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CHALLENGES AND PROSPECTS OF TECHNOLOGY ADOPTION BY SMALL AND MEDIUM ENTERPRISES IN RIVERS STATE, NIGERIA

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DOI:<https://doi.org/10.5281/zenodo.15389229>

Abstract: This study investigates the challenges and opportunities of technology adoption among small and medium enterprises (SMEs) in Rivers State, Nigeria. Given the crucial role SMEs play in economic development and job creation, understanding their capacity to integrate innovative technologies is essential for enhancing competitiveness and fostering growth. Through a qualitative methodology, including a conceptual review and analysis of relevant case studies, this research explores the current state of technology adoption, identifying key barriers such as financial constraints, inadequate infrastructure, and limited digital skills. The findings reveal that while some SMEs have begun to embrace basic digital tools, the overall integration of advanced technologies remains limited. Additionally, the study highlights the role of supportive government policies and the need for targeted interventions to facilitate technology adoption. Key recommendations include promoting low-cost technology solutions, investing in employee training, and fostering partnerships with technology providers to enhance accessibility and support. Furthermore, the research emphasizes the importance of government incentives, such as tax relief and infrastructure improvements, to create a conducive environment for SMEs. This study contributes to the existing body of knowledge by providing insights into the specific challenges faced by SMEs in Rivers State, along with actionable recommendations for overcoming these barriers. By leveraging technology, SMEs can improve operational efficiency, expand market access, and ultimately drive economic growth in the region. The findings underscore the need for a collaborative approach involving SMEs, government, and technology firms to effectively harness the potential of technological innovation in enhancing the entrepreneurial landscape of Rivers State.

Keywords: Innovation, Technology Adoption, SMEs (Small and Medium Enterprises), Rivers State, Challenges, Opportunities

1. Introduction

Global Small and Medium Enterprises

(SMEs) depend heavily on innovation and the adoption of new technologies to remain competitive and thrive. The ability to adopt technical innovations is crucial for survival in an increasingly globalized market, particularly in the context of Rivers State, Nigeria, where SMEs are critical to economic development and employment generation. As per Ebri (2021), small and medium-sized enterprises (SMEs) account for around 96% of all businesses in Nigeria and make for approximately 48% of the GDP of the country. Though they make a substantial

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contribution, many SMEs in Rivers State find it difficult to use cutting-edge technologies, which hinders their ability to perform well and expand.

Due to technology breakthroughs like digitization, automation, and the rise of artificial intelligence (AI), the corporate landscape is rapidly changing on a global scale. Businesses who do not adapt new technology run the risk of becoming obsolete, as highlighted by Mellal (2020). According to Genç, Dayan, and Genc (2019), SMEs in industrialized nations who adopt innovative techniques claim increased market reach, increased efficiency, and higher customer satisfaction. On the other hand, the poor adoption rate of these technologies among SMEs in Rivers State is mainly attributable to the lack of proper infrastructure, low technical skills among the workforce, and restricted access to funding.

Furthermore, the necessity for SMEs to embrace cutting-edge technologies has increased due to the growing significance of digital platforms in business operations. The COVID-19 epidemic brought even more attention to how important technology is to maintaining company operations and breaking into new markets. According to a study by Khalil, Abdelli, and Mogaji (2022), companies that quickly embraced digital solutions during the pandemic recovered more quickly and were more robust. Since the capacity to innovate and adapt can result in increased sustainability and competitiveness, this trend is especially important for SMEs in Rivers State.

Although there are many prospects for SMEs from technological improvements, the implementation of these advancements is hindered significantly in Rivers State. Fostering a strong SME sector that can prosper in a technology-driven global economy requires an understanding of these obstacles as well as an appreciation of the potential advantages of innovation.

Problem Statement and Research Objective

Even though innovation and technology adoption are widely considered to be important, SMEs in Rivers State encounter numerous obstacles that make it difficult for them to successfully incorporate these developments. The main obstacles are a shortage of skilled workers, restricted infrastructure, hard to get financing, and business owners' aversion to change. Approximately 70% of SMEs in Nigeria see financial restrictions as the main barrier to implementing new technology, according to a study by Effiom&Edet (2020). The lack of training programs and technical support services catered to the unique requirements of small and medium-sized enterprises (SMEs) exacerbates this problem.

The lack of adequate infrastructure in Rivers State, including unstable electricity supplies and inadequate internet access, makes adopting new technologies even more difficult. According to a survey by Nwokocha & Nwankwo (2019), more than 50% of SMEs in the area frequently face disruptions as a result of infrastructural issues, which hinders their ability to operate efficiently and willingness to make technology investments.

