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Inventory Management System and Performance of Pharmaceutical Firms in Anambra State and Imo State, Nigeria

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ABSTRACT: The study aimed at investigating the effect of inventory management system and performance of pharmaceutical firms in Anambra State and Imo State, Nigeria. The specific objectives were; To determine the effect of barcode scanning System on inventory turnaround time in pharmaceutical firms in Anambra State, Nigeria; To investigate the degree to which radio frequency identification technology (RFID) affect process efficiency in pharmaceutical firms in Anambra State, Nigeria. Relevant literature were reviewed under conceptual review, theoretical framework, and empirical review. The research work was anchored on Task-Technology Fit (TTF) theory. Survey research design was adopted for the study. The population of the study was 1882. The statistical formula devised by Borg and Gall (1973), was employed to arrive at a sample size of 361. Linear regression analysis was conducted to test the hypotheses in other to assess the relative predictive power of the independent variables on the dependent variable. All tests were conducted at 0.05 level of significance. The statistical package for social sciences (SPSS) version 23 was employed to test the hypotheses. The result showed that Barcode scanning System had a positive and significant effect on inventory turnaround time in pharmaceutical firms in Anambra State, Nigeria (t-statistics 3.976; p.value= 0.000). Radio frequency identification technology (RFID) had a positive and a significant effect on process efficiency in pharmaceutical firms in Anambra State, Nigeria (t-statistics =7.162; p.value=0.005). The study concluded that effective inventory management plays important role in ensuring that pharmaceutical firms maintain adequate stock, minimize inventory-related costs, improve operational processes, and provide timely services to customers. The study recommended that Management should ensure that pharmaceutical products are properly barcoded, strategically positioned at key points such as receiving, storage, stock counting, picking, and dispatch and regularly maintain and update barcode equipment and software to prevent system failures that could delay inventory operations.

Keywords: Barcode scanning system, inventory turnaround time, radio frequency identification technology, pharmaceutical firms.

INTRODUCTION

Organisational performance in contemporary business environment is shaped by a combination of operational, financial, and technological factors. In recent years, scholars have emphasized that organisational performance is multidimensional, incorporating financial and non-financial indicators such as profitability, service quality, operational efficiency, and customer satisfaction (Hassan & Ojo, 2022). Recent

studies highlight that organisational performance is strongly influenced by internal management systems, technological adoption, and operational efficiency.

Inventory management has evolved over time as organisations have sought more efficient ways to control stock and ensure the smooth flow of goods and services. In the early stages of business development, inventory management was largely manual, involving simple record-keeping using paper, ledgers, and basic counting methods. These traditional systems were prone to human error, inefficiencies, and lack of real-time information, making it difficult for organisations to effectively control stock levels (Afolabi & Adeyemi, 2022). With the growth of industrialization in the 20th century, businesses began to adopt more structured approaches to inventory control. Techniques such as the Economic Order Quantity (EOQ) model and Just-in-Time (JIT) systems were developed to help organisations determine optimal order quantities and reduce holding costs. These models improved efficiency by balancing ordering costs with storage costs and minimizing waste (Khan & Sadiq, 2023). The introduction of computers in business operations marked a significant turning point in inventory management.

During the late 20th century, organisations began using computerized inventory systems such as barcode systems to track stock levels, automate calculations, enable faster and more accurate recording of stock movement, and generate reports. This reduced manual errors and improved decision-making processes (Chen & Park, 2023).

In the 21st century, inventory management systems have become increasingly sophisticated with the integration of Enterprise Resource Planning (ERP) systems, cloud computing, technology adoption and real-time data analytics. These systems allow organisations to monitor inventory across multiple locations, forecast demand accurately, and make data-driven decisions. Additionally, technologies such as Radio Frequency Identification (RFID) and mobile applications have improved visibility and control over inventory processes (Nwankwo & Eze, 2024). According to Okeke and Umeh (2025), businesses that adopt modern inventory technologies experience improved operational efficiency, reduced costs, and better customer satisfaction.

