

Investigating Inventory Management and Profitability of Listed Consumer Goods Companies in Nigeria

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Abstract

Inventory management is crucial to a company's health, as effective inventory management determines how an organisation's profit can be maximised. In light of the above, this study was carried out to determine the influence of inventory management on the corporate profitability of listed consumer goods firms in Nigeria. The sample population consisted of 20 consumer goods firms listed in the Nigeria Exchange Group. Information for the study was obtained from secondary sources, specifically, the audited financial statement of the firms between 2016 and 2022. The study employed panel regression analysis as the technique of estimation. Financial success was represented by return on assets, which is the dependent variable, while inventory-to-asset ratio, inventory-to-turnover ratio and inventory-to-sales were the proxies for inventory management; firm size and firm growth were the control variables. The findings using the random-effect regression model revealed that all the independent variables have a non-significant influence on corporate profitability in consumer goods firms in Nigeria. The study concludes that inventory management influences corporate profitability positively in consumer goods firms in Nigeria. The study then recommended that management should avoid tying down capital on inventory by ensuring adequate inventory control to avoid overstock and under-stock of raw materials and goods.

Keywords: *Inventory management, Inventory to asset ratio, Inventory to sales ratio, Inventory to turnover ratio, Profitability*

1. Introduction

Most enterprises in the global economic system want to survive, develop, fulfil their social obligations, and make a respectable profit. This amount of return enables the firm to take advantage of economic possibilities, engage in research and innovation that furthers the development and long-term survival, and fulfil its social commitments as well as its duties to the owners (Agu, Obi-Anike & Eke, 2016; Afolabi, Onifade & Olumide, 2017). Over time, Nigerian FMCG firms have experienced insufficient financial report declarations, institutional constraints, under capitalisation, and weak internal control practises, which hinder their success and make it challenging to identify issues quickly (Akinola, Adegoke, Efuntade & Efuntade, 2021).

If a corporation wants to sustain its current state, management must make positive efforts to reduce operating expenses, promote productivity, and improve the appearance of these items. Inventory management may increase a company's profitability by reducing its cost of goods sold and boosting sales. However, one of the most effective approaches to achieving the necessary degree of efficiency in corporate operations is bringing operational expenses to a manageable level. The investment in "inventories" is a significant portion of this cost in many industrial organisations that demands management's attention (Ndubisi, Uche, Ezechukwu & Obi, 2018; Adebola & Adesola, 2019).

In the sense that poor inventory management would result in clientele loss and declining revenues, inventory management is crucial to the development and survival of a business. Companies should manage carefully to prevent depreciation, theft, and waste while ensuring the resources are available when needed (Onikoyi, Babafemi, Ojo & Aje, 2017; Orga & Mbah, 2017). According to Anshur, Ahmed, and Dhodi (2018), improper inventory tracking, waste, and additional costs hurt a company's overall operational performance, which increases the likelihood of inventory issues. Inventory and warehouse managers employ a variety of inventory management approaches, including predicting stock of goods, reorder points, information technology, and inventory turnover, to monitor and enhance an organisation's financial success.

As Raimi and Tosin (2021) pointed out, inventory control is the most important aspect of inventory management and serves as the brain of any business that handles inventories. Production costs are accounted for by inventory management to the tune of 50%. A weak inventory system will lead to losing clients and sales; thus, inventory management is crucial. Ugwu and Nwakoby (2021) also noted that an efficient inventory management system might increase revenue, directly impacting how well the business performs. As a result, it calls for an organised inventory management system overseen by a team of personnel with specialised knowledge.

The effective management of these materials, which represent a significant cost item, will contribute significantly to the profitability and success of the business concern. In contrast, ineffective material management may result in lower profits and the eventual demise of the once-promising business. In Nigeria's economic cycle, the problem of insufficient stocks, which slows production and ultimately results in lost sales, profits, and maybe lost goodwill, has recently taken on an unprecedented scope and size. Mishandling and inadequate storage facilities, which can result in inventory item damage and a loss to the business, are other issues that plague the industrial sector frequently (Amahalu, Abiahu, Obi & Nweze, 2018; Efuntade & Akinola, 2020; Ajayi, Obafemi & Araoye, 2021).

Since different sectors draw different conclusions regarding the effect of inventory management on performance, the findings of prior studies in other sectors may not apply to consumer products enterprises. Due to variations in the environment and industry in which these manufacturing businesses operate in terms of supervision, regulation, and operation, the conclusions of earlier research conducted in developed and developing countries may not apply to consumer product enterprises in Nigeria. As a result, this study tries to broaden its geographic focus by looking at the Nigerian manufacturing environment.

