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IMPACT OF DIGITAL TRANSFORMATION ON EFFICIENCY OF SMALL ENTERPRISES IN MARARABA, KARU LOCAL GOVERNMENT AREA OF NASARAWA STATE-NIGERIA.

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ABSTRACT

This study investigates the impact of digital transformation on the operational efficiency of small enterprises in Maraba, Karu Local Government Area of Nasarawa State, Nigeria. The research explores the extent to which digital tools such as mobile payment platforms, e-commerce channels, social media marketing, and cloud-based applications contribute to improved efficiency outcomes among Small Enterprises. A descriptive survey design was employed, and data were collected through structured questionnaires distributed to 150 Small enterprises owners and employees. The responses of 145 valid questionnaires (96.7% response rate) were analyzed using descriptive statistics and multiple regression analysis via software SPSS. The findings reveal a significant positive relationship between the adoption of digital tools and business efficiency. The study concludes that while digital tools have a notable impact on enhancing Small enterprises performance, issues such as poor infrastructure, limited technical skills, and high technology costs remain key barriers. It recommends targeted interventions by government and private stakeholders to enhance digital literacy, provide affordable digital tools such as POS machines and cloud software, and promote an enabling environment that supports the seamless adoption of mobile payment platforms, e-commerce, social media marketing, and cloud-based solutions among small enterprises in Maraba.

INTRODUCTION

Background to the Study

Digital transformation has become a critical driver of business success globally, reshaping how enterprises operate, interact with customers, and manage internal processes (Bai et al., 2021). Small enterprises form the backbone of many economies, including Nigeria, embraces digital technologies to improve efficiency, increase market reach, and enhance customer engagement. The emergence of digital solutions such as mobile payment systems, e-commerce platforms, social media marketing, and cloud-based software has provided small businesses with opportunities to compete effectively in the evolving business landscape (Adebayo & Olayemi, 2022). In Nigeria, small enterprises play a vital role in employment generation and economic growth. However, many of these businesses struggle with challenges such as inefficient payment processing, limited access to markets, and difficulties in managing business operations (Akinyemi & Okonkwo, 2022). Traditional business practices often involve cash-based transactions, which are slow and prone to errors. Additionally, businesses relying solely on physical sales may miss opportunities to reach a broader customer base. To address these inefficiencies, digital transformation presents itself as a viable solution. The drive towards digital transformation is often motivated by the need to improve business efficiency. For small enterprises, efficiency entails the ability to streamline operations, reduce operational costs, increase customer satisfaction, and enhance decision making speed. By integrating digital tools such as, Mobile payment systems facilitate cashless transactions, reducing the risks associated with handling cash and enhancing transaction speed (Ogunleye et al., 2023). The adoption of mobile payment solutions such as Point-of-Sale (POS) machines, mobile banking, and fintech apps has allowed small enterprises to improve their financial transactions. E-commerce platforms provide businesses with an avenue to expand beyond physical stores, allowing customers to browse and purchase goods online. This increases accessibility and revenue generation potential. Social media marketing has become a cost-effective way for businesses to reach customers, engage audiences, and build brand loyalty. Platforms such as Facebook, Instagram, and WhatsApp allow businesses to advertise their products, interact with customers, and increase visibility. Lastly, cloud-based software enhances efficiency in data management, inventory tracking, and customer relationship

management by enabling real-time access to business records. Businesses can optimize resource use and improve both internal processes and external service delivery. Despite the evident, benefits of digital transformation, small enterprises in semi-urban areas such as Maraba, Karu Local Government Area, do face barriers such as inadequate digital skills, financial constraints, and resistance to change. This study examined the impact of mobile payment systems, e-commerce platforms, social media marketing, and cloud-based software in improving business efficiency among small enterprises in Maraba.

Statement of the Problem

Small enterprises in Maraba, Karu Government, face operational inefficiencies that hinder business efficiency and sustainability. Issues such as slow transaction processing, difficulty in reaching new customers, lack of digital marketing strategies, and poor business data management negatively impact their efficiency. Traditional business methods, including manual record-keeping and cash-based transactions, often lead to delays, errors, and security risks (Nwachukwu & Eze, 2023). Furthermore, limited accesses to technology and lack of awareness about the benefits of digital transformation have slowed the adoption of modern business solutions. While digital transformation has been widely studied in urban settings and large businesses, there is limited research on its impact on small enterprises in semi-urban areas like Maraba. Understanding how mobile payment systems, e-commerce platforms, social media marketing, and cloud-based software influence efficiency in small businesses is essential for promoting technology adoption among entrepreneurs.

Objectives of the Study

The primary objective of this study is to examine how small enterprises efficiency in Maraba, Karu local Government could be improved through the use of digital transformation constructs the study specifically:

i. To assess the impact of mobile payment systems on operational efficiency in small enterprises in Maraba, Karu Local Government Area.
ii. To analyze the impact of e-commerce platforms in sustaining operational efficiency of small enterprises in Maraba, Karu Local Government Area.
iii. To evaluate the effectiveness of social media marketing in improving operational efficiency of small enterprises in Maraba Karu Local Government Area.
iv. To investigate how cloud-based software enhances operational efficiency of small enterprises in Maraba Karu Local Government Area.

Research Questions

To achieve the study's objectives, the following research questions were addressed:

i. To what extent does mobile payment systems affect operational efficiency in small enterprises in Maraba, Karu Local Government Area?
ii. To what extent does e-commerce platforms contribute to sustaining operational efficiency in small enterprises in Maraba, Karu Local Government Area?
iii. To what extent does social media marketing improve small operational efficiency of small enterprises in Maraba, Karu Local Government Area?
iv. To what extent does cloud-based software contribute to operational efficiency of small enterprise in Maraba, Karu Local Government Area?

