Inventory Flow Management and Profitability of Quoted Food and Beverage Manufacturing Firms in Nigeria

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Abstract

This study examines the impact of inventory flow management on financial performance in the Nigerian food and beverage manufacturing sector. Using an ex-post facto research design, secondary data from sixteen listed firms on the Nigerian Stock Exchange (NSE) between 2017 and 2021 were analyzed. The study employs bivariate regression to assess the relationship between Economic Order Quantity (EOQ) and Return on Assets (ROA), as well as Inventory Turnover (ITO) and Return on Equity (ROE). The findings indicate that EOQ has a significant positive effect on ROA ($\beta = 1.405$, p = 0.016), suggesting that optimal inventory management enhances asset efficiency and profitability. Conversely, ITO exhibits an insignificant negative relationship with ROE ($\beta = -0.501$, p = 0.384), implying that frequent inventory turnover does not necessarily improve shareholder returns. These results emphasize the importance of inventory optimization in driving firm performance while highlighting the need for complementary financial strategies to enhance overall profitability. The study contributes to inventory management literature by demonstrating how EOQ influences asset utilization, while also cautioning against over-reliance on turnover rates as a sole determinant of financial success.

Keywords: Inventory flow Management, Economic Order Quantity, Inventory Turnover, Financial Performance, Nigerian Manufacturing Firms

1. Introduction

Efficient inventory flow management is a critical factor in the financial performance and sustainability of manufacturing firms, particularly in the food and beverage sector, where product shelf life and demand variability significantly impact profitability. Inventory flow management involves the strategic control of stock levels, order quantities, and turnover rates to optimize operational efficiency and financial outcomes (Kumar & Rajeev, 2022). Effective inventory management ensures the availability of raw materials and finished goods while minimizing holding costs, stockouts, and excess inventory, which can lead to financial losses and operational inefficiencies (Adebayo & Olayemi, 2021).

In the Nigerian manufacturing sector, poor inventory management practices have been identified as a major challenge, leading to increased production costs, wastages, and reduced profitability (Eze & Nwosu, 2023). The food and beverage industry, in particular, faces inventory-related issues due to perishable goods, fluctuating demand, and supply chain disruptions. Firms with inadequate inventory control often experience liquidity problems, lower asset turnover, and diminished returns on investment (Obi & Uchenna, 2022). Despite the importance of inventory flow management in achieving financial efficiency, many quoted food and beverage manufacturing firms in Nigeria struggle to adopt modern inventory techniques, leading to suboptimal financial performance (Olawale & Adekunle, 2023).

This study, therefore, seeks to examine the effect of inventory flow management on the profitability of quoted food and beverage manufacturing firms in Nigeria. Specifically, it investigates the impact of Economic Order Quantity and Inventory Turnover on key profitability indicators such as Return on Assets and Return on Equity. By employing secondary data from financial statements of selected firms, the research aims to provide empirical insights into the relationship between inventory efficiency and financial performance. The findings of this study will contribute to existing literature on inventory management while offering practical recommendations for firms to enhance their profitability through strategic inventory practices.

1.2 Conceptual Framework

The conceptual framework for this study illustrates the relationship between Inventory Flow Management and Profitability of quoted food and beverage manufacturing firms in Nigeria. Inventory flow management plays a crucial role in enhancing financial performance by ensuring optimal stock control, minimizing holding costs, and improving operational efficiency. This framework is anchored on inventory management theories such as the Economic Order Quantity (EOQ) Model and the Just-in-Time (JIT) Inventory System, which emphasize cost efficiency, stock optimization, and financial performance enhancement (Kumar & Rajeev, 2022). These theories provide a foundation for understanding how firms can effectively manage their inventory to improve profitability (Adebayo & Olayemi, 2021).



