



INVENTORY CONTROL SYSTEM AND PERFORMANCE OF CONSUMER GOODS MANUFACTURING FIRMS IN NIGERIA

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Abstract: Inventory management is very pivotal for the effective management of inventory system for meeting the target profit margin of firms. The study investigated the effect of inventory control system on performance of consumer goods firms in Nigeria. The study used expo-facto research design. Sixteen quoted consumer goods firms in the Nigerian Exchange Market for the period 2018 to 2024 formed the sample size and the data was analysed using robust least square regression technique. The empirical findings revealed that raw material inventory control has an insignificant negative impact on performance of consumer goods firm, work-in-progress inventory control has a significant negative impact on performance of consumer goods firm and finished goods inventory control has an insignificant positive impact on performance of consumer goods firm. The study concludes that, for the purpose of driving the performance of consumer goods firms in Nigeria overtime, Management should ensure that there is no delay of raw material arrival in order to enhance their performance. The study recommended that management of firms should ensure that work-in-progress inventory is kept at a minimum level in order to cushion the adverse effect on performance among others.

Keywords: *Raw material, Raw material inventory control, Work-in-progress inventory control, Finished goods inventory control and Performance.*

1. Introduction

Inventory control system has been of great concern for manufacturing firms in recent time given the global economic reality. Inventory management is very pivotal for the effective management of inventory system for meeting the target profit margin of manufacturing firms (Mamuda & Adamu, 2023). Yankah et al. (2022) maintained that inventory control form the large percentage of the total costs in manufacturing firms. Ogbo et al. (2014, p.1) stressed that “inventory management system is the replenishment of lead time, replenishment of goods, returns and defective goods and demand forecasting, carrying costs of inventory, asset management, physical inventory, available physical space, demand forecasting, inventory valuation, inventory visibility, future inventory price forecasting and quality management”.



Inventory control enables manufacturing organization to support the customer service, logistic and manufacturing processes in situations where the purchase or manufacture of items is unable to meet demand.

The presence of increasing operational costs is a signal for motivating manufacturing company to maintain effective stock management control (Aro-Gordon & Gupte, 2016). The challenges bedeviling manufacturing firms were the level of inefficiency in handling inventory control and procurement that might result to loss, thief, amortization, and even deficiency (Golas & Bieniasz, 2016). However, effective management of inventory control brings about firm performance and success path. The challenges that might affect the effectiveness and efficiency of performance of a manufacturing firm include inability to forecast, long lead times, lack of optimum target inventory and high supply chain costs (Moosivand et al., 2019). Therefore, high level of inventory holding stock has a negative effect on the procurement performance of cash flow and the presence of inefficient management of inventory may cause a decline in sales volume and weaken the profit level of manufacturing firm.

Prior studies in Nigeria on the connection between inventory control system and performance explored the ordinary least regression methodology (Mamuda & Adamu, 2023; Lyndon & paymaster, 2016; Eneje et al., 2012). Mamuda and Adamu (2023) used OLS regression to examine the effect of inventory management on financial performance of consumer manufacturing companies, Lyndon and paymaster (2016) explored the use of multiple regression technique to investigate the effect of inventory cost management on profitability in Nigeria, and Eneje et al. (2012) used OLS regression technique employed to test the hypothesis. The study addressed the gap in knowledge by employing the robust least square methodology approach to investigate inventory control system and performance of consumer goods manufacturing firms in Nigeria within the period of 2018 to 2024. The choice for the use of the robust least square methodology as a methodological gap in this study, is because it provides a more accurate estimate of regression coefficients when data contains outliers and it is less dependent on the normality assumption of error terms. The usage of data set up to 2024 also formed a period gap in the study.

Inventory control system is decomposed into raw material inventory control, work in progress inventory control and finished good inventory control. In order to achieve the objective of this study, the following null hypotheses are raised;



- H₀₁: Raw material inventory control has no significant impact on performance of consumer manufacturing goods firms in Nigeria.
- H₀₂: Work-in-progress inventory control has no significant impact on performance of consumer manufacturing goods firms in Nigeria.
- H₀₃: Finished goods inventory control has no significant impact on performance of consumer manufacturing goods firms in Nigeria.

2. Literature Review

Conceptual Review

This section reviews the concepts used in the study.

