Inventory Management Practices and Stewardship to Shareholders of Listed Nigerian Cement Companies

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ABSTRACT

This study explored the relationship between inventory management practices and the financial performance of listed cement companies in Nigeria. Data for the analysis were obtained from the published annual reports and accounts of the sampled listed Nigerian cement companies from 2015 to 2024 (10 years). Data were analyzed using descriptive and inferential statistics (multiple regression). Inventory management practices were proxied by inventory turnover ratio (ITR), inventory holding period (IHP), inventory-to-sales ratio (ISR), and inventory-to-asset ratio (IAR). Financial metrics are proxied by Return on Assets (ROA) and Return on Equity (ROE). Inventory management practices had a positive and significant effect on ROA. Inventory management practice had a positive and significant effect on ROE. The study advised industry managers to adopt Inventory management practices that align with current technology to remain profitable. Inventory is very germane in the manufacturing industry; it should be accorded critical attention for the sustainability of business.

Keywords: Cement companies, financial performance, Inventory management practices, Nigeria,

JEL: G31; G32; M11; O16;

INTRODUCTION

The modern business environment is increasingly competitive due to globalization, rapid technological advancement, and rising consumer awareness. As a result, organizations seeking sustainable growth must continuously enhance product availability, quality, and operational efficiency to remain competitive. Financial performance remains a key indicator of organizational success, reflecting a firm's ability to generate revenue, manage costs, and maximize shareholder value. Common measures of financial performance include revenue growth, net income, earnings per share, return on assets (ROA), return on equity (ROE), and profit margins. These indicators are essential for investors, management, and creditors when evaluating a firm's financial health and prospects (Okeke et al., 2022). In Nigeria, the financial performance of listed cement companies is influenced by both macroeconomic conditions and firm-specific operational strategies.

Inventory management is one of the most critical operational strategies affecting financial performance, particularly in manufacturing firms. It refers to systematic planning, monitoring, and control of inventory to ensure the availability of materials at the right time and in the right quantities. Effective inventory management is vital for manufacturing organizations, as poor inventory practices can result in delayed order fulfillment, customer dissatisfaction, and loss of market share(Kolawole et al., 2019). Consequently, efficient inventory management has become increasingly important for firms seeking to improve operational efficiency and achieve a competitive advantage.

Inventory management is defined as the process of managing inventory inflows and outflows while preventing excessive stock accumulation or shortages. The objective is to balance the costs associated with overstocking with the risks of understocking, thereby ensuring optimal inventory levels (Nwaiku & Ejechi, 2022). This balancing process often creates conflicting objectives within organizations, as finance managers typically aim to minimize inventory costs, while marketing managers prioritize product availability to meet customer demand. Effective inventory management helps resolve these conflicts by ensuring materials are available when required while minimizing losses from waste, pilferage, and obsolescence (Gołaś, 2020).

Efficient inventory management plays a crucial role in ensuring business survival and maximizing profits. A well-structured inventory management system provides timely and accurate information on stock levels, enabling managers to make informed decisions and reduce operational costs (Bah et al., 2023). Empirical evidence also suggests that proper inventory management systems have a positive effect on overall firm performance by improving cost control and operational efficiency (Odumusor, 2024).

The relationship between inventory management practices and financial performance is particularly important in the cement industry, where inventory constitutes a substantial portion of total assets. Studies have shown that effective inventory management practices enhance supply chain efficiency and improve financial outcomes such as profitability and return on assets (Chinta, 2022; Adamu et al., 2025). However, the cement industry faces unique challenges, including fluctuating demand, high storage costs, and the perishability of certain raw materials, which complicate inventory planning and control (Essam & Mohamed, 2025). Overstocking ties up capital and increases holding costs, while stock-outs disrupt production, reduce sales, and damage customer relationships (Adegbite & Ajagbe, 2023; Nnaji et al., 2024).

Given the demand volatility associated with construction activities, effective inventory management is essential for ensuring smooth production processes and minimizing financial losses in the cement industry. Maintaining optimal levels of raw materials and finished goods reduces downtime, prevents production delays, and enhances financial performance (Gołaś, 2020); (Ekpudu et al., 2022). Therefore, this study aims to examine the relationship between inventory management practices and the financial performance of listed cement companies in Nigeria. Specifically, the study seeks to evaluate the effect of inventory management practices on financial performance and shareholders' stewardship in listed cement companies in Nigeria.

REVIEW OF LITERATURE

Conceptual Review

This conceptual review provides a foundation for investigating the relationship between inventory management practices and financial performance within the Nigerian cement industry.

Financial performance

A company's management reports performance to shareholders at the end of a financial year. The report shows a company's profitability, financial health, and the efficiency with which it makes use of its resources. It is often measured using some financial measures and indicators that show how well the organization is meeting its shareholders' objectives. Financial performance is defined as the ability of a firm to minimize its cost of operations, efficiently use its assets, and maximize the value of shareholders.(Karim et al., 2024); (Olaide & Omodero, 2023)). It demonstrates the effectiveness and efficiency of management in utilizing corporate resources. It is further defined as the attempt by a firm to meet established goals or improve productivity.

