Digital Transformation and Agricultural Supply Chain Management

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Introduction

Agriculture remains a cornerstone of Nigeria's economy, contributing approximately 25.18% to the nation's Gross Domestic Product (GDP) in 2023, with crop production being the predominant sub-sector (NITDA, 2024). Despite its significance, the sector faces persistent challenges, including limited access to technology, high production costs, post-harvest losses, and restricted market access, which collectively hinder productivity and economic potential (NITDA, 2024). This research was carried out to investigate the impact of digital transformation on agricultural supply chain management.

Methodology.

Sholeay Farms and Agricultural Ventures, Ayetoro, Ogun State, was used for this study. To achieve an overarching objective, a survey research design was adopted and the population comprises of 215 employees of Sholeay Farms. A sample size of 140 respondents was determined using the Taro Yamane sample determination formula. with a structured questionnaire as the instrument for data collection. The collected data were analysed using descriptive and inferential statistics. Descriptive statistics was used to present the demographic information of the respondents while inferential statistics was utilised to test the hypotheses.

Results and discussion

The result revealed that Artificial Intelligence (AI) integration has a positive and significant impact on supply chain efficiency (β=.263; $p<0.05$). Similarly, the result indicated that blockchain adoption has a positive and significant impact on supply chain efficiency (β=.647; $p<0.05$). The study, therefore, concludes that digital transformation has a positive and significant impact on agricultural supply chain management.

Conclusions

This study concludes that the integration of AI and Blockchain technology significantly enhances supply chain efficiency at Sholeay Farms. The findings reveal that Blockchain technology has a stronger impact on supply chain efficiency than AI, highlighting its role in improving transparency, traceability, and security. These results align with existing studies discussed in the empirical review, such as Abdulquadri et al. (2024), which found that Blockchain enhances supply chain resilience, and Eteyen (2024), which emphasised AI's role in optimizing logistics and demand forecasting. In light of the findings, the study recommends that Sholeay Farms should invest in advanced Artificial Intelligence (AI) solutions such as predictive analytics, automated inventory management, and AI-driven decision support systems. Furthermore, to strengthen supply chain transparency and security, Sholeay Farms should adopt Blockchain technology for real-time tracking, contract management, and fraud prevention

Keywords

Agriculture, Artificial intelligence, Blockchain, Food security, Supply chain