Research Hypotheses

The study will test the following hypotheses:

$H_0$1: Mobile payment systems have no significant impact on operational efficiency of small enterprises in Maraba, Karu Local Government Area.

$H_0$2: E-commerce platforms do not significantly affect operational efficiency of small enterprises in Maraba, Karu Local Government Area.

$H_0$3: Social media marketing has no significant impact on operational efficiency of small enterprises in Maraba, Karu Local Government Area.

$H_0$4: Cloud-based software does not significantly enhance operational efficiency of small enterprises in Maraba, Karu Local Government Area.

Significance of the Study

This study is significant for several stakeholders, including business owners, policymakers, researchers, and technology providers. For small business owners, the findings will offer valuable insights into the benefits of digital transformation and serve as a guide in adopting cost-effective digital solutions that can enhance operational efficiency. For government and policymakers, the study's outcomes can inform the development of policies and initiatives aimed at promoting the adoption of digital technologies among small enterprises in Nigeria, contributing to broader economic development. In academia, the research adds to the existing body of literature on digital transformation and business efficiency, with a particular focus on semi-urban environments, thereby offering a nuanced understanding of the challenges and opportunities in these contexts. For technology providers, insights into the digital needs and practices of small enterprises will support the design and delivery of tailored technological solutions that drive growth and improve performance.

Scope of the Study

This study investigates the impact of digital transformation on the efficiency of small enterprises, with a particular focus on businesses located in Maraba, a semi-urban area within Karu Local Government Area of Nasarawa State, Nigeria. The research is geographically confined to this area due to its growing population of small enterprises and increasing adoption of digital technologies. The study centers on four key components of digital transformation: mobile payment systems, e-commerce platforms, social media marketing and cloud-based software. These are treated as the independent variables. The dependent variable, business efficiency, is examined in terms of operational efficiency, financial efficiency, market efficiency, customer satisfaction and customer retention. The time scope of the study spans from 2024 to 2025, providing a current and relevant analysis of how digital tools influence the performance of small enterprises within this period. The study excludes medium and large-scale enterprises, as well as businesses outside the selected geographic area. It focuses on small enterprises in Maraba, Karu Local Government. It examines the extent to which mobile payment systems, e-commerce platforms, social media marketing, and cloud-based software influence business efficiency. The research considered enterprises across various sectors, including retail, services, and food businesses, to understand the impact of digital transformation across different industries.

Definition of Key Terms

i. **Digital Transformation**: The integration of digital technologies into business operations to enhance efficiency and service delivery.
ii. **Small Enterprises**: Businesses with limited financial resources, fewer employees, and a smaller market size compared to larger corporations.
iii. **Mobile Payment System**: A financial transaction method using mobile devices, including mobile banking, POS, and fintech apps.
iv. **E-commerce Platform**: An online system that enables buying and selling of goods and services.
v. **Social Media Marketing**: The use of social media platforms for advertising and customer engagement.
vi. **Cloud-Based Software**: Software applications hosted online that allows real-time data access and collaboration.

LITERATURE REVIEW

The rapid evolution of digital technologies has significantly transformed business operations worldwide, enhancing efficiency, customer engagement, and sustainability. While developed economies have largely integrated digital transformation into their business models, small

enterprises in developing regions, including Nigeria, face numerous adoption barriers such as financial constraints, digital illiteracy, and poor infrastructure (Nwachukwu & Eze, 2023).
This section critically reviews existing literature on digital transformation and its impact on small enterprises. The review follows the 5C's approach: Cite, Compare, Contrast, Critique, and Connect Dito provide a robust analysis of key digital technologies, theoretical frameworks, and empirical studies.

Concept of Digital Transformation (Independent Variable)
Digital transformation refers to the profound integration of digital technologies across all areas of an organization's operations, fundamentally reshaping how businesses operate, interact with customers, and deliver value. It extends beyond the mere adoption of technologies; it necessitates a rethinking of business models, processes, and organizational culture to align with the rapidly evolving digital landscape (Fitzgerald et al., 2014). This process has become critical in enabling organizations to remain competitive and agile in a world where technological advances and customer expectations are constantly shifting (Sebastian et al., 2017). Digital transformation in small enterprises is largely driven by the integration of specific digital technologies that streamline operations, reduce costs, and enhance customer satisfaction. In the context of semi urban area like Maraba, these technologies serve as enablers of efficiency, competitiveness, and sustainability. The key technologies include:

Mobile Payment Systems
Nigeria's mobile financial services market continues to expand, with fintech platforms like OPay and Palm Pay processing over ₦71.5 trillion in transactions in 2024 (Naira metrics, 2025). While mobile payments enable fast transactions, challenges such as high service fees and unreliable networks hinder adoption in semi-urban areas (Intel point, 2024). Most research focuses on urban businesses, leaving gaps in understanding semi-urban adoption challenges. In Maraba, mobile payment adoption has become widespread among traders and service providers, helping to reduce cash-related inefficiencies and enabling financial inclusion

E-Commerce Platforms
Nigeria's e-commerce market is projected to reach $9.54 billion by 2025, highlighting its rapid growth (Mordor Intelligence, 2025).While e-commerce reduces overhead costs, Small enterprises in semi-urban areas struggle with logistics, digital literacy, and consumer trust issues (Statista, 2024).Many studies emphasize large retailers, neglecting the unique challenges small businesses face in leveraging e-commerce. In Maraba small retailers are increasingly using WhatsApp and Facebook for product promotion and customer communication, reducing their dependence on physical foot traffic.