2. Literature Review

Theory of Constraints

The theory of constraints is a management concept aiming to boost the production system's performance, as measured by sales, by identifying the processes limiting the manufacturing system's ability to produce goods quickly and efficiently. According to Fawcett, Ellram and Ogden (2007), the theory of constraints posits that a chain is only as strong as its weakest link and that the control should be elevated and managed as necessary.

Constraints theory is limited by the need for more appropriate inventories, a substantial percentage of delivery delays or orders that require a lot of extra work (overtime). Incorrect material orders, a significant majority of urgent orders and expedition levels, increased concentrations of decentralisation, a lack of critical business engagement, and variations or lack of regulation over primary concern orders are the problems with the constraints theory (James, 2016). The notion is based on the idea that an organisation will not operate as effectively as one that optimises the material flow and value produced by its operational performance. An organisation that maximises the productivity of every machine will work better than one that does.

The theory of limitations strongly emphasises controlling these constraints' capacity and capability efficiently if one wants to boost an organisation's operational performance. Production companies may do this by implementing effective inventory control techniques. Businesses have needed help to make the technological and organisational investments necessary to synchronise current systems and enable coordinated inventory movements (Kotler & Keller; Kilonzo, 2016). According to the Theory of Constraints approach, a production firm's use of inventory control systems affects organisational efficiency.

Empirical Review

Priniotakis and Argyropoulos (2019) discussed some basic concepts and techniques for classifying inventory, controlling inventory levels, avoiding stock outs and increasing customer satisfaction. It also discusses the importance of forecasting demand. The study used the Root Mean Square Error (RMSE) to effectively measure the forecast error, which later became a primary driver for inventory management. They state that Service Level (SL) is a performance metric and emphasises the importance of Safety Stock (SS) and also the use of the Reorder Point (ROP) as an efficient indicator for triggering production replenishment and proposes a simple technique for prioritising production orders. This study, however, only concentrated on basic concepts and methods of inventory management without considering the empirical analysis of the influence of inventory management on the financial performance of companies. This current study then empirically investigated inventory management and firm performance.

Anshur, Ahmed and Dhodi (2018) investigated the role of inventory management on the financial success of Selected Manufacturing Companies in Mogadishu. The study selected 72 respondents using a questionnaire as an instrument and analysed data using descriptive and correlation statistics of mean and frequency (percentage) for SPSS. The study found a significant positive relationship between inventory management and financial success. Although this study utilised a primary

source of data collection (questionnaire), the current study relied on secondary sources of data (annual reports and financial statements of firms) to improve the validity of data and results.

Ndubisi et al. (2018) investigated the effect of inventory control on the profitability of manufacturing companies listed on (the NSE) from 2011-2015. The study used multiple regressions and descriptive and Ordinary Least squares (OLS) to analyse the data collected. They discovered that raw material significantly affects profitability using Return on Asset (ROA) as profitability indices. The inventory conversion period has a significant effect on profitability. Inventory turnover significantly affects profitability; storage cost has an insignificant negative impact. The study ended the empirical analysis in 2015. The current study will extend the inventory management and performance research until 2021 to close the time gap.

In their study, Orga and Mbah (2017) analysed the effect of inventory management practices on the organisational performance of departmental stores in southeast Nigeria. The study showed that inventory management positively affects the corporate growth of departmental stores in South East Nigeria. The inventory management system positively affects the profitability of departmental stores in South East Nigeria. Inventory management significantly affected organisational productivity; there was a high positive correlation between efficient inventory management and corporate profitability. The study concluded that inventory management is very vital to the success and growth of organisations.

Ryan (2017) examined the impact of materials management on the profitability of Nigeria brewing companies using a sample size of 368 companies. The study used a questionnaire and oral interviews to collect data. The study established that materials procurement and storage have a significant effect on the profitability of brewing companies. The study also found that materials inventory significantly contributes to brewing companies' profitability, and interdepartmental collaboration contributes to the profitability of brewing firms.

Okoye, Amahalu, Nweze and Obi (2016) studied the relationship between inventory and financial success in manufacturing companies. The researchers studied 52,254 businesses for 25 years between 1980 and 2005; they used multiple regressions to determine the correlation between financial success and various inventory levels. They measured financial success using gross profits, operating profit results, and Inventory levels regarding raw materials, partially manufactured products, and finished products. The results revealed a positive correlation between a company's inventory management and financial success. The authors also noted that Degrees of correlation varies depending on the type of inventory and the economic success.

Most researchers completed their empirical analysis in 2017 (Priniotakis & Argyropoulos, 2019; Anshur et al., 2018; Ndubisi et al., 2018). The success of consumer goods companies in Nigeria concerning inventory management and financial performance has yet to be tracked during the subsequent years. Therefore, this study aims to close the gap until 2021.

