276	3.29	1.156	Accepted
16	Overall, our firm's productivity has significantly increased.	276	3.61	1.099	Accepted
	Grand Mean	**276**	**3.35**	**1.182**	**Accepted**

Source: Field Survey, 2025

Table 2 provides an analysis of the effect of e-commerce adoption on operational efficiency.

The grand mean of 3.35 indicates an overall acceptance that e-commerce adoption has a positive effect. The highest-rated statement was Item 10 (mean = 3.97), showing a strong consensus that e-commerce is effective for expanding customer reach. Item 9 (mean = 3.48) and Item 12 (mean = 3.13) were also accepted, confirming that SMEs are using online platforms and some digital marketing. A significant finding is the rejection of Item 11 (mean = 2.76), which suggests that a majority of SMEs struggle with integrating their e-commerce platforms with backend systems like inventory management. This highlights a critical operational challenge despite the overall positive perception of e-commerce.

Research Question 3: What is the effect of digital payment systems usage on the operational efficiency of SMEs in Anambra State, Nigeria?

Table 3: Mean and Standard Deviation of Responses on the Effect of Digital Payment Systems Usage on Operational Efficiency

S/N	Questionnaire Items	N	Mean	SD	Remark
17	Our firm actively uses digital payment systems (e.g., POS, bank transfers, mobile money) for transactions.	276	4.19	0.901	Accepted
18	We encourage our customers to use digital payment methods for their purchases.	276	4.08	0.956	Accepted
19	The use of digital payments has improved the security of our financial transactions compared to handling cash.	276	4.26	0.887	Accepted
20	Our digital payment systems are reliable and easy for both our staff and customers to use.	276	3.81	1.034	Accepted
21	Our business processes have become faster and more streamlined.	276	4.13	0.911	Accepted
22	We have experienced a noticeable reduction in our overall operational costs.	276	3.79	1.008	Accepted
23	The accuracy of our work and the quality of our output have improved.	276	4.01	0.963	Accepted
24	Overall, our firm's productivity has significantly increased.	276	4.23	0.895	Accepted
	Grand Mean	**276**	**4.06**	**0.944**	**Accepted**

Source: Field Survey, 2025

The data in Table 3 examines the effect of digital payment systems usage on operational efficiency. The results show overwhelming agreement, with a high grand mean of 4.06. All individual items received mean scores well above the 3.0 acceptance level, indicating a strong positive perception. The highest scores were for Item 19 (mean = 4.26), revealing that improved security is a major perceived benefit, and Item 24 (mean = 4.23), confirming a significant link to increased productivity. Item 17 (mean = 4.19) and Item 18 (mean = 4.08) also scored very high, showing that the active use and promotion of digital payments are widespread among the surveyed SMEs. The findings suggest that digital payment systems are the most successfully integrated and impactful component of digital literacy for these businesses.

Hypotheses Testing

Decision Rule: Reject the null hypothesis (H_0) if the p-value (Sig.) is less than the significance level of 0.05. Otherwise, accept the null hypothesis.

H_{01}: Digital skills proficiency has no significant effect on operational efficiency of SMEs in Anambra State, Nigeria.

H_{02}: E-commerce adoption has no significant effect on operational efficiency of SMEs in Anambra State, Nigeria.

H_{03}: Digital payment systems usage has no significant effect on operational efficiency of SMEs in Anambra State, Nigeria.

Table 4: Multiple Regression Analysis of the Effect of Digital Literacy Components on Operational Efficiency

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.728[a]	.530	.525	.68911

a. Predictors: (Constant), Digital Payment Systems Usage, E-commerce Adoption, Digital Skills Proficiency

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	145.881	3	48.627	102.396	.000[b]
Residual	129.173	272	.475		
Total	275.054	275			

a. Dependent Variable: Operational Efficiency
b. Predictors: (Constant), Digital Payment Systems Usage, E-commerce Adoption, Digital Skills Proficiency