Figure 1: Conceptual Framework for Inventory Flow Management and Profitability of Quoted Food and Beverage Manufacturing Firms in Nigeria

Source: Kumar & Rajeev, (2022) and Adebayo & Olayemi, (2021)

2. Literature Review 2.1 Theoretical Framework

The theoretical framework for this study is grounded in inventory management and financial performance theories that explain the relationship between Inventory Flow Management and Profitability in food and beverage manufacturing firms. The key theories underpinning this study are:

2.1.1 Economic Order Quantity (EOQ) Model

The EOQ model, developed by Ford W. Harris (1913) and later refined by Wilson (1934), is a fundamental theory in inventory management. It determines the optimal order quantity that minimizes the total cost of inventory, including ordering costs and holding costs (Harris, 1913). The EOQ model assumes that efficient stock replenishment enhances cost efficiency and profitability (Kumar & Rajeev, 2022). In the context of food and beverage firms, implementing EOQ can help optimize raw material procurement and reduce unnecessary storage costs, leading to improved Return on Assets (ROA) and Return on Equity (ROE) (Eze & Nwosu, 2023).

2.1.2 Just-in-Time (JIT) Inventory System

The JIT system, introduced by Taiichi Ohno (1988) and widely used in lean manufacturing, emphasizes minimizing inventory levels by ensuring that raw materials arrive exactly when needed

in the production process. The theory suggests that excessive inventory leads to inefficiencies, increased holding costs, and capital tie-up, while JIT reduces waste and enhances firm profitability (Obi & Uchenna, 2022). The application of JIT in Nigerian food and beverage firms can lead to efficient inventory turnover, thereby enhancing financial performance by improving cash flow and reducing unnecessary storage costs (Olawale & Adekunle, 2023).

2.1.3 Transaction Cost Economics (TCE) Theory

Proposed by Ronald Coase (1937) and further developed by Williamson (1975, 1985), TCE theory explains how firms minimize transaction costs associated with procurement, inventory storage, and order processing. By implementing efficient inventory flow management practices, firms can reduce procurement inefficiencies and operational costs, thereby enhancing profitability (Adebayo & Olayemi, 2021). This theory supports the argument that well-managed inventory turnover and EOQ policies lead to financial stability and improved shareholder returns.

2.1.4 Resource-Based View (RBV) Theory

The RBV theory, developed by Barney (1991), suggests that firms gain a competitive advantage by effectively managing their resources, including inventory systems. In food and beverage manufacturing, firms that adopt advanced inventory management technologies and maintain an optimal inventory turnover ratio tend to achieve superior financial performance (Kumar & Rajeev, 2022). This theory reinforces the study's assumption that effective inventory flow management contributes to firm profitability by enhancing asset utilization and reducing waste. The EOQ model and JIT system provide a strong foundation for understanding how inventory flow management impacts financial performance by reducing costs and improving efficiency. Transaction Cost Economics further supports the notion that minimizing procurement and storage costs enhances profitability. Finally, the Resource-Based View highlights how firms with superior inventory strategies can achieve sustainable competitive advantages in the food and beverage industry.

2.2 Conceptual Review 2.2.1 Inventory Flow Management

Inventory flow management refers to the strategic processes firms adopt to regulate stock levels, determine optimal order quantities, and improve inventory turnover efficiency. In this study, inventory flow management is operationalized through the following proxies:

2.2.1.1 Economic Order Quantity (EOQ)

This represents the optimal order quantity that minimizes the total cost of inventory, including ordering and holding costs. Effective EOQ management ensures cost reduction and operational efficiency, leading to improved financial performance (Obi & Uchenna, 2022). Firms that fail to implement EOQ strategies often face excessive holding costs, stockouts, and wastage, which negatively affect their profitability (Eze & Nwosu, 2023).

2.2.1.2 Inventory Turnover (ITO)

This measures the frequency at which a firm sells and replaces its inventory within a given period. A higher inventory turnover indicates better inventory efficiency, reduced storage costs, and improved cash flow management (Olawale & Adekunle, 2023). Firms with slow-moving inventory may experience capital tie-up, reduced liquidity, and increased risk of obsolescence, ultimately impacting profitability (Eze & Nwosu, 2023).

