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Inventory Management and Financial Performance of Quoted Maufacturing Firms in Nigeria 2000-2023

Dr. Emmanuel Chika Obizue [1*], Rev'd Canon Amako Jonathan Chima [2], Dr Gladday Igwagbara [3]
[1] FMIMPS, FIAPS, FIEMPS, Department of Banking and Finance, Institute of Education, Management and Professional Studies, Faculty of Management Sciences, Imo State University Owerri, Imo State, Nigeria
[2] PhD, Department of Banking and Finance, School of Business and Management Technology, Federal Polytechnic Nekede Owerri, Imo State, Nigeria
[3] FCA, Department of Accounting, Faculty of Management, Benson Idahosa University Benin, Edo State, Nigeria

* Corresponding Author: **Dr. Emmanuel Chika Obizue**

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Abstract
This study examined Inventory Management and Financial Performance of quoted manufacturing firms in Nigeria for the period 2000 to 2023. The major problem that necessitated this study is that there is lack of consensus in the findings of previous studies on this subject matter as most inventory managers have failed to painstakingly evaluate and take advantage of modern economical inventory management strategies which have marred their performance in one way or the other. The study is a quasi-experimental research design which developed an econometric model using Profit after Tax (PAT) as the dependent variable and the four independent variables of inventory management are the cost of raw materials (CRM), cost of work-in-progress (CWIP), cost of finished goods (CFG), cost of maintenance, repairing and operating supplies (CMRO) of quoted manufacturing firms in Nigeria. The study randomly selected fifteen manufacturing firms and secondary data were obtained from the audited annual financial statements of these firms published in the exchange group. Panel data analysis was adopted in this study and the result showed a mixed relationship among the variables based on which, it was recommended that firms should not treat inventory management as a clerical function but as a strategic role requiring specialized knowledge hence businesses should prioritize hiring and training skilled personnel who understand the principles of demand forecasting, stock categorization, and inventory accounting.

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Introduction

Inventory management is one of the corporate management functions that plays a vital role in the operations of corporate firms. In developing economies like Nigeria, where volatility in supply chains, infrastructural constraints, and macroeconomic instability are commonplace, inventory constitutes a substantial proportion of current assets in most organizations, making its effective management crucial for loss and waste prevention towards business continuity and sustainability. Kolawole and Bbalola (2021) averred that accurate record-keeping of inventories helps businesses maintain optimal levels while lowering theft and pilfering without interfering with daily operations. Unaelisesi (2018) [12] posited it serves as a buffer against uncertainties in supply and demand, facilitates uninterrupted production cycles which enhances customer satisfaction. Studies have revealed that in the Nigerian context, the challenges associated with erratic electricity supply, inefficient transportation systems, fluctuating exchange rates, and bureaucratic bottlenecks in importation processes make inventory management an even more critical concern. Firms that fail to manage inventory effectively are often confronted with stockouts, overstocking, increased obsolescence, and higher holding costs all of which can have deleterious effects on financial outcomes such as profitability,

liquidity, return on investment (ROI) and overall operational efficiency. To improve on this, the implementation of effective inventory practices such as accurate demand forecasting, real-time inventory tracking, adoption of technology-driven systems and lean inventory strategies can lead to enhanced financial performance (Ogbulue & Emenini, 2019) [11]. In recent years, there has been growing empirical interest in understanding the precise nature of the relationship between inventory management and corporate financial performance, especially within the Nigerian business environment.

The impact of inventory management on financial performance is not uniform across all industries. Sector-specific characteristics such as product perishability, demand variability, regulatory requirements, and production cycles influence how inventory is managed and the financial outcomes that result. In the context of this study, Manufacturing firms, often deal with complex supply chains and volatile input availability. Manufacturing companies like Dangote Cement, Nestlé Nigeria, and Unilever usually maintain high safety stock levels to buffer against raw material delays and transport disruptions. While this strategy improves production continuity, it ties up large amounts of working capital**,** negatively affecting liquidity ratios and increasing holding costs. Akpan & Nwekene (2023) [5] posited that firms that incorporate demand forecasting, vendor-managed inventory and economic order quantity models tend to exhibit higher gross profit margins and return on assets.

Acording to Obizue & Obizue (2025) [10], businesses environment in Nigeria is highly unpredictable, constrained and volatile and this makes inventory management a fundamental role in determining the financial trajectory of quoted corporate firms particularly in the manufacturing sector of Nigeria. They further emphasized that relationship between inventory management and financial performance is neither incidental nor superficial. As demonstrated in this study, inventory serves not only as a booster to firms' financial performance but also as a vital asset that, when effectively managed, enhances profitability, improves liquidity, and supports long-term financial health towards the expansion and continuous operation of firms as going concerns. Poorly managed inventory whether through overstocking, understocking, or inefficiencies in procurement can severely affect a firm's cost structure, tie up working capital, and erode profit margins. In the words of Akinbola & Oyeleye (2013), strategic inventory practices such as lean stock control, technology adoption, and accurate forecasting empower firms to allocate resources more effectively, meet customer demand with precision, and sustain operational continuity.