The purpose of this study is to investigate the potential and problems related to innovation and technology adoption among SMEs in Rivers State, Nigeria. Through an analysis of the primary obstacles to technology integration and a consideration of the potential advantages, the study will offer practical recommendations to stakeholders, legislators, and business owners. The ultimate objective is to create an atmosphere that promotes innovation, boosts SMEs' competitiveness, and aids in Rivers State's overall economic growth. By conducting this examination, the study hopes to add to the expanding body of knowledge on the growth of SMEs in Nigeria

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and offer suggestions that will help the sector become more resilient and stronger in the face of technological improvements.

2. Literature Review

Innovation in SMEs

The introduction of novel concepts, procedures, goods, or services that boost a company's capacity to satisfy client demands and boost operational effectiveness is referred to as innovation. Innovation is essential to small and medium-sized businesses (SMEs) because it boosts competitiveness, ensures sustainability, and drives growth. SMEs are frequently distinguished by their adaptability and agility, which allow them to react quickly to shifting market conditions. Innovation in SMEs can take many different forms, including organizational, process, marketing, and product innovation (Littunen, Tohmo, & Storhammar, 2021).

SMEs throughout the world are using technology more and more to innovate and enhance their business processes. According to a World Bank analysis from 2021, SMEs must embrace technology if they want to increase efficiency, increase consumer engagement, and gain access to international markets. For example, SMEs are now able to efficiently reach new customers and optimize operations thanks to digital tools like data analytics, CRM systems, and e-commerce platforms. Furthermore, the speed of innovation among SMEs has increased due to the quick spread of mobile technology and internet access, which enables them to take advantage of online platforms and resources for expansion (Xiong, Zang & Gao, 2021).

In developing countries, particularly Nigeria, the importance of innovation in SMEs cannot be emphasized. According to African Development Bank research from 2021, creative SMEs have a higher chance of surviving and growing in cutthroat markets. However, there are still barriers that prevent Nigerian SMEs from embracing innovation to the fullest. These include a shortage of trained workers, insufficient access to capital, and deficiencies in infrastructure.

Challenges in Technology Adoption

The process of adopting technology is riddled with problems, particularly for SMEs in Rivers State, Nigeria. The lack of finance is one of the biggest obstacles. Since traditional lending institutions sometimes view technology expenditures as high-risk endeavors, many SMEs find it difficult to obtain funding for them. Approximately 70% of SMEs in Nigeria experience financial obstacles that prevent them from investing in new technology, according to Ochinanwata et al. (2021). The tight collateral requirements set by banks and the high interest rates on loans make this issue worse.

Limited technical skills within the workforce also constitute a substantial challenge. In Rivers State, a large number of SMEs lack personnel with the technical know-how needed to adopt and support new technology. According to the Nigeria Economic Summit Group (2022), a significant barrier to the implementation of technology, cited by more than 60% of SMEs, is the lack of skilled workers. This skill gap is frequently associated with insufficient training opportunities and employees' and business owners' ignorance of the possible advantages of technology.

Another major obstacle to SMEs adopting technology is resistance to change. Fear of the unknown or worries about the associated expenses may be holding back many Rivers State entrepreneurs from implementing new technologies. Cultural issues and a lack of familiarity with technology advancements are contributing reasons to

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this reluctance, according to a study by Leong et al. (2021). Because of this, many SMEs are still deeply ingrained in conventional business methods, which hinders their capacity to adjust to the shifting dynamics of the market. In addition, the obstacles posed by inadequate internet access and unstable power supplies to SMEs make it more difficult for them to adopt new technologies. Nearly 50% of SMEs in Rivers State, according to Wu et al. (2022), frequently face disruptions as a result of infrastructural shortcomings, which negatively impacts their operational efficiency and willingness to invest in technology.

Opportunities for SMEs

Notwithstanding the difficulties, Rivers State's SMEs have a lot of chances because to the usage of technology. Enhanced operational efficiency is among the most noteworthy advantages. Small and medium-sized businesses (SMEs) can increase production, cut expenses, and streamline procedures by incorporating technology. Automation of monotonous work, for example, can free up employees' critical time to concentrate on strategic activities, which promotes growth and innovation (Purwaningsih et al., 2024). According to research, SMEs that use technology can enhance productivity by up to 20%, which has a big influence on their sustainability and profitability (European Commission, 2022).

One other possible benefit of adopting technology is the expansion of the market. SMEs can attract audiences outside of their local markets with the use of digital marketing tools and e-commerce apps. Due to their ability to quickly adapt to online selling, many SMEs were able to continue their operations despite constraints during the COVID-19 pandemic, which highlighted the need of digital channels for survival (World Economic Forum, 2023). SME reliance on traditional sales channels can be decreased by utilizing technology to reach new client segments and diversify their revenue sources.

Technology adoption can also strengthen a company's competitive edge. In a market that is changing quickly, SMEs that embrace innovation can set themselves apart from rivals by providing better goods or services, enhancing customer support, and more adeptly meeting client needs. Research by the International Finance Corporation (2022) indicated that SMEs who implemented digital technology were better positioned to compete in both local and international markets. SMEs can achieve long-term growth and a more stable market position by strengthening their competitive advantage.