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1 (Constant)	.411	.181		2.271	.024
Digital Skills Proficiency	.358	.059	.341	6.068	.000
E-commerce Adoption	.081	.048	.089	1.688	.093
Digital Payment Systems Usage	.403	.061	.416	6.607	.000

a. Dependent Variable: Operational Efficiency

The multiple regression analysis in Table 4; was conducted to determine the effect of digital skills proficiency, e-commerce adoption, and digital payment systems usage on the operational efficiency of SMEs. The models summary shows that the three independent variables collectively explain a significant portion of the variance in operational efficiency, with an R-squared value of .530, indicating that 53.0% of the variation in operational efficiency can be attributed to these digital literacy components. The ANOVA result confirms the overall significance of the model ($F(3, 272) = 102.396$, $p < .001$). An examination of the individual predictors reveals that both Digital Skills Proficiency ($\beta = .341$, $p < .001$) and Digital Payment Systems Usage ($\beta = .416$, $p < .001$) have statistically significant positive effects on operational efficiency. However, E-commerce Adoption ($\beta = .089$, $p = .093$) was found to have no statistically significant effect on operational efficiency. Based on these results, the null hypotheses for digital skills proficiency and digital payment systems usage are rejected, while the null hypothesis for e-commerce adoption is accepted.

Discussion of Findings

The finding that digital skills proficiency has a significant positive effect on the operational efficiency of SMEs aligns with the core tenets of the Technology Acceptance Model (TAM). This result suggests that when SME operators and their employees possess the necessary skills, their perception of the ease of use of digital tools increases, which in turn enhances the perceived usefulness of these technologies in performing business tasks. This proficiency allows them to effectively leverage digital platforms to streamline processes and boost productivity, a conclusion that resonates with the findings of Umetiti, Nwafor, Arachie, and Ifeme (2025), who also found a significant positive relationship between digital literacy and SME performance in the region. The present study reinforces the idea that human capability is a critical precursor to technological impact, as the ability to confidently use digital tools directly translates into tangible operational gains, a sentiment also shared by Ojobo, Orga, and Okechukwu (2023).

Conversely, the study revealed that e-commerce adoption had no statistically significant effect on operational efficiency. This counter intuitive finding can be understood through the lens of the descriptive data, which indicated a significant struggle among SMEs to integrate their online sales platforms with backend inventory and order management systems. In the context of TAM, while the perceived usefulness of e-commerce for expanding market reach is high, the perceived ease of use is severely undermined by these operational and infrastructural complexities. This difficulty in implementation likely creates new bottlenecks that offset the potential efficiency gains from online sales. This finding, while contrasting with the more direct positive results found by Edokobi, Okoli, and Ugochukwu (2024), highlights a critical nuance: without seamless integration, e-commerce can fail to deliver on its promise of enhanced efficiency.

The research established that the usage of digital payment systems was the most significant predictor of operational efficiency. This strong positive relationship can be attributed to the high perceived usefulness and ease of use of these systems, as posited by TAM. Digital payment platforms offer immediate and tangible solutions to core SME challenges by enhancing transaction speed, improving security, and simplifying financial record-keeping. These direct benefits make their adoption highly impactful. This result strongly corroborates the findings of Mustapha, Onimole, and Adebusoye (2025), who concluded that electronic payment

systems usage significantly enhances SME performance. It also aligns with the work of Olurotimi, Rufus, Ifeanyi, and Olufemi (2023), which identified POS terminals as a particularly impactful e-banking tool, reinforcing the notion that digital payments are a foundational and highly effective component of digital transformation for SMEs in Anambra State, Nigeria.

Conclusion

This study concludes that digital literacy significantly enhances the operational efficiency of SMEs in Anambra State, although the impact of its components is uneven. While digital skills proficiency and, most notably, the use of digital payment systems are powerful drivers of productivity and cost reduction, the potential of e-commerce adoption is currently unrealized due to significant challenges with backend integration. Ultimately, for SMEs to fully leverage digitalization, they must move beyond mere adoption to achieve a holistic and well-integrated digital ecosystem supported by continuous investment in human capital.

Recommendations

1. SME owners and managers should prioritize consistent investment in practical digital skills training for their employees to bridge the gap between possessing technology and using it effectively.
2. Government agencies, such as the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), should collaborate with technology providers to facilitate access to affordable and seamlessly integrated e-commerce solutions tailored for SMEs.
3. Financial institutions and fintech companies are encouraged to continuously bolster the security infrastructure and public awareness campaigns for digital payment systems to build on their proven success and further deepen trust among users.

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