3. Methodology

This article utilizes *ex post facto* research design. Both inferential and descriptive statistics were relied on to examine inventory management variables and profitability of consumer goods firms in Nigeria. The study used panel data (time series and cross sectional) research design between 2016 and 2022 retrieved from the financial statements of the selected consumer goods firms. The

population of the study consists of the 20 consumer goods firms quoted on the Nigerian Exchange Group Plc. as of 31st December 2021. Panel data regression was adopted to establish the influence of inventory management variables; inventory to assets ratio (Mohopadkar & Patil, 2017), inventory turnover ratio (Ashraf & Muhannad, 2017) and inventory to sales ratio (Prayag & MEgha, 2018) on corporate profitability; return on assets (Ajayi et al. 2021; Wahab, Akinola & Dare, 2022).

Model Specification

This paper developed the following models to analyse the relationship between inventory management and the financial success of listed consumer goods firms.

$$Y_{it} = \beta_0 + \beta_1 IAR_{it} + \beta_2 ITR_{it} + \beta_3 ISR_{it} + \beta_4 FSz_{it} + \beta_5 FGth_{it} + \varepsilon_{it} \dots \dots \dots 3.1$$

Y represents the profitability of quoted consumer goods firms in Nigeria, measured by Return on Assets (ROA).

α = the constant term

IAR_{it} = Inventory to Assets Ratio of *ith* firm at *t* time

ITR_{it} = Inventory Turnover Ratio of *ith* firm at *t* time

ISR_{it} = Inventory to Sales Ratio of *ith* firm at *t* time

FSz_{it} = Firm Size of *ith* firm at *t* time

$FGth_{it}$ = Firm Growth of *ith* firm at *t* time

β = the coefficient of the function

e = error term.

The model was modified as follows:

$$ROA_{it} = \beta_0 + \beta_1 IAR_{it} + \beta_2 ITR_{it} + \beta_3 ISR_{it} + \beta_4 FSz_{it} + \beta_5 FGth_{it} + \varepsilon_{it} \dots \dots \dots 3.2$$

4. Results and Discussions

Descriptive Analysis

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
ROA	140	.028783	3.7807	-18.8765	17.4529
IAR	140	.4388983	1.9537	.0399	15.1611
ISR	140	1.95686	13.0244	.0067	100.8604
ITR	140	8.471525	3.4635	.0099	17.9448
FG	140	.4736	2.9649	-.34	23
FS	140	8.057645	.48224	6.0988	8.7617

Source: Author's Computation Using Stata 14.0 (2023)

The result provides insight into the nature of the selected listed consumer goods firms in Nigeria. The study examines the descriptive statistic for both explanatory and dependent variables. The study examined each variable based on the mean, minimum, maximum and standard deviation. Firstly, the study showed that the sample firms had a positive return on assets of .0288 over the period under review, which was a proxy for corporate profitability. This means that the firm sample within the period is performing well. The standard deviation stood at approximately 3.78, which is higher than the mean value, implying that its position is higher than the standard error. The maximum value of return on asset was 17.45, while the minimum was -18.88. This value suggests that some companies in the sample perform exceptionally well while some perform poorly.

Inventory to asset ratio (IAR) stood at a mean value of .439, implying that the effect of stock to asset ratio on corporate profitability is .4389 compared to the standard deviation of 1.95. The maximum value of the inventory-to-asset ratio was 15.16, while the minimum was .039, which implies that some consumer firms are profitable while others are not. The inventory-to-sales ratio, which also proxies inventory management, stood at a mean value of 1.96, implying that the effect of stock to turnover ratio on corporate profitability is low compared to the standard deviation of 13.02. The maximum value of the inventory-to-sales ratio was 100.86, while the minimum was .006. Inventory to turnover ratio, which proxy inventory management, reveals that within the period under review, the sampled companies have an average inventory turnover value of 8.47, implying that the effect of inventory to turnover ratio on corporate profitability is high compared to the standard deviation of 3.46. The maximum value of the inventory-to-turnover ratio was 23, while the minimum was -.34, which also implies that some companies performed better while some performed poorly. This, in doubt, will affect the liquidity level and management of the firms.

The mean of the two control variables in the study were .473 and 8.058 for firm growth and firm size, respectively. In observing the highest and lowest values for both firm growth and firm size, the consumer firms that form the study sample differ in many aspects; while some companies perform better, others perform poorly. Also, while some consumer firms are profitable, others are not.

