Mobile Computing as a Catalyst for Retail Supply Chain Collaboration: Insights from Ilorin, Nigeria

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ABSTRACT

Objectives: This study explores how mobile computing technologies such as smartphones, online platforms, and mobile payment systems, shape supply chain collaboration among fast-moving consumer goods (FMCG) retailers in Ilorin, Kwara State, Nigeria. The aim was to determine whether these technologies contribute equally to collaboration outcomes and to highlight the contextual factors that may influence their effectiveness. **Methods:** A quantitative approach method was adopted, with data collected through structured surveys and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 3.0. The measurement model demonstrated strong reliability and validity, with factor loadings above 0.70, Cronbach's alpha and composite reliability exceeding 0.70, and average variance extracted (AVE) scores above 0.50. Discriminant validity was confirmed using both the Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio. **Results:** The findings of the research revealed mixed results. That is, it revealed that online platforms significantly enhance supply chain collaboration, improving communication, coordination, and efficiency. In contrast, mobile payment systems showed a significant but negative relationship, while smartphones had no meaningful effect. These results suggest that adoption alone is insufficient; effective integration strategies and supportive infrastructure are critical to realizing the benefits of mobile technologies. **Conclusions:** This study provides empirical evidence from an emerging market context, showing that not all mobile technologies contribute equally to collaboration. It underscores the importance of strategic deployment, investment in infrastructure, and training to maximize digital transformation benefits. Future research should investigate barriers to mobile payment integration and explore strategies for leveraging smartphones more effectively, while encouraging retailers to capitalize on the proven advantages of online platforms.

Keywords: Mobile computing, supply chain collaboration, online platforms, mobile payment systems, smartphones, emerging markets

INTRODUCTION

Supply chain collaboration has evolved in tandem with technological innovation. Among the most influential of recent technologies is the smartphone, which has reshaped not only communication but also entertainment and business transactions [2]. What began as a tool for interpersonal connection has become central to online marketing and commerce. As [41] observe, online platforms are increasingly regarded as strategic spaces for expanding competition and influencing consumer behaviour. Yet, despite efforts by Nigeria's mobile phone industry to highlight the value of these platforms [11], their impact on consumer behaviour has not been systematically examined. The influence of online marketing is evident in the sheer volume of social media activity. [30] report that users generate thousands of posts daily, shaping consumer perceptions in both positive and negative ways.

At its foundation, supply chain collaboration refers to the exchange of information between sellers and buyers, often facilitated by integrated computer systems that enhance communication and coordination with suppliers and partners [25]. Collaboration encompasses the sharing of data, processes, and tools to improve visibility, efficiency, and responsiveness across the supply chain. For instance, a buyer's system may receive real-time

updates directly from a retailer's computer [39]. Effective collaboration depends on elements such as shared goals, trust, open communication, performance measurement, technology integration, and continuous improvement [46]. The global rise of smartphones, with their expanding functions, has created both opportunities and challenges for companies, particularly in customer service. Retailers have capitalised on this trend, using mobile technologies to attract new customers and strengthen relationships with existing ones.

The COVID-19 pandemic accelerated the adoption of technology in supply chain activities [18]. [45] note that lockdowns forced retailers to close physical stores and rapidly adopt technology-based solutions such as online ordering, click-and-collect services, and robot-assisted operations. To remain competitive, retailers increasingly rely on mobile computing, ranging from smartphones to portable inventory management devices, which are now integral to retail operations [33]. These tools support data collection, inventory tracking, customer relationship management, and real-time communication across supply chain networks. Despite the rapid deployment of mobile technologies in retail, there remains a notable gap in systematic research on their impact on supply chain collaboration, particularly in Nigerian towns such as Ilorin. Collaboration is vital for efficiency, responsiveness, and customer satisfaction, yet it remains complex and challenging. While global evidence underscores the benefits of mobile computing, empirical studies in Nigeria's retail sector are scarce.

This study addresses the lack of empirical evidence on how mobile computing, through smartphones, online platforms, and mobile payment systems shapes supply chain collaboration among retailers in Ilorin. By situating Nigeria's experience within global technological trends, the research seeks to provide context-specific insights that can guide both practitioners and policymakers in strengthening retail supply chains through mobile innovation.

