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DIGITAL TRACKING TOOLS ON INVENTORY MANAGEMENT (A STUDY OF NESTLE NIGERIA PLC., AGBARA)

BY

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Abstract:

This study investigated the effects of digital tracking on inventory management in Nigerian manufacturing industry using Nestle Nigeria Plc. as a study area. The objectives of this study were to determine the effect of real-time tracking, barcode scanning and radio frequency identification on inventory management. The study adopted descriptive research design. The population is the entire staff of the company under review. Simple random sampling technique was used to select the respondents from the study targeting all staff of Nestle Nigeria Plc. The sample size of 171 was derived from the population using Taro Yamane Statistical formula while 169 were valid for analyses. Questionnaire was structured using likerts scale (strongly agree, agree, disagree and strongly disagree). The data were tested using percentage method while the hypotheses were tested using simple regression, anova and coefficient analysis with the aid of statistical packages for social sciences (SPSS) version 27. The findings revealed that among the variables tested; real-time tracking and barcode scanning are significant with p-value of .000 and .000 respectively while economic status was insignificant with p-value of 0.533. The study concluded that digital tracking has significant effect on inventory management in Nigerian manufacturing industry. The researcher therefore recommended that Manufacturing companies, particularly Nestlé Nigeria Plc, should invest more in advanced real-time tracking technologies to enhance inventory management efficiency. In addition, regular staff training should be conducted to improve employees' competence in barcode scanning operations, leading to greater inventory accuracy, reduced inventory losses, and improved operational efficiency.

Keywords: Inventory Management, Real-Time Tracking, Barcode Scanning, Radio Frequency Identification, Inventory Management.

1.0 INTRODUCTION

Inventory management has become an essential aspect of organizational operations because it determines the efficiency of material handling, stock control, and overall business performance (Zott, Amit & Donlevy, 2020). Organizations across manufacturing, retail, construction, logistics, and service industries rely heavily on effective inventory management systems to ensure the availability of materials and products needed for smooth operational activities. Traditionally, many organizations depended on manual inventory management methods such as paper-based record keeping and physical stock counting (Shankar, Smith & Rangaswamy, 2022). Meanwhile, according to Nafisah & Albari (2024), digital tracking refer to the use of digital technologies such as barcode systems, Radio Frequency Identification (RFID), cloud-



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based inventory software, Internet of Things (IoT), Artificial Intelligence (AI), and Enterprise Resource Planning (ERP) systems to monitor, control, and manage inventory activities in real time. These technologies enable organizations to automate stock monitoring processes, reduce inventory discrepancies, and improve supply chain coordination.

The increasing advancement in digital technologies and Industry 4.0 has transformed the way organizations manage inventory and supply chain operations globally. Industry 4.0 emphasizes the integration of smart technologies into organizational activities to improve efficiency, automation, and data-driven decision-making processes (Wijaya & Subagio, 2025). Technologies such as cloud computing, IoT devices, RFID systems, AI-driven analytics, and blockchain technologies now play significant roles in inventory monitoring and warehouse management. According to Ivanov, Dolgui, and Sokolov (2021), organizations adopting digital inventory systems experience improved inventory accuracy, reduced operational costs, enhanced customer satisfaction, and better supply chain responsiveness. These technological innovations have made inventory management more efficient and proactive compared to traditional inventory systems that depend heavily on manual labor and delayed information processing (Okpara, 2024).

In developing economies such as Nigeria, many organizations still encounter numerous challenges in inventory management due to inadequate technological infrastructure, insufficient employee training, financial limitations, and resistance to technological change (Mohammad & Henry, 2023). Adzrul, Wen, Jie, Nadzmi, Shamsudin, Shukery and Mohd (2026) observed that digital inventory tracking systems significantly reduce inventory errors and operational inefficiencies in construction projects by improving material tracking and centralized communication systems. The growing adoption of these technologies demonstrates the increasing relevance of digital inventory management in modern organizational operations (Alnor, Al-Matari, Mohamed, Berradia, Mohamed & Benzerrouk, 2024). Based on this background, it is important to examine the effects of digital tracking on inventory management in Nigeria manufacturing industry using Nestle Nigeria Plc. as a study area.