In conclusion, employing technology presents a number of obstacles for SMEs in Rivers State, but there are also significant potential rewards. SMEs may boost productivity, access a wider audience, and obtain a competitive edge by removing obstacles to technology adoption. Leaders in business and policymaking who want to support a thriving SME sector that can prosper in a technologically advanced environment must investigate these opportunities and obstacles.

Theory Integration

It is imperative to integrate theories of innovation dissemination and technology acceptance in the literature review and discussion sections to enhance the academic rigor of the writing. These theories provide a framework for understanding how new technologies are accepted and the factors influencing their integration into small and medium companies (SMEs).

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Innovation Diffusion Theory

According to Innovation Diffusion Theory (IDT, Rogers, 1962), the manner by which an innovation is communicated through certain courses among some span around then among the individuals from a social framework essentially impacts its reception. To summarize briefly, the IDT consists of several antecedents-immature human-like characteristics that makes a good innovation (what are innovations); communicative-interactive channels; social system; and adopter categories.

Rogers outlined the following five attributes that shape an individual's decision to adopt innovations: relative advantage, compatibility complexity, trialability, and observability. Relative advantage: the degree to which an innovation is perceived as better than the idea it supersedes.

The adoption of technology by small and medium-sized businesses (SMEs) in Rivers State is largely dependent on their capacity to see its advantages in terms of increased productivity and profitability. Businesses are more likely to accept technologies that seamlessly integrate into their workflow when they are compatible, which is defined as how well a new technology aligns with the company's current values and operational demands. However, complexity also refers to how challenging it appears to use the invention; too complex technology may deter uptake. Offering streamlined systems in addition to comprehensive training and support can assist in resolving this.

Another crucial component is trialability, which enables SMEs to test new technologies in smallscale trials before committing fully. Innovations that SMEs can test without taking significant risks are more likely to be adopted. Furthermore, observability—the degree to which the innovation's effects are apparentcan encourage self-assurance in other people. A brave SME may be inspired to take the risk by case studies and success stories from companies that are similar to their own.

Additionally, Rogers divides users of technology into five categories: laggards, innovators, early adopters, early majority, and late majority. It can be useful to adjust technology adoption plans by determining where Rivers State SMEs fit within these categories. Early adopters, for instance, might promote the advantages of new technology within their networks by acting as influencers. The adoption of technology by SMEs is significantly influenced by the larger social context, including peer pressure, community support, and pre-existing business networks (MDPI, 2013).

Technology Acceptance Model

Fred Davis developed the Technology Acceptance Model (TAM) in 1989 to illustrate the major determinants of user acceptance and usage of technology. Technology acceptance is driven by two key factors—perceived usefulness and ease of use, according to TAM.

The term "perceived ease of use" describes how simple a person thinks using a technology will be. For SMEs, if business owners consider that new technologies are easy to deploy and require little work to utilize, they are more inclined to accept them. Perceived usefulness, on the other hand, is concerned with whether or not technology is thought to improve job performance. To get approval in the case of SMEs in Rivers State, one must demonstrate how technology may increase productivity, customer happiness, or profitability.

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TAM also acknowledges that perceived utility and ease of use can be influenced by outside variables like as business culture, support systems, and training. Through tackling these outside factors, interested parties can raise the likelihood that SMEs will adopt new technologies.

Integration of Theories

Combining Innovation Diffusion Theory (IDT) and the Technology Acceptance Model (TAM) creates a comprehensive approach to understanding technology adoption in SMEs. IDT sheds light on the social and contextual elements that influence how innovations spread, while TAM focuses on the personal perceptions that drive individuals to accept and use technology. Together, these frameworks provide a well-rounded perspective on the challenges and opportunities SMEs in Rivers State face regarding technology adoption.

By applying these theories, strategies to promote technology uptake among SMEs can be better informed. For instance, awareness campaigns that emphasize the observability aspect of IDT can showcase successful local technology implementations, creating a ripple effect and encouraging others to follow suit. Customized training programs can address the perceived ease of use highlighted in TAM, helping to simplify the adoption of new technologies. Offering workshops and hands-on sessions can boost the confidence of SME owners and employees, making them more comfortable with the systems.

Additionally, pilot programs provide SMEs with a chance to experience the advantages of technology firsthand, addressing both IDT's concept of trialability and TAM's perceived usefulness. Testimonials from those who have participated in successful pilot programs can further influence hesitant businesses to adopt new technologies.

By integrating IDT and TAM, stakeholders gain a solid theoretical foundation to understand the factors that impact technology adoption among SMEs in Rivers State. Tackling the challenges within these frameworks can help create an environment that encourages innovation and strengthens the competitiveness of SMEs in the region.

