

Information Technology (IT) And Supply Function of Nigerian Breweries PLC

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Abstract: *This study examines the impact of information technology (IT) on the supply function of Nigerian Breweries Plc., focusing on its role in enhancing operational efficiency, streamlining procurement processes, and improving supplier relationships. A descriptive research design was adopted, utilizing primary data collected through questionnaires distributed to supply chain staff at Nigerian Breweries Plc. out of 120 distributed questionnaires, 110 were retrieved, yielding a response rate of 91.67%. The findings reveal that IT infrastructure significantly enhances supply chain efficiency by enabling real-time inventory management, accurate demand forecasting, and improved supplier collaboration. However, challenges such as high maintenance costs, frequent system downtimes, and skill gaps among employees were identified as barriers to optimal IT utilization. The study concludes that while IT plays a critical role in modernizing supply chain operations, addressing these challenges through continuous training, robust system maintenance, and investment in advanced technologies is essential for sustained effectiveness. This research provides valuable insights for industry practitioners and contributes to the growing body of literature on IT adoption in supply chain management.*

Keywords: operational efficiency, procurement processes, supplier relationships, information technology, supply chain

INTRODUCTION

The advent of information technology has revolutionized business operations across various industries, fundamentally transforming how organizations manage their supply chains and operational processes. In today's competitive business environment, organizations are increasingly relying on IT solutions to streamline their operations, reduce costs, and enhance efficiency (Singh & Prabhakar, 2021). The brewing industry, being a significant sector in Nigeria's manufacturing landscape, has witnessed substantial technological evolution in recent years. Nigerian Breweries

plc., established in 1946, stands as the pioneer and largest brewing company in Nigeria, commanding approximately 60% of the market share (Nigerian Breweries Annual Report, 2023). Modern supply chain management has evolved from traditional manual processes to sophisticated digital systems incorporating Enterprise Resource Planning (ERP), Supply Chain Management (SCM) software, and Internet of Things (IoT) devices. These technological advancements have enabled real-time tracking, improved inventory management, and enhanced supplier relationship management (Mubarik & Khan, 2024). The integration of IT in supply functions has become particularly crucial in the brewing industry due to the complex nature of beer production, distribution, and storage requirements. According to Elly & Wilson (2022), effective IT systems help manage perishable inventory, optimize production schedules, and maintain quality standards throughout the supply chain.

Nigerian Breweries plc has made significant investments in IT infrastructure across its operations, implementing various digital solutions to enhance its supply function. These investments aim to improve operational efficiency, reduce waste, and strengthen competitive advantage in the Nigerian beverage market (Nigerian Breweries Annual Report, 2023). The company's supply function encompasses various critical activities including procurement, inventory management, logistics, and supplier relationship management. Davis (2024) argues that effective integration of IT systems in these areas is essential for maintaining operational excellence and meeting customer demands efficiently. Recent global events, including the COVID-19 pandemic, have further emphasized the importance of robust IT systems in supply chain management. Organizations with advanced digital capabilities have demonstrated greater resilience and adaptability in managing supply chain disruptions (Srivastava & Rogers, 2022).

Despite significant investments in IT infrastructure, Nigerian Breweries plc faces several challenges in optimizing its supply function. These include integration difficulties between legacy systems and modern IT solutions, resistance to technological change among personnel, and data management concerns (Xin *et al.*, 2024). The company struggles with high implementation and maintenance costs of IT systems, coupled with the need for specialized skills and continuous training. These challenges affect the optimal utilization of IT resources in supply chain operations. Furthermore, there is limited empirical evidence on the impact of IT adoption on supply function performance in Nigerian brewing companies. This research gap necessitates a comprehensive study to evaluate how IT implementation has influenced supply operations at Nigerian Breweries plc. The main objective is to examine the impact of information technology on the supply function of Nigerian Breweries plc. Specific objectives are to:

- i. Determine the impact of information technology on supply efficiency in Nigeria Breweries Plc.
- ii. Examine the effect of IT infrastructure availability on the supply chain operations of Nigeria Breweries Plc.

- iii. Assess the influence of IT utilization challenges on the effectiveness of supply chain operations in Nigeria Breweries Plc.