1.1 Statement of the Problem

Despite the critical role of pharmaceutical firms in the healthcare delivery system in Anambra State and Imo state, many organizations continue to struggle with suboptimal inventory management practices. This inefficiency directly threatens their operational performance and long-term viability. These unique challenges faced by pharmaceutical firms are; logistical challenges such as erratic lead times from distributors and fluctuating exchange rates for imported medications; high carrying costs (storage, insurance, and security) and high ordering costs; relying on manual or semi-manual recording systems and these methods are prone to human error leading to discrepancies between physical stock and ledger records; poor demand forecasting leading to overstocking where capital is tied up in slow-moving inventory; and tracking of individual batches of medicine for expiration which is prone to oversight due to bulk storage.

If these inventory management challenges are not addressed, pharmaceutical firms in Anambra State and Imo state will continue to face declining competitive advantage, increased operational waste, and an inability to meet the healthcare demands of the growing population. Inventory system will remain "opaque," making it impossible to achieve the levels of precision required for modern

pharmaceutical excellence. The essence of this study is to determine whether the adoption of modern technology systems like warehouse management system, Barcoding system, RFID (radio Frequency identification), POS (point of Sale) is one of the critical success factors that supports those firms that are performing well in the sector.

Although, effective strategies have been developed to combat the excesses of poor inventory management system. Despite this, organizations in recent times are still faced with all these challenges. It is against this backdrop that the study is poised to examine the effect of inventory management system and performance of pharmaceutical firms in Anambra State and Imo state, Nigeria.

1.2. Objectives of the Study

The overall objective of this research is to investigate the relationship between inventory management system and organizational performance of pharmaceutical firms in Anambra State and Imo state, Nigeria. In order to achieve this, the study seeks to;

1. To determine the effect of barcode scanning System on inventory turnaround time in pharmaceutical firms in Anambra State and Imo state, Nigeria.
2. To investigate the degree to which radio frequency identification technology (RFID) affect process efficiency in pharmaceutical firms in Anambra State and Imo state, Nigeria.

1.3 Hypotheses

The following null hypotheses were formulated to guide this study:

Hypothesis One

H_{o1}: Barcode scanning System has no significant effect on inventory turnaround time in pharmaceutical firms in Anambra State and Imo state, Nigeria.

Hypothesis Two

H_{o2}: Radio frequency identification technology (RFID) has no significant effect on process efficiency in pharmaceutical firms in Anambra State and Imo state, Nigeria.

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Inventory Management System

In the contemporary business landscape, the definition of an Inventory Management System (IMS) has evolved from a simple record-keeping tool to a sophisticated, integrated ecosystem that manages the entire lifecycle of a product. According to Thompson (2023), "An inventory management system is defined as the combination of technology, processes, and procedures used to oversee the flow of goods from manufacturers to warehouses and eventually to the point of sale, ensuring that the right amount of stock is available at the right time to meet customer demand without over-investing in capital". Zhan (2025) defined an inventory management system as a predictive engine that utilizes machine learning algorithms to harmonize historical sales data with external market signals, automating replenishment cycles and minimizing human intervention in the procurement process". This perspective emphasizes that an inventory management system no longer exists in a vacuum but is a node in a larger, interconnected digital network. "An inventory management system is a coordinated digital ecosystem that integrates internal warehouse data with external supplier and logistics networks. It functions as the central intelligence hub of Supply Chain 4.0, facilitating the seamless exchange of real-time information to eliminate the bullwhip effect and ensure end-to-end visibility" (IntechOpen, 2024). It has moved beyond the warehouse walls to become a centralized, predictive hub that harmonizes sales, finance, and logistics.

Operationally, an inventory management system is the nerve center of the supply chain. It provides real-time visibility into stock levels, locations, and movements. One of it key functions is Automated reordering, barcode/RFID scanning, and warehouse location management. In the modern Context, it now utilizes Computer Vision and IoT sensors to eliminate manual counting, achieving "perpetual inventory" accuracy levels of over 99% (Patel, 2025). Inventory management is the heartbeat of any business that deals with physical goods. At its simplest, it's about having the right products, in the right quantity, at the right time, to avoid the twin nightmares of "out of stock" and "too much dust on the shelves**."**

Oliveira Filho B. (2023) and others note that many small businesses still rely on "current manual inventory systems" due to low cost and ease of implementation, despite higher error risks.