3. Research Methodology

This study adopted a conceptual review and content analysis methodology which involved the analysis of case studies on Rivers State, Nigeria in particular. The research began with an extensive literature review that sought to develop a better understanding of the current situation, challenges and opportunities associated with technology adoption by SMEs in Rivers State based on an established body of knowledge. This was followed by a systematic theoretical evaluation of innovation theories and practical lessons from documented cases. Content analysis as a research method was applied to provide insight, pattern or trends, highlights or emphasis, and make meaning of the research focus and issue.

Data for this paper were sourced from secondary sources – research reports and reviews by scholars, government and donor agency's reports, newspaper/magazine articles, and journal articles on the subject matter. The research began with an extensive review of literature, which entailed a critical appraisal of the contemporary status, challenges, and prospects of technology adoption for improving enterprise performance and competitiveness among SMEs in Rivers State. The literature review set the background knowledge for understanding technology adoption; identifying the main challenges to technology acquisition as including lack of finance, lack of skilled personnel and bad infrastructure; as well as opportunities that could be harnessed. The content analysis approach was utilized for analysis, providing a detailed examination of existing data and offering recommendations for enhancing technology integration among SMEs in the region.

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4. Technology Adoption Strategies for SMEs in Rivers State

Small and medium-sized businesses (SMEs) in Rivers State, Nigeria, have a lot of options to improve operational efficiency, reach a wider audience, and maintain their competitiveness in a global economy by implementing new technology. However, many SMEs are unable to completely adopt technology developments due to structural, technical, and financial hurdles. The strategic methods for removing these obstacles and encouraging SMEs in Rivers State to use technology are covered in this section. SMEs can position themselves for sustainable growth in an increasingly digital economy by resolving financial restrictions, developing capability, collaborating with technology enterprises, utilizing digital platforms, and receiving support from government policies.

Financial Investment and Accessibility

Limited access to financial resources is a major obstacle preventing SMEs in Rivers State from adopting technology. Many SMEs have limited operating capital and find it difficult to set aside money for technological improvements. In order to help SMEs acquire new technologies, government actions, subsidies, and loan availability must be improved. By providing tax breaks or grants intended expressly for the adoption of new technology, governments might lessen the financial burden associated with buying or subscribing to digital tools (Yang, Tang & Zhang, 2021). These subsidies could target essential technologies that support company innovation, such as cloud computing, digital payment systems, and e-commerce platforms.

Access to reasonably priced loans that are customized to meet the needs of SMEs is crucial, in addition to government assistance. Financial institutions can provide SMEs with low-interest loans to invest in digital infrastructure through partnerships with government organizations. To finance technology upgrades, small firms can take advantage of the SME Credit Guarantee Scheme, one of the financial inclusion initiatives developed by Nigeria's Central Bank (Tunbosun, Olasoji&Fatai, 2023). In a similar vein, collaborations with tech companies might give SMEs access to affordable solutions. To help SMEs embrace new systems gradually and with lower upfront costs, IT companies can provide software-as-a-service (SaaS) models, rebates, and installment payment options.

Training and Capacity Building

Adopting new technology involves more than just buying new tools; it also entails training SME personnel to use it efficiently. Developing digital skills is essential for SMEs to make the most of technology and keep a competitive edge. The inability of many SMEs in Rivers State to properly employ digital tools due to a lack of technical skills limits their ability to incorporate new technology into their operations (Nwakanma & Lilian, 2020). To close this gap, training initiatives that are specifically designed with SMEs' needs in mind are imperative. Furthermore, SMEs can collaborate and share expertise by establishing a supporting environment through peer learning networks. This will allow them to overcome technical obstacles as a group and promote innovation.

Collaboration with Tech Companies

Creating strategic partnerships with technology companies is another practical way to help SMEs in Rivers State embrace affordable solutions. SMEs can obtain scalable and customized technologies that are suited to their unique requirements by partnering with IT businesses. These alliances can take many different shapes, including cooperative product creation, platform sharing, or mutually beneficial joint ventures (Barenji et al., 2020). For

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example, in order to develop solutions that specifically address their operational difficulties, SMEs can work with local technology firms to automate inventory management or create online payment systems.

Furthermore, cloud-based services from technology providers enable small and medium-sized enterprises (SMEs) to access software, storage, and processing power without requiring a major infrastructure investment. As a result, SMEs have less financial strain and can only pay for the services they really utilize. These services are also scalable and flexible, enabling SMEs to modify their technology use in accordance with their own business requirements. Additionally, vendor relationships can guarantee that SMEs can continuously profit from the most recent technological breakthroughs by providing after-sales support, technical assistance, and periodic upgrades. The function of incubators and accelerators is also crucial under this situation. These organizations can assist SMEs in Rivers State with financial access, mentoring on digital transformation tactics, and establishing connections with technology providers. These kinds of partnerships can help SMEs successfully adapt and incorporate new technology into their operations by promoting an innovative and collaborative culture.