This study focuses on Nigerian Breweries' operations across its major production facilities in Lagos, Aba, Enugu, and Kaduna, examining IT implementations from 2021 to 2024. The research specifically covers the company's supply function, including procurement processes, inventory management systems, supplier relationship management, and order processing.

CONCEPTUAL CLARIFICATION

Information Technology

Information Technology (IT) is the use of computers, networking, storage, and other physical devices, as well as infrastructure and processes, to create, process, store, secure, and exchange all forms of electronic data. IT encompasses both hardware and software technologies used to enable business operations, enhance decision-making, and improve organizational efficiency (Laudon & Laudon, 2024). In the context of modern business operations, IT has become a pivotal tool for organizations to maintain competitive advantages by streamlining processes, improving customer service, and enabling data-driven decision-making.

IT plays a transformative role in enabling automation, enhancing communication, and optimizing the flow of information across organizations. Its application within the supply chain domain has revolutionized how goods and services move from suppliers to end-users, making it possible for firms to achieve high levels of efficiency and reliability. The deployment of technologies like Enterprise Resource Planning (ERP) systems, Radio Frequency Identification (RFID), and Internet of Things (IoT) solutions in logistics has created opportunities for tracking goods in real time, reducing delays, and forecasting demands with greater precision (Turban et al., 2022).

Information Technology in Supply Chain Management

The use of IT in Supply Chain Management (SCM) refers to the implementation of technologies that facilitate the planning, control, and optimization of supply chain activities. IT enables better collaboration, integration, and visibility across all stakeholders in the supply chain, from suppliers to end customers. Key technologies in SCM include ERP, Warehouse Management Systems (WMS), and RFID, which enable real-time data gathering, streamline logistics, and provide analytics for informed decision-making (Christopher, 2022). These technologies can significantly impact key areas such as demand forecasting, inventory control, order processing, transportation, and customer service. For instance, ERP systems allow seamless integration of various supply chain functions, enabling end-to-end visibility and information flow between departments, which is essential for effective decision-making and quick response to market changes (Hugos, 2024). Furthermore, innovations like blockchain and IoT add an additional layer of transparency and

traceability, which is critical in the brewing industry, where quality and safety standards are paramount.

The Supply Function in Nigeria Breweries Plc

Nigeria Breweries Plc, as a major player in the brewing industry, relies heavily on an efficient supply function to ensure the timely and cost-effective delivery of raw materials, production resources, and finished goods. The supply function in Nigeria Breweries Plc includes sourcing raw materials, managing inventory, coordinating with suppliers, and ensuring efficient distribution to meet demand while minimizing costs. Given the perishable nature of certain raw materials used in brewing, the company prioritizes an agile supply chain capable of rapid adjustments (Nigeria Breweries Plc Annual Report, 2023).

With the adoption of IT, Nigeria Breweries Plc has made significant strides in improving its supply chain operations. For instance, the company utilizes ERP systems to integrate its supply chain activities, enabling real-time monitoring of inventory levels, enhancing demand forecasting accuracy, and reducing stockouts. The integration of IT in their supply function has facilitated better supplier collaboration and improved the speed and reliability of delivery, which are essential for maintaining the quality and freshness of their products (Dada & Adedokun, 2022).

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is widely used to understand the adoption and acceptance of technology in organizations. According to TAM, two main factors influence an individual's decision to use a technology: perceived usefulness and perceived ease of use. In the context of Nigeria Breweries Plc, TAM is relevant in examining how employees perceive the effectiveness and efficiency of IT in enhancing supply chain operations. Perceived usefulness refers to the degree to which employees believe that using IT will enhance their job performance, while perceived ease of use refers to the effort involved in learning and using the technology. The successful adoption of IT within Nigeria Breweries' supply chain could depend on employees' acceptance and comfort with technology, which TAM suggests can be enhanced through training, support, and an intuitive user interface (Venkatesh & Davis, 2000).