Empirical studies across Nigerian sectors from manufacturing to retail and services have consistently reinforced the positive impact of well-structured inventory systems on metrics such as Profit after Tax (PAT), Return on Assets (ROA), Return on Equity (ROE), and Gross Profit Margins. Despite this, Nigerian firms continue to encounter a multitude of challenges in managing inventory optimally. Infrastructural inadequacies, unreliable logistics, inflation, policy instability, and technological deficits all serve as barriers to inventory efficiency. Duru, Oleka & Okpe (2012) [7] observed that many organizations still operate with manual systems, lack skilled personnel, or fail to integrate inventory planning with broader financial and operational strategies. According to Zaleyimu & Erebian (2022), these challenges highlight the need for deliberate action and policy direction aimed at improving inventory practices as a lever for corporate growth.

This study explores this linkage by reviewing relevant conceptual foundations, theoretical underpinnings, current inventory practices among Nigerian firms, empirical findings from various sectors, and strategic recommendations aimed at improving financial outcomes through effective inventory management.

The major problem identified in this work is that there is no precise method of determining the optimal capital of firms. Many studies have been conducted on the impact of inventory management on firm's performance yet their findings so far have not shown any clear-cut direction of relationship between inventory management and corporate performance of quoted firms in Nigeria. These mixed and conflicting results from the various studies imply that there is lack of consensus among researchers. The mixed relationship has also been identified by many researchers like Eneje, Nweze & Ude (2012) [7], Akinbola & Oyeleye (2013), Duru, Oleka & Okpe (2014) [7], Akpan & Nwekene (2023) [5] on their respective investigations concerning on this subject matter.

In the light of the above problem, this research work seeks to achieve the main objective of ascertaining the effect of inventory management on the financial performance of quoted manufacturing firms in Nigeria by focusing on the core inventory indices which include the cost raw material (CRM), cost of work-in-progress (CWIP), cost of finished goods (CFG) cost of maintenance, repairing and operating supplies (CMRO) and profit after tax (PAT) as the performance indicator.

Based on the above major objectives, the following specific objectives were looked into.

1. The impact of the impact of the cost of raw materials on the profit after tax of quoted manufacturing firms in Nigeria
2. The effect of the cost of work-in-progress on the profit after tax of quoted manufacturing firms in Nigeria
3. The cost of finished goods determine the profit after tax of quoted manufacturing of firms in Nigeria
4. The relationship between the cost of maintenance, repairing and operating supplies and profit after tax of quoted manufacturing of firms in Nigeria

In line with specific objectives, the following research questions were raised to guide this study:

1. What is the impact of the cost of raw materials on the profit after tax of quoted manufacturing firms in Nigeria?
2. What is the effect of the cost of work-in-progress on the profit after tax of quoted manufacturing firms in Nigeria?
3. To what extent does the cost of finished goods determine the profit after tax of quoted manufacturing of firms in Nigeria?
4. What is the relationship between the cost of maintenance, repairing and operating supplies and profit after tax of quoted manufacturing of firms in Nigeria?

The following hypotheses were postulated and tested in this study;

H_{o1}: There is no significant impact of the cost of raw materials on the profit after tax of quoted manufacturing firms in Nigeria

H_{o2}: The cost of work-in-progress has no significant effect on the profit after tax of quoted manufacturing firms in Nigeria

H_{o3}: The cost of finished goods is not a significant function of the profit after tax of quoted manufacturing firms in Nigeria.

H_{04}: The cost of maintenance, operating and operating supplies does not significantly correlate with the profit after tax of quoted manufacturing firms in Nigeria.

The scope of this study is from 2000 to 2023. It is limited to only quoted manufacturing firms in Nigeria and also concentrates on the indices identified above.

Literature Review

Inventory

Inventory refers to the goods, materials or products that an organization holds in stock for their business purposes which includes and not limited to sales and manufacturing. Obizue & Obizue (2025) [10] defined inventory as those tangible materials that a firm keeps in order to meet the goals of the organization through production or merchandising. They further posited that inventory is meant to serve several purposes which include; soothing production processes by maintaining a steady supply of products and satisfying customers' demands by ensuring that products are available when needed.

In the words of Abubakar (2019) [1], inventory is the set of resources kept on hand to support the company's present and future requirements for a production process.

Types of Inventory

Each type of inventory has its own unique characteristics and management requirements. By understanding the different types of inventory, businesses can develop effective inventory management strategies to optimize their inventory levels and reduce costs. here are several types of inventory that businesses may hold, depending on their industry, products, and operations. Here are some common types of inventory:

Raw Materials Inventory

Inventory of raw materials, components, or parts used in the production process to create a business's finished goods. They are the essential inputs and basic components needed and used in a production process. Alamezie (2017) [6] defined raw materials as the building blocks of every product without which there would be no finished product. These can be direct raw material like steel, wood, fabric, grains, plastic, oil, natural gas, coal and other solid and liquid minerals. In line with the above examples, Akalonu & Echezona (2024) [3] analysed that there are four categories of raw materials including agricultural products, mineral resources, energy resources and forest products. Unaelisesi (2018) [12], Abubakar (2019) [1] and Obizue & Obizue (2025) [10] generally viewed raw materials as a basic materials that are utilized in the production of goods, finished goods, energy or intermediate materials that are further used as feedstock for future finished products.