Key Components and Types of Inventory

According to Munyaka & Yadavalli (2022), inventory management system handles three main types of manufacturing inventory: Raw materials. Work-in-progress (WIP), Finished goods. Additional categories include transit, buffer/safety stock, decoupling stock, anticipation stock, and cycle stock. According to Silva et al., (2025), Core activities in an inventory management system include: Forecasting demand, Placing orders (when and how much), Receiving and storing goods, Tracking movements (real-time where possible), Replenishment and reordering, Auditing and reporting. Mohamed (2024) consistently highlight these goals and objectives of inventory management system:

i. Minimize total inventory costs (ordering + holding + stockout costs)
ii. Ensure high customer service levels and availability
iii. Improve cash flow by reducing tied-up capital
iv. Reduce waste, obsolescence, and errors (especially through automation)
v. Support supply chain resilience and efficiency

2.1.2 Barcode scanning System

Barcode scanning systems have become a foundational technology in modern inventory management, replacing manual processes with automated, accurate, and efficient data capture. Many researchers now define barcode scanning as a "networked ecosystem" rather than a standalone device. . Santhosh Kumar et al. (2024) defined an automated barcode system as a comprehensive framework consisting of barcode scanners, a centralized database, and programmable controls. They emphasize that the system's primary function is the "classification and direction of items" to reduce manual labor and minimize sorting errors in warehouse environments. Munro (2023) defined it from a logistics perspective, Munro describes a barcode inventory system as a "network of hardware and software" including printers, mobile computers, and infrastructure that allows goods to be "tracked along the entire supply chain."

2.1.3 Radio Frequency identification

Zhang, et al. (2025) in their systematic literature review of 109 articles, view RFID as a technology enabling automatic identification, real-time tracking, and data sharing in supply chain management. It improves transparency, traceability, and operational efficiency compared to traditional barcode systems, which require line-of-sight and support only single-item scanning. Kathiriya (2025) also view RFID technology as an essential to modernization of supply chain and inventory management systems as it enables precise, automated tracking in real time." Mora-Mora et al. (2024) define RFID as a "contactless, wireless sensing technology" that uses

electromagnetic fields to automatically identify and track tags attached to objects. According to Badmus et al. (2024), they emphasize that modern RFID systems are no longer just "electronic barcodes" but are now "IoT nodes" that can store and transmit real-time data about an item's history, temperature, and location. communication between RFID tags and readers to reduce human error and enhance visibility throughout the supply chain. They further stated that electromagnetic fields is used to automatically identify and track tags attached to objects, products, or assets.

2.2 Theoretical Framework

This study is anchored on two theories; Task-Technology Fit (TTF) theory.

Task-Technology Fit (TTF) theory

The Task-Technology Fit (TTF) theory is a cornerstone of Information Systems (IS) research. It suggests that the success of a technology is not determined by how "advanced" it is, but by how well its features align with the specific requirements of the task it is meant to perform. According to the original propounders, Goodhue and Thompson (1995) (and validated in modern logistics by Finale, 2025), TTF consists of four key variables:

Task Characteristics: The actions carried out by individuals (e.g., scanning 500 small jewelry items vs. 5 large pallets).

Technology Characteristics: The features of the tool (e.g., Barcode's line-of-sight requirement vs. RFID's bulk scanning).

Task-Technology Fit: The "degree of matching" between the two.

Performance/Utilization: High fit leads to better worker performance and higher data accuracy.

Goodhue and Thompson (1995) further argue that for technology to be effective, it must provide functionalities that support task requirements such as data quality, accessibility, compatibility, and ease of use. When there is a good fit between task and technology, users are more likely to utilize the system effectively, leading to improved performance outcomes.