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory, introduced by Barney (1991), posits that an organization's competitive advantage is derived from its unique resources and capabilities. In the case of Nigeria Breweries Plc, the integration of IT in the supply chain can be seen as a strategic resource that provides competitive advantages, such as improved operational efficiency, better customer service, and lower costs. According to RBV, for IT to contribute to a sustainable competitive advantage, it should be valuable, rare, inimitable, and organized (Barney, 1991). Nigeria Breweries' IT infrastructure, if proprietary or highly specialized, could serve as a valuable

and difficult-to-replicate resource that enhances supply chain responsiveness and flexibility. Additionally, the RBV theory highlights the importance of complementary resources, such as skilled personnel and effective management practices, to maximize IT's impact on the supply function.

Empirical Review

Empirical studies have consistently shown that the use of IT in supply chain management improves efficiency, reduces operational costs, and enhances customer satisfaction. For instance, a study by Gunasekaran and Ngai (2024) on IT adoption in supply chains found that the deployment of ERP systems significantly improved the coordination of supply chain activities and reduced lead times. Similarly, Lee and Whang (2023) highlighted that IT facilitates faster information exchange and real-time inventory visibility, both critical for reducing stockouts and ensuring timely delivery.

In Nigeria, Muraina (2024) conducted a study on IT's impact on supply chain operations in the manufacturing sector and found that IT adoption led to improved logistics coordination, inventory management, and demand forecasting accuracy. These findings align with Nigeria Breweries Plc's experience, where IT has been shown to streamline processes, improve data accuracy, and enable better forecasting, all of which are crucial for ensuring efficient supply chain operations (Dada & Adedokun, 2022). Mendoza-Fong et al. (2023) investigated blockchain technology's impact on supply chains, revealing its effectiveness in enhancing security and transparency. Blockchain systems minimized fraud risks and optimized record-keeping, fostering trust among partners and reducing transaction costs.

Shiralkar et al. (2023) examined the integration of artificial intelligence (AI) and big data analytics in SCM. Their research demonstrated that AI-driven predictive analytics improved demand forecasting accuracy, enabling better inventory management and enhancing customer satisfaction. These technologies also streamlined decision-making processes by offering actionable insights. A study by Kumar et al. (2023) focused on IT-enabled inventory management systems. The research highlighted how automation reduced inventory holding costs and improved stock replenishment cycles. Automated systems facilitated precise tracking, ensuring stock levels were adequate to meet demands.

Research by Intalar and Jeenanunta (2022) showed how IT integration strengthened supplier relationships. The study revealed that digital platforms enhanced communication and collaboration, reduced lead times, and improved supplier performance. These advancements were attributed to IT-enabled transparency and shared data analytics. Despite its advantages, challenges such as high costs, inadequate infrastructure, and a lack of skilled personnel were identified as significant barriers to IT adoption. Emerald (2024) emphasized that addressing these barriers through training programs and strategic investments is essential to maximize IT's potential in SCM.

Finally, studies recommended further exploration of IT's impact on sustainability and crossindustry supply chain practices. For example, Zhou et al. (2024) highlighted the need for deeper research into IT's role in reducing carbon footprints and promoting circular supply chains. Similarly, Mendoza-Fong et al. (2023) suggested integrating IT systems with green initiatives to achieve broader sustainability goals

Several case studies highlight the successful adoption of IT in breweries and similar industries. For instance, a case study on Heineken's supply chain transformation revealed that the company achieved significant improvements in lead time and inventory management through the implementation of advanced IT systems, including RFID and ERP solutions (Ngulle & Nshimirimana, 2012). These technologies allowed Heineken to monitor inventory levels in realtime, reducing waste and improving response times.

In a similar vein, Anheuser-Busch implemented IoT solutions for better asset tracking and predictive maintenance, which resulted in decreased downtime and improved production efficiency. These improvements were largely due to the ability of IoT technology to provide detailed insights into machinery performance and maintenance needs, thereby enabling a proactive approach to maintenance and resource allocation (Cisco Systems, 2019). For Nigeria Breweries Plc, similar IT solutions could enhance the transparency, efficiency, and responsiveness of their supply chain, particularly in managing logistics and inventory.