LITERATURE REVIEW

Mobile computing has emerged as a rapidly growing sector, enabling access to computation, information, and resources while on the move [44]; [39]. It encompasses a wide range of technologies, devices, and applications that allow users to work, communicate, and access services anytime and anywhere [20]. Defined as the use of portable devices such as smartphones and laptops connected to wireless networks, mobile computing facilitates real-time access to information [38]. The market continues to expand, driven by the widespread adoption of smartphones and other mobile devices [15]. Beyond communication, mobile computing supports remote work, streamlined decision-making, navigation, ride-sharing, and real-time tracking of vehicles and deliveries. Its ability to enhance productivity, communication, and convenience has made it indispensable for businesses, enabling activities such as online banking, mobile payments, and social media engagement [32].

Social media, in particular, has been recognised as a strategic tool for expanding competition and influencing consumer behaviour [49]; [16]. Despite efforts by Nigerian smartphone industry players to highlight its value [11], the systematic study of online platforms' impact on consumer behaviour remains limited. The influence of online marketing is evident in the sheer volume of social media activity. [35] notes that users post thousands of messages daily, shaping consumer perceptions both positively and negatively. [50] emphasise that internet-based media enable participation in marketing, selling, comparing, rating, purchasing, and sharing of goods and services across offline and online marketplaces. When effectively utilised, online platforms strengthen business operations by connecting firms with customers, suppliers, and partners globally. This connectivity fosters customer relationship building, innovation, and resource exchange, ultimately enhancing customer satisfaction. [40] observed that business relationships between retailers and customers improve when ICT devices such as mobile phones and GPS are integrated with social media platforms to support customer-centric strategies. Their study in the United Kingdom demonstrated how retail networks leveraged social media to design service operations and marketing approaches that predicted customer loyalty. Similarly, [2] highlighted that mobile applications enhance communication between wholesalers and retailers, reducing lead times. [6], [12], and [22] further argued that mobile technology provides inventory visibility, a critical factor in supply chain responsiveness.

The role of mobile computing in enhancing supply chain collaboration has been widely examined. [29], [43], and [47] found that mobile applications for inventory management significantly improve stock record accuracy [4], in their study of online retailers in Calabar, Nigeria, emphasised that supply chain management begins and

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ends with customers. The central objective of integration and collaboration is to add value and meet customer demands effectively and efficiently. Research on MSMEs in Indonesia also revealed that e-payment and e-commerce services positively and significantly impact supply chain performance, underscoring the global relevance of mobile computing in retail operations. [48] examined the effect of mobile social apps (MSAPs) on consumer purchase attitudes, highlighting the importance of trust and technological factors in developing nations. Their findings suggest that evolving MSAPs, combined with technological and trust mechanisms, reinforce consumer online purchase attitudes in today's competitive digital era. Similarly, [31] found that social media influences consumer purchasing behaviour in Zimbabwe's mobile telephony industry, though stimulating consumer interest requires the right social variables.

This study adopts the diffusion of innovation theory to explain how retailers' deployment of smartphones, online platforms, and mobile payment systems influences supply chain collaboration in Ilorin, Nigeria. The theory provides insights into how new technologies are adopted and spread within organisations and industries. In addition, the resource-based view (RBV) theory is applied to understand how firms leverage technological capabilities such as mobile computing to gain competitive advantage. Within supply chain collaboration, RBV highlights how mobile applications and platforms create valuable resources, including information sharing, real-time visibility, and streamlined communication. Together, these theories provide a framework for understanding how mobile computing can be integrated into supply chain collaboration to improve performance, strengthen relationships, and adapt to dynamic market conditions. With the increasing speed and agility required to develop and deliver complex technologies, big-data analytics and digital platforms have become essential drivers of growth in competitive markets [8]. Digital platforms, built on cloud computing infrastructures, connect suppliers and consumers in real time through collaborative networks [37]. These ecosystems often operate under business-to-consumer (B2C) models, enabling firms to deliver innovations directly to customers. While offering significant opportunities, such platforms can also introduce complexity, requiring firms to balance agility with integration.

METHODOLOGY

This study adopted a quantitative research design, employing survey methods to collect data through structured questionnaires. The instrument consisted of closed-ended questions, designed to facilitate straightforward data analysis and ensure consistency across responses. To analyse the relationships among construct variables, the study employed the Structural Equation Modeling (SEM) approach, which allows for simultaneous estimation of multiple dependent relationships. Rather than using separate linear models for each construct, SEM was chosen for its ability to display complex path relationships. Specifically, the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was applied using SmartPLS 3.0 software, which is well-suited for exploratory research and predictive modeling in social sciences.