Normality Test

Table 2 shows the result of data normality obtained from the joint probability of skewness and kurtosis for all the variables of interest on the sample consumer goods firms during the period of study are all normally distributed at 1% level of significance except for the variable of inventory to turnover ratio which have abnormal distribution.

Table 2 Normality Test

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	Adj chi2(2)	Prob>chi2
ROA	140	0.0073	0.0000	27.48	0.0000
IAR	140	0.0000	0.0000	.	0.0000
ITR	140	0.9728	0.1135	2.62	0.2694

ISR	140	0.0000	0.0000	.	0.0000
FG	140	0.0000	0.0000	.	0.0000
FS	140	0.0020	0.0037	14.18	0.0008

Source: Author's Computation Using Stata 14.0 (2023)

Regression Results

Table 3: Pooled OLS Regression Result

ROA	Coefficient	Standard Error	T	P>/t/	(95% Conf. Interval)	
					3.7089	
IAR	.2963647	1.702138	0.17	0.862	-3.116216	4
IVSR	.0216448	.2498761	0.09	0.931	-.4793265	.522616
IVTR	.0359326	.1642713	0.22	0.828	-.2934115	.365276
FGRT	.0117276	.1715293	0.07	0.946	-.3321679	.355623
FSZ	.4424151	1.288504	0.34	0.733	-2.14088	3.02571
R-squared 0.0367		Prob> F: 0.8385				

Source: Author's Computation Using Stata 14.0 (2023)

Table 4 Fixed Effect Panel Regression Results

ROA	Coefficient	Standard Error	T	P>/t/	(95% Conf. Interval)	
					4.47182	
IAR	.1363522	2.152556	0.06	0.950	-4199119	3
IVSR	.0448587	.3046809	0.15	0.884	-.5688001	.6585175
IVTR	.0641181	.2387707	0.27	0.790	-.4167908	.5450271
FGRT	.0094814	.2080891	0.05	0.964	-4.4096317	.4285944
FSZ	.3350248	5.109338	0.07	0.948	-9.955709	10.62576
F(5, 45) = 0.28		Prob > F = 0.9224				

Source: Author's Computation Using Stata 14.0 (2023)

Table 5 Random-Effect Panel Regression Results

ROA	Coefficient	Standard Error	T	P>/t/	(95% Conf. Interval)	
IAR	.2963647	1.702138	0.17	0.862	-3.039764	3.632493
IVSR	.0216448	.2498761	0.09	0.931	-.4681033	.5113929
IVTR	.0359326	.1642713	0.22	0.827	-.2860332	.3578984
FGRT	.0117276	.1715293	0.07	0.945	-.3244636	.3479189
FSZ	.4424151	1.288504	0.34	0.731	-2.083006	2.967837
Prob > chi2 = 0.8409						

Source: Author's Computation Using Stata 14.0 (2023)

Interpretation of Results

The results above present the three-panel data estimation techniques of pooled OLS, fixed-effect and random-effect adopted in the study. The fixed effect panel regression estimation was based on the assumption of no correlation between the error term and the explanatory variable. In contrast, that random effect considers that the error term and explanatory variables are correlated. In selecting from the two-panel regression estimation results, the Hausman test was conducted, and the test is based on the null hypothesis that the random effect is preferred to the fixed effect model if the p-value is more than (0.05). Still, if the p-value is less than 0.05, fixed-effect is preferred. A look at the p-value of the Hausman test (0.99) implies that we should accept the null hypothesis and reject the alternative hypothesis. This means this study should adopt the random effect panel regression results to draw conclusions and recommendations. Also, this implies that the random effects result is more appealing statistically when compared to the fixed effect. As shown in Table 4 above, the results indicate that all the independent and control variables, namely inventory to turn over ratio, inventory to sales ratio, inventory to asset ratio, firm growth, and firm size, satisfy the apriori expectation with respect to their sign. IVAR, IVSR, IVTR, FMG & FMS have a positive coefficient and insignificant effect on corporate profitability of consumer goods firms which implies that a unit increase in IVAR, IVSR, IVTR, FMG & FMS will lead to a negligible rise in corporate profitability of consumer good firms in Nigeria. The increase in corporate profitability might be attributed to the efficient inventory management of the stock of inventories of the firms, which enhances their production, sales and profitability. However, the effect is not significant because of other vital factors that improve corporate profitability other than proper and efficient inventory management. The R² value of 0.0295 does not indicate an impressive goodness of fit for the model, attributed to the short study period. This means that for the period under study, based on the data collected, the inventory-to-turn-over ratio, inventory-to-sales ratio, inventory-to-assets ratio, firm growth and firm size accounted for approximately 30% of the variation in corporate profitability of consumer food firms in Nigeria, with 70% being explained by other variables not included in the study.