The literature review indicates that IT plays a significant role in enhancing the efficiency and effectiveness of supply chain functions in the brewing and manufacturing industries. The conceptual framework outlined how IT has transformed SCM practices and illustrated the benefits that Nigeria Breweries Plc could obtain from these advancements. The theoretical framework, based on TAM and RBV, highlights the importance of employee acceptance and strategic resources in maximizing Its impact. Empirical studies provide strong evidence of IT's positive impact on supply chain efficiency, emphasizing that successful implementation can lead to substantial improvements in coordination, cost reduction, and customer satisfaction.

In conclusion, IT has become indispensable for modern supply chain management, offering tools that enable greater visibility, efficiency, and responsiveness. Nigeria Breweries Plc stands to gain significantly by further integrating IT into its supply function, enhancing its ability to meet demand effectively, maintain product quality, and remain competitive in the dynamic brewing industry.

METHODOLOGY

This study adopts a descriptive research design using primary data collected through questionnaire administration. The descriptive approach enables the analysis of relationships and patterns between IT implementation and supply chain performance in Nigerian Breweries Plc. The focus

is on capturing respondents' perceptions and experiences regarding IT's role in supply operations. The population of the study comprises the supply chain staff of Nigerian Breweries Plc across its major facilities in Lagos, Aba, Enugu, and Kaduna. These include personnel involved in procurement, inventory management, logistics, and supplier relationship management. A stratified random sampling technique was used to ensure representation of supply chain staff across the various departments and facilities. The sample size consists of 120 employees selected based on their roles and responsibilities in supply chain operations. This sample size was determined to capture diverse perspectives while ensuring feasibility within the study's timeframe. Primary data was collected through a structured questionnaire designed to gather information on IT availability, its impact on supply efficiency, and challenges faced in IT utilization. The questionnaire was divided into sections covering demographic information, IT infrastructure availability, contributions to supply chain efficiency, and challenges in IT adoption. The collected data was analyzed using descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, and mean scores, were used to summarize respondents' demographic characteristics and perceptions. Inferential statistics, such as chi-square tests, were employed to test the study's hypotheses

RESULTS

This section presents the data collected from the survey and interviews conducted to assess the impact of information technology (IT) on the supply function of Nigeria Breweries Plc. Out of the 120 questionnaires distributed to supply chain staff, 110 were retrieved, resulting in a response rate of 91.67%. The data collected were analyzed using tables and descriptive statistics.

Respondents' Demographic Characteristics Table

4.1: Demographic Distribution of Respondents

Variable	Category	Frequency	Percentage%
Gender	Male	75	68.18
	Female	35	31.82
Age Range	20-30 years	30	27.27
	31-40 years	50	45.45
	41-50 years	20	18.18
	51 years and above	10	9.09
Educational Level	HND/B.Sc.	80	72.73
	Postgraduate	30	27.27

Source: Researchers computation, (2024).

Responses to Research Questions

Table 4.2: Availability of IT Infrastructure

Response Category	Frequency	Percentage
Strongly Agree	70	63.64
Agree	40	36.36
Neutral	5	4.55
Disagree	3	2.73
Strongly Disagree	2	1.82

Source: Researchers computation, (2024).

From Table 4.2, 90.91% of respondents agreed or strongly agreed that IT infrastructure is readily available in Nigeria Breweries Plc. This suggests a strong technological base supporting supply chain activities.

Table 4.3: Contribution to Efficiency in Supply Operations

Response Category	Frequency	Percentage
Strongly Agree	70	63.64
Agree	30	27.27
Neutral	5	4.55
Disagree	3	2.73
Strongly Disagree	2	1.82

Source: Researchers computation, (2024).

Table 4.3 shows that 90.91% of respondents believe IT significantly enhances supply chain efficiency. This highlights IT's role in ensuring timely procurement, inventory management, and distribution.

Table 4.4: Key Challenges in IT Utilization

Challenge	Frequency	Percentage%
High cost of maintenance	50	45.45
Technical skill gap	40	36.36
Frequent system downtime	20	18.18

Source: Researchers computation, (2024).