Kolawole & Babalola (2021) averred that raw materials inventory is the total cost of a manufacturer's components, subassemblies and stock supplies that are involved in any current production process. There are direct and indirect material. The direct raw material are those which are directly used in the manufacturing process, such as corn for flour, flour for bread, wood for chair etc on the other hand indirect raw materials are not part of the finished products but are indirectly and comprehensively involved in the production process.

Work-in-Progress (WIP)

This is the inventory of partially completed products. It is the cost or quantity of goods in the process of being manufactured. Examples: Unfinished products, assemblies, etc. WIP constitutes all the inventory upon which production work has commenced on but are yet to be completed. Alamezia (2017) posited that this category of inventory are still undergoing production process hence at a particular stage of the process yet constitute part of the production cost. It can also be called work-in-process, in-process inventory or goods-in-process depending on the context and they serve as tangible item in organisation's balance sheet.

Finished Goods

This is the inventory of completed products ready for sale or distribution or consumption. Examples: Finished products, such as electronics, clothing, etc. in essence, they have passed through all the necessary stages of production and have come to the usable or sellable stage.

Maintenance, Repair, and Operating (MRO) Supplies - Inventory of supplies used for maintenance, repairs, and operations such as spare parts, tools and equipment, lubricants, cleaning supplies etc.

It is important to note that there are some other categories of inventory like goods in transit, buffer stock, safety stock, cycle stock, seasonal stock, obsolete inventory, decoupling inventory and anticipation inventory (Duru, Oleka & Okpe, 2014) [7].

Inventory Management

Inventory management is the coordinated approach to the supervision of stock levels, ordering, storing, and utilizing inventory ranging from raw materials to finished goods in a way that aligns with a company's production and sales demands while minimizing costs (Obizue & Obizue, 2025) [10]. It is both a logistical and a strategic activity, touching on procurement planning, warehouse management, forecasting, cost control, and supplier coordination.

An effective inventory management system strikes a balance between stock availability and cost efficiency. Excess inventory ties up working capital, incurs storage costs, and can result in waste or obsolescence, especially for perishable or fast-moving consumer goods. On the other hand, insufficient inventory can lead to production delays, customer dissatisfaction, and lost sales.

Abubakar (2019) [1], Zaleyimi & Erebian (2022) and Akalonu & Echezona (2024) [3] maintained that effective inventory management is crucial for the financial performance of manufacturing firms in Nigeria. Studies have shown a significant relationship between inventory management practices and key financial metrics like profitability, asset turnover, and return on investment. Efficient inventory control can lead to reduced production costs, minimized waste, and improved profitability.

Core Elements in Inventory Management

- **Inventory Turnover Ratio:** This ratio measures how many times inventory is sold and replaced over a given period. A high turnover ratio implies efficient inventory use and reduced holding costs, while a low ratio may suggest overstocking or sluggish sales.
- **Reorder Level (Reorder Point):** This is the specific stock level at which a new order is triggered. It considers lead time and average usage rate to avoid stockouts and maintain continuous operations.
- **Economic Order Quantity (EOQ):** EOQ is a mathematical model used to determine the most cost-effective order quantity that minimizes total inventory-related costs, including ordering and holding expenses. It is essential for optimizing batch sizes and replenishment cycles.
- **Just-in-Time (JIT):** JIT is a lean inventory strategy that minimizes holding costs by ensuring materials and products arrive just when they are needed in the production process. While highly efficient, JIT requires reliable suppliers and a stable logistics environment, which can be a challenge in the Nigerian context.
- **ABC Analysis:** This inventory classification technique prioritizes inventory items based on their value and consumption frequency. "A" items are high-value, low-volume products, "B" items are moderate in both value and usage, and "C" items are low-value but high-volume. This helps firms allocate resources and control efforts efficiently.

Impact of Inventory Management on Financial Performance of Manufacturing Firms

Adeyemi & Salami (2010), Alamezie (2017) [6] and Zaleyimi & Erebian (2022) observed that inventory management can impact the financial performance of corporate entities as follows;

Reduced Costs: Proper inventory management minimizes storage costs, insurance and potential obsolescence and waste, ultimately lowering production expenses.

Improved Profitability: By optimizing inventory levels, firms can ensure that the right amount of inventory is available to meet demand and avoid understocking, overstocking and stockouts (which lead to lost sales) and excess inventory (which ties up capital and incurs storage costs), thereby boosting profitability.

Enhanced Asset Turnover: Efficient inventory turnover, which is the rate at which inventory is sold and replaced, positively impacts asset turnover, a key indicator of how effectively a company uses its assets to generate revenue.