Statement of the Problems

Despite the advantages associated with digital inventory systems, several organizations still face challenges in implementing and managing these technologies effectively. Financial constraints, inadequate technical knowledge, poor internet connectivity, cybersecurity concerns, and employee resistance to technological change remain significant barriers to digital transformation in inventory management. Small and Medium Enterprises (SMEs) especially in the manufacturing sectors face difficulties in adopting advanced inventory technologies due to limited financial and technological resources. Jaba and Ashte (2025) emphasized that many SMEs in developing economies experience imbalances in digital technology adoption because of organizational and technical limitations. These challenges necessitate further studies on digital tracking and inventory management in order to identify practical solutions for improving inventory management practices among organizations.

Objectives of the Study

The general objective of this study was to determine the effect of digital tracking on inventory management using a study of Nestle Nigeria Plc. Derived from the above main objectives are the specific objectives listed below;

- i. To determine the effect of real-time tracking on inventory management.
- ii. To examine the effect of barcode scanning on inventory management.
- iii. To ascertain the effect of radio frequency identification on inventory management.



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Scope of the Study

The study focuses on examining the effect of digital tracking on inventory management using Nestle Nigeria Plc as the case study. It specifically considers three dimensions of digital tracking: real-time tracking, barcode scanning and radio frequency identification, and how these variables influence inventory management. The study is limited to staff of Nestle Nigeria Plc., Agbara, Ogun State, Nigeria.

2.0 LITERATURE REVIEW

Concept of Digital Tracking

Digital tracking refers to the use of electronic and computerized technologies to monitor, record, and manage activities, movements, or transactions in real time within an organization or system (Santos, 2023). It involves the collection, processing, and storage of data through digital devices and software applications to improve operational efficiency and decision-making processes. According to Rust and Kimasi (2021), digital tracking systems enable organizations to monitor inventory, logistics, production activities, and customer interactions accurately and efficiently. The concept has become increasingly important in modern business operations because organizations now rely heavily on data-driven systems to improve productivity and reduce operational errors (Pandya & Dholakia, 2023).

According to Rahahleh (2020), traditional manual tracking methods were often associated with inaccuracies, delays, poor record management, and high operational costs. Consequently, organizations began to adopt digital technologies such as barcode systems, Radio Frequency Identification (RFID), cloud computing, Global Positioning Systems (GPS), and Internet of Things (IoT) devices to improve tracking efficiency and operational control. Heizer, Render, and Munson (2020) noted that digital tracking technologies enhance visibility and transparency within organizational processes by providing real-time access to operational data. Digital tracking plays a significant role in inventory management because it enables organizations to monitor stock movement, inventory levels, and warehouse activities effectively. Through digital tracking systems, organizations can identify stock shortages, excess inventory, and product movement instantly without relying on manual stock counting methods. RFID and barcode technologies are among the most commonly used digital tracking tools in inventory management. According to Ivanov, Dolgui, and Sokolov (2021), digital inventory tracking improves inventory accuracy, minimizes stock discrepancies, and enhances supply chain coordination across organizations.

Elements of Digital tracking

Real-Time Tracking

Real-time tracking refers to the continuous monitoring and updating of inventory, materials, products, or operational activities instantly as events occur within an organization. It involves the use of digital technologies such as Internet of Things (IoT) devices, cloud computing, Global Positioning Systems (GPS), barcode systems, and Radio Frequency Identification (RFID) technologies to provide immediate and accurate information regarding inventory movement and operational processes (Kim & Raymond, 2024). Real-time tracking enables organizations to access current inventory information without delays, thereby improving operational visibility and management efficiency (Chopra & Meindl, 2019). One of the major features of real-time tracking is instant data accessibility. Through digital systems, inventory information is automatically updated whenever products are received, moved, sold, or dispatched within an organization. This allows managers to monitor stock levels continuously and make informed decisions regarding inventory replenishment and production planning. According to Heizer, Render, and Munson (2020), real-time inventory tracking reduces delays



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associated with manual stock recording and improves operational responsiveness in organizations.

Barcode Scanning

Barcode scanning refers to the use of machine-readable codes and scanning devices to identify, record, and monitor inventory items electronically within an organization (Kumar & Singh, 2021). A barcode consists of a series of parallel lines or patterns containing encoded information about a product, which can be read using barcode scanners connected to computerized inventory systems. Barcode scanning technology is widely used in inventory management, warehousing, retailing, manufacturing, and logistics operations because of its speed, accuracy, and efficiency in data processing (Heizer, Render & Munson, 2020). Barcode scanning technology emerged as an improvement over traditional manual inventory recording methods, which were often associated with human errors, delays, and poor inventory accountability. With barcode systems, inventory information is captured automatically when products are scanned, thereby reducing the need for manual data entry.