Model Specification and Analysis

In line with the study's objectives, the PLS-SEM technique was used to specify and test the structural model. The following null hypothesis was formulated to guide the analysis:

H_{01}: Deploying smartphones, online platforms, and mobile payment systems does not significantly predict supply chain collaboration and performance.

This hypothesis was tested through path analysis to determine the predictive strength and significance of mobile computing technologies on supply chain collaboration outcomes.

Assessment of the Measurement Model

Before evaluating the structural model, the measurement model was assessed to ensure the reliability and validity of the constructs. The assessment included:

Factor Loadings: To confirm that individual items adequately represent their respective constructs.

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Composite Reliability (CR): To evaluate the internal consistency of the constructs.

Construct Validity: To ensure that the constructs accurately measure the intended theoretical concepts.

Discriminant Validity: To verify that constructs are distinct from one another and not overlapping.

Only items that met the required thresholds for these criteria were retained in the final SEM analysis, ensuring the robustness and credibility of the model.

Analysis Of Data And Interpretation

Table I: Factor Loadings, Construct Validity and Reliability

Constructs	Items	Factor Loading	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Mobile Payment System (MPS)	MPS-1	0.882	0.832	0.901	0.754
	MPS-3	0.956	0.778	0.900	0.818
	MPS-5	0.755			
Smartphone (SP)	SP-1	0.904			
	SP-3	0.905			
Online Platform (OP)	OP-2	0.770	0.819	0.864	0.683
	OP-4	0.744	0.840	0.903	0.757
	OP-5	0.950			
Supply Chain Collaboration (SCC)	SCC-1	0.853			
	SCC-3	0.857			
	SCC-5	0.900			

Source: SmartPLS-3 (2025)

Table I presents the items retained following the assessment of the measurement instrument. Items excluded did not meet the standardized factor loading requirement for SEM. The results indicate that the factor loadings for all retained items exceed the minimum threshold of 0.70. Since factor loadings above 0.70 are considered desirable, the retained items are deemed fit to measure their respective construct variables. Cronbach's alpha and composite reliability statistics were employed to establish the internal consistency of the items when jointly reflecting their constructs. The minimum acceptable value for these tests is 0.70. The results show that Cronbach's alpha values for all construct variables are above this benchmark (MPS = 0.83, SP = 0.78, OP = 0.82, SCC = 0.84). Similarly, the composite reliability coefficients also exceed the minimum threshold of 0.70 (MPS = 0.90, SP = 0.90, OP = 0.86, SCC = 0.90). These findings confirm that none of the construct variables suffer from reliability issues. The Average Variance Extracted (AVE) was used to assess convergent validity, which establishes whether measures of a construct that are expected to be related are indeed correlated. The recommended threshold for AVE is 0.50. As shown in Table I, all constructs recorded AVE values above this benchmark (MPS = 0.75, SP = 0.82, OP = 0.68, SCC = 0.76), thereby confirming their convergent validity.

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Table II: Fornell-Larcker Criterion

Construct	DPP	MT	SM	SCI
MPS	**0.868**	**0.904**	**0.826**	**0.870**
SP	0.552	0.081	0.236	
OP	0.221	0.206		
SCC	0.276			

Source: SmartPLS-3 (2025)

The Fornell-Larcker criterion is a widely accepted approach for assessing discriminant validity. This method compares the square root of each construct's Average Variance Extracted (AVE) with its correlations to other constructs. According to [13], discriminant validity is established when the square root of a construct's AVE is greater than its highest correlation with any other construct. The results presented in Table 2 show that the square roots of the AVEs (bolded) are consistently larger than the corresponding inter-construct correlation coefficients. This outcome confirms that the constructs are distinct from one another and therefore do not present any discriminant validity concerns.

Table III: Heteroriat-Monotrait (HTMT) Criterion

	MPS	SP	OP	SCC
MPS				
SP	0.686			
OP	0.268	0.163		
SCC	0.337	0.257	0.205	

Source: SmartPLS-3 (2025)

The heterotrait-monotrait (HTMT) criterion is based on the multitrait-multimethod matrix. This method is an improvement over the Fornell-Larcker criterion. Discriminant validity is a concern if any HTMT ratio is equal to or above 0.9. The result of the HTMT ratios in Table 3 indicates that all the values are below the 0.9 threshold, suggesting that the discriminant validity condition is satisfied.

Table 4: Model Fit

	R Square	R Square Adjusted
Supply Chain Collaboration (SCC)	0.571	0.563

Source: Smart PLS-3

Table 4 reveals the model fit result of the structural model. The R-squared value of 0.571 implies that the construct variables (DPP, MT, and SM) jointly explain 57.1 per cent of the total variation in the exploratory variable (SCI). Suggests a good model fit.