Risk Management: Risk of stockouts, understocking and overstocking is appriopriately managed by ensuring proper inventory management strategies.

Cash-flow Management: proper inventory management helps to improve cash flows by minimizing the amount of capital tied up in inventory.

Challenges to Effective Inventory Management Practices in Nigeria Manufacturing Sector

Many Nigerian manufacturing firms face challenges with poor inventory management, leading to increased costs and reduced profitability and they often force firms to choose between inventory efficiency and operational continuity. Understanding these barriers is essential for contextualizing why certain inventory practices are ineffective or only partially implemented and why financial performance may suffer despite theoretical best practices.

According to Adeyemi & Salami (2010), Alamezie (2017) [6] and Zaleyimi & Erebian (2022), the following are the challenges to effective inventory management in Nigeria

Fluctuating Demand

In sectors like food and beverage, fluctuating demand and supply chain disruptions can complicate inventory management.

Lack of Trust

In some cases, a lack of trust between suppliers and manufacturers, or within different units of a company, can hinder inventory planning and control.

Transport and Logistics Deficiencies

One of the most critical impediments to efficient inventory management in Nigeria is the poor state of infrastructure. Bad road networks, insufficient rail systems, congested ports and unreliable logistics last-mile delivery services result in delays in restocking and product distribution. This forces firms to carry higher safety stock to compensate for supply chain unreliability and avoid disruptions thereby increasing holding costs.

Lack of qualified and Skilled Personnel

Inventory roles are frequently assigned to unqualified personnel without formal training and required analytical skills, leading to poor record-keeping, stock miscounts, safety stock calculations, resulting in ad hoc and reactive inventory decisions and procedural errors. This skill gap compromises the ability of firms to align inventory with market dynamics, resulting in ad hoc and reactive inventory decisions and ultimately reducing profitability and efficiency.

Exchange Rate Volatility and Import Delays

Nigeria's dependence on imported raw materials often leads firms to overstock during foreign exchange scarcity to hedge against currency fluctuations. Bureaucratic hurdles at ports can extend lead times significantly, influencing firms to adopt conservative (high-inventory) strategies.

Erratic Electricity Supply

Power outages disrupt real-time inventory systems, especially for firms reliant on computer-based tools or cold-chain facilities for perishable goods. The cost of running alternative power sources like generators adds to operational expenses. These infrastructural challenges reduce the feasibility of adopting lean inventory strategies such as Just-in-Time (JIT), which depend heavily on timely deliveries and responsive logistics.

Inconsistent Government Policies and Regulatory Bottlenecks

Policy instability in Nigeria introduces substantial uncertainty into procurement and inventory planning. Many firms rely on imported raw materials. Import restrictions, delayed customs clearance fluctuating exchange rates, changes in customs policies or sudden bans on items make it difficult to plan inventory costs, especially for firms sourcing materials from abroad and usually disrupt supply chains and

lead to stock shortages or excesses. This often results in speculative bulk purchases which can tie up working capital and increase the risk of obsolescence thereby compounding inventory inefficiencies.

Security and Supply Chain Disruptions

Nigeria faces multiple internal security challenges, including banditry and insurgency in northern regions, oil theft and militancy in the Niger Delta, Rising cases of warehouse theft and vandalism during protests or civil unrest are issues disrupt both upstream and downstream supply chain operations. For example, companies may be forced to reroute shipments or delay deliveries, increasing logistical complexity and inventory carrying costs**.**

Inflation and Rising Cost of Goods

Nigeria is constantly experiencing double-digit inflation rates**,** the cost of inventory procurement and storage is constantly increasing. Firms must frequently adjust their reordering and pricing strategies to reflect market changes, which can create volatility in inventory valuation, cash flow pressure due to rising input prices and reduced profitability if prices cannot be passed on to consumers**.** In such environments, inventory decisions require constant recalibration to avoid losses or margin erosion.

Improvement in Inventory Management in Nigeria Manufacturing Sector

Adeyemi & Salami (2010), Alamezie (2017) [6] and Zaleyimi & Erebian (2022) recommended as follows;

Better Return on Investment

Improved asset turnover and reduced costs translate to higher returns on investments, making the company more attractive to investors.

Liquidity Management

Adequate inventory control helps companies manage their cash flow more effectively.

Adopt Inventory Forecasting Techniques

Implementing modern inventory forecasting techniques can help firms accurately estimate inventory needs and optimize stock levels.

Utilize Automated Tracking Systems

Automated inventory management systems can provide real-time tracking of inventory movements, improving efficiency and accuracy.

Strengthen Supplier Relationships

Building strong relationships with suppliers can improve supply chain reliability and facilitate better inventory planning.

Implement Effective Inventory Control Systems

Adopting inventory control systems like the Economic Order Quantity (EOQ) can help optimize inventory levels and reduce associated costs thereby avoiding liquidity problems that can arise from holding too much or too little inventory.