Return on Assets (ROA)

Return on Assets (ROA) is a key financial performance indicator used to evaluate how efficiently a firm utilizes its assets to generate profits. It measures profitability relative to total assets and reflects management efficiency in deploying company resources (Nwaiku & Ejechi, 2022). ROA is calculated as the ratio of net income to total assets, offering a comprehensive assessment of overall operational performance.

The metric enables meaningful comparison among firms within the same industry by accounting for differences in asset structures (AKINTOLA, 2023); (Ajibola et al., 2025). A higher ROA indicates efficient asset utilization and stronger profitability, while a lower ROA suggests inefficiencies in resource deployment (Okeke et al., 2022).

The formula for calculating ROA is:

ROA can be calculated using:

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}} * 100$$

Net income is obtained from the income statement, while total assets are derived from the statement of financial position. ROA is usually expressed as a percentage.

Return on Equity (ROE)

Return on Equity (ROE) measures a company's ability to generate profits from shareholders' equity and is a critical indicator of financial performance and managerial efficiency. In the Nigerian cement industry, ROE is widely used to assess corporate profitability and investment attractiveness (Adegbite & Ajagbe, 2023).

Companies with higher ROE often exhibit superior operational efficiency and effective management practices, making them more appealing to investors (Akinleye & Adesina, 2024). Ikechukwu et al., 2023 found that industry leaders like Dangote Cement Plc consistently reports higher ROE due to economies of scale, strategic management, and optimized production planning.

The formula for calculating ROE:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$$

Inventory Management Practices

Inventory management involves overseeing non-capitalized assets to ensure the availability of the right products in the right quantities at the right time. Effective inventory management enhances operational efficiency, reduces costs, and improves customer satisfaction (Ammar et al., 2021). Proper inventory control helps firms avoid stock shortages and excess inventory, thereby optimizing cash flow and performance (Amahalu, 2018).

Given the complexities of global logistics, firms are encouraged to adopt integrated inventory visibility systems that synchronize data across locations (Adebayo et al., 2024). However, inventory management practices must be tailored to firm-specific and industry conditions. Studies highlight that inventory management also plays a risk-mitigation role by addressing supply chain disruptions caused by uncertainties such as demand variability and geopolitical events (Chinta, 2022); (Nnaji et al., 2024); (Adamu et al., 2025).

Inventory Turnover Ratio (ITR)

Inventory Turnover Ratio (ITR) measures how frequently a firm sells and replaces its inventory within a given period, reflecting inventory efficiency and sales effectiveness (Essam Eldin Salama & Mohamed Etab, 2025)(Essam Eldin Salama & Mohamed Etab, 2025). A higher ITR indicates efficient inventory management and strong sales performance, while a lower ratio may signal overstocking or weak demand (Muffee, 2021; Adebayo et al., 2024).

The formula for calculating inventory turnover ratio is;

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

Macroeconomic conditions, such as inflation and economic downturns, can negatively affect turnover ratios by slowing consumer demand and increasing holding periods (Essam Eldin Salama & Mohamed Etab, 2025). Firms must adopt flexible inventory strategies to address challenges related to demand volatility and supply chain disruptions (Madamidola et al., 2024).

Inventory Holding Period (IHP)

Inventory Holding Period, also known as Days Inventory Outstanding (DIO), measures the average number of days inventory is held before sale (Bah et al., 2023). It directly affects cash flow, storage costs, and the risk of obsolescence (Ammar et al., 2021); (Odumusor, 2024). A shorter holding period suggests efficient inventory turnover, while a longer period may indicate overstocking or supply chain inefficiencies.

The Formula for calculating the inventory holding period.

$$\text{Inventory Holding Period} = \frac{\text{Average Inventory}}{\text{Cost of Goods Sold}} \times 365 \text{ Days}$$

Where:

Average Inventory = (Beginning Inventory + Ending Inventory) / 2

Cost of Goods Sold (COGS) is the total cost of goods sold during a specific period (usually a year)

Studies show that effectively managing inventory holding periods improves supply chain responsiveness and reduces operating costs, thereby enhancing competitive advantage (Akinleye & Adesina, 2024); (Chinta, 2022); (Adebayo et al., 2024).

Inventory-to-Sales Ratio (ISR)

The Inventory-to-Sales Ratio (ISR) evaluates the relationship between inventory levels and sales volume, indicating inventory efficiency (Essam Eldin Salama & Mohamed Etab, 2025). A high ISR may suggest excess inventory and increased holding costs, while a low ISR can result in stock-outs and lost sales (Ikechukwu et al., 2023).