Policy and Regulatory Support

A key factor in fostering an atmosphere that encourages SMEs to use technology is government policy. Effective legislative and regulatory frameworks are required in Rivers State to encourage the adoption of new technologies while guaranteeing that the advantages of the digital transformation are shared fairly among the commercial community. Government incentives can encourage more enterprises to use digital tools into their operations. Examples of these incentives include tax breaks, subsidies, and grants for SMEs who embrace specific technology (Dinis, Lemos & Serra, 2023).

Furthermore, it is crucial to have legal frameworks that support data protection, provide reasonably priced and dependable internet access, and lower the cost of digital transactions. Reducing import taxes on technology gear and software, for instance, can make it less expensive to get the instruments required for digital transformation. In order to enhance internet infrastructure and increase access to broadband services, the government can also form public-private partnerships, particularly in underserved areas where SMEs encounter connectivity issues (Gerli & Whalley, 2021).

SMEs can also benefit from clear standards and incentives for incorporating digital technologies into their business models, which can be established by creating technology adoption roadmaps at the state and federal levels. These roadmaps ought to list the strategic aims for different industries, draw attention to the support systems that are available, and encourage cooperation between financial institutions, IT companies, and government organizations.

Use of Digital Platforms

For SMEs in Rivers State, social media and digital platforms offer a significant chance to increase market reach and boost operational effectiveness. Social media platforms like Facebook, Instagram, and WhatsApp have developed into indispensable resources for small businesses looking to market their goods, engage with clients, and handle orders. SMEs can expand their consumer base, get around conventional market restrictions, and become more visible by utilizing these platforms (Maftah&Zulianto, 2023). Through cloud-based solutions, digital payments, and e-commerce, digital platforms also help SMEs optimize their operations. For example, SMEs can reach clients outside of their immediate geographic location while lowering operational costs

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associated with traditional shops by opening an online store. Furthermore, the integration of mobile payment systems such as Paystack and Flutterwave allows SMEs to offer customers seamless and secure payment options, enhancing customer satisfaction and driving sales (Ahmed et al., 2022).

SMEs can also track business performance, improve marketing strategies, and keep an eye on client behavior by utilizing the analytics capabilities offered by digital platforms. These insights help companies target customers more effectively, increase operational efficiency, and make data-driven decisions. Developing SME staff's ability to use these platforms and realize their full potential is crucial to optimizing the advantages of going digital.

In conclusion, SMEs in Rivers State have a variety of technical, structural, and financial difficulties that call for a multifaceted strategy to overcome. SMEs may successfully adapt new technologies and prosper in an increasingly digital economy by giving them access to financial resources, improving their digital skills, collaborating with tech businesses, putting supportive regulations in place, and making use of digital platforms.

5. Discussion of Findings Evaluation of Technology Adoption

There have been differing degrees of success in Rivers State, Nigeria, when it comes to SMEs implementing innovation and technology. The research and case studies indicate that while the adoption of technology solutions by SMEs in the region is uneven and occurs at a modest pace across various industries, the adoption is nonetheless occurring. Basic digital tools that many SMEs have adopted include social networking platforms for marketing, mobile payment systems, and some level of automation in their business operations. This is consistent with global trends in small business digital transformation, where technology is seen more and more as a tool for competitiveness and growth (Yaqub&Alsabban, 2023). However, Rivers State SMEs are often limited to low-cost, rudimentary technologies rather than more advanced digital solutions like artificial intelligence (AI) or blockchain, which are transforming SMEs in other parts of the world (Pan & Zhang, 2021).

To increase their consumer base and optimize operations, a sizable portion of SMEs in the service industry, especially in retail, have embraced e-commerce platforms. Mobile payment systems like Flutterwave and Paystack, together with social media sites like Facebook, are commonly used to speed up transactions and marketing campaigns. According to Chatterjee and Kar (2020), small and medium-sized enterprises (SMEs) can now access customers outside of their local markets, improve customer interaction, and process payments more quickly thanks to these technologies. Additionally, research indicates that cloud-based solutions are becoming more popular for data storage and collaboration, particularly among small and medium-sized enterprises (SMEs) in the IT and education sectors who need scalable and affordable infrastructure (Li, 2021).

The use of more sophisticated technology, such data analytics, CRM software, and enterprise resource planning (ERP) tools, is still somewhat low despite these developments. In order to properly utilize these tools for decision-making and operational efficiency, many SMEs in Rivers State lack the necessary technical competence. If SMEs do use more advanced digital tools, they are frequently using them at a surface level and solely for fundamental tasks rather than taking advantage of all the features that these technologies have to offer (Zamani, 2022). While adopting technology is necessary for competitiveness, the literature emphasizes that the ability of employees and business owners to successfully integrate these tools into everyday operations and strategic planning is a key factor in the success of digital transformation in SMEs.