Social Media Marketing
Social media has become an essential business tool, with over 40 million Nigerian Small enterprises actively engaging on platforms like Instagram and Facebook (Hootsuite, 2024).While cost-effective, social media marketing requires continuous content updates and algorithm adaptability, which can be challenging for Small enterprises (Business Day, 2025).Studies often overlook how social media literacy influences small business marketing success. Many Maraba-based Small enterprises especially fashion vendor and restaurants, use social media to showcase products and run promotions, thus increasing footfall and boosting sales without traditional, marketing costs.

Cloud-Based Software
Cloud solutions help Small enterprises streamline operations, improve collaboration, and enhance data security (World Bank Blogs, 2023).Despite these benefits, high subscription costs and unreliable internet hinder widespread adoption among small businesses in semi-urban areas (Forbes, 2024).Research often assumes cloud adoption is seamless, overlooking financial and infrastructural challenges for Small enterprises. In Maraba, emerging Small enterprises have started adopting

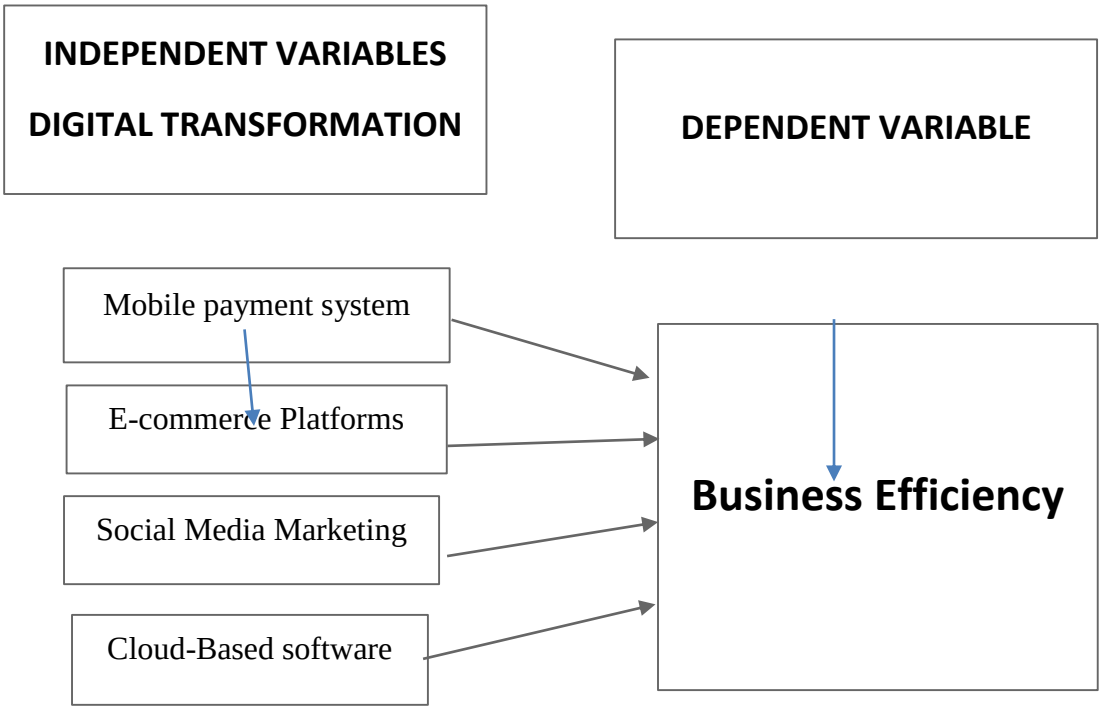
affordable cloud-based tools like Google sheets for inventory, and WhatsApp Business for customer management, enabling them to operate efficiently without heavy capital investment.

Concept of Business Efficiency (Dependent Variable)

Business efficiency refers to an organization's ability to utilize its resources human, financial, and technological in a manner that maximizes output while minimizing input and waste (Panigrahi, Shrivastava & Nudurupati, 2024). In the context of small enterprises, especially in emerging economies like Nigeria, achieving efficiency is essential for sustainability, competitiveness, and growth. Two critical dimensions of business efficiency are financial efficiency and operational efficiency.

Operational Efficiency

Operational efficiency is defined as the ability to deliver products or services quickly, reliably, and at the lowest possible cost without compromising quality (SMEScale, 2024). It focuses on optimizing business processes and internal functions.



Source: Conceptual Framework designed by the researcher 2025

Fig.1 Conceptual Framework of Digital Transformation on the Efficiency of Small Enterprises.

Theoretical Review

In exploring the impact of digital transformation on small enterprises, three key theories provide critical insight into the mechanisms and factors influencing digital adoption and its impact on business efficiency: The Technology-Organization-Environment Theory, Resource-Based Theory, and Diffusion of Innovation (DOI) theory. These theories highlight the interplay of technology, organizational factors, and external environments in shaping digital transformation outcomes.

Technology-Organization-Environment Theory

The Technology-Organization-Environment (TOE) theory, proposed by Tornatzky and Fleischer in 1990, is a widely recognized model for understanding the various factors that influence the adoption of technological innovations within organizations. According to this framework, three core elements technology, organization, and environment jointly shape the adoption process. The technological context involves how new technologies are perceived in terms of their relative advantage, compatibility with existing systems, and complexity of implementation. The organizational context includes internal characteristics such as firm size, availability of resources, and the level of management support, all of which determine the organization's readiness and capacity to adopt new solutions. The environmental context refers to external pressures, including the level of

competition, evolving market demands, and regulatory or policy influences that can drive or hinder adoption efforts. The TOE theory rests on several key assumptions. First, it assumes that technological innovation is a critical enabler of business success, providing competitive advantage and operational improvements. Second, it acknowledges that both organizational capabilities and environmental factors significantly influence how and when a firm adopts technology. Third, it posits that the decision to adopt technological innovations is shaped by the interplay between internal readiness and external pressures. This theory is particularly relevant to small enterprises operating in semi-urban areas. Such businesses often face constraints like limited financial and human resources, underdeveloped infrastructure, and reduced access to digital tools. The TOE framework helps in analyzing how these firms evaluate digital technologies in terms of their fit with existing operations, whether they have the internal capacity to support adoption, and how external factors such as customer expectations, competitive forces, and policy initiatives influence their decisions. By considering these dimensions, the TOE theory offers a structured way to understand and potentially support the digital transformation of small enterprises in resource-constrained and evolving market environments.