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Table 5: Bootstrapping Result

Path	Beta	T Statistics	P-values	Decision
Mobile Payment System (MPS) -> Supply Chain Integration (SCC)	-0.312	5.085	0.000	Supported
Smartphone (SP) -> Supply Chain Integration (SCC)	-0.059	0.941	0.347	Rejected
Online Platform (OP) > Supply Chain Integration (SCC)	0.309	6.684	0.000	Supported

Source: SmartPLS-3

The estimates presented in Table 5 reveal a negative coefficient (β = -0.312) for the path between mobile payment systems (MPS) and supply chain collaboration (SCC). This indicates an inverse relationship, such that a 100 per cent increase in MPS usage corresponds to a 31.2 per cent decrease in SCC. At the 5% significance level ($p < 0.05$), the path's t-statistic ($t = 5.085$) confirms statistical significance. This result suggests that while retailers' deployment of mobile payment systems is significant, its influence on supply chain collaboration appears to reduce collaborative outcomes, reflecting possible operational or integration challenges. Similarly, the path between smartphones (SP) and supply chain collaboration (SCC) shows a negative coefficient (β = -0.059). This also suggests an inverse relationship, where a 100 per cent increase in smartphone usage reduces SCC by 5.9 per cent. However, the t-statistic ($t = 0.941$) is not statistically significant at the 5% level ($p = 0.35 > 0.05$). This implies that retailers' deployment of smartphones in operational transactions does not significantly predict supply chain collaboration. In contrast, Table 5 reports a positive coefficient (β = 0.309) for the path between online platforms (OP) and supply chain collaboration (SCC). This indicates a direct relationship, where a 100 per cent increase in the deployment of online platforms enhances SCC by 31 per cent. At the 5% significance level ($p < 0.05$), the path's t-statistic ($t = 6.68$) is statistically significant.

This finding implies that retailers' use of online platforms in operational transactions significantly predicts and strengthens supply chain collaboration. The findings align with the Diffusion of Innovation (DOI) theory, which explains how new technologies are adopted and diffused across networks. The significant positive effect of online platforms on supply chain collaboration suggests that retailers in Ilorin are more willing to adopt innovations that directly enhance visibility and customer interaction. Conversely, the negative coefficients for mobile payment systems and smartphones highlight the challenges of adoption, reflecting DOI's emphasis on compatibility and complexity as barriers to diffusion. From the perspective of the Resource-Based View (RBV), online platforms appear to function as valuable, rare, and inimitable resources that strengthen collaboration and performance. In contrast, mobile payment systems and smartphones, while widely deployed, may not yet be leveraged as strategic resources, possibly due to integration issues or limited trust in their use within collaborative supply chain contexts. Together, these results underscore the importance of aligning technological adoption with organizational capabilities to achieve sustainable competitive advantage.

DISCUSSION OF RESULTS

The analysis revealed that supply chain collaboration is significantly predicted by retailers' deployment of online platform in their operational transactions because PLS-SEM makes no distributional assumptions. Since they show that the construct explains more than 50% of the indicator's variance, indicator loadings above 0.708 are advised; this offers acceptable indicator reliability because all of them are above 0.7. The conventional metric was proposed by [13]. It was suggested to compare each construct's squared variance within (AVE) to the squared inter-construct correlation of that construct and all other reflectively measured constructs in the structural model in order to determine the shared variance between the constructs. The result of the Fornell-Larcker criterion indicates that the square roots of the AVEs (bolded) are more significant than all the inter-construct correlations. These AVEs suggest that the constructs do not have a discriminant validity problem. Heterotrait monotrait (HTMT) of correlations [21], is used to assess discriminant validity. The

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HTMT is calculated by dividing the heterotrait-heteromethod correlations, which are the mean value of the indicator correlations across constructs, by the monotrait-heteromethod correlations, which are the (geometric) mean of the average correlations for the indicators representing the same construct. Moreover, Discriminant validity problems occur when HTMT values are higher than 0.90. Therefore, HTMT in the table indicates that all the values are below the 0.9 threshold, suggesting that the discriminant validity condition is satisfied. The nonparametric approach PLS-SEM uses bootstrapping to estimate standard errors and calculate confidence intervals. Bootstrap confidence intervals were used to test whether the HTMT significantly differed from 1.0 or a reduced threshold value, such as 0.9 or 0.85 [21].