Although, several scholars have expanded the TTF theory over time:

Dishaw and Strong (1999) extended TTF by integrating it with the Technology Acceptance Model (TAM), emphasizing that both perceived usefulness and task-technology fit influence system usage and performance. Zigurs and Buckland (1998) applied TTF to group support systems, suggesting that the effectiveness of technology depends on its alignment with the nature of group tasks. Fuller and Dennis (2009) highlighted that task characteristics such as complexity and interdependence influence the level of fit required between task and technology. Gebauer, Shaw, and Gribbins (2010) emphasized that TTF is crucial in mobile and enterprise systems, where technology must align with dynamic and context-specific tasks.

Isaac et al. (2017) applied TTF in e-learning environments, showing that a good fit between learning tasks and technology enhances user satisfaction and performance. Task-Technology Fit Theory provides a strong foundation for understanding how technology influences performance. The central idea is that technology alone does not guarantee improved outcomes; rather, its success depends on how well it fits the tasks it is designed to support. Organizations that ensure a proper alignment between task requirements and technological capabilities are more likely to achieve higher efficiency and effectiveness.

Relevance of this theory to Warehouse Management Systems (WMS)

The adoption of Warehouse Management Systems (WMS) in pharmaceutical firms is largely driven by the need to improve operational efficiency, accuracy, and service delivery. However, the effectiveness of the system depends not only on their availability

but also on how well they align with the tasks they are designed to support. In pharmaceutical firms, warehouse tasks are complex and highly specialized. These tasks include drug storage under controlled conditions, batch and expiry date tracking, regulatory compliance, order fulfillment, and product traceability.

When a WMS is designed to accommodate these specific requirements—such as temperature monitoring, batch tracking, and compliance reporting—it achieves a high level of task-technology fit. This alignment ensures that the system effectively supports pharmaceutical warehouse operations. This in turn improves regulatory compliance (meeting standards set by health authorities), Reduction in drug wastage due to better expiry and storage management, Enhanced traceability for product recalls and safety monitoring, increased operational efficiency in warehousing and distribution and better customer service and product availability.

2.3 Empirical Review

Atnafu, & Balda (2018) examined the impact of inventory management practice on firms' competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia. The objective of the study was to empirically examine the impact of inventory management practices on firms' competitiveness and organizational performance. The research design employed was Quantitative survey. The sample size was 188. Questionnaire (Likert scale) was used in collecting data from the respondents. Exploratory factor analysis and structural equation modeling (SEM) in STATA 13 was used in testing the hypotheses. The study found out that higher inventory management practices significantly enhance competitive advantage ($\beta=0.594$, $p<0.01$) and organizational performance ($\beta=0.438$, $p<0.01$); competitive advantage mediates the relationship. The study recommended that organization should provide training, adopt ABC/EOQ/JIT tools, and shift to ICT/computerized systems. The study concluded that Inventory management practices positively drive competitiveness and performance in MSEs, supporting broader economic contributions.

Adebola (2019) explored an Empirical Review of Inventory Management and Control System in International Breweries Plc. Nigeria. The broad objective was to appraise the inventory management system. The specific objectives were to (i) examine operational efficiency in ensuring optimum stock level and reduction in ordering and carrying cost; (ii) assess adequacy of accounting practice for recording inventory; (iii) appraise appropriateness of inventory valuation method. The research Design was the Survey research design (descriptive). The population of the study was the Staff and management involved in inventory operations at International Breweries Plc. The Primary data was the questionnaires.. The study found out that the system is effective, efficient, adequate, and properly implemented. It also found out that it reduces ordering/carrying costs; frequent monitoring based on production capacity and demand; uses weighted average valuation; adequate accounting. The study recommended that Manufacturing firms in emerging economies should adopt similar techniques to minimize wastage, obsolescence, and tied-up capital. It concluded that efficient inventory management with sound accounting practices significantly reduces costs, ensures optimum stock levels, prevents excess/shortage, and supports profitability.