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Challenges

Despite significant progress in adopting technology, SMEs in Rivers State continue to face a number of obstacles that prevent the complete integration of digital solutions. Limitations in the infrastructure, especially in terms of inconsistent power supplies and inadequate internet access, provide a significant challenge to the efficient use of digital instruments. Large data transfers, cloud services, and video conferencing are challenging for the region's many SMEs since they depend on mobile networks with constrained capacity. Businesses are unable to use vital technology for prolonged periods of time due to inconsistent power supplies, particularly during peak operating hours (Chen, Wang & Gong, 2020). As a result, SMEs are no longer able to embrace and incorporate new technology into their workflows as quickly.

Additionally, the high expense of technology remains a key obstacle. Due of their tight operating budgets, SMEs frequently cannot afford the up-front expenses of purchasing new digital tools, such as internet access, software licensing, and hardware upgrades. The expense of maintaining and updating these technology can be prohibitive, especially for enterprises with limited profit margins, even when SMEs are able to acquire funding. This issue is made worse by the absence of government financial assistance in the form of grants, subsidies, or low-interest loans, which forces SMEs to shoulder the entire cost of implementing new technology (Faasolo&Sumarliah, 2022).

The lack of technical knowledge among SME owners and their staff is another major issue. The digital literacy needed to properly utilize technology for operational efficiency and market expansion is lacking in many firms. The underuse of sophisticated digital technologies, such CRM systems and data analytics platforms, is especially indicative of this. SMEs cannot fully utilize these technologies to automate repetitive processes or make data-driven decisions without adequate training. These capabilities are essential for increasing profitability and productivity (Afolayan et al., 2021). Technology adoption is further hampered by the reluctance to change displayed by many small and medium-sized enterprise (SME) owners who are used to using conventional business practices.

Opportunities for Growth

Notwithstanding these obstacles, Rivers State SMEs can achieve substantial growth prospects by strategically implementing technology. E-commerce is one important area where companies may use internet platforms to reach a wider audience than just their local clientele. SMEs may access both domestic and foreign markets through e-commerce, boost sales, and cut expenses related to operating physical locations (Sharma, 2023). The COVID-19 epidemic has accelerated the global move towards online buying, making this opportunity especially pertinent given the rising reliance of consumers on digital media.

Data analytics is another exciting field that can assist SMEs in streamlining their operations by offering insights into internal efficiency, market trends, and client preferences. SMEs can improve their competitiveness and profitability by using analytics technologies to tailor consumer experiences, make well-informed decisions, and create focused marketing campaigns (Adwan et al., 2023). Lastly, automation offers the chance to automate repetitive processes like order processing, customer support, and inventory management, freeing up time and resources for higher-value work. SMEs may greatly increase their operational efficiency, lower errors, and more successfully scale their operations by embracing automation.

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Rivers State's SMEs have a difficult time implementing new technologies because of infrastructure, cost, and technical know-how issues. Despite this, there are great development prospects in fields like automation, data analytics, and e-commerce. SMEs may fully reap the rewards of technology adoption to boost their competitiveness and spur long-term growth by addressing these issues with focused interventions including better infrastructure, funding, and training in digital skills.

6. Conclusion

This study investigated the potential and difficulties associated with SMEs in Rivers State, Nigeria, adopting new technologies. Important discoveries indicate that although a small number of SMEs are embracing digital tools such as social media and mobile payments, the use of more sophisticated technologies is still restricted. Poor infrastructure, especially in terms of erratic power and restricted internet access, and the high expense of purchasing and maintaining digital instruments are major obstacles. The full potential of technology utilization is also hampered by the resistance to change and lack of digital literacy that many SMEs face.

Despite these obstacles, technology offers a lot of potential for advancement. SMEs may access a wider audience and cut expenses through e-commerce, while automation and data analytics can improve decision-making and operational effectiveness. Government assistance in enhancing infrastructure, financial support in the form of loans and subsidies, and capacity-building initiatives centered on digital skills are crucial for removing the obstacles.

In addition, public-private partnerships can be very helpful in giving SMEs access to technical assistance and reasonably priced technology solutions. SMEs in Rivers State can use technology to enhance operations, spur growth, and support the region's overall economic development with the correct mix of policies, funding, and training.

7. Recommendations

To promote effective technology adoption among SMEs in Rivers State, a comprehensive approach is needed, involving both the SMEs themselves and supportive government policies.

1. SMEs should focus on adopting affordable and user-friendly digital tools such as mobile payment systems, cloud-based solutions, and social media platforms. These tools can enhance operational efficiency, expand market reach, and streamline processes without requiring significant upfront investment.

2. Developing the digital skills of employees is essential for successful technology integration. SMEs should regularly train their staff to improve digital literacy and ensure employees are proficient in using new technologies. This can be done through internal workshops or collaborations with local training providers and technology firms.

3. Strategic alliances with tech companies can help SMEs access cost-effective and tailored solutions. Such partnerships may also provide ongoing technical support and reduce the operational burden on SMEs. Collaborating with tech providers ensures that SMEs stay updated with technological advancements while minimizing costs.

4. Rather than a full-scale overhaul, SMEs should adopt incremental technology upgrades, implementing small-scale solutions to automate specific processes and improve efficiency.