Radio Frequency Identification

Radio Frequency Identification (RFID) is a digital tracking technology that uses radio waves to identify, monitor, and track inventory items automatically without physical contact. RFID systems consist of electronic tags attached to products, RFID readers, and computerized software used for data processing and inventory management (Chang, 2021). The RFID reader communicates with the electronic tag through radio signals and retrieves information stored within the tag. According to Heizer et al. (2020), RFID technology improves inventory visibility and enhances operational efficiency by enabling automated and real-time inventory tracking processes. RFID technology has become increasingly popular in inventory management because of its ability to provide faster and more accurate inventory tracking compared to traditional inventory systems. Unlike barcode systems that require direct line-of-sight scanning, RFID systems can read multiple tags simultaneously from a distance. This makes RFID technology more efficient for managing large volumes of inventory within warehouses and manufacturing environments.

Theoretical Framework

Technology Acceptance Theory (TAM)

The Technology Acceptance Model (TAM) was propounded by Fred Davis in 1989. The theory was developed to explain how individuals accept and use new technologies within organizations and society. According to Davis (1989), the adoption of any technological innovation is primarily influenced by two major factors, namely perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which an individual believes that using a particular system will improve job performance, while perceived ease of use refers to the extent to which a person believes that using the technology will be free from stress or difficulty (Maskus, 2023). The theory suggests that when users perceive a technology as beneficial and easy to operate, they are more likely to accept and utilize it effectively within organizational activities (Nogueira, Viana & de Souza, 2025).

Furthermore, perceived ease of use is also important in inventory management systems because complicated software applications may discourage employees from utilizing the systems effectively (Legros & Galia, 2023). Organizations that provide training and user-friendly digital platforms encourage technology acceptance among workers, thereby improving inventory operations and reducing errors. The theory therefore explains why organizations that successfully implement digital inventory technologies often achieve better operational performance and inventory control. TAM provides a strong theoretical foundation for



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understanding employee acceptance of digital tracking technologies in inventory management practices (Mohnen & Hall, 2021).

3.0 METHODOLOGY

Research Design

This study adopted descriptive survey research design. The descriptive survey was suitable for this study because the study strive to ascertain the effects of digital tracking on Inventory management of consumer goods using Nestle Nigeria Plc as the case study. The sample technique for this study is simple random sampling technique.

The researcher determined the needed sample size from the study population by using Taro Yamane Statistical formula with 95% confidence level and resulted to 171 staff was the source of information needed for the study. The data collected for the study comprise of primary data. The demographic data will be presented in inferential statistics and presented with the use of graphs and chats while the hypotheses will be tested with multiple regression analysis using SPSS version 23.0. The variables included both dependent and independent variables.

4.0 RESULTS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.836	.836	20

Source: Extracted from SPSS, Version 27.

The alpha value ($\alpha = .84$) in the reliability test in table 4.2.1 indicates that the instruments is reliable. That mean, it can consistently measure what it is set to measure at all time in a similar situation.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.957 ^a	.916	.915	.12160

a. Predictors: (Constant), Real-Time Tracking, Barcode Scanning, Radio Frequency Identification (RFID)

Source: Extracted from SPSS, Version 27.

The table above shows the R square with the value of .91 which indicates that 91% variation in organizational performance was caused by the explanatory variables which include cost reduction strategy, risk management and quality improvement. Also, the adjusted R square indicates that after adjusting the degree of freedom, the explanatory variables can still explain 91% variation in inventory management.

Table 4.2.4 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.238	.095		-2.500	.013
	Real-Time Tracking	.485	.037	.532	13.173	.000
	Barcode Scanning	.570	.043	.473	13.380	.000
	Radio Frequency Identification (RFID)	.024	.039	.025	.625	.533

a. Dependent Variable: Inventory Management



Source: Extracted from SPSS, Version 27

The coefficient table revealed the relationship between the variables which shows that Real-Time Tracking, Barcode Scanning and Radio Frequency Identification (RFID) have a positive relationship with Inventory Management with 0.485, 0.570 and 0.024 respectively. The table further revealed the significance of the explanatory variables which was however used to test the hypotheses of the study. However, the T statistic rules states that once the probability value of the variable is greater than 0.05 which is the level of significance, we therefore accept null hypothesis and if otherwise, we reject null hypothesis and accept alternate hypothesis.

Table 4.2.4 revealed that Real-Time Tracking and Barcode Scanning are significant with the P value of 0.000 and 0.000 which is lesser than 0.05 level of significance. Radio frequency identification is insignificant with the P value of 0.533 which is greater than 0.05 level of significance.