The most prominent challenge identified was the high cost of maintaining IT systems (45.45%), followed by the lack of technical expertise (36.36%)

Hypothesis Testing

Hypothesis	Observed value	Critical Value (df=4, $\alpha = 0.05$)	Decision	Conclusion
H₀₁ : IT does not significantly impact supply efficiency.	25.34	9.49	Reject H₀₁	IT significantly Impacts supply efficiency.
H₀₂ : IT infrastructure availability does not affect supply chain operations	18.67	9.49	Reject H₀₂	IT infrastructure significantly affect supply chain operations
H₀₃ : Challenges of IT utilization do no significantly affect supply chain effectiveness	22.18	9.49	Reject H₀₃	Challenges significantly affect supply chain effectiveness

Source: Researchers computation, (2024).

DISCUSSION OF FINDINGS

The findings reveal a significant positive impact of information technology on the efficiency of supply chain operations within Nigeria Breweries Plc. Over 90% of respondents agreed that IT infrastructure is readily available and plays a vital role in enhancing supply chain efficiency by streamlining inventory management, procurement, and distribution processes. These results align with prior studies emphasizing the value of technology in improving operational speed, accuracy, and responsiveness, which are crucial for sustaining competitive advantage.

IT infrastructure availability was also shown to have a considerable effect on supply chain performance. The statistical analysis supports that having adequate IT infrastructure positively influences the ease of managing supply operations, as it enhances data accuracy, decision-making, and interdepartmental coordination. This finding aligns with the technology acceptance model (TAM), which highlights that perceived usefulness and ease of use drive effective technology adoption. In this context, a well-integrated IT infrastructure supports real-time data access, crucial for agile supply chain management in a fast-paced industry like brewing.

Despite these benefits, challenges such as high maintenance costs and a skills gap emerged as significant barriers to effective IT utilization. Over 45% of respondents identified these challenges as major factors affecting IT's full potential in supply chain functions. This finding underscores the need for continuous investment in IT system upgrades and employee training to maximize efficiency. Addressing these challenges can further strengthen Nigeria Breweries Plc's supply chain operations, enabling the company to adapt to industry demands more effectively.

CONCLUSION

This study investigated the impact of information technology (IT) on the supply function of Nigeria Breweries Plc, focusing on inventory management, order processing, and supplier relationship management. The findings reveal that IT implementation has significantly enhanced operational efficiency, accuracy, and responsiveness within the organization. Through tools such as ERP systems, EDI, and automated order management systems, Nigeria Breweries Plc has optimized its inventory management processes, reduced order processing times, and improved supplier collaboration. However, the study also highlighted challenges such as high maintenance costs, occasional system downtimes, and a technical skills gap among employees. While IT infrastructure has been successfully integrated into the supply function, addressing these challenges is crucial for ensuring the system's sustainability and maximizing its benefits. Overall, the study concludes that IT is a critical enabler of efficient supply chain operations. Effective utilization of IT not only streamlines processes but also strengthens the organization's ability to adapt to market demands, thereby enhancing competitiveness and long-term sustainability.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

Invest in Employee Training and Development: To address the skills gap, Nigeria Breweries Plc should implement continuous training programs for employees, focusing on IT tools and systems used in the supply function. This will enhance their technical competence and improve the overall efficiency of IT utilization.

Enhance IT System Maintenance and Reliability: Regular maintenance of IT infrastructure is essential to minimize system downtimes and ensure reliability. The company should allocate sufficient resources for periodic upgrades and proactive troubleshooting of IT systems to maintain seamless operations.

Adopt Advanced IT Solutions: The company should explore and invest in emerging technologies such as artificial intelligence (AI), predictive analytics, and blockchain to further enhance its supply chain capabilities. These technologies can improve forecasting accuracy, enhance transparency, and streamline supplier management.

Strengthen IT Security: As reliance on IT grows, so does the risk of cyber threats. Nigeria Breweries Plc should implement robust cybersecurity measures to protect its systems from unauthorized access, data breaches, and other cyber risks.

Foster Collaboration with Suppliers through IT Platforms: The company should continue to strengthen its supplier relationships by enhancing its supplier portals and data-sharing platforms. This will ensure better coordination, improve quality control, and enhance the overall efficiency of supply chain operations.

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