2.2.2 Profitability

Profitability is a key measure of financial performance and reflects a firm's ability to generate returns on investments. In this study, profitability is assessed using the following indicators:

2.2.2.1 Return on Assets (ROA)

This metric evaluates how efficiently a firm utilizes its assets to generate profits. Effective inventory management is expected to enhance asset utilization, thereby improving ROA (Kumar & Rajeev, 2022). Firms that optimize inventory flow tend to minimize asset underutilization and increase productivity, which leads to higher returns (Adebayo & Olayemi, 2021).

2.2.2.2 Return on Equity (ROE)

This measures the financial returns provided to shareholders relative to the company's equity. Proper inventory flow management contributes to cost efficiency, enhanced revenue generation, and increased shareholder value (Obi & Uchenna, 2022). A well-managed inventory system helps firms achieve stable financial performance, ensuring a positive impact on equity returns (Olawale & Adekunle, 2023).

2.3 Empirical Review

Koumanakos (2008) studied the effect of inventory management on firm performance in Greece's food, textile, and chemical manufacturing sectors from 2000 to 2002. The study found that firms maintaining excessive inventory levels experienced lower financial performance, supporting the hypothesis that lean inventory management enhances profitability. Mathuva (2009) analyzed the influence of working capital management components on corporate profitability using a sample of 30 firms listed on the Nairobi Stock Exchange from 1993 to 2008. Employing pooled OLS and fixed effects regression, the study found a positive and significant relationship between inventory conversion and profitability, indicating that maintaining adequate inventory levels reduces business interruptions and enhances profitability. Padachi (2012) examined the relationship between working capital management and corporate profitability using a sample of 58 small manufacturing firms between 1998 and 2003. Using return on total assets as a profitability measure, the study found that excessive inventory investment negatively impacts profitability due to increased holding costs, pilferage, and spoilage.

Anichebe and Agu (2013) assessed the impact of inventory management on organizational performance in Nigeria using a sample of 248 respondents. The study found a strong positive

correlation between inventory management and profitability, emphasizing that effective inventory control enhances productivity and organizational effectiveness. Nwosu (2014) examined the impact of materials management on the profitability of Nigerian brewing companies, using a sample of 368 firms. The study found that effective materials procurement, storage, and interdepartmental collaboration significantly contributed to profitability. Sitienei and Kioko (2015) investigated the effect of working capital management on the profitability of cement manufacturing firms in Kenya from 2000 to 2014. The study found a significant positive relationship between inventory conversion and profitability, while firm size and liquidity had a positive but insignificant effect. Mwangi and Thogori (2015) explored the role of inventory management in food processing firms in Kenya using a sample of 110 respondents. The study found that efficient inventory control, cost management, and continuous supply management positively influenced firm performance.

Prempeh (2016) studied the relationship between inventory management and profitability in Ghanaian manufacturing firms using a cross-sectional dataset from 2004 to 2014. Applying an OLS regression model, the study revealed a strong positive impact of inventory management on profitability. Etale and Bingilar (2016) examined the effect of inventory cost management on the profitability of listed Nigerian brewery firms from 2005 to 2014. Using multiple regression analysis, the study found that efficient inventory cost management positively influenced profitability. Golas and Bieniasz (2016) conducted an empirical analysis of inventory management and financial performance in Poland's food industry. The study, based on regression models, found that shorter inventory cycles were positively correlated with profitability. Orga and Mbah (2017) analyzed inventory management practices and organizational performance in South-East Nigerian departmental stores. The study found that effective inventory management positively influenced profitability, growth, and productivity. Onikoyi, Babafemi, Ojo, and Aje (2017) found a positive relationship between inventory reorder points, organizational growth, and profitability in Nigerian cement firms. The study emphasized that proper inventory policies enhance profitability. Francis, Timbirimu, Kiizah, and Olutayo (2017) examined inventory management in Uganda's Gumutindo Coffee Cooperative. The study found that effective inventory management improved profitability and operational efficiency by minimizing wastage and costs.

3. Methodology

The ex-post facto survey research design is adopted for this study. The population of the study consists of sixteen (16) listed manufacturing firms on the Nigerian Stock Exchange (NSE) as of 2022, which have consistently submitted their annual reports to the NSE from 2017 to 2021. Some of these companies are multinational firms that have adopted inventory management practices in line with global best practices. These firms integrate equity and debt structure information in their annual reports. The sample size includes all sixteen (16) food and beverage manufacturing firms in Nigeria since they are relatively few and comprehensively represent the characteristics of all food and beverage firms in the country.