Resource-Based Theory

The Resource-Based Theory, introduced by Wernerfelt and Barney (1991), posits that competitive advantage stems from the unique resources and capabilities that an organization possesses. These resources can be tangible (e.g., financial capital, digital tools) or intangible (e.g., knowledge, skills). For small enterprises, digital transformation can provide valuable resources, such as e-commerce platforms or mobile payment systems, which improve business operations and enhance customer engagement. The assumptions are First, Resources (both tangible and intangible) are key drivers of competitive advantage. Second, A firm's unique resources, when leveraged effectively, create value and differentiate it from competitors. Third, not all firms have access to the same resources, which leads to differences in performance. RBT is relevant for small enterprises because it emphasizes the need for businesses to leverage their unique digital resources (e.g., digital tools, customer data, or digital skills) to enhance efficiency and create competitive advantages. By investing in these resources, small businesses can improve their internal processes and create more value for their customers, leading to improved operational efficiency and growth.

Diffusion of Innovation (DOI) Theory

Everett Rogers' Diffusion of Innovation (DOI) theory (1962) explains how new technologies spread through a population. According to DOI, the adoption rate of innovations is influenced by five key factors: relative advantage, compatibility, complexity, trialability, and observability. Its relative advantage is that its perceived benefits of a technology over existing methods. Compatibility: How well the innovation aligns with current practices and needs. Complexity: The ease or difficulty of adopting the technology. Trialability: The ability to test the technology before full-scale adoption. Observability: The visibility of the technology's benefits. Some if the assumptions of theory are (i) Innovations are adopted at different rates depending on individual or organizational characteristics. (ii) The decision to adopt is influenced by perceived advantages and the ease of integration into existing systems. (iii) Adoption is a social process and is influenced by interactions with others who have already adopted the innovation. The relevance of the theory are for small enterprises, especially in semi-urban areas, DOI is relevant because it provides insight into how small businesses adopt digital tools like mobile payments, e-commerce platforms, or social media marketing. By considering factors like relative advantage and compatibility, small businesses can better understand why certain digital tools may be more readily adopted than others, especially in resource-constrained environments. This theory also explains how the visibility of successful use cases and peer influence can accelerate the adoption process in local communities.

Theoretical Framework

The theoretical framework for this study is grounded in the Technology-Organization-Environment (TOE) theory which is well-suited for examining the digital transformation of small enterprises in

semi-urban Nigeria. This theory, developed by Tornatzky and Fleischer (1990), posits that the adoption of technological innovations is influenced by three interrelated factors: Technology, Organization, and Environment. These elements help to explain the challenges and opportunities small businesses face when integrating digital technologies to improve operational efficiency. The TOE theory (Tornatzky & Fleischer, 1990) focuses on the interplay between three key components (Technology, organization and environmental) that shape the adoption and successful implementation of new technologies in organizations. The TOE theory is particularly relevant for this study as it provides a comprehensive model for examining how small businesses in semi-urban Nigeria adopt and utilize digital technologies. By focusing on the interaction of technological, organizational, and environmental factors, the framework offers a robust lens through which to explore the barriers and enablers of digital transformation in these enterprises. In the context of semi-urban Nigeria, the TOE theory is crucial because it takes into account both the internal dynamics of small businesses, such as their resource limitations and organizational culture, and external pressures, such as market demand for digital services and the availability of technological infrastructure. This theory helps to identify the specific factors that facilitate or impede the adoption of digital tools that can enhance business efficiency. By adopting the TOE as Framework, this study aims to provide a nuanced understanding of how small enterprises in Maraba navigate the complexities of digital transformation. It allows for a holistic analysis of the factors that influence the decision to adopt digital technologies, the challenges faced during the integration process, and the resulting impacts on business efficiency. This theoretical framework will guide the exploration of the key drivers of digital transformation and provide valuable insights into the role of technology in enhancing business operations in semi-urban contexts.

Empirical Reviews

Chaffey (2020) studied Digital Business and E-Commerce Management and examined the role of e-commerce adoption in enhancing the operational efficiency of Small enterprises. The methodological approach used was descriptive analysis of Small enterprises digital adoption across Europe and selected emerging markets. The data analysis involved the use of the measures of central tendency with the predictive being regression analysis. Findings showed that Small enterprises using e-commerce platforms experienced increased market reach, reduced operational overheads, and improved customer engagement. However, while the study provides valuable insights into the transformative potential of e-commerce for Small enterprises, it focuses largely on developed economies. This limits its contextual relevance to semi-urban environments like Maraba in Nigeria, where infrastructure and digital literacy challenges persist.

Mettler (2021) studied Cloud Computing and Its Impact on Small Business Efficiency and investigated how cloud computing affects collaboration, communication, and decision-making in Small enterprises. The methodological approach used was empirical quantitative analysis, utilizing survey data from 150 small businesses in Europe. The data analysis involved descriptive statistics to evaluate operational agility, with findings indicating that cloud-based tools enhanced agility, reduced IT costs, and improved interdepartmental communication and scalability. However, while the study provides valuable insights into the efficiency benefits of cloud adoption, its setting in developed European contexts may not fully capture the infrastructural limitations, inconsistent power supply, and limited digital skills that small enterprises in semi-urban Nigerian communities like Maraba often contend with. This limits the direct applicability of the results, though the findings remain directionally useful.