The formula for calculating the Inventory-to-sales ratio is:

$$\text{Inventory to sales ratio} = \frac{\text{Average Inventory}}{\text{Net sales}}$$

Where:

Inventory average is calculated as the average value of inventory over a specific period, often using the beginning and ending inventory values for that period. Optimizing ISR enhances profitability, cash flow management, and operational efficiency (Kolawole et al., 2019; Kesavan & Kushwaha, 2020; Eze et al., 2020; Ajibola et al., 2025).

Inventory-to-Asset Ratio (IAR)

The Inventory-to-Asset Ratio measures the proportion of total assets invested in inventory, reflecting liquidity and operational efficiency. An optimal ratio balances holding costs and stock availability to meet customer demand (Bah et al., 2023; Karim et al., 2024).

The Formula for calculating the Inventory to Asset Ratio is:

$$\text{Inventory to Asset Ratio} = \frac{\text{Inventory}}{\text{Total Assets}}$$

A high ratio may indicate overstocking, while a low ratio could signal potential stock shortages. Firms with flexible inventory-to-asset ratios are better positioned to withstand economic fluctuations and maintain stability (Li & Wang, 2023).

Theoretical Review

Inventory Management Theory

Ford W. Harris (1915) developed the economic order quantity model (EOQ), which was a fundamental concept in Inventory Management Theory supported by (Erlenkotter, 1989). Significant advancements were made in inventory management in the 1950s and 1960s with the development of new techniques and models such as the Just-in-Time (JIT) system. Inventory Management Theory assumes that inventory levels can be optimized to minimize costs and maximize efficiency. It also assumes that demand is relatively stable and can be forecasted with some accuracy. Many researchers and practitioners support Inventory Management Theory, including scholars in operations management and supply chain management. Some critics argue that Inventory Management Theory oversimplifies the complexities of real-world inventory management, neglecting factors like supply chain disruptions and demand uncertainty.

Inventory Management Theory remains highly relevant in today's business environment, helping organizations optimize inventory levels, reduce costs, and improve customer satisfaction. The customer satisfaction translates to more revenue which meets the shareholders' objective.

Theory of Inventory and Production

Kenneth J. Arrow and others made significant contributions to the Theory of Inventory and Production in 1958, as reviewed by (Starrett, 1987). The theory has been evolving over the years with ongoing research and advancements in supply chain management, production planning, and inventory control. The Theory of Inventory and Production assumes that inventory levels and production rates are interrelated and that optimizing these variables can improve overall system performance. Many researchers in operations management and supply chain management support the Theory of Inventory and Production, recognizing its importance in coordinating production and inventory decisions. Production requirement determines what inventory to plan for and what quantity of inventory to buy. Some critics argue that the Theory of Inventory and Production can be complex and difficult to apply in practice, particularly in environments with high demand uncertainty or supply chain disruptions.

The Theory of Inventory and Production remains highly relevant in today's business environment, helping organizations optimize production and inventory decisions to improve efficiency, reduce costs, and enhance customer satisfaction.

Empirical Review

Several studies have been made on inventory management practices and performance of listed cement companies, and some of the outcomes are discussed below:

Inventory Management Practices and Return on Assets

Akinleye & Adesina, 2024) analyzed firms across multiple sectors listed on the Nigerian Exchange Group and found that inventory management, together with receivables and payables periods within the cash conversion cycle, significantly affects ROA. This is consistent with the result of Essam et al.2025 which examined non-financial firms listed on the Egyptian Stock Exchange reported that inventory turnover, sales growth, and operating cash flow exert a significant positive effect on ROA, with the model explaining 60.1 percent of the variation in asset returns. Empirical evidence indicates that inventory management significantly influences return on assets (ROA). Similarly, Adegbie et al., 2020 documented a positive relationship between inventory management practices and ROA among Nigerian cement companies, concluding that efficient inventory control enhances asset utilization and overall financial performance. Further evidence from Oladejo & Deji-Adisa, 2024

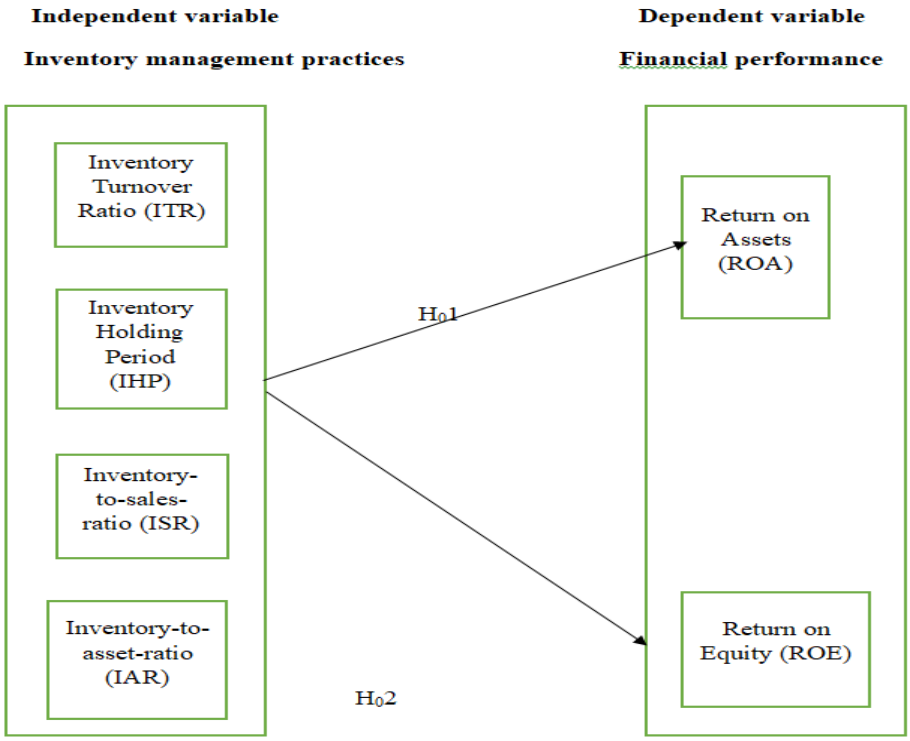
revealed an inverse relationship between days' sales of inventory and ROA among listed paint firms in Nigeria, indicating that shorter inventory holding periods and improved inventory turnover contribute positively to ROA.

Inventory Management Practices and Return on Equity

Studies also demonstrate a link between inventory management and return on equity (ROE). (Srour & Azmy, 2021) investigated firms listed on the Egyptian Stock Exchange and found that inventory and receivables management are significantly related within the broader framework of working capital management, which in turn affects financial performance. This is in support of the work of Adegbite & Ajagbe, 2023 which further established that inventory management strategies significantly influence ROE among Nigerian manufacturing firms. Their findings indicate that while asset size negatively affects profitability, turnover, and equity exert significant positive effect on return on equity.

Conceptual Framework

Inventory management practices and financial performance of listed cement companies in Nigeria. The diagram below shows the relationship between the dependent variables and independent variables:



Source: Author's Figure (2025)

Gap in Literature

A significant gap is the limited number of industry-specific studies. While inventory management and financial performance have been extensively studied in broader contexts, there is a noticeable scarcity of research focusing on the cement industry in Nigeria. This sector has unique characteristics, high capital intensity, significant raw material costs, and intricate supply chain logistics, which necessitate a more focused examination. Insufficient studies make it difficult to generalize findings from other companies to the cement sector.

Previous studies used an exploratory research design and survey design, but this focused on an ex post facto research design. Previous studies used inventory management practices (proxied by Just- in-time theory), this research expanded inventory management practices (Inventory turnover ratio, Inventory holding period, Inventory-to-sales ratio, and Inventory-to-asset ratio) on the financial performance (return on asset and return on equity). Another important item that distinguishes this paper is the use of current data generated from the 2024 financial statements recently released by the companies.

METHODOLOGY

Research Design

This study adopted a secondary data research design, which involves using information gathered from the companies' financial statements. Since the data already exist, no effort was made to control or manipulate the relevant independent variables. This design was used to determine and measure the relationship between variables or the significance of one variable on another.

Population of the Study

This study's population consists of three (3) cement companies (Dangote Cement, BUA Cement, and Lafarge Africa Cement) listed on the Nigerian Exchange Group (NGX). Data were obtained from the annual reports of the listed cement companies in Nigeria for the fiscal years ending between December 2015 and December 2024.

Sample Size and Sampling Technique

It includes all the elements or units of the population that are accessible and can potentially be included in the sample. The sample frame for this study was obtained from the Nigerian Exchange Group (NGX) listings. The sample frame consists of the three (3) listed cement companies with adequate and accurate data obtained from their annual reports from 2015-2024 within the cement industry. Due to the low number of players in the industry, the population figure is the same as the sample.

Method of Data Collection

Data have been gathered from secondary sources for this research. Data from 2015 – 2024 were obtained from the financial statements of sampled cement companies on NGX. It is regarded as the best method to reduce unfairness and inaccurate answers. These documents provide detailed information on the financial performance, inventory levels, and inventory management practices of the sampled companies. They are publicly available on the companies' websites.

Validity of Research Instrument

The statistics used in this study were checked and validated by external auditors, as evidenced by the sampled companies' annual reports and accounts. Co-authors also double-checked and validated the accuracy of all data related to the study's variables.

Reliability of Research Instrument

The data used in this study were derived from audited financial statements of the listed cement companies as approved by the Nigerian Exchange Group (NGX) and the Financial Reporting Council of Nigeria (FRCN) for the various periods. The companies complied with the statutory provisions of CAMA 2020, sections 401- 404, for the statutory audit of the financial statements and data approved by the Nigerian Exchange Group (NGX) and FRCN. Data from these audited financial statements were considered reliable and accurate to meet the study's objectives.

Method of Data Analysis

The study employed panel data, which included pooled regression, fixed-effect estimation, and random-effect estimation techniques. Panel data allows for probing and exploring both cross-sectional and time series data simultaneously. The analysis results were used to test the study's hypotheses.

Model Specification

The Return on Assets (ROA) and Return on Equity (ROE) were used as proxies for measuring financial performance in this study, while the Inventory Turnover Ratio, Inventory Holding Period, Inventory-to-Sales Ratio, and Inventory-to-Asset Ratio were used to measure Inventory management practices.

The regression equation can be computed as follows:

$Y = f(X)$

Y = financial performance (dependent variable)

X = inventory management practices (independent variable)

Y = y1, y2

y1= return on assets (ROA)

y2 = return on equity (ROE)

X = x1, x2, x3, x4

x1= inventory turnover ratio (ITR)

x2= inventory holding period (IHP)

x3= inventory to sales ratio (ISR)

X4= inventory to asset ratio (IAR)

$y_1 = \alpha_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it}$ ……. equation 1

$y2 = \alpha_0 + \beta_1 X_{1i1} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it}$ ……. equation 2

α_0 - coefficient

β_1 - β_4 - coefficient of independent variables

μ - error terms

$ROA_{it} = \alpha_0 + \beta_1 ITR_{it} + \beta_2 IHP_{it} + \beta_3 ISR_{it} + \beta_4 IAR_{it} + \mu_{it}$ ……Model 1

$ROE_{it} = \alpha_0 + \beta_1 ITR_{it} + \beta_2 IHP_{it} + \beta_3 ISR_{it} + \beta_4 IAR_{it} + \mu_{it}$ ……Model 2

DATA ANALYSIS, RESULTS, AND DISCUSSION OF FINDINGS

Descriptive Analysis

Descriptive statistics

The descriptive statistics presented in Table 1 show the mean, standard deviation, minimum, and maximum of the explanatory variables measured by Inventory Turnover Ratio (ITR), Inventory Holding Period (IHP), Inventory-to-sales ratio (ISR), and Inventory-to-asset ratio (IAR). The dependent variables are measured by Return on Asset (ROA) and Return on Equity (ROE).

Table 1 Descriptive statistics

	IAR	IHP	ISR	ITR	ROA	ROE
Mean	0.093711	104.2895	0.592336	4.068646	0.107226	0.203098
Median	0.071851	92.36511	0.151123	3.951717	0.098958	0.197675

Maximum	0.322932	210.1383	12.80784	11.17807	0.458712	0.799443
Minimum	0.0364	63.8412	0.1047	1.8281	--0.0589	-0.2204
Std. Dev.	0.0676	38.9344	2.3083	1.5785	0.0879	0.1671
Skewness	2.3696	1.7712	5.1914	2.9322	1.9492	0.8852
Kurtosis	7.5980	4.8968	27.9803	15.0872	9.9444	7.6692
Jarque-Bera	54.5009	20.1836	914.7771	225.6134	79.2779	31.1696
Probability	0	0.000041	0	0	0	0
Sum	2.811322	3128.685	17.77009	122.0594	3.216772	6.092942
Sum Sq. Dev.	0.132533	43960.74	154.5138	72.2542	0.224238	0.809754
Observations	30	30	30	30	30	30

Source: Researcher's Computation (2025)

Interpretation

Table 1 presents the descriptive statistics of variables obtained from the sampled cement companies in Nigeria. The mean inventory-to-asset ratio (IAR) is 0.094, indicating that inventories constitute a relatively small proportion of total assets on average. The wide range between the minimum (0.036) and maximum (0.323) values suggests substantial variation in inventory investment across firms. The standard deviation of 0.067 indicates moderate dispersion around the mean, reflecting some instability in inventory allocation practices.

The inventory holding period (IHP) has a mean of 104.29 days, with values ranging from 63.84 days to 210.14 days. This indicates considerable differences in inventory retention strategies among cement companies. The standard deviation of 38.93 days further confirms notable variability in inventory holding efficiency.

The inventory turnover ratio (ITR) records a mean value of 4.068, with minimum and maximum values of 1.83 and 11.18, respectively, showing differences in the speed at which firms convert inventory into sales. The standard deviation of 1.578 suggests moderate dispersion, implying variations in operational efficiency across firms.

The inventory-to-sales ratio (ISR) has a mean value of 0.59, with a wide range between 0.104 and 12.81, indicating significant disparities in inventory levels relative to sales. The standard deviation of 2.308 suggests high variability and possible inefficiencies in inventory management practices among some firms.

Regarding performance measures, the mean return on assets (ROA) is 10.72 percent, with values ranging from –5.89 percent to 45.87 percent, indicating substantial differences in asset utilization and profitability. The standard deviation of 8.79 percent reflects moderate volatility in returns. Similarly, return on equity (ROE) records a mean of 20.31 percent, with a minimum of –22.04 percent and a maximum of 79.94 percent, highlighting wide variations in shareholders' returns. The standard deviation of 16.71 percent indicates considerable dispersion, suggesting uneven financial performance among the sampled firms.

Pre-estimation Tests

Multicollinearity

A multicollinearity test was done to establish the appropriateness of the data that were used in the models. The data series were tested using the Correlation matrix and Variance Inflation Factor (VIF) tests. The results of

these tests are presented in Table 2. The VIF test revealed the presence or absence of multicollinearity through the mean value of the test result, but did not reveal the degree of association among the variables to easily recognize the variables affected, though the correlation matrix reveals the magnitude of the association among variables. The correlation analysis shows the relationship between the independent variables. It is highly correlated which may suggest multicollinearity.

Table 2 Correlation Analysis

	IAR	IHP	ISR	ITR	VIF
IAR	1	0.7266	0.7511	-0.3056	2.4325
IHP	0.7266	1	0.9091	-0.6165	8.6729
ISR	0.7511	0.9091	1	-0.4555	6.8647
ITR	-0.3056	-0.6165	-0.4555	1	1.8576
Average					4.9569

Source: Author's computation (2025)

The correlation analysis examined the associations and multicollinearity among the explanatory variables. Table 2 indicates that the Inventory-to-Asset Ratio (IAR) is positively related to the Inventory Holding Period (IHP) and the Inventory-to-Sales Ratio (ISR), while IHP and ISR are highly correlated. The Inventory Turnover Ratio (ITR) is negatively related to IAR and also shows negative relationships with IHP (-0.6165) and ISR (-0.4555). IHP records the highest correlation value at 0.9091, whereas ITR has the lowest at -0.6165. Although there is a high correlation between IHP and ISR, this effect is mitigated by the negative relationships between ITR and IAR, ITR and IHP, and IAR and IHP. Consequently, the Variance Inflation Factor (VIF) is 4.9569, indicating the possible presence of multicollinearity; however, this value remains within the acceptable range, as VIF values below 5 are considered moderate, while values above 5 are regarded as critical or problematic.

Test of Hypotheses

Analysis of Hypothesis One

Research Hypothesis One: Inventory management practices have no significant effect on return on assets of listed cement companies in Nigeria

Table 3 Estimation Results for Model One

Dependent Variable: ROA

Method: Least Squares

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.051588	0.100004	0.515864	0.6105
ITR	-0.00494	0.012614	-0.3915	0.6987

IAR	0.480567	0.337032	1.425879	0.1663
ISR	-1.10102	0.449393	-2.45002	0.0216
IHP	0.002189	0.001105	1.981006	0.0587
R-squared	0.310009		Mean dependent var	0.107226
Adjusted R-squared	0.19961		S.D. dependent var.	0.087934
S.E. of regression	0.078669		Akaike info criterion	-2.09611
Sum squared resid	0.154722		Schwarz criterion	-1.86258
Log likelihood	36.44168		Hannan-Quinn criter.	-2.0214
F-statistic	2.808086		Durbin-Watson stat	2.603086
Prob(F-statistic)	0.047155			

Source: Author's computation (2025)

Note: All the analyses were tested at a significant level of 5 percent

Interpretation

Post Estimation Test Results

To determine the most appropriate model of estimating the regression Model One for listed cement companies, among pooled OLS, fixed effects, and random effects as presented in Table 3, the fixed/random effects test was carried out: and based on the result of the test with the p-value of 0.00, which is less than the 5 percent level of significance chosen for the study revealed that fixed effects are the most appropriate estimator according to its null hypothesis which states that there is the presence of unsystematic difference in the model coefficient; thus, the study rejected the null hypothesis. This is the reason for the use of fixed effects for this model.

Regression Equation Results

$ROA_{it}=\alpha_0+\beta_1 ITR_{it}+\beta_2 IHP_{it}+\beta_3 ISR+\beta_4 IAR+\mu_{it}$..... **Model 1**

$ROA_{it}= 0.0516 -0.00494 ITR_{it}+0.00219 HP_{it} -1.1010 ISR_{it} + 0.4806 IAR_{it}+\mu_{it}$..... **Model 1a**

Model One in Table 3 investigated the effect of inventory management practices on the return on assets (ROA) of listed cement companies in Nigeria. The regression results showed that the inventory turnover ratio (ITR) had a negative and insignificant effect on ROA ($\beta = -0.00494$, $p = 0.6987$). This implies that a one-unit increase in ITR would result in a marginal decrease of 0.00494 percent in ROA. Similarly, the inventory-to-sales ratio (ISR) was found to have a negative but statistically significant effect on ROA ($\beta = -1.1010$, $p = 0.0216$), indicating that a one-unit increase in ISR would lead to a 1.1010 percent decrease in ROA.

In contrast, the inventory age ratio (IAR) exhibited a positive but insignificant relationship with ROA ($\beta = 0.4806$, $p = 0.0216$), suggesting that a unit increase in IAR would increase ROA by 0.4806 percent. Inventory holding period (IHP) also showed a positive and insignificant effect on ROA ($\beta = 0.00219$, $p = 0.0587$), meaning that a one-unit increase in IHP would lead to a marginal increase of 0.00219 percent in ROA. The R-squared value indicated that the independent variables explained 31.00 percent of the variation in ROA, while the remaining 69.00 percent was attributed to factors outside the model.

At a 5 percent level of significance, with a degree of freedom of 2 and an F-statistic of 2.808086, the model produced a p-value of 0.047155, which is less than 0.05. Consequently, the null hypothesis that inventory management practices have no significant effect on ROA was rejected, and the alternative hypothesis was accepted. This result suggests that effective inventory management practices significantly influence ROA and are essential for improving asset utilization and overall performance of listed cement companies in Nigeria.

Analysis of Hypothesis Two

Research Hypothesis Two states that inventory management practices have no significant effect on the return on equity of listed cement companies in Nigeria.

Table 4 Estimation for Model Two

Dependent Variable: ROE

Method: Least Squares

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.062691	0.186891	0.335444	0.7401
ITR	-0.00335	0.023573	-0.14203	0.8882
IAR	0.83999	0.629856	1.333635	0.1943
ISR	-2.445	0.839841	-2.91126	0.0075
IHP	0.00493	0.002065	2.387146	0.0249
R-squared	0.332671	Mean dependent var		0.203098
Adjusted R-squared	0.225899	S.D. dependent var.		0.1671
S.E. of regression	0.14702	Akaike info criterion		-0.84548
Sum squared resid	0.540372	Schwarz criterion		-0.61195
Log likelihood criter.	17.68226	Hannan-Quinn		-0.77078
F-statistic	3.115698	Durbin-Watson stat		2.270507
Prob(F-statistic)	0.032867			

Source: Author's computation (2025)

Note: All the analyses were tested at a significant level of 5 percent

To determine the most appropriate model of estimating the regression Model Four for listed cement companies, among pooled OLS, fixed effects, and random effects as presented in Table 4, the fixed/random effects test was carried out: and based on the result of the test with the p-value of 0.00, which is less than the 5 percent level of significance chosen for the study revealed that fixed effects are the most appropriate estimator according to its null hypothesis which states that there is the presence of unsystematic difference in the model coefficient; thus, the study rejected the null hypothesis hence fixed effect for this model.

Regression Equation Results

$ROE_{it}=\alpha_0+\beta_1ITR_{it}+\beta_2IHP_{it}+\beta_3ISR+\beta_4IAR+\mu_{it}$.....**Model 2**

$ROE_{it}= 0.06269 - 0.00335ITR_{it} + 0.00493IHP_{it} -2.445ISR_{it} + 0.83999IAR_{it}+\mu_{it}$.....**Model 2a**

Model Two in Table 4 assessed the effect of inventory management practices on the return on equity (ROE) of listed cement companies in Nigeria. The regression results indicated that Inventory Turnover Ratio (ITR) had a negative but insignificant effect on ROE ($\beta = -0.00335$, $p = 0.8882$), implying that a one-unit increase in ITR would result in a marginal decrease of 0.00335 percent in ROE. Similarly, Inventory to Sales Ratio (ISR) showed a negative and significant relationship with ROE ($\beta = -2.445$, $p = 0.0075$), indicating that a unit increase in ISR would reduce ROE by 2.445 percent. In contrast, Inventory Assets Ratio (IAR) exhibited a positive but insignificant effect on ROE ($\beta = 0.83999$, $p = 0.1943$), suggesting that a unit increase in IAR would increase ROE by 0.83999 percent. Inventory Holding Period (IHP) had a positive and significant impact on ROE ($\beta = 0.00493$, $p = 0.02497159$), implying that each additional unit of IHP would lead to a 0.00493 percent increase in ROE.

The R-squared value showed that the independent variables explained 33.27 percent of the variation in ROE, while the remaining 66.73 percent was attributed to other factors not captured in the model.

Decision

At a 5 percent level of significance, with a degree of freedom of 2 and an F-statistic of 3.115698, the p-value of 0.032867 was lower than 0.05. Consequently, the null hypothesis that inventory management practices have no significant effect on return on equity was rejected, and the alternative hypothesis was accepted. This result confirms that inventory management practices significantly affect ROE, which may influence investors' and shareholders' decisions.

DISCUSSION OF FINDINGS

Model One

The findings for return on assets (ROA) in Table 3, revealed that ITR had a negative effect on ROA, while ISR exerted a significant negative influence. However, the Inventory Assets Ratio (IAR) demonstrated a positive but insignificant effect on ROA. These results suggest that the efficiency of inventory conversion into sales is more important for asset returns than inventory holding or turnover alone. The average inventory holding period is longer than three months, and it takes longer than six months to hold stocks for some cement companies. The negative effect of inventory turnover on ROA shows that it takes longer to convert inventory to sales, and also shows that more cost is incurred in holding inventory before sales take place.