This study utilizes secondary data sourced from the annual reports and financial statements of the selected firms. Specifically, the data includes economic order quantity, inventory return ratio, return on assets, and return on equity. Additional sources of data include textbooks, journals, and online publications. Annual reports are widely regarded by management and external stakeholders as the most critical and influential source of corporate information. Chief executive officers also consider annual reports as primary communication tools for internal and external stakeholders regarding company performance.

The study employs bivariate regression analysis to examine the relationship between inventory management and profitability. The model summary will explain the strength of the relationship and the determinant percentage using the R and R-square values. The significance of variability will be tested using ANOVA, while hypotheses will be accepted or rejected at a 0.05 level of significance based on the coefficients table. The analysis will be conducted using the SPSS platform to ensure accuracy and reliability of results.

4. Results and Discussion

Dependent	Independent	R	R	Adjusted R	Std. Error of	Durbin-
Variable	Variable		Square	Square	Estimate	Watson
ROA	EOQ	.575	.331	.286	10.675259	1.667
ROE	ITO	.225	.051	012	11.568691	2.883

Table 1: Model Summary

Source: SPSS Version 25

The first model examines the relationship between Economic Order Quantity (EOQ) and Return on Assets (ROA). The R-value of 0.575 indicates a moderate positive correlation. The R-Square of 0.331 means that 33.1% of the variation in ROA is explained by EOQ. The adjusted R-Square of 0.286 suggests a slight downward adjustment due to the number of predictors. The Durbin-Watson statistic of 1.667 indicates no serious autocorrelation concerns. The second model examines the relationship between Inventory Turnover (ITO) and Return on Equity (ROE). The R-value of 0.225 suggests a weak positive correlation. The R-Square of 0.051 means that only 5.1% of the variation in ROE is explained by ITO, which is very low. The adjusted R-Square of -0.012 suggests that adding ITO to the model does not improve its predictive power. The Durbin-Watson statistic of 2.883 suggests a slight negative autocorrelation. The significant positive relationship between EOQ and ROA implies that efficient inventory management improves asset utilization and profitability. Firms that optimize their EOQ can reduce stockouts and excess inventory costs, leading to better financial performance.

Sum of Squares	Df	Mean Square	F	Sig.
844.403	1	844.403	7.410	.016
1709.417	15	113.961	-	-
2553.820	16	-	-	-
107.486	1	107.486	0.803	.384
2007.519	15	133.835	-	-
2115.006	16	-	-	-
	Sum of Squares 844.403 1709.417 2553.820 107.486 2007.519 2115.006	Sum of SquaresDf844.40311709.417152553.82016107.48612007.519152115.00616	Sum of SquaresDfMean Square844.4031844.4031709.41715113.9612553.82016-107.4861107.4862007.51915133.8352115.00616-	Sum of SquaresDfMean SquareF844.4031844.4037.4101709.41715113.961-2553.82016107.4861107.4860.8032007.51915133.835-2115.00616

Table 2: ANOVA Results

Source: SPSS Version 25

For the first model (ROA & EOQ), the F-statistic is 7.410 with a significance level of 0.016, indicating that the model is statistically significant at the 5% level. This means that EOQ has a significant impact on ROA. For the second model (ROE & ITO), the F-statistic is 0.803 with a significance level of 0.384, which is not statistically significant. This implies that ITO does not significantly explain variations in ROE. The insignificant and negative effect of ITO on ROE suggests that frequent inventory turnover does not necessarily improve shareholder returns. This could mean that while high turnover may indicate strong sales, it might also reflect lower profit margins or high operating costs.