Oliveira and Martins (2019) studied The Barriers to Digital Transformation in Small enterprises and identified and categorized the key obstacles Small enterprises face in adopting digital technologies. The methodological approach used was a systematic literature review and thematic analysis of existing research on digital adoption challenges. The analysis revealed that financial constraints, lack of digital skills, poor infrastructure, and low organizational readiness were the main barriers to digital transformation. While this study offers a comprehensive synthesis of global

barriers, its reliance on secondary data and lack of field-based empirical evidence may reduce the specificity of its conclusions for unique local contexts. Nevertheless, its findings are highly relevant to the Nigerian setting, as they closely reflect the real challenges faced by Small enterprises in Maraba, thus serving as a strong foundational reference for understanding digital adoption limitations in semi-urban areas.

Jonathan (2022) studied Organizational Readiness for Digital Transformation in Nigerian Small enterprises and examined the influence of organizational readiness on successful digital transformation in Small enterprises. The methodological approach used was a mixed-methods design involving surveys and interviews with Nigerian Small enterprises owners and staff. The analysis revealed that high digital readiness such as trained employees, leadership support, and access to funding correlates strongly with successful digital adoption. While the study provides rich insights into internal enablers of digital transformation, its generalization may be limited by the size and regional concentration of its sample. However, its direct focus on Nigerian Small enterprises significantly enhances its contextual relevance and makes its findings particularly applicable to the realities of small enterprises in semi-urban areas like Maraba.

Karim (2023) studied Government Policies and Digital Transformation: A Study of Small Enterprises in Developing Countries and assessed how government incentives and policies affect the digital adoption rate in small enterprises. The methodological approach used was a combination of policy analysis and field surveys involving 200 Small enterprises across Sub-Saharan Africa. Descriptive statistics and correlation analysis were employed to evaluate the relationship between policy initiatives and digital adoption. Findings showed that digital literacy campaigns, tax incentives, and infrastructure investments were critical enablers of digital transformation among small enterprises. While the study spans a broad regional context, which may dilute location-specific nuances, its insights remain highly applicable to Maraba, highlighting the vital role that targeted government interventions play in facilitating digital transformation among Small enterprises in semi-urban Nigerian settings.

Hsu & Cheng (2022) studied Competitive Pressures and Digital Transformation: The Case of Small enterprises and analyzed how market competition influences the pace and extent of digital adoption in Small enterprises. The methodological approach was quantitative, based on survey data from 300 Small enterprises in Southeast Asia. Regression analysis was used to examine the relationship between competitive intensity and digital tool adoption. Findings indicated that intense competition positively influenced the adoption of digital tools, particularly in marketing, customer service, and operations. However, while the study is situated in Southeast Asia, where market conditions may differ, the underlying principle that competitive pressure drives innovation is highly relevant to Small enterprises in Maraba. It offers a strong basis for understanding how external market forces can compel digital transformation even in semi-urban Nigerian contexts.

RESEARCH METHODOLOGY

Research Design

This study adopts a descriptive survey research design, which is appropriate for systematically gathering information from a sample population to understand their experiences with digital transformation tools and how it affects operational efficiency.

Population of the Study

The population of this study comprises the owners and staff of small-scale enterprises operating within Maraba, Karu Local Government Area, Nasarawa State. These businesses include those in the retail, food services, ICT, fashion, and general service sectors. According to the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), small enterprises are defined as businesses with a staff strength between 10 and 49 employees. Data obtained from the Karu Local Government Business Registry and the Maraba Small Business Association (2024) indicate that there

are approximately 240 registered small-scale enterprises in the study area that meet this criterion. Retail=70, Food service=50, ICT/Tech-services=40, Fashion and Tailoring=30, General service =50. These 240 businesses are form the target population for the study.

Sample Size and Sampling Technique

The study population consists of 240 registered small-scale enterprises in Maraba, Karu Local Government Area, Nasarawa State. These businesses span various sectors including retail, food services, ICT, fashion, and general services.

To determine the appropriate sample size, the Yamane (1967) formula was applied:

$n = N/1+ Ne^2$

n = Sample size

N = Population size (240)

e = Margin of error (0.05)

$n = 240/1 + 240(0.05)^2 = 240/1 + 0.6 = 240/1.6 = 150$

Therefore, a sample size of 150 respondents was selected from the population of 240 SMEs.

The sample was drawn using a stratified random sampling technique to ensure fair representation across the major business sectors. Each stratum represents a business sector, and firms were proportionally selected based on sector size. From each selected firm, typically one or two respondents were chosen — either the owner or a key operational staff member.

Although 150 questionnaires were distributed, only 145 were correctly filled and returned, resulting in a valid response rate of 96.7%. All analysis and interpretation in subsequent chapters are based on the 145 valid responses

Sources and Method of Data Collection

This study utilized both primary and secondary data to ensure a comprehensive understanding of the impact of digital transformation on small enterprise efficiency in Maraba. Primary data were obtained through the administration of a structured questionnaire designed to collect first-hand information from owners and operational staff of small enterprises across selected sectors (retail, food services, ICT, fashion, and general services). The questionnaire was structured into three sections, covering demographic data, adoption of digital tools, and business efficiency outcomes, it employed a 5-point Likert scale to measure responses to relevant variables. The researcher personally visited the business premises to distribute the questionnaires and, in some cases, conducted brief interviews to clarify questions. This face-to-face distribution ensured a high response rate and accurate completion of the instrument. Secondary data were obtained from reputable academic journals, government reports, policy documents, and publications from institutions such as the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN), the National Bureau of Statistics (NBS), and World Bank digital economy reports. These sources provided theoretical and empirical support, helping to frame the conceptual background and literature review of the study.