The result of the findings reveals that the measured constructs (MPS, OP, SP, and SCC) all have an excellent standing internally, the average variance extracted scores for each construct revealed high Cronbach's alpha and the composite reliability values, as well as good convergent validity. The HTMT criterion and the discriminant validity confirmed through the Fornell-Larcker criterion suggest that each construct is distinct in the study. Examining the relationship between MPS and SCC, the findings revealed that the negative coefficient indicates an inverse relationship; this suggests that an increase in the adoption of MPS correlates with a decrease in SCI. An in-depth look into this result might make it appear unscientific since mobile payment systems are mainly supposed to modernise transaction processes and increase efficiency. However, there could be many reasons for this outcome; for instance, MPS implementation could face varied challenges, leading to SCC reduction. In a study, [5] indicated that even though collaborating digital payment systems can yield efficiencies, it might also require significant changes to business practices. The negative correlation between SP usage and SCC, which was insignificant, might suggest that more than smartphones is needed to drive impactful integration within supply chain activities in the retail sector, which aligns with the search of [10]. This result is in line with the work of [17] and [23], suggesting that smartphones needs to be part of a larger, more comprehensive digital transformation strategy to influence supply chain integration significantly. Equally, the positive relationship between OP and SCC specifies that online platforms tools positively contribute to supply chain collaboration. This result aligned with past research findings, which state that integrating online platforms can facilitate improved collaboration and better communication among supply chain partners and enhance information sharing, leading to improved supply chain performance.

Meanwhile, the structural model indicates that the independent variables (MPS, SP, and OP) explain significant variance in SCC. This model suggests that these technology-related variables influence supply chain integration to a substantial extent. The contradictory outcomes for MPS, SP and OP's beneficial influence provide evidence that technological interventions do not all contribute equally to improved supply chain collaboration. The observation was that the data could corroborate the overall trend of digitalization and its beneficial effects on supply chains, which is consistent with [9] research. Given the unexpected negative correlation between MPS usage and SCC, subsequent research is warranted. Could these results be influenced by local factors specific to the Ilorin metropolis or the larger Nigerian context? What role do culture, infrastructure, or economic conditions play in adopting digital payment platforms and their effect on the supply chain? These are pertinent questions for ongoing research. The analysis using SmartPLS-3 revealed several conclusions regarding the impact of mobile computing on supply chain collaboration among retailers in Ilorin, Nigeria. The results identified strong internal consistency and reliability in the measurement of the constructs, along with a satisfactory level of model fit indicated by an R-squared value of 0.571 for SCI. These outcomes are in alignment with existing literature, such as that of [14], that underscores the positive impact of technology on supply chain operations.

Notably, the study presented an intriguing result with a negative coefficient between the usage of MPS and SCC, suggesting an inverse relationship that could signal potential challenges in assimilating digital payment methods with existing supply chain processes. This finding deviates from the expected positive influence of technological adoption on supply chain collaboration. However, it could reflect specific contextual challenges within the Ilorin retail environment, such as infrastructure issues or compatibility problems with existing systems. It urges further investigation and implies that merely deploying digital technologies guarantees improved supply chain collaboration. Meanwhile, the positive relationship indicated by online platform use asserts the vital role of social platforms in enhancing supply chain coordination and communication, a sentiment resonated by contemporary research. This aspect of the findings aligns with the exertion of [27], on

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the current global narrative of the digital transformation of supply chains, emphasizing the importance of social media as a facilitator of information sharing and collaboration.

On the other hand, the insignificant relationship between smartphones and supply chain collaboration could suggest that in Ilorin, more traditional business communication methods through smartphones are not substantially influencing supply chain collaboration or that the study does not succeed in best capturing the measure of impact. The results suggest that while mobile payment system and online platforms significantly impact supply chain collaboration, the relationship between smartphones and supply chain collaboration needs to be supported in the studied model. These findings align with recent research by [24] on the evolving role of digital technologies in shaping supply chain dynamics. This present study contributes to the literature by providing empirical evidence of the varying impacts of different digital platforms on supply chain, within an emerging market context. These insights highlight that while technology adoption is generally beneficial, its integration into supply chain processes warrant careful consideration, due to its complex nature that can be influenced by numerous factors.