Focus on Inventory Turnover

While inventory turnover is important, firms should also consider other financial strategies to enhance overall profitability.

Financial Performance

Financial performance refers to the measure of how well a firm utilizes its assets and resources to generate revenue, manage costs, and deliver value to its stakeholders. It is a multi-dimensional construct, encompassing profitability, liquidity, efficiency, solvency, and shareholder value.

Financial performance is typically assessed using a mix of accounting-based measures (derived rom financial statements) and market-based measures (based on investor perceptions and market data). For the purpose of this study, emphasis is placed on operational and profitability metrics that are directly impacted by inventory practices. Fundamentally, financial performance of corporate firms can be measure with the following key indicators; Return on Assets (ROA), Return on Equity (ROE), Gross Profit Margin and Inventory Turnover. Poor inventory practices can negatively affect these metrics by increasing working capital requirements, decreasing liquidity, causing stock losses, and disrupting customer service. Conversely, sound inventory management enhances cost control, operational efficiency, and profitability, thus contributing to stronger financial health.

Inventory Management Strategies for Improved Financial Performance

Effective inventory management is a cornerstone of operational excellence and financial sustainability in modern businesses. In the context of Nigeria—where companies face infrastructural constraints, policy instability, inflationary pressures, and technological limitations—the adoption of strategic inventory practices is not merely advisable but essential. As firms navigate complex supply chains and volatile markets, the implementation of well-structured inventory strategies becomes a determinant of profitability, liquidity, and long-term competitiveness.

One of the foremost strategies for improving financial performance is the adoption of technology-driven inventory systems. Modern inventory technologies, such as Enterprise Resource Planning (ERP) systems and Inventory Management Software (IMS), enable companies to track stock levels in real time, automate reordering processes, and integrate inventory data with procurement, finance, and sales functions. These systems reduce manual errors, minimize stockouts, and enhance inventory turnover all of which contribute to reduced operational costs and improved cash flow. In addition, mobile and cloud-based tools offer scalable solutions, especially for SMEs that lack the infrastructure for enterprise-level software. With tools like barcode scanners, RFID systems, and mobile inventory apps, firms can better manage their stock across multiple locations while maintaining visibility and control.

Another critical approach is the adoption of lean inventory techniques. Practices such as the Economic Order Quantity (EOQ) model help determine the optimal quantity to order, minimizing the combined cost of ordering and holding inventory. This is especially valuable in Nigeria, where capital is limited and storage costs can be high. The Just-in-Time (JIT) inventory model, though reliant on dependable logistics, is also an effective method for reducing excess stock and waste. While full implementation may be challenging in Nigeria due to infrastructural deficits, even partial adoption of JIT principles can result in significant efficiency gains. Moreover, ABC analysixs where inventory

items are categorized based on their consumption value and frequency allows firms to focus attention and resources on the most critical inventory items, improving financial oversight and resource allocation.

Building internal capacity through staff training is equally important. Many Nigerian firms suffer from a shortage of personnel with formal training in inventory management. By investing in continuous education, certifications, and cross-functional training, companies can equip their staff with the skills necessary to manage inventory scientifically rather than intuitively. A trained workforce can better interpret inventory data, forecast demand accurately, and align inventory decisions with broader financial goals, thereby reducing wastage and improving the return on assets.

Supplier collaboration is another key strategy that can positively influence financial outcomes. Vendor-Managed Inventory (VMI) systems, where suppliers are responsible for maintaining agreed inventory levels, have proven effective in reducing stockouts and administrative costs. Long-term contracts with reliable suppliers can also stabilize lead times, improve order accuracy, and create pricing advantages. These collaborative efforts reduce uncertainty and allow firms to maintain lower inventory levels without compromising service delivery.

To support these efforts, firms should develop clear and enforceable inventory policies. Such policies should outline procedures for inventory classification, cycle counting, reordering, disposal of obsolete items, and audit controls. When embedded into corporate governance, these policies help institutionalize best practices and foster accountability. Additionally, firms should integrate inventory management into financial planning processes. Metrics such as the inventory-to-sales ratio, current ratio, and cash conversion cycle should be regularly analyzed to ensure that inventory levels are aligned with the firm's liquidity and profitability targets.

Data-driven decision-making is central to strategic inventory management. Firms that leverage sales data, historical trends, and market forecasts can more accurately plan procurement and adjust stock levels in anticipation of seasonal fluctuations or demand shifts. This minimizes the risks of overstocking or understocking, both of which have adverse financial consequences.

Finally, the use of Key Performance Indicators (KPIs) such as inventory turnover ratio, stockout rate, order accuracy, and shrinkage rate enables firms to continuously evaluate and refine their inventory strategies. These metrics provide actionable insights that inform managerial decisions and support continuous improvement. Inventory management is far more than a logistical necessity—it is a strategic function that directly influences financial performance. Nigerian firms can achieve greater profitability, improved liquidity, and enhanced operational efficiency by adopting technology, implementing lean inventory methods, investing in staff capacity, fostering supplier partnerships, and embracing data analytics. In an economy characterized by uncertainty and volatility, firms that take a proactive and systematic approach to inventory management will be better positioned to thrive.