Method of Data Collection

The method of data collection involved a quantitative survey approach, using the structured questionnaire as the main instrument. The researcher employed a stratified random sampling technique to identify and engage respondents across five business sectors. This method ensured proportional representation across business types and allowed for systematic data collection that aligned with the study's objectives.

Validity and Reliability of the Instrument

The instrument was validated through expert review. A pilot test with 20 Small enterprises in a nearby LGA yielded a Cronbach Alpha of 0.81, confirming high internal consistency.

Method of Data Analysis
The data collected were analyzed using descriptive and inferential statistical techniques. Descriptive statistics such as frequencies, means, and percentages were used to summarize the responses. Multiple regression analysis was employed to examine the relationship between digital transformation tools (independent variables) and business efficiency (dependent variable). All analyses were carried out with the aid of Software SPSS version 25.0 as the computational platform.

Model Specification
Regression Model:
> $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$
Where:
Y = Operational Efficiency, X_1 = Mobile Payment Systems, X_2 = E-commerce Platforms, X_3 = Social Media Marketing, X_4 = Cloud-Based Software, β_0 = Constant, β_1 - β_4= Coefficients, ε = Error Term

Ethical Considerations
Respondents were briefed on the purpose of the study, assured of confidentiality, and gave informed consent. Participation was voluntary.

RESULTS AND DISCUSSIONS

This section presents, analyzes, and interprets the data collected from 150 respondents who are small enterprise owners or staff in Maraba, Karu Local Government Area, Nasarawa State. The data were analyzed in line with the study's objectives and hypotheses. Both descriptive and inferential statistical techniques were applied using Software SPSS.

Response Rate
Out of 150 questionnaires distributed, 145 were duly completed and returned, yielding a response rate of 96.7%. This high rate of return is considered adequate for statistical analysis and generalization.

Demographic Characteristics of Respondents
Table 4.1: Gender Distribution
Table 4.1 presents the gender breakdown of the 145 respondents surveyed from small-scale enterprises in Maraba. Gender distribution helps to identify whether adoption of digital tools may be influenced by gender roles or participation levels in business.

Gender	Frequency	Percentage
Male	82	56.6%
Female	63	43.4%
Total	**145**	**100%**

Out of the 145 respondents, 82 (56.6%) were male and 63 (43.4%) were female. This slight male dominance reflects the gender makeup of business ownership and staff in Maraba. Including both genders ensures that the data captures a balanced perspective of digital transformation across male and female-led enterprises.

Table 4.2: Age Distribution
Table 4.2 shows the age distribution of the respondents. Age is a significant variable, as younger individuals may be more open to adopting digital technologies, while older business owners may rely on traditional practices.

Age range	Frequency	Percentage
18-25	22	15.2%
26-35	54	37.2%
36-45	38	26.2%
46 and above	31	21.4%

Total	**145**	**100%**

The largest age group was 26–35 years, with 54 respondents (37.2%), followed by 36–45 years with 38 respondents (26.2%). This indicates that most participants were in their prime productive years, which is typically associated with active engagement in digital solutions for business efficiency.

Table 4.3: Educational Qualification

Table 4.3 outlines the educational qualifications of the respondents. Education level often affects digital literacy and openness to technology adoption, making this a crucial demographic indicator.

Qualification	Frequency	Percentage
SSCE	25	17.2%
OND/NCE	39	26.9%
HND/BSc	58	40%
Msc/professional cert	23	15%
Total	**145**	**100%**

A total of 58 respondents (40%) held a HND or BSc, the highest percentage among the educational categories. This suggests that the sample population is relatively well-educated, which supports their ability to understand and respond accurately to questions related to digital transformation.

Table 4.4: Years in Business

Table 4.4 displays the number of years the respondents' businesses have been in operation. Duration in business can indicate how experienced the respondents are in running enterprises and adapting to changes such as digitalization.

Years in business	Frequency	Percentage
Less than 1 year	16	11%
1-3 years	41	28.3%
4-6 years	42	29.0%
More than 6 years	46	31.7%
Total	**145**	**100%**

Most respondents have been in business for more than 6 years (46 or 31.7%) and 4-6 years (42 or 29.0%). This distribution shows that the majority are experienced business owners or staff, likely to have encountered and possibly implemented digital tools, making them suitable for evaluating the impact of digital transformation.

Descriptive Statistics of Key Variables

Responses to Sections B, and C of the questionnaire were analyzed using mean and standard deviation based on a 5-point Likert scale.

Adoption of Digital Tools

Table 4.5: Mean Responses on Digital Tool Adoption

Table 4.5 presents the respondents' mean ratings on the extent to which various digital transformation tools are adopted in their businesses. The responses were measured on a 5-point Likert scale, where:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

The higher the mean score, the greater the perceived adoption and impact of that digital tool.