The result of inventory to assets ratio from the random-effect model showed a coefficient value of .2964 and a probability value of 0.862, showing that stock to asset ratio has a positive relationship with corporate profitability (ROA). At the same time, the p-value reveals that the inventory-to-asset ratio has a statistically non-significant influence on corporate profitability. Hence, the study concludes that the inventory-to-asset ratio has a positive relationship with ROA, which is not statistically significant at the 5% level. Based on the analysis, the study with this accepts the null hypothesis. It rejects the alternative theory stating that inventory to assets ratio has no significant effect on corporate profitability in consumer goods firms in Nigeria.

The inventory turnover ratio revealed a coefficient value of .0359 and a probability value of 0.827, which indicates that the inventory turnover ratio has a positive relationship with corporate

profitability (ROA). In contrast, the p-value reveals that the inventory turnover ratio has a statistically non-significant influence on corporate profitability. Hence, the study concludes that inventory turnover has a positive relationship with ROA, which is not statistically significant at the 5% level. Based on the analysis, the study accepts the null hypothesis formulated. It concludes that the inventory turnover ratio has no significant influence on corporate profitability in listed consumer goods firms in Nigeria.

Inventory to sales ratio revealed a coefficient value of .0216 and a probability value of 0.931, which showed that inventory to sales ratio positively influences corporate profitability (ROA). In contrast, the p-value showed that inventory to sales ratio has a statistically non-significant relationship with corporate profitability. Therefore, the study concludes that the inventory-to-sales ratio has a positive relationship with ROA, which is not statistically significant at the 5% level. This result implies that inventory to sales ratio has no significant impact on corporate profitability in consumer goods firms in Nigeria. Hence, all the independent variables which proxy inventory management are the weak determinants of corporate profitability in consumer goods firms in Nigeria.

Discussion of Findings

Firstly, it was observed that the inventory-to-assets ratio has a positive and non-significant effect on the corporate profitability of consumer goods firms in Nigeria. Inventory to assets ratio positive coefficient value, as indicated in the table above, is in line with (Adeyeye, Ogunnaike, Amaihian, Olokundun & Inelo, 2016; Althaqafi, 2020) the study apriori expectation that an increase in inventory to assets ratio will lead to an increase in corporate profitability. This increase though not significant, can be attributed to proper and efficient inventory management of stocks of the consumer goods firms in Nigeria because the higher the assets turnover ratio, the more efficient the firm is at generating revenue from its assets.

Secondly, the result showed that the inventory-to-turnover ratio has a non-significant influence on corporate profitability in consumer goods firms in Nigeria. The positive coefficient indicates a positive relationship between turnover ratio and corporate as an increase in inventory to turnover ratio leads to a rise in corporate profitability of consumer goods firms in Nigeria. However, the impact is not statistically significant. This implies that firms should increase their turnover ratio as it is part of the determinant of corporate profitability. A high inventory turnover reduces the amount of capital in their inventory, improving the firms' liquidity and financial strength. This study is with Ndirangukungu (2016), Atnafu and Balda (2018)

Thirdly, it was observed that the inventory-to-sales ratio has a weak positive relationship with corporate profitability. This implies that inventory to sales ratio positively influences the corporate profitability of consumer goods firms in Nigeria, as an increase in sales ratio leads to a rise in the firm's profitability. Finally, it was observed that the control variables, namely firm growth and firm size, have a positive and non-significant effect on corporate profitability, implying that an increase in firm growth and size will lead to a rise in corporate profitability, respectively.

5. Conclusion and Recommendations

This study examined the influence of inventory management on consumer goods firms' corporate profitability in Nigeria. The dependent variable (return on assets) was a proxy for corporate profitability. At the same time, the inventory-to-asset ratio, inventory-to-turnover ratio and inventory-to-sales were the proxies for inventory management. Also, firm size and firm growth were the control variable. The findings using the Random-effect regression model revealed that all the independent variables have a non-significant positive influence on corporate profitability in consumer goods firms in Nigeria. The study concludes that inventory management influences corporate profitability positively in consumer goods firms in Nigeria.

The study then recommended that management avoid tying down capital on inventory by ensuring adequate inventory control to avoid overstock and under-stock of raw materials and goods. The managers of consumer firms should pay adequate attention to ensuring enough goods and materials to meet demand without creating overstock or excess inventory. The store managers should be adequately trained in inventory management for a better understanding, as both availability and demand lead to higher inventory turnover, which leads to more significant profit. The firms should hire a professional in inventory management for expert advice on inventory management in the Nigerian consumer goods firms' food under study.

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