Empirical Evidences

It's important to review some related literature which is pivotal in validating the theoretical and conceptual nexus between inventory management practices and financial performance as such revealing impact of inventory efficiency on profitability, liquidity, asset utilization and overall corporate performance. The empirical findings from different studies examined below will help to reinforce the conception that efficiency in inventory control is not just a matter of operational convenience but a strategic necessity that directly influences financial outcomes of business organisations particularly in the manufacturing industry.

The following empirical studies were deemed relevant hence reviewed in this study;

Akinbola & Oyeleye (2013) examined the relationship between effective inventory management and firms' performance in manufacturing Sector in Nigeria from 1980 to 2010. This study focused on manufacturing firms and used raw materials (RM) and finished goods (FG) as inventory measures while the firms' financial performance proxies were PAT and Tobin's Q. The study used annualized panel data for a sample of 15 firms that were quoted in the Nigerian exchange group and selected from diverse sectoral classifications. The econometric analytical tool was used to estimate the series and it was indicated from the study results that RM and FG significantly impacted on performance proxy by PAT and Tobin's Q. This result revealed a robust relationship between inventory and financial performance. The study recommended among other things that manufacturing firms in Nigeria should rely on long term debt inventory management plans and therefore concluded that Firm-specific factors that are relevant in the developed business climate are also relevant in Nigeria in explaining the relationship between inventory management and corporate performance.

Ogbulue, E. & Emenini, E. (2019) [11] adopted a model to measure the effect of inventory management decisions on the efficiency of cement industries in Nigeria from 1990 to 2015. Return on equity (ROE) was used as performance measure while cost of raw materials (RM), cost of work in progress (WIP), cost of finished goods (FG) and cost of maintenance, repairing and operations supplies (MRO) were used to represent inventory management upon which the study collected secondary data. The unit root test result showed that the data were integrated at first difference and the ECM result generally showed the short run relationship among the variables having ROE reinforce itself at two lags. The paper also found positive and significant correlation between inventory management indices and ROE. The ECM cointegrating equation was significant and rightly signed with an error correction coefficient of -0.724059 indicating a speed of adjustment from the short run equilibrium to the long run equilibrium at 72% estimated annually. The study recommended that manufacturing firms should ensure a good strategic match in their inventory management operations in order to attain a fair profitability level.

Duru, Oleka & Okpe (2022) [7] studied inventory management and corporate financial performance using 30 sampled firms listed in the Nigerian Exchange Group during the period 2000-2020. The performance indicators used in this study were Return on Assets (ROA) and Return on Assets (ROE) and Raw Materials (RM), Work-in-Progress (WIP) and Finished Goods (FG) as independent variables. The panel data analytical method was employed in this study and the result indicated that RM, WIP and FG significantly and positively impacted on ROE respectively but exert a significant and negative relationship with ROA. The study therefore concludes that the performance of firms in Nigeria is highly related to the inventory management strategies

hence it is recommended that Nigerian firms should be proactive in formulating their inventory management policies.

Akpan & Nwaekene (2023) evaluated the relationship between inventory management and firms' performance using a sample of 50 quoted firms in Nigeria from 2010-2022). Raw materials (RM), Work in Progress (WIP) and Finished goods (FG) were the metrics for inventory while Return on assets, (ROA), Profit after tax (PAT) and Tobin's Q ratio were used for firms' performance, while sales growth and firm size were used as control variables. The data for the study were sourced from the annual reports of the organizations and the ordinary least square was adopted. The findings of the study showed that RM and FG has significant positive relationship with ROA, PAT and Tobin's Q ratio, while WIP has a significant and negative relationship with ROA and Tobin's Q ratio but positively and significantly correlated with PAT. The authors recommended that firms should show efficiency in their inventory management operations so as to hold enough stock without experiencing stock-out.

Obizue, E.C. & Obizue, M.N. (2025) [10] conducted a study on creativity and innovation in inventory management in sub-Sahara Africa for the period 2000-2020. The study employed the panel data techniques and proxied performance with PAT, ROA and ROE. Raw materials (RM) and finished goods (FG) were used as inventory metrics. The unit root test showed that all the variables were stationary at level. The results further indicated that inventory management of listed organisations in Sub-Sahara Africa is statistically significant in the manufacturing sector but insignificant in other sectors. It was also found that the size of an organization and her inventory procurement level and asset tangibility are important determinants of firm's performance. The study concluded that firms' financial performance depend on their inventory structure. The recommendation was that organisations should enhance their inventory managerial efficiency so as to attain high earning level that will make them remain in operation and satisfy their customers' demand.

Methodology

This study employed the quasi-experimental research design. Ten quoted firms were randomly selected from the manufacturing sector of the Nigerian economy and secondary data were sourced from their audited annual financial reports on the Nigerian Exchange Group for the period under review (specifically the income statement and statement of financial position).