Digital Tool Item	Mean	SD
Mobile payment platforms are used	4.23	0.71
Mobile payment improves transaction speed	4.17	0.79
Mobile payment reduces theft risks	4.09	0.88
My business sells via online platforms	3.95	0.96

E-commerce increased market reach	4.05	0.84
E-commerce reduced operational costs	3.87	1.01
Social media is used for marketing	4.34	0.65
Social media attracted new customers	4.22	0.71
Social media improved communication	4.18	0.74
Cloud-based tools are used	3.91	0.92
Cloud tools improved data storage/access	4.02	0.86
Cloud tools enhanced collaboration	3.85	0.97

The table indicates strong adoption of digital tools across the surveyed Small enterprises: Social media tools had the highest mean scores, especially "Social media is used for marketing" (Mean = 4.34), showing widespread use and effectiveness in customer outreach. Mobile payment tools also scored highly "Mobile payment platforms are used" (Mean = 4.23) and "improves transaction speed" (Mean = 4.17) indicating that mobile financial technology is popular and beneficial among small businesses in Maraba. E-commerce tools had moderate to high adoption, with "increased market reach" scoring 4.05, though "reduced operational costs" scored slightly lower at 3.87. Cloud-based tools had the lowest average means compared to other tools, with "Cloud tools enhanced collaboration" rated 3.85. This suggests that cloud technologies, though present, are less commonly adopted or understood by small businesses.

Business Efficiency Outcomes

Table 4.6: Mean Responses on Business Efficiency

Table 4.6 shows the average responses of small enterprise owners and staff on the effect of digital transformation tools on overall business efficiency. Responses were recorded on a 5-point Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree. The analysis gives insight into whether digital tools have positively influenced cost, customer growth, and service delivery.

Business Efficiency item	**Mean**	**SD**
Digital tools improved operational efficiency	4.19	0.72
Digital tools reduced operational costs	4.07	0.85
Digital tools increased customer base	4.15	0.81
Customer satisfaction has improved	4.21	0.74

All items have mean scores above 4.00, showing strong agreement among respondents that digital tools have significantly contributed to business efficiency in multiple ways:

The highest-rated item, "Customer satisfaction has improved" (Mean = 4.21), suggests that digital engagement has enhanced customer service quality. "Improved operational efficiency" (Mean = 4.19) and "Increased customer base" (Mean = 4.15) also indicate that digital transformation enhances productivity and market expansion. Although "Reduced operational costs" scored slightly lower (Mean = 4.07), it still reflects a positive impact. These results affirm that digital transformation tools directly support efficiency gains and customer-related outcomes in small businesses.

Challenges with Digital Tools

Table 4.7: Mean Response on Digital Tool Challenges

Table 4.7 presents the mean score and standard deviation for the overall perception of challenges affecting the adoption of digital tools among small enterprises. This item aggregates responses regarding constraints like cost, infrastructure, digital literacy, and policy-related issues.

Challenges (aggregated measure)	**Mean**	**SD**
Extent challenges impede digital adoption	3.62	0.94

The mean score of 3.62 indicates a moderately high level of agreement that various challenges significantly affect the adoption of digital tools by small enterprises in Maraba. The standard deviation of 0.94 reflects some variation in the responses, likely due to differences in firm size, sector, or digital maturity. This result underscores the reality that while adoption is happening, Small

enterprises are still grappling with systemic and operational challenges that could limit the effectiveness and sustainability of digital transformation. It supports the need for policy interventions, infrastructure investment, and training programs to ease these barriers.

Test of Hypotheses

To assess the impact of digital transformation tools on business efficiency, a multiple regression analysis was conducted.

Model Specification

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

Where: Y = Business Efficiency, X_1 = Mobile Payment, X_2 = E-commerce, X_3 = Social Media, X_4 = Cloud Tools

Table 4.8: Model Summary

Table 4.8 shows the model summary of the regression analysis conducted to examine the relationship between digital transformation tools (independent variables) and business efficiency (dependent variable).

Model	R	R^2	Adjusted R^2	Std. error
1	.842	.709	.698	0.417

The R value of 0.842 indicates a very strong positive correlation between digital transformation tools and business efficiency. The R^2 value of 0.709 suggests that approximately 70.9% of the variation in business efficiency is explained by the model that is, by the combined effects of mobile payments, e-commerce, social media marketing, cloud tools. The Adjusted R^2 of 0.698 further confirms that even after adjusting for the number of predictors in the model, nearly 70% of the variation in business efficiency can still be accounted for. The standard error of 0.417 indicates the average distance that the observed values fall from the regression line, which is acceptable and shows a relatively good model fit. These results validate the model's strength and highlight the significant role digital tools play in enhancing Small enterprises efficiency, justifying efforts to promote their adoption across semi-urban enterprises.

Table 4.9: ANOVA

Table 4.9 presents the ANOVA results, which test the overall significance of the regression model in explaining the relationship between digital transformation tools (independent variables) and business efficiency (dependent variable).

Model	Sum of square	DF	Mean Square	F	Sig.
Regression	98.512	5	19.702	76.813	.000
Residual	40.328	139	0.290		
Total	138.840	144			

Source: SPSS output,2025

The ANOVA results indicate that the regression model is statistically significant at the 0.001 level ($p < 0.001$), as shown by the F-value of 76.813 and the associated significance value of .000. This means the combined predictors mobile payments, e-commerce, social media marketing and cloud-based tools. significantly predict business efficiency among Small enterprises in Maraba. The high F-value reflects that the variation explained by the regression model is much greater than the variation due to residuals (unexplained variance), confirming the model's strong explanatory power. Therefore, we reject the null hypothesis that digital transformation tools have no impact on business efficiency, supporting the theoretical premise that these digital factors contribute positively to Small enterprises performance.

Table 4.10: Coefficients

Table 4.10 presents the regression coefficients that indicate the individual contribution of each predictor variable mobile payment, e-commerce, social media marketing and cloud tools to business efficiency.