This step-by-step approach makes the transition smoother and more manageable.

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5. The government can provide tax relief on technology-related expenses, encouraging SMEs to invest in digital tools. Additionally, reducing import duties on technology products can make these solutions more affordable for SMEs, thereby facilitating wider adoption.
6. A reliable power supply and access to high-speed internet are critical for digital transformation. The government should invest in improving these infrastructures, particularly in underserved areas, to create a conducive environment for businesses to adopt and use digital technologies.
7. Government-led initiatives, in collaboration with the private sector, should fund and promote digital literacy programs for SMEs. These programs should aim to equip business owners and employees with the skills necessary to leverage technology for growth, productivity, and innovation.

References

- Adwan, A., Kokash, H., Adwan, R., & Khattak, A. (2023). Data analytics in digital marketing for tracking the effectiveness of campaigns and inform strategy. *International Journal of Data and Network Science*. <https://doi.org/10.5267/j.ijdns.2023.3.015>.
- African Development Bank. (2021). Annual development effectiveness review 2021 [Report]. Retrieved from https://www.afdb.org/sites/default/files/news_documents/ader_2021_en_v17.pdf
- Ahmed, J., Talukdar, A., Khan, M., Sharif, R., & Ahmed, A. (2022). Flutterwave—A digital payment solution in Nigeria. *Journal of Information Technology Teaching Cases*, 13, 50 - 57. <https://doi.org/10.1177/20438869211063210>.
- Barenji, A., Li, Z., Wang, W., Huang, G., & Guerra-Zubiaga, D. (2020). Blockchain-based ubiquitous manufacturing: a secure and reliable cyber-physical system. *International Journal of Production Research*, 58, 2200 - 2221. <https://doi.org/10.1080/00207543.2019.1680899>.
- Chatterjee, S., & Kar, A. (2020). Why do small and medium enterprises use social media marketing and what is the impact: Empirical insights from India. *Int. J. Inf. Manag.*, 53, 102103. <https://doi.org/10.1016/j.ijinfomgt.2020.102103>.
- Chen, X., Wang, X., & Gong, K. (2020). The Effect of Bidimensional Power Structure on Supply Chain Decisions and Performance. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 50, 1095-1110. <https://doi.org/10.1109/TSMC.2017.2704445>.
- Dinis, A., Lemos, K., & Serra, S. (2023). Tax incentives for SMEs' digital transformation. 2023 18th Iberian Conference on Information Systems and Technologies (CISTI), 1-6. <https://doi.org/10.23919/CISTI58278.2023.10211325>.

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- Ebri, E. (2021). Small and Medium Scale Enterprises (SMEs) and Economic Growth in Nigeria. . <https://doi.org/10.47310/IARJBM.2021.V02I01.005>.
- Effiom, L., & Edet, S. (2020). Financial innovation and the performance of small and medium scale enterprises in Nigeria. *Journal of Small Business & Entrepreneurship*, 34, 141 - 174. <https://doi.org/10.1080/08276331.2020.1779559>.
- European Commission. (2022). Digital transformation of SMEs: Opportunities and challenges [Report]. Retrieved from <https://op.europa.eu/webpub/com/general-report2022/en/>
- Faasolo, M., & Sumarlia, E. (2022). Sustainability-oriented technology adoption in Tonga: the impact of Government's incentives and internal factors. *International Journal of Emerging Markets*. <https://doi.org/10.1108/ijoem-09-2021-1424>.
- Genç, E., Dayan, M., & Genc, O. (2019). The impact of SME internationalization on innovation: The mediating role of market and entrepreneurial orientation. *Industrial Marketing Management*. <https://doi.org/10.1016/J.INDMARMAN.2019.01.008>.
- Gerli, P., & Whalley, J. (2021). Fibre to the countryside: A comparison of public and community initiatives tackling the rural digital divide in the UK. *Telecommunications Policy*. <https://doi.org/10.1016/J.TELPOL.2021.102222>.
- International Finance Corporation. (2022). The role of digital technologies in enhancing SME competitiveness [Report]. Retrieved from https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/financial-institutions/resources/sme-competitiveness-report
- Khalil, A., Abdelli, M., & Mogaji, E. (2022). Do Digital Technologies Influence the Relationship between the COVID-19 Crisis and SMEs' Resilience in Developing Countries?. *Journal of Open Innovation: Technology, Market, and Complexity*, 8, 100 - 100. <https://doi.org/10.3390/joitmc8020100>.
- Leong, L., Hew, T., Ooi, K., & Lin, B. (2021). A meta-analysis of consumer innovation resistance: is there a cultural invariance?. *Ind. Manag. Data Syst.*, 121, 1784-1823. <https://doi.org/10.1108/IMDS-12-2020-0741>.
- Li, Q. (2021). The Use of Artificial Intelligence Combined with Cloud Computing in the Design of Education Information Management Platform. *Int. J. Emerg. Technol. Learn.*, 16. <https://doi.org/10.3991/IJET.V16I05.20309>.