Consequently, the study specified a model where profit after tax (PAT) is used as proxy for the financial performance of the manufacturing firms in Nigeria while the cost of raw materials (CRM), cost of work-in-progress (CWIP), cost of finished goods (CFG) and cost of maintenance, repairing and operating supplies (CMRO) were used as the inventory management indices.

Therefore the functional form of the model is represented below as;

$$PAT = f(CRM, CWIP, CFG, CMRO) . \quad (1)$$

Expressing the model in econometric format we have;

$$PAT_{it} = b_0 + b_1CRM + b_2CWIP_{it} + b_3CFG_{it} + b_4CSP_{it} + Ut_{it} \ldots\ldots\ldots \quad (2)$$

Where PAT = Profit after tax of manufacturing firms in Nigeria

CRM = Cost of raw materials of manufacturing firms in Nigeria

CWIP = Cost of work-in-progress of manufacturing firms in Nigeria

CFG = Cost of finished goods of manufacturing firms in Nigeria

CMRO = Cost of maintenance, repairing and operating supplies of manufacturing firms in Nigeria

Ut_{it} = Stochatic error term (unexplained variables in the model)

b_0 = Constant

b_1 - b_4 = The unknown parameters to be estimated

The study is a cross-sectional time series analysis hence it adopted the panel data analytical technique. The pool unit root test was firstly carried out to avoid having spurious results. In conducting the panel data analysis, the Hausman test specification was carried out to effectively choose the consistent and best performing effect between the random effects and the fixed effects. The E-view 10.0 econometric software was used for the analysis.

Data Analysis and Interpretation of Results

Unit Root Test Result

Pool unit root test: Summary				
Sample: 2000 2023				
Exogenous variables: Individual effects				
Automatic selection of maximum lags				
Automatic lag length selection based on SIC: 0				
Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test				
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-41.4661	0.0000	70	200
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.8055	0.0000	70	200
ADF - Fisher Chi-square	217.010	0.0000	70	200
PP - Fisher Chi-square	255.451	0.0000	70	200
** Probabilities for Fisher tests are computed using an asymptotic Chi				
-square distribution. All other tests assume asymptotic normality.				

In the result above, four test statistics were specified. These include: Levin, Lin & Chu statistics, Im, Pesaran and Shin W-statistic, ADF-Fisher Chi-square and PP- Fisher Chi-square tests with their associated test statistic and probabilities. The summary results indicate that the series were all stationary at level. Thus, the null hypothesis of a unit root was rejected.

Estimated Results

The relationship between profit after tax of manufacturing firms and inventory management indices, (CRM, CWIP, CFG, and CMRO) were estimated using both the random and fixed effects methods while the Correlated Random Effects - Hausman Test was used to compare the two sets of estimates to determine the one that is consistent and proper for the estimation.

Correlated Random Effects - Hausman Test

Pool: POOL01				
Test cross-section random effects				
Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		11.219914	5	0.0244
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
CRM?	-0.165416	0.144919	0.033801	0.0609
CWIP?	0.146118	0.344882	0.024693	0.1343
CFG?	0.159205	0.597430	0.024540	0.0038
CMRO?	-0.139312	-0.395295	0.026376	0.1644

The result above reported a significant difference between the random effects specification and that of the fixed effects specification with a chi-square value of 11.219914 at 5 degrees of freedom and 0.0244 probability which is less than the 5% benchmark. This indicates that the fixed effects specification is superior to the random effects specification; so we reject the random effects model as inconsistent and adopt the fixed effects model to estimate the relationship between return on equity of firms and capital structure as presented below.

Results of Estimated Fixed Effects Model

Dependent Variable: ROE?				
Method: Pooled Least Squares				
Date: 02/07/25 Time: 10:32				
Sample: 2000 2023				
Included observations: 7				
Cross-sections included: 10				
Total pool (balanced) observations: 70				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	21.33988	28.94777	0.771731	0.4455
CRM?	0.155416	0.349238	-0.502283	0.0318
CWIP?	0.113148	0.451519	0.230662	0.0811
CFG?	0.156106	0.462342	0.335366	0.0134
CMRO?	-0.138673	0.365078	-0.370606	0.0713
R-squared	0.854934	Mean dependent var		13.01493
Adjusted R-squared	0.800293	S.D. dependent var		8.563374
S.E. of regression	2.515011	Akaike info criterion		4.925757
Sum squared resid	221.3848	Schwarz criterion		5.499363
Log likelihood	-108.1439	Hannan-Quinn criter.		5.144189
F-statistic	14.049311	Durbin-Watson stat		1.431346
Prob(F-statistic)	0.000000			

Decision Rule: If the p-value is less than the 5% level of significance, the alternative hypotheses will be accepted and the null hypothesis will be rejected.