CONCLUSION AND RECOMMENDATIONS

This study examined the role of smartphones, online platform applications, and mobile payment systems in the supply chain activities of FMCG retailers in Ilorin, Nigeria. The findings highlight that consumer-driven impacts have become crucial for efficient supply and demand management in supply chain collaboration. With information sourced directly from the market, retailers are better positioned to take initiatives that strengthen collaboration. Achieving significant success in Nigeria's supply chain activities will increasingly depend on intensifying the use of new technologies to communicate with consumers, process data, and share insights on customer behaviour, preferences, and purchasing patterns. Data collected through smartphones, in particular, can enhance the effectiveness of retailers' marketing strategies and provide accurate information about demand across the supply chain network. Furthermore, retailers should place greater emphasis on mobile computing as a tool for improving supply chain collaboration. Mobile technologies offer diverse functions, including expanding access to potential buyers and providing timely market information. These capabilities play a vital role in enhancing collaboration, delivering economic and social benefits, reducing product losses, and increasing competitiveness in global markets. By leveraging mobile computing to capture customer experiences and encourage feedback, retailers in developing countries can add value to their operations and strengthen their position in the evolving digital economy.

Significance And Suggestion For Further Studies

This study explored how smartphones, online platform applications, and mobile payment systems influence supply chain activities of FMCG retailers in Ilorin, Nigeria. the impact varies across technologies. Online platforms show strong potential, offering significant opportunities to enhance coordination, communication, and efficiency. In contrast, mobile payment systems and smartphones, though widely adopted, did not yield the expected improvements in regional supply chain collaboration. These findings suggest that adoption alone is insufficient; effective implementation strategies are required to realize the full benefits of mobile technologies. For policymakers, technology providers, and supply chain stakeholders, the results highlight the importance of planning and developing strategies that support the efficient use of mobile computing in retail supply chains. For practitioners in Ilorin and similar emerging markets, investments in infrastructure, training, and process alignment are essential to ensure that these tools are utilized to their full capacity. The unexpected outcomes regarding mobile payment systems warrant further local investigation to uncover contextual barriers and inform targeted interventions. In addition, technology deployment can significantly enhance supply chain collaboration, but its effectiveness depends on both the nature of the technology and the perspective of use. Future studies should examine barriers to mobile payment integration in emerging markets and explore strategies for leveraging smartphones more effectively in supply chain collaboration. Additionally, given the positive impact of online platforms, retailers should be encouraged to explore these tools to strengthen supply chain performance.

REFERENCES

1. Alfian, G., Ijaz, M. F., Syafrudin, M., Syaekhoni, M. A., Fitriyani, N. L., & Rhee, J. (2019). Customer behavior analysis using real-time data processing: A case study of digital signage-based online stores. Asia Pacific Journal of Marketing and Logistics, 31(1), 265–290. https://doi.org/10.1108/APJML-06-2017-0111
2. Attaran, M. (2020). Digital technology enablers and their implications for supply chain management. Supply Chain Forum: An International Journal, 21(3), 158–172. https://doi.org/10.1080/16258312.2020.1816361
3. Awa, H. O., Ojiabo, O. U., & Emecheta, B. C. (2015). Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. Journal of Science & Technology Policy Management, 6(1), 76–94. https://doi.org/10.1108/JSTPM-04-2014-0012
4. Awara, N. F., Udoh, E. G., & Anyadighibe, J. A. (2018). Information technology tools and supply chain performance of online retailers in Calabar metropolis, Cross River State, Nigeria. Global Journal of Social Sciences, 17(1), 55–67. https://doi.org/10.4314/gjss.v17i1.5
5. Beck, T., Pamuk, H., Ramrattan, R., & Uras, B. R. (2018). Payment instruments, finance and development. Journal of Development Economics, 133, 162–186. https://doi.org/10.1016/j.jdeveco.2018.01.001
6. Bhandari, R. (2014). Impact of technology on logistics and supply chain management. IOSR Journal of Business and Management, 17(2), 19–24. https://doi.org/10.9790/487X-17221924
7. Bouwer, L. (2017). Innovation management theory evolution map. SSRN. https://doi.org/10.2139/ssrn.3222848
8. Burchardt, C., & Maisch, B. (2019). Digitalisation needs a cultural change—Agility and open innovation will drive the digital transformation. Procedia CIRP, 84, 112–117. https://doi.org/10.1016/j.procir.2019.04.250
9. Chae, H.-C., Koh, E. C., & Park, K. O. (2018). Information technology capability and firm performance: Role of industry. Information & Management, 55(5), 525–546. https://doi.org/10.1016/j.im.2017.10.001
10. De Vass, T. (2018). The "Internet of Things" enabled supply chain integration and performance: A mixed method investigation of the Australian retail industry (Doctoral dissertation, Victoria University).
11. Enahoro, M. A., & Olawade, D. B. (2021). GSM and the Nigerian economy: The journey from 2004 to 2019. International Journal of Economics and Finance, 13(7), 69–78. https://doi.org/10.5539/ijef.v13n7p69
12. Farr-Wharton, G., Choi, J. H. J., & Foth, M. (2014). Food talks back: Exploring the role of mobile applications in reducing domestic food wastage. In Proceedings of the 26th Australian Computer-Human Interaction Conference on Designing Futures: The Future of Design (pp. 352–361). ACM. https://doi.org/10.1145/2686612.2686665
13. Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. Journal of Marketing Research, 18(1), 39–50. https://doi.org/10.1177/002224378101800104
14. Ganbold, O., Matsui, Y., & Rotaru, K. (2021). Effect of information technology-enabled supply chain integration on firm's operational performance. Journal of Enterprise Information Management, 34(3), 948–989. https://doi.org/10.1108/JEIM-06-2019-0180
15. Godwin-Jones, R. (2008). Mobile-computing trends: Lighter, faster, smarter. Language Learning & Technology, 12(3), 3–9.
16. Guan, Y. (2023). Consumer behavior analysis and marketing strategy optimization in the digital media environment. Industrial Engineering and Innovation Management, 6(10), 87–94.
17. Habjan, A., Andriopoulos, C., & Gotsi, M. (2014). The role of GPS-enabled information in transforming operational decision making: An exploratory study. European Journal of Information Systems, 23(4), 481–502. https://doi.org/10.1057/ejis.2013.15
18. Hald, K. S., & Coslugeanu, P. (2022). The preliminary supply chain lessons of the COVID-19 disruption—What is the role of digital technologies? Operations Management Research, 15(1), 282–297. https://doi.org/10.1007/s12063-021-00222-3

19. Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. Journal of Management Studies, 58(5), 1159–1197. https://doi.org/10.1111/joms.12639
20. Helal, A. A., Haskell, B., Carter, J. L., Brice, R., Woelk, D., & Rusinkiewicz, M. (2006). Any time, anywhere computing: Mobile computing concepts and technology. Springer.
21. Henseler, J., Ringle, C. M., & Sarstedt, J. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. Journal of the Academy of Marketing Science, 43(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8
22. Hole, Y., Pawar, M. S., & Khedkar, E. B. (2019). Omni channel retailing: An opportunity and challenges in the Indian market. Journal of Physics: Conference Series, 1362(1), 012121. https://doi.org/10.1088/1742-6596/1362/1/012121
23. Huang, S., Potter, A., & Eyers, D. (2020). Social media in operations and supply chain management: State-of-the-art and research directions. International Journal of Production Research, 58(6), 1893–1925. https://doi.org/10.1080/00207543.2019.1636329
24. Ivanov, D., Dolgui, A., & Sokolov, B. (2019). The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analytics. International Journal of Production Research, 57(3), 829–846. https://doi.org/10.1080/00207543.2018.1488100
25. Jiang, W. (2019). An intelligent supply chain information collaboration model based on internet of things and big data. IEEE Access, 7, 58324–58335. https://doi.org/10.1109/ACCESS.2019.2914450
26. Kilay, A. L., Simamora, B. H., & Putra, D. P. (2022). The influence of e-payment and e-commerce services on supply chain performance: Implications of open innovation and solutions for the digitalization of Indonesia's MSMEs. Journal of Open Innovation: Technology, Market, and Complexity, 8(3), 119. https://doi.org/10.3390/joitmc8030119
27. Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital transformation: An overview of the current state of the art of research. Sage Open, 11(3), 21582440211047576. https://doi.org/10.1177/21582440211047576
28. Lal, M., Shukla, C., & Tarangini. (2018). Study of effectiveness of POS data in managing supply chain. Industrial Engineering Journal, 11(10), 1–9.
29. Li, G., Yang, H., Sun, L., & Sohal, A. S. (2009). The impact of IT implementation on supply chain integration and performance. International Journal of Production Economics, 120(1), 125–138. https://doi.org/10.1016/j.ijpe.2008.07.021
30. Lin, S. Y., Cheng, X., Zhang, J., Yannam, J. S., Barnes, A. J., Koch, J. R., ... & Xue, H. (2023). Social media data mining of antitobacco campaign messages: Machine learning analysis of Facebook posts. Journal of Medical Internet Research, 25, e42863. https://doi.org/10.2196/42863
31. Makudza, F., Mugarisanwa, C., & Siziba, S. (2020). The effect of social media on consumer purchase behaviour in the mobile telephony industry in Zimbabwe. Dutch Journal of Finance and Management, 4(2), em0065. https://doi.org/10.29333/djfm/8444
32. Markoska, K., Ivanochko, I., & Gregus, M. (2017). Mobile banking services—Business information management with mobile payments. In Agile Information Business: Exploring Managerial Implications (pp. 125–175). Springer. https://doi.org/10.1007/978-981-10-5036-8_7
33. Mashayekhy, Y., Babaei, A., Yuan, X. M., & Xue, A. (2022). Impact of Internet of Things (IoT) on inventory management: A literature survey. Logistics, 6(2), 33. https://doi.org/10.3390/logistics6020033
34. Moyo, T., Proches, C. G., Mutambara, E., & Singh, U. G. (2022). The nexus between Twitter as a social blog and social capital in corporate reputation behaviour for the Zimbabwe telecommunications industry. Gender and Behaviour, 20(1), 18827–18851.
35. Ndurura, N. (2020). The significance of social media as a marketing tool. International Journal of Business and Environmental Studies, 7(1), 12–26.
36. Ojo, A. J., & Ajayi, A. P. (2024). Integration of the supply chain and its impact on performance among retailers in Ilorin Metropolis, Nigeria. Journal of Innovations, 75(6), 1124–1132.
37. Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). Platform revolution: How networked markets are transforming the economy, and how to make them work for you. W. W. Norton & Company.
38. Pattnaik, P. K., & Mall, R. (2015). Fundamentals of mobile computing. PHI Learning Pvt. Ltd.