Abdullah (2025) examined the de Impact of Inventory Management on Firm Performance from Jordanian Industrial Sector. 28 industrial firms listed on the Amman Stock Exchange were used. The objective of the study was to explore how managing inventories (particularly inventory cycle duration and stock turnover ratio) affects financial efficiency/profitability

of industrial enterprises; consider firm scale and financial leverage as controls. The population of the study was the Industrial firms listed on Amman Stock Exchange. A Sample Size of 28 firms; archival data over 17 years (2006–2023). Panel data regression on official financial statements was used in analyzing the data. The study found out that longer inventory cycles have a statistically significant negative influence on profitability; higher turnover rates positively correlate with improved economic performance; firm size has no substantial influence. The study recommended that decision-makers should reduce the inventory cycle to enhance profitability. The study concluded that efficient inventory practices (shorter cycles, higher turnover) meaningfully contribute to organizational success and financial performance in Jordanian industry.

Zbigniew (2020) investigated Does Inventory Management Improve Profitability? Empirical Evidence from Polish Manufacturing Industries. The objective of the study was to investigate relationship between inventory management efficiency and financial performance; analyze total inventories and components. The Research Design was Descriptive statistics and dynamic panel regression. The sample size was the sector-level database, 2013–2019 (size-class disaggregation). Dynamic panel regression on financial data; analysis of inventory days ratios was used in hypotheses testing. The study found out that there's a statistically significant negative relationships between inventory days (total and most components, except FGI) and profitability; strongest negative impacts from WIP and RMI days on return on assets. The study recommended that Manufacturing firms should adjust inventory volume/mix; rational management adds value to owners. The study concluded that efficient inventory management (and components) causally improves financial performance across sub-sectors and firm sizes.

Satya and Yamunah (2021) examined an exploratory Study of Inventory Management Techniques on organizational Performance in AB Technologies Ltd (manufacturing), Malaysia. The objectives of the study was to investigate inventory management's effect on organisational performance. Case study was employed. The sample Size was 80 respondents targeted. Structured interviews, questionnaires, observations, and literature revie were used. Findings show positive correlation between inventory management and productivity/performance. Recommendations were that organization should adopt suitable inventory systems and accurate forecasting for planning. The study concluded that effective inventory management ensures production consistency, effectiveness, and organisational profitability.

Torrico and Oyola (2021) explored a Case Study of Inventory Management System for an International Lifestyle Product Retailer in Bolivia. The objective of the study was to analyze current inventory management practices The Methodology employed were Analysis of practices; implementation of triple exponential smoothing, ABC segmentation, newsvendor model, powers-of-two policies, turnover-based metrics. Findings show No use of basic inventory control techniques; high supply uncertainty and management illiteracy; high buffer stocks typical in developing countries. Recommendations made was that organization should implement data-driven forecasting and segmentation. The study concluded that Context-specific inventory systems significantly reduce uncertainty and improve management in developing-country retail.

METHODOLOGY

The research adopted a survey method. This study was conducted in the selected Pharmaceutical Companies in Anambra State

and Imo state, Nigeria. With respect to this research work, the researcher made use of primary and secondary sources of data. In connection with this study, the population drawn from eighteen selected Pharmaceutical firms in Anambra State and Imo State, Nigeria is 1882. The research instrument that was used for the study is the questionnaire. In a quest to attach the validity feature to the questionnaire designed for this study, the researcher forwarded respective copies of the written questions to the supervisor, his colleagues and his other academic mentors for approval and further adjustment. Noteworthy is the fact that the supervisor finally scrutinized it to ensure that the questionnaire was capable of eliciting the information needed to tackle the problems prompting this study effectively.

The reliability of the questionnaire used for data collection was tested. An instrument is said to be reliable if it measures consistently what it set out to measure. This means that the measure yielded similar result for the same object at different times and under different conditions. The outcomes of the measure must be consistent, dependable and predictable. Test-re-test method was adopted. The need to enhance easy comprehension and analysis prompted the use of the simple percentage distribution table to analysis the research questions. Linear regression analysis will be conducted to test the hypotheses in other to assess the relative predictive power of the independent variables on the dependent variable. All tests were conducted at 0.05 level of significance. The statistical package for social sciences (SPSS) version 23 was employed to test the hypotheses.