From the result above, the following results were obtained:

The regression equation can be presented thus;

b_0PAT = 21.33988 + b_1CRM0.155416 + b_2CWIP0.113148 + b_3CFG0.156106 + bCMRO0.138673

The constant parameter (bo) has a positive value of 21.21581 which implies that if all the independent variables are held constant, the dependent variable (PAT) will increase by 21.21581 units per annual. Conversely, keeping all conditions constant, a unit increase in CRM, CWIP and CFG will cause PAT to increase by 0.155416, 0.113148 and 0.156106. Conversely, a unit increase in CMRO will statistically reduce PAT by 138673. The t-test statistical tool is used to test for the individual significance of the estimated parameters. Cost of raw materials (CRM) has a coefficient value of 0.155416 and probability of 0.0318 which revealed a positive and statistical significant relationship with PAT leading to the rejection of the null hypothesis which stated that CRM of manufacturing firms has no significant relationship with PAT at 5% level of significance. Similarly, CWIP and CFG positively correlated with PAT with coefficient values of

0.13148 and 156106 respectively. The probability of CWIP stood at 0.0811 meaning an insignificant influence on PAT with the null hypothesis accepted. CFG statistically and significantly impacted on the PAT of manufacturing firms in Nigeria with the probability of 0.0134 which is lower than 5% significance level hence the null hypotheses is also accepted.

The F-test result with f-statistic value of 14.049311 and associated probability value of 0.0000 indicates that the explanatory variables jointly and statistically significant with the dependent variable, PAT at 5% level thereby making the fixed model legitimate and suitable for statistical inference. Thus, it can be concluded that the model has predictive value. Also, the Adjusted R-squared value of 0.800293 or 80% still indicates that the inventory management variables explain about 80% of the variation in profit after tax of the manufacturing firms sampled in this study. The portion of the dependent variable that cannot be explained by an independent variable that falls outside the purview of this investigation may be responsible for the unexplained portion. The Durbin-Watson statistic of 1.431346 tends towards 1 which indicates that there may be serial or auto-correlation in the residuals of the estimated model.

Discussion of Findings

This study examined the correlation between inventory management and the financial performance quoted manufacturing firms in Nigeria between 2000 and 2023. The panel data analytical tool was adopted in this study and the fixed effect was used in the analysis. Summarily, based on the coefficient and probability values of the variables in this study, the result revealed that the relationship between CRM, CFG and CWIP with PAT is respectively positive. This result is consistent with the findings of Akinbola & Oyeleye (2013), Akpan & Nwekene (2023) [5] and Obizue & Obizue (2025) [10] who found a significant positive association between inventory management and profit after tax (PAT) variables in their study. However, a negative relationship was discovered between CMRO and PAT which substantially supports the findings of Abubakar (2019) [1] and Ogbulue & Emenini (2019) [11] whose findings indicated the same as in this current study. Also, CRM and CFG is significant with PAT while CWIP and CMRO showed insignificant effect on PAT. This explains that in this study, there is a mixed relationship among the dependent and independent indices. However, it was greatly indicated that positive relationship existed between the explanatory variables and the dependent variable except the CMRO. The result revealed that the CRM and CFG statistically and significantly impactful on the performance of listed manufacturing firms in Nigeria proxied with PAT while CWIP and CMRO exerted insignificant influence over PAT. The joint influence of inventory management variables over PAT as revealed by the F-test result in this study further confirms that inventory management is a good predictor of financial performance and this gains credence from the views of Unaelisesi (2018) [12] and Kolawole & Babalola (2021) that an optimum inventory management operations enable firms to generate maximum returns to shareholders and also plays an important role in the growth and progress of any company.

The Durbin-Watson statistic indicated that there may be serial or auto-correlation in the residuals of the estimated model.

In summary, based on the adjusted R squared coefficient, the findings above explain that the explanatory variables accounted for about 80% variations in (PAT) of the manufacturing firms sampled in this study.

Conclusion

This study generally revealed that the inventory management variables in this study were found to have to be essential in determining the performance of quoted manufacturing firms in Nigeria. Based on the study findings, the study concluded that effective inventory management is a precursor and predictor of financial performance of the manufacturing sector in Nigeria hence a factor to be considered in investigating the performance of firms in Nigeria.

Recommendations

In light of these findings, several key recommendations emerge:

First, firms must invest in modern inventory technologies that enhance real-time monitoring, forecasting accuracy, and stock optimization.

Second, Inventory management should not be treated as a clerical function but as a strategic role requiring specialized knowledge hence businesses should prioritize hiring and training skilled personnel who understand the principles of demand forecasting, stock categorization, and inventory accounting.

Third, firms should implement lean inventory strategies such as Economic Order Quantity (EOQ), Just-in-Time (JIT), and ABC analysis to minimize waste and optimize stock levels. These methods help reduce carrying costs, free up working capital, and align procurement with actual market demand.

Last, corporate policies and government regulations must support efficient inventory ecosystems. Policymakers should streamline import processes, stabilize foreign exchange markets, and provide incentives for local production and warehousing. At the firm level, management must institute clear inventory policies that promote accountability, periodic audits, and continuous improvement based on measurable KPIs.

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