39. Raji, M. A., Olodo, H. B., Oke, T. T., Addy, W. A., Ofodile, O. C., & Oyewole, A. T. (2024). Real-time data analytics in retail: A review of USA and global practices. GSC Advanced Research and Reviews, 18(3), 59–65. https://doi.org/10.30574/gscarr.2024.18.3.059
40. Ramanathan, U., Subramanian, N., & Parrot, G. (2018). The role of social media in retail network operations and marketing to enhance customer satisfaction. International Journal of Operations & Production Management, 37(1), 105–123. https://doi.org/10.1108/IJOPM-03-2016-0150
41. Rishi, N., & Tiwari, M. (2024). Navigating the dynamics of online consumer behaviour: Insights for e-commerce strategies in India and globally. International Journal of Innovative Research in Technology and Science, 12(2), 453–463.
42. Rogers, D. L. (2016). The digital transformation playbook: Rethink your business for the digital age. Columbia University Press.
43. Saengchai, S., & Jermsittiparsert, K. (2019). Improving sustainability performance through Internet of Things capability in Thailand: Mediating role of IoT-enabled supply chain integration. International Journal of Supply Chain Management, 8(5), 572–584.
44. Satyanarayanan, M. (2011). Mobile computing: The next decade. ACM SIGMOBILE Mobile Computing and Communications Review, 15(2), 2–10. https://doi.org/10.1145/1924281.1924283
45. Shankar, V., Kalyanam, K., Setia, P., Golmohammadi, A., Tirunillai, S., Douglass, T., & Waddoups, R. (2021). How technology is changing retail. Journal of Retailing, 97(1), 13–27. https://doi.org/10.1016/j.jretai.2020.10.006
46. Tarigan, Z., Jiputra, J., & Siagian, H. (2021). The effect of supply chain practices on retailer performance with information technology as a moderating variable. International Journal of Data and Network Science, 5(1), 47–54. https://doi.org/10.5267/j.ijdns.2020.9.004
47. Tiwari, S. (2021). Supply chain integration and Industry 4.0: A systematic literature review. Benchmarking: An International Journal, 28(3), 990–1030. https://doi.org/10.1108/BIJ-08-2020-0419
48. Waheed, A., Zhang, Q., Farrukh, M., & Khan, S. Z. (2021). Effect of mobile social apps on consumer's purchase attitude: Role of trust and technological factors in developing nations. Sage Open, 11(2), 21582440211006714. https://doi.org/10.1177/21582440211006714
49. Zafar, B., & Younis, M. (2020). Social media influence on consumer behavior: Insights from supermarket shoppers in Lahore. Journal of Business and Economic Options, 3(2), 65–71.
50. Zu, Q., Sarkis, J., & Lai, K. H. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. Journal of Purchasing and Supply Management, 19(2), 106–117. https://doi.org/10.1016/j.pursup.2012.11.001