RESULTS AND DISCUSSION

4.1 Descriptive Analysis

This section presents the descriptive statistics of inventory management system. The aim of the analysis is to examine inventory management system and organizational performance of pharmaceutical firms in Anambra State and Imo state, Nigeria. The analysis of the individual characteristics of these variables is presented in the table below:

Table 4.1 Descriptive Characteristic of the Variables

Descriptive Statistics

	Mean	Std. Deviation	N
OP	1.39	.489	323
BSS	1.41	.842	323
RFID	2.29	1.222	323

Source: Author's Compilation from SPSS Version 21.0

This table present the summary of statistics used in the analysis. It provides information about the mean and standard deviation of the variables used in the study. The mean value for organizational performance is 1.39 while the standard deviation is 0.489. Barcode scanning system and radio frequency identification technology recorded a mean value of 1.41 and 2.29 with a standard deviation of 0.842 and 1.222 respectively. It therefore concluded that inventory management system and organizational performance of pharmaceutical firms in Anambra State and Imo State, Nigeria**.**

4.2 Multiple Regression Analysis

Multiple regression result was employed to test the effect of independent or explanatory variables on the dependent variable. The result of the multiple regression analysis is presented in the tables below.

The regression model is represented as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + e \quad - \quad - \quad - \quad - \quad (1)$$

Where:

Y = dependent variable
α = Constant Term
β= Beta coefficients
X_1 to X_4 = Independent variables
Ẹ = Error Term

Where IMS= Inventory Management System
X_1 = Barcode scanning System (BSS)
X_2 = radio frequency identification technology (RFID)

Table 4.2 Summary of the Regression Result

The result of the multiple regressions formulated in chapter three is presented in the tables below.

Table 4.2 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.475[a]	5.226	.5118	.432	.226	30.997	3	319	.000	1.721

a. Predictors: (Constant), BS, RFID

b. Dependent Variable: OS

The table shows that R^2 which measures the strength of the effect of independent variable on the dependent variable have the value of 52%. This implies that 21% of the variation in organisational structure are explained by variations in barcode scanning System, radio frequency identification technology. This was supported by adjusted R^2 of 51%. In order to check for autocorrelation in the model, Durbin-Watson statistics was employed. Durbin-Watson statistics of 1.721 in table 3 shows that the variables in the model are not auto correlated and that the model is reliable for predications.

Table 4.3. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.346	3	5.782	30.997	.000[b]
	Residual	59.503	319	.187		

	Total	76.848	322			

a. Dependent Variable: OS

b. Predictors: (Constant), BS, RFID

The f-statistics value of 30.997 in table 4.5 with f-statistics probability of 0.000 shows that the independent variables have significant effect on dependent variables such as barcode scanning System, radio frequency identification technology can collectively explain the variations in Inventory Management System.

4.3. Coefficients of the Model

T-statistics and probability value from the regression result are the effect of individual independent or explanatory variables on the dependent variables. The summary of the result is presented in the table below.

Table 4.4. T-Statistics and Probability Value from the Regression Result

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.657	.150		11.055	.000	1.362	1.952
	BSS	.114	.029	.196	3.976	.000	-.170	-.057
	RFID	.145	.020	.363	7.162	.000	.105	.185

a. Dependent Variable: OP

The table shows the coefficient of the individual variables and their probability values. Barcode scanning system variable has regression t-value of 3.976 with a probability value of .0.000. This implies that Barcode scanning system has a positive and significant effect on organisational performance of selected pharmaceutical firms in Anambra State and Imo State, Nigeria. Radio frequency identification technology has a regression t-value of 7.162 with a probability value of 0.000 implying that radio frequency identification technology variable has a positive and significant effect on organisational performance of selected pharmaceutical firms in Anambra State and Imo State, Nigeria.

4.4 Test of Hypotheses

Here, the four hypotheses formulated in chapter one were tested using t-statistics and

significance value of the individual variables in the regression result. The essence of this is to ascertain how significant are the effect of individual independent or explanatory variables on the dependent variables

.

4.4.1 Test of Hypothesis One

H_{01}: Barcode scanning System has no significant effect on inventory turnaround time in pharmaceutical firms in Anambra State and Imo State, Nigeria.