Variable	B	Std.error	Beta	t	Sig.
(Constant)	1.002	0.324		3.093	0.002
Mobile payment	0.212	0.054	0.198	3.926	0.000
E-commerce	0.184	0.060	0.161	3.067	0.003
Social Media	0.274	0.052	0.248	5.269	0.000
Cloud Tools	0.135	0.061	0.123	2.213	0.029

Source: SPSS output,2025

The regression coefficients reveal that all the predictors have a statistically significant positive effect on business efficiency ($p < 0.05$). Specifically, the constant value (1.002, $p = 0.002$) indicates the baseline level of business efficiency when all predictors are zero. Social media marketing has the largest standardized beta coefficient ($\beta = 0.248$), highlighting its significant impact on enhancing business operations through customer engagement and marketing reach. Mobile payment ($\beta = 0.198$) and e-commerce ($\beta = 0.161$) also contribute positively, demonstrating their importance in facilitating transactions and expanding market access. Cloud tools have the smallest yet still significant effect ($\beta = 0.123$), suggesting their role in improving operational processes and data management. All t-values exceed the critical value, and p-values are below 0.05, confirming the reliability of these effects. This evidence validates the hypothesis that digital transformation components and enhance efficiency in the study context.

Interpretation of Results

The results from the multiple regression analysis show that all the independent variables (mobile payment, e-commerce, social media, and cloud tools) have a statistically significant and positive relationship with business efficiency ($p < 0.05$).

Summary of Findings

1. Small enterprise in Maraba have adopted various digital tools with a high level of agreement on their benefits.
2. Use of digital transformation tools is positively associated with increased business efficiency.
3. Social media and mobile payment were the most influential predictors of efficiency.
4. Despite the benefits, challenges such as inadequate training and poor internet access still hinder effective digital adoption.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This section presents the summary of findings, conclusions drawn from the study, and practical recommendations. The study assessed the impact of digital transformation tools on the efficiency of small enterprises in Maraba, Karu Local Government Area, Nasarawa State, Nigeria.

Summary

The main objective was to examine how digital tools such as mobile payments, e-commerce platforms, social media marketing, and cloud-based software influence operational efficiency. Key findings include First, High Adoption Rate, Small enterprises in Maraba show strong adoption of digital tools, especially mobile payments and social media marketing. Second, Positive Impact on Efficiency, Digital tools significantly enhance business efficiency, including increased customer base, reduced transaction time, and moderate cost reduction. Third, Challenges, Key barriers include poor internet connectivity, lack of digital skills, and insufficient government support.

Conclusion

The study concludes that digital transformation tools positively influence the operational efficiency of Small enterprises. When businesses possess the necessary transformation such as training staff with digital infrastructure the impact of these tools becomes even more pronounced. Social media marketing and mobile payment systems emerged as the most influential tools.

Recommendations

1. Small enterprises in Maraba should increase the use of mobile payment platforms to enhance transaction speed and reduce cash handling risks. Government and financial bodies should provide affordable POS machines and training support.
2. Small enterprises should adopt e-commerce channels to expand market reach and cut operational costs. Digital literacy programs and onboarding support should be provided by relevant agencies to ease adoption.
3. Business owners should leverage platforms like Facebook and Instagram for marketing. Training in digital branding and customer engagement should be offered through local workshops.
4. Small enterprises are encouraged to adopt cloud tools for better data access and team collaboration. Subsidized software licenses and technical support should be made available through public-private partnerships.

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APPENDIX 1
RESEARCH QUESTIONNAIRE

Topic: The Impact of Digital Transformation on Efficiency of Small Enterprises in Maraba, Karu LGA, Nasarawa State

Dear Respondent,

My name is Eucharia Nnenna Asiuloka, a doctoral student in the Department of Business Administration at the National Open University of Nigeria (NOUN). I am conducting a research study in partial fulfillment of the requirements for the award of a PhD in Business Administration.

This questionnaire is designed to gather data for a research study on how digital transformation tools influence the operational efficiency of small enterprises in Maraba. Your responses will be treated with strict confidentiality and used solely for academic purposes. Thank you for your participation.

Section A: Demographic Information

I. Gender: [ ] Male, [ ] Female
II. Age: [ ] 18–25, [ ] 26–35 , [ ] 36–45 , [ ] 46 and above
III. Educational Qualification: [ ] SSCE, [ ] OND/NCE, [ ] HND/BSc, [ ] MSc/PhD, [ ] None of the above
IV. Nature of Business: _____
V. Years of Operation: [ ] Less than 1 year, [ ] 1–3 years, [ ] 4–6 years, [ ] Above 6 years

SECTION B: Adoption of Digital Tools

Please rate the following statements using this scale:
(1 - Strongly Disagree | 2 - Disagree | 3 - Neutral | 4 - Agree | 5 - Strongly Agree)

vi. My business uses mobile payment platforms (e.g., POS, mobile banking apps).
vii. Mobile payment has improved transaction speed in my business.
viii. Mobile payment has reduced cash handling risks such as theft.
ix. My business sells goods/services on online platforms (e.g., WhatsApp, Jumia).
x. E-commerce has increased my market reach beyond Maraba.
xi. Using e-commerce has reduced my operational costs.
xii. I use social media platforms (e.g., Facebook, Instagram) for marketing my business.
xiii. Social media has helped me attract new customers.
xiv. Social media has improved my customer communication.
xv. I use cloud-based tools (e.g., Google Drive, accounting apps) for my business operations.
xvi. Cloud tools have improved my ability to store and access information.
xvii. Cloud tools have enhanced collaboration among my staff.

SECTION C: Business Efficiency Outcomes

(Use the same scale provided in Section B.)

xviii. Use of digital tools has improved my operational efficiency.
xix. Use of digital tools has reduced my operational costs.
xx. Use of digital tools has increased my customer base.
xxi. I am satisfied with customer satisfaction since adopting digital tools.