5.0 CONCLUSION

The study concluded that digital tracking has a significant influence on inventory management in manufacturing companies, particularly at Nestle Nigeria Plc. The findings revealed that both real-time tracking and barcode scanning significantly improve inventory management by enhancing stock visibility, reducing manual errors, and increasing operational efficiency. Real-time tracking showed a strong positive and significant effect on inventory management, while barcode scanning emerged as the most influential digital tracking tool with a significant positive relationship. However, radio frequency identification (RFID) was found to have no significant effect on inventory management within the study context. Overall, the study established that the adoption of digital tracking technologies, especially real-time tracking and barcode scanning, contributes substantially to effective inventory management and improved organizational performance in manufacturing firms.

REFERENCES

- Adzrul, M. A., Wen, L. C., Jie, Y. K., Nadzmi, N. S., Shamsudin, S. F., Shukery, M. F., & Mohd, R. (2026). Digital inventory tracking systems and operational efficiency in construction project management. *International Journal of Construction and Project Management*, 14(1), 66–81.
- Alnor, A., Al-Matari, E., Mohamed, A., Berradia, A., Mohamed, A., & Benzerrouk, M. (2024). The growing relevance of digital inventory management technologies in modern organizations. *International Journal of Information Systems and Supply Chain Management*, 11(3), 102–118.
- Chang, Y. (2021). Barcode and RFID technologies in inventory management systems. *Journal of Digital Logistics and Inventory Control*, 10(1), 54–69.
- Chopra, S., & Meindl, P. (2019). *Supply chain management: Strategy, planning, and operation* (7th ed.). Pearson Education.
- Heizer, J., Render, B., & Munson, C. (2020). *Operations management: Sustainability and supply chain management* (13th ed.). Pearson Education.
- Ivanov, D. (2021). Barcode technologies and production coordination in manufacturing firms. *International Journal of Production Systems and Inventory Management*, 16(3), 142–157.
- Jaba, R., & Ashte, R. (2025). Integrating digital technologies for inventory and material management in SMEs in Vijayapura District. *Journal of Entrepreneurship and Innovation Studies*, 13(1), 91–107.



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- Kim, S., & Raymond, T. (2024). Internet of Things and real-time inventory tracking technologies in organizations. *Journal of Digital Operations and Technology Management*, 18(2), 73–89.
- Kumar, R., & Singh, P. (2021). Effectiveness of barcode technology in inventory management among Indian retail organizations. *International Journal of Business Technology and Innovation*, 15(3), 101–116.
- Mohammad, Y., & Henry, P. (2023). Challenges affecting digital inventory management adoption in developing economies. *African Journal of Business and Technology*, 10(2), 73–89.
- Nafisah, S., & Albari, A. (2024). Digital tracking technologies and inventory management efficiency. *Journal of Contemporary Management Research*, 12(1), 15–29.
- Okpara, C. (2024). Traditional versus digital inventory systems: Implications for organizational productivity. *Nigerian Journal of Operations Management*, 6(3), 120–134.
- Pandya, R., & Dholakia, N. (2023). Data-driven systems and operational efficiency in modern organizations. *Journal of Business Analytics and Information Systems*, 10(1), 41–56.
- Puriwat, W., & Tripopsakul, S. (2023). Inventory management systems and customer loyalty in retail businesses. *Journal of Retail and Consumer Management*, 17(1), 84–99.
- Rahahleh, M. (2020). Limitations of traditional tracking methods and the emergence of digital tracking systems. *International Journal of Operations and Information Management*, 6(2), 84–99.
- Rust, R., & Kimasi, M. (2021). Digital tracking systems and organizational operational efficiency. *Journal of Technology and Business Operations*, 8(3), 102–118.
- Santos, L. (2023). Digital tracking technologies and real-time organizational monitoring systems. *International Journal of Digital Innovation and Management*, 17(2), 61–76.
- Shankar, V., Smith, A. K., & Rangaswamy, A. (2022). Customer satisfaction and operational efficiency through digital transformation technologies. *Journal of Marketing and Technology Innovation*, 18(4), 211–226.
- Wijaya, T., & Subagio, H. (2025). Industry 4.0 and smart technologies in inventory and supply chain management. *Journal of Digital Business Transformation*, 7(2), 54–69.
- Zott, C., Amit, R., & Donlevy, J. (2020). Inventory management and organizational operational performance. *International Journal of Operations and Production Management*, 40(5), 411–428.