H_{02}: Barcode scanning System has a significant effect on inventory turnaround time in pharmaceutical firms in Anambra State and Imo State, Nigeria.

Barcode scanning System has a t-statistics of 3.976 and a probability value of 0.000 which is statistically significant. Therefore, we accept the alternative hypothesis and reject the null hypotheses which state barcode scanning System has a significant effect on inventory turnaround time in pharmaceutical firms in Anambra State and Imo State, Nigeria.

4.4.2 Test of Hypothesis Two

H_{o1}: Radio frequency identification technology (RFID) has no significant effect on process efficiency in pharmaceutical firms in Anambra State and Imo State, Nigeria

In testing this hypothesis, the t-statistics and probability value in table above is used. Radio frequency identification technology (RFID) variable has a t-statistics of 7.162 and a probability value of 0.005 which is statistically significant. Therefore, we reject the alternative hypothesis and accept the null hypotheses which state that Radio frequency identification technology (RFID) has a significant effect on process efficiency in pharmaceutical firms in Anambra State and Imo State, Nigeria

4.5 Discussion of Findings

The test of hypothesis one revealed that Barcode scanning System has a significant effect on inventory turnaround time in pharmaceutical firms in Anambra State and Imo State, Nigeria under study. Barcode scanning System coefficient of 0.627 indicates a positive significance between Barcode scanning System and organisational performance which is statistically significant (with t = 17.220). This finding appears consistent with Heizer et al. (2020) stated that technologies like barcode scanners reduce operational bottlenecks in inventory handling. They found that faster identification and recording of goods improve cycle time efficiency, thereby reducing inventory turnaround time.

The test of hypothesis two using simple regression analysis shows that Radio frequency identification technology (RFID) has a significant effect on process efficiency in pharmaceutical firms in Anambra State and Imo State, Nigeria. This aligns with the views of Zhang and Chen (2022) who investigated the impact of RFID adoption in warehouse operations in China and they found that RFID significantly reduced manual data entry errors and improved inventory tracking speed, resulting in enhanced process efficiency.

Summary of Findings

The major findings of the research work are as summarized below:

1. Barcode scanning System has a significant effect on inventory turnaround time in pharmaceutical firms in Anambra State and Imo State, Nigeria with a t-statistics of 3.976 and a probability value of 0.000 which is statistically significant
2. Radio frequency identification technology (RFID) has a significant effect on process efficiency in pharmaceutical firms in Anambra State and Imo State, Nigeria with a t-statistics of 7.162 and a probability value of 0.005 which is statistically significant

CONCLUSION

This study examined the relationship between inventory management system and organizational performance of pharmaceutical firms in Anambra State and Imo State, Nigeria. The study was undertaken in recognition of the critical role that effective inventory management plays in ensuring that pharmaceutical firms maintain adequate stock, minimize inventory-related costs, improve operational processes, and provide timely services to customers. Since pharmaceutical products are highly sensitive and must be available in the right quantity and condition, the effectiveness of inventory management is particularly important to the sustainability and performance of firms in the industry.

The study focused on key dimensions of inventory management system, including warehouse management system (WMS), barcode scanner system, radio frequency identification (RFID), and point-of-sale (POS) system, while organizational performance was assessed in terms of relevant performance indicators such as inventory turnaround time, process efficiency, speed of service delivery, and resource utilization. The findings generally demonstrate that the adoption and effective use of appropriate inventory management technologies contribute positively to the ability of pharmaceutical firms to manage their inventory and improve organizational performance.

Recommendations

In view of the findings, the following recommendations are made;

1. Management should ensure that pharmaceutical products are properly barcoded, strategically positioned at key points such as receiving, storage, stock counting, picking, and dispatch and regularly maintain and update barcode equipment and software to prevent system failures that could delay inventory operations..
2. Management should integrate RFID with existing inventory databases and other organizational information systems to ensure that inventory information is accurately captured and readily available to relevant employees and adequate training should be provided to employees responsible for RFID operations, while the system should be regularly monitored and maintained..

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