Original Article

- Littunen, H., Tohmo, T., & Storhammar, E. (2021). Innovation among SMEs in Finland: The impact of stakeholder engagement and firm-level characteristics. *Journal of Entrepreneurship, Management and Innovation*. <https://doi.org/10.7341/20211746>.
- Maftah, M., & Zulianto, M. (2023). Innovation In Social Media Strategy: A Study of Smes In Jember. *JurnalBisnis dan Manajemen*. <https://doi.org/10.23960/jbm.v19i3.1830>.
- MDPI. (2013). Strategies for Successful Information Technology Adoption in Small and Mediumsized Enterprises. Retrieved from <https://www.mdpi.com/2078-2489/3/1/36>
- Mellal, M. (2020). Obsolescence – A review of the literature. *Technology in Society*, 63, 101347. <https://doi.org/10.1016/j.techsoc.2020.101347>.
- Nigeria Economic Summit Group. (2022). SME survey report: Addressing the skills gap for technology adoption [Report]. Retrieved from <https://www.nesgroup.org/research>
- Nwakanma, S., & Lilian, I. (2020). Workshop Tools Management Techniques Needed For Sustaining Quality Vocational Education In Technical Colleges In Rivers State. *International journal of scientific and research publications*, 10, 158-163. <https://doi.org/10.29322/ijsrp.10.09.2020.p10519>.
- Nwokocha, V., & Nwankwo, C. (2019). The effects of subcontracting forms on the sustenance of SMEs. *World Journal of Entrepreneurship, Management and Sustainable Development*. <https://doi.org/10.1108/WJEMSD-01-2019-0006>.
- Ochinanwata, N., Ezepe, P., Nwankwo, T., Ochinanwata, C., & Igwe, P. (2021). Public–private entrepreneurial financing partnership model in Nigeria. *Thunderbird International Business Review*. <https://doi.org/10.1002/TIE.22194>.
- Pan, Y., & Zhang, L. (2021). Roles of artificial intelligence in construction engineering and management: A critical review and future trends. *Automation in Construction*, 122, 103517. <https://doi.org/10.1016/j.autcon.2020.103517>.
- Purwaningsih, E., Muslikh, M., Suhaeri, S., & Basrowi, B. (2024). Utilizing blockchain technology in enhancing supply chain efficiency and export performance, and its implications on the financial performance of SMEs. *Uncertain Supply Chain Management*. <https://doi.org/10.5267/j.uscm.2023.9.007>.
- Rogers, E. M. (1983). *Diffusion of Innovations* (3rd ed.). Free Press.
- Sharma, S. (2023). Revving Up Growth: A Study of the Positive Impact of e-Commerce Adoption by SMEs. *Scholedge International Journal of Business Policy & Governance* ISSN 23943351. <https://doi.org/10.19085/sijbpg.100101>.

Original Article

- Tunbosun, L., Olasoji, O., & Fatai, B. (2023). Financial Inclusion and Rural Entrepreneurship: Demand-Side Review of Central Bank of Nigeria Programmes for Small and MediumSized Enterprises. *International Journal of Accounting and Management Sciences*. <https://doi.org/10.56830/ijams10202301>.
- World Bank. (2021). Digitalizing SMEs to boost competitiveness [Report]. Retrieved from <https://documents1.worldbank.org/curated/en/099515009292224182/pdf/P17608901a9db608909f5b02980d48c4e28.pdf>
- World Economic Forum. (2023). The impact of COVID-19 on SMEs: Digital transformation and resilience [Report]. Retrieved from https://www3.weforum.org/docs/WEF_Annual_Report_2023_2024.pdf
- Wu, F., Fu, X., Zhang, T., Wu, D., & Sindakis, S. (2022). Examining Whether Government Environmental Regulation Promotes Green Innovation Efficiency—Evidence from China’s Yangtze River Economic Belt. *Sustainability*. <https://doi.org/10.3390/su14031827>.
- Xiong, F., Zang, L., & Gao, Y. (2021). Internet penetration as national innovation capacity: worldwide evidence on the impact of ICTs on innovation development. *Information Technology for Development*, 28, 39 - 55. <https://doi.org/10.1080/02681102.2021.1891853>.
- Yang, R., Tang, W., & Zhang, J. (2021). Technology improvement strategy for green products under competition: The role of government subsidy. *Eur. J. Oper. Res.*, 289, 553-568. <https://doi.org/10.1016/j.ejor.2020.07.030>.
- Yaqub, M., & Alsabban, A. (2023). Industry-4.0-Enabled Digital Transformation: Prospects, Instruments, Challenges, and Implications for Business Strategies. *Sustainability*. <https://doi.org/10.3390/su15118553>.
- Zamani, S. (2022). Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management*. <https://doi.org/10.1108/ejim-07-2021-0360>.