Performance

Performance is described as the extent to which firms effectively allocate the available assets to generate maximum return for the organisation (Adegoroye et al., 2017). According to Rubin (2019) performance is driven by market performance which is seen as the relationship between sales value to costs, the scale of supply, operational efficiencies, advancement in processes and goods produced. Performance can be adopted as tools for influencing detailed actions taken by firms in achieving organizational goals and objectives. Kusrini et al. (2014) argued that performance measurements are designed to measure how feasible, the objectives and goals of organisations are measured with high level of effectiveness by supply chain managers to potentially explore different opportunities awaiting the business organisations in future. Akinwumi et al. (2021) posited that performance refers to how well a firm is doing in terms of making profit, return on investment, and retention of employees as well as having a good reputation from their host community. In other words, firm has to measure both the input and the output side of the inventory system when there is increase in performance.

Inventory Control System

Inventory control system is an inventory management system that is explored by manufacturing firms to keep and maintain a reasonable level of inventory investment so as to attain high level of operational performance (Atnafu & Balda, 2018). Anantadjaya et al. (2021) defined inventory management as the level of discipline exercised by manufacturing firm in relation to characterisation of the proportion and form of stocks in possession. Kimaiyo and Ochiri (2014) affirmed that inventory management is a means of efficiently integrating suppliers,



manufacturers, warehouses and inventory in order to produce and distribute the right quantities of finished goods and at the right time in order to minimize system wide costs while satisfying service-level requirements. This study employed the usage of raw material, work-in-progress and finished goods as inventory control system variables of interest.

Raw Material Inventory Control

Effective inventory control of raw material facilitates the early stage of production by manufacturing firms (Ogah et al, 2021). Raw material inventory control is seen as the process of managing the stock of raw materials. Raw material control is the process of preventing shortages and disruption in the manufacturing processes by maintaining inventory levels, reorder points, and managing safety stock to optimise procurement. Mehralian et al. (2012) opined that inventory control is based on supplier selection and supplier relationship are very keen for manufacturing companies in its supply chain management and the company must consider factors like quality of materials, delivery performance, reputation and position in industry, bargaining power, production facilities and capacity, technical capability, geographic location, order fulfillment lead time, net price, total logistics cost etc. Material inventory control enhances the flexibility of production scheduling, quick delivery system with timely economic purchase order size (Inyama, 2006). Besides, effective inventory system is a basis of planning and controlling materials from the purchase, internal operations and the service point stages through efficient distribution. Florén et al. (2013) added that effective control of raw materials promotes sustainability and performance of the manufacturing firms.

Work-in-Progress Inventory Control

Inventory management is made up of products and services, raw materials, work-in-progress and finished goods (Ziukov, 2015). Cuatrecasas-Arbós (2015) describes work in progress inventory control as the management of partially completed products or goods that are still in the production process. The essence is to cushion the uncertainty and variability in the process of ensuring that the manufacturing process is sustained. Work-in-progress inventory ensures an efficient inventory management system so as to attain high level of performance. Shareholders value might be maximized when operating costs are reduced by maintaining the level of work-in-progress inventory by satisfying customers as well as high revenue growth (Nallusamy et al., 2018).



Finished Goods Inventory Control

Finished goods inventory control is defined as the practice of managing the stock of completed goods that are awaiting distribution, sales, and to achieve optimal level of inventory to meet demand (Naufal, 2012). Inventory control enables manufacturing organisation to support the customer service, logistic and manufacturing processes in situations where purchasing or manufacturing of the items is not able to satisfy the demand. Kimaiyo and Ochiri (2014) added that inventory management is a means of efficiently integrating suppliers, manufacturers, warehouses and inventory in order to produce and distribute the right quantities of finished goods and at the right time in order to minimise system wide costs while satisfying service-level requirements. Agu et al. (2016) stated that finished goods inventory is an asset on the statement of financial position of companies.

Empirical Review

Mamuda and Adamu (2023) used ex-post facto and causal research design to examine the effect of inventory management on financial performance of manufacturing companies. Secondary data was collected from listed 41 manufacturing firm in NGX for the period of 2015 to 2021 and OLS regression was used for the data analysis. The results showed that raw material inventory control exerts a significant positive effect on financial performance while work-in-progress inventory control and finished goods inventory control exert a positive and insignificant effect. Atnafu and Balda (2018) employed survey research design to investigate the effect of inventory management on competitive spirit and performance of business organisation in Ethiopia. Primary data was collected from respondents across 188 SMEs operating in this sub-sector of the Ethiopian industrial companies and analysed using descriptive statistics and regression method. The study documented that effective inventory control bring about competitive edges and organisational success in terms of performance. Alrