Artificial Intelligence Adoption and Operational Efficiency of small and Medium-Scale Enterprises in Lagos State, Nigeria

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Introduction

Small and medium-sized enterprises (SMEs) are well-known as major drivers of economic growth, offering high rates of employment, encouraging innovation, and contributing to national economies (OECD, 2017). Formal SMEs in emerging economies produce up to 40% of national income (GDP), highlighting their role in sustainable development (World Bank, 2017). With the rapid evolution of artificial intelligence (AI), new opportunities have emerged to enhance efficiency, productivity, and innovation. AI is increasingly viewed as a vital technology for solving complex business problems. According to Jadhav (2021), AI has become the preferred solution for addressing business challenges across various sectors, including manufacturing, finance, healthcare, agriculture, and education, especially among SMEs. Some countries, such as Germany and Malaysia, regard the integration of AI into SMEs as a potential engine for future national development. However, despite these advantages, AI adoption in Lagos State and Nigeria's business sector remains uncertain.

Materialsand methods/Methodology.

This study investigated the impact of AI adoption on the operational efficiency of SMEs in Lagos State, Nigeria. A survey research design was adopted for the study. Data were collected using a structured self-administered questionnaire targeting a total population of 42,067 owner-managers of SMEs operating in Lagos State, Nigeria. (SMEDAN Report, 2021). A multistage sampling technique was employed to select a sample of 396 respondents across five divisions of Lagos for proportionate distribution. Data analysis was conducted using linear regression and correlation coefficients through SPSS software to test the relationship and substantial effect between the variables

Results and discussion

The results revealed that Chatbots/Virtual Assistants had a high F-value of 169.535 and a p-value of 0.000, indicating a significant impact on customer service in SMEs, aligning with the study by Bala, Hamza, and Lawal (2024). Recommendation Systems also recorded a high F-value of 210.422 and a p-value of 0.000, confirming their effect on user engagement, in support of the findings by Muktar, Ufua, and Okorie (2024) and Lee (2021). Moreover, Machine Learning demonstrated a strong relationship with operational speed and responsiveness, with an F-value of 362.987 and a p-value of 0.000, reinforcing the findings of Kumar and Sharma (2019) on its role in enhancing operational efficiency.

Conclusions

The research concluded that the deployment of AI technologies, including Chatbots/Virtual Assistants, Recommendation Systems, and Machine Learning, significantly improved operational performance by enhancing customer care, user satisfaction, and responsiveness. SMEs are encouraged to invest in these technologies to maintain a competitive advantage in the digital age. Future research should explore the long-term effects of these AI technologies on SME development and sustainability, as well as investigate other AI domains such as Predictive Analytics, Robotic Process Automation (RPA), and Natural Language Processing (NLP).

Keywords: Artificial Intelligence, Tools, Adoption, SMEs, and Operational Efficiency**.**