These findings are consistent with prior studies by Ikechukwu et al., 2023 and Eze et al., 2020, which emphasized the importance of maintaining optimal inventory levels to sustain healthy asset returns. This is in contrast with the study of Essam et al. 2025 which found inventory management practices significant on return on assets of non-financial firms listed on the Egyptian Stock Exchange, and Akinleye & Adesina, 2024 which reported a significant effect of inventory management on return on asset of multiple sectors on the Nigerian Exchange Group.

Model Two

In Table 4, the results showed that both ITR and ISR negatively affected equity returns, with ISR being significantly negative. IAR had a positive but insignificant effect on ROE, indicating that an improved inventory assets ratio may enhance equity returns. The inventory holding period has a positive effect on return on equity, though it is insignificant. The overall result shows that inventory management practices has positive and significant effect on return on equity with an F—statistic of 2.808086 and a p-value of 0.047155.

This outcome aligns with the findings of (Akinleye & Adesina, 2024), who emphasized that effective inventory management practices significantly influence return on equity by promoting efficient asset utilization and profit generation.

Implications of Findings

The results obtained from the various analytical models present mixed outcomes with important implications for stakeholders within the cement industry, including investors, company management, professionals, policymakers, regulators, researchers, and the general public.

Investors and Shareholders:

The findings emphasize the importance of assessing inventory management efficiency when making investment decisions. The significant negative effect of the inventory-to-sales ratio (ISR) on financial performance indicators such as ROA and ROE suggests that firms with excessive inventory holding costs are likely to perform poorly. Investors should therefore prioritize firms with efficient inventory systems that support improved profitability and returns.

Company Management:

Management, particularly in manufacturing firms, can leverage the findings to strengthen financial performance through effective inventory management. Reducing storage costs, improving inventory turnover, and adopting best inventory practices can enhance ROA and ROE. Efficient inventory control also supports better resource utilization, reduced waste, and improved profitability.

Accounting Profession:

The study reinforces the need for accurate inventory accounting and reporting. Proper documentation of inventory costs is essential for producing reliable financial statements that reflect the true financial position of firms and support informed decision-making by stakeholders.

Financial and Business Analysts:

Analysts can improve company evaluations by incorporating inventory efficiency indicators into financial models. Understanding the link between inventory management and financial outcomes allows analysts to provide more robust performance assessments and identify operational improvement opportunities.

Researchers:
The study provides a basis for further research on inventory management and firm performance. Future studies may examine the role of technology, automation, supply chain integration, and industry-specific factors, as well as explore causal and long-term effects.

Regulators and Policymakers:

Regulators may use the findings to establish benchmarks and guidelines for inventory efficiency within the manufacturing sector. Policymakers can support initiatives that promote technological investment, training, and improved inventory practices to enhance competitiveness and economic growth.

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

This study empirically examined the relationship between inventory management practices and the financial performance of listed cement companies in Nigeria. Financial performance was measured using Return on Assets (ROA) and Return on Equity (ROE), while inventory management was proxied by Inventory Turnover Ratio (ITR), Inventory Holding Period (IHP), Inventory-to-Sales Ratio (ISR), and Inventory-to-Asset Ratio (IAR).

The study was anchored on several theoretical frameworks, including the Economic Order Quantity (EOQ) model, Theory of Constraints (TOC), Trade-Off Theory, and the Theory of Inventory and Production. These theories collectively emphasize cost minimization, bottleneck management, optimal inventory balancing, and alignment of inventory systems with organizational objectives. Their relevance is particularly pronounced in the cement industry, where storage costs, demand stability, and supply chain complexity are critical concerns.

Conclusion

The study found that inventory management practices significantly influence the financial performance of listed cement companies in Nigeria.

The results revealed that ITR had an insignificant negative effect, while ISR exerted a significant negative effect. IAR and IHP showed no significant influence. Overall, inventory management practices were found to significantly affect ROA, leading to the rejection of the null hypothesis.

ITR and ISR had negative effects, with ISR being statistically significant. IAR and IHP showed positive effects, although IAR was insignificant. The model confirmed a significant relationship between inventory management practices and ROE, resulting in the rejection of the null hypothesis.

Overall, the study concludes that effective inventory management practices (ITR, IHP, ISR, and IAR) enhance the financial performance of listed cement companies in Nigeria.

Recommendations

Based on the findings, the following recommendations are made:

To Managers and Analysts:

Managers should strengthen inventory management practices to improve ROA and ROE. The adoption of advanced inventory systems, regular policy reviews, and alignment with market demand can reduce holding costs and improve efficiency. Given the significant negative effect of ISR, firms should minimize storage costs through improved supply chain processes, better storage facilities, and just-in-time inventory practices. Financial analysts should integrate inventory metrics such as ITR and ISR into performance evaluations to provide more accurate assessments of operational efficiency and financial health.

To Investors:

Investors should consider inventory management efficiency as a key factor in investment decisions. Firms that effectively manage inventory turnover and storage costs are more likely to achieve stronger ROA and ROE. Analyzing inventory-related indicators in financial statements can offer valuable insights into a firm's profitability potential and operational strength.

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