Table 3: Coefficients Results

Model	Unstandardized Coefficients	Std.	Standardized	Т	Sig.
	(B)	Error	Coefficients (Beta)		
(Constant)	46.600	10.375	-	4.492	.000
EOQ	1.405	0.516	0.575	2.722	.016
(Constant)	28.536	11.243	-	2.538	.023
ITO	-0.501	0.559	-0.225	-0.896	.384

Source: SPSS Version 25

In the first model, the constant term (46.600, p = 0.000) represents the expected ROA when EOQ is zero. The EOQ coefficient of 1.405 (p = 0.016) suggests that a unit increase in EOQ leads to a 1.405 increase in ROA, and since it is significant at the 5% level, EOQ has a meaningful impact on ROA. In the second model, the constant term (28.536, p = 0.023) represents the expected ROE when ITO is zero. The coefficient for ITO is -0.501 (p = 0.384), meaning that a unit increase in ITO is associated with a decrease of 0.501 in ROE. However, since the p-value is not significant, this effect is not statistically meaningful. The first model (EOQ & ROA) is statistically significant, meaning that inventory optimization strategies can be a key driver of financial success. The second model (ITO & ROE) is not statistically significant, indicating that other factors beyond inventory turnover may be more critical in determining equity returns. Firms should explore additional financial and operational drivers of ROE.

4.1 Discussion of Findings

The findings from this study reveal critical insights into the relationship between inventory management and financial performance, specifically the effects of Economic Order Quantity (EOQ) on Return on Assets (ROA) and Inventory Turnover (ITO) on Return on Equity (ROE).

The study establishes a significant positive relationship between EOQ and ROA ($\beta = 1.405$, t = 2.722, p = 0.016), indicating that optimal inventory management enhances asset efficiency and profitability. This finding is consistent with the Economic Order Quantity (EOQ) model, which posits that firms can minimize total inventory costs by determining the optimal order size. This result aligns with Singh et al. (2018), who found that firms with well-managed EOQ models achieve higher asset utilization and profitability. Similarly, Olufemi & Ajayi (2020) demonstrated that firms implementing inventory optimization strategies experience better financial performance due to reduced holding costs and improved cash flow. The findings further support the resource-based theory, which emphasizes that firms with superior inventory management capabilities can gain a competitive advantage and improve financial returns.

The study finds that ITO has an insignificant negative effect on ROE ($\beta = -0.501$, t = -0.896, p = 0.384). This suggests that while frequent inventory turnover may enhance operational efficiency, it does not necessarily lead to higher shareholder returns. A possible explanation is that rapid inventory turnover may be accompanied by lower profit margins, excessive discounting, or increased operational costs, which can erode profitability. This result is in line with Johnson & Parker (2017), who found that high inventory turnover does not always translate to improved financial performance, particularly in industries with low-margin sales models. However, it contradicts Chen et al. (2019), who argued that firms with faster inventory cycles tend to generate higher shareholder returns due to better liquidity management.

5. Conclusion

This study examined the impact of inventory management on financial performance by analyzing the relationship between Economic Order Quantity (EOQ) and Return on Assets (ROA), as well as Inventory Turnover (ITO) and Return on Equity (ROE). The results show that EOQ has a significant positive effect on ROA, suggesting that optimizing inventory order sizes leads to improved asset efficiency and profitability. On the other hand, ITO does not significantly affect ROE, implying that frequent stock turnover alone is not a sufficient determinant of shareholder returns. The findings highlight the importance of inventory optimization strategies in enhancing firm performance. While managing inventory efficiently can improve operational effectiveness, firms should also consider broader financial strategies to maximize profitability and shareholder value. The study recommends as follows

i. Firms should adopt advanced inventory management techniques such as EOQ modeling, demand forecasting, and just-in-time (JIT) systems to minimize holding costs and improve asset utilization.

- ii. While high inventory turnover is desirable, firms should ensure that it does not come at the expense of lower profit margins or increased operational costs. A balanced approach to stock management is necessary to sustain financial performance.
- iii. Implementing digital inventory tracking systems and enterprise resource planning (ERP) solutions can enhance real-time inventory monitoring and decision-making.
- iv. Since ITO does not significantly influence ROE, firms should focus on other factors such as cost control, pricing strategies, and financial leverage to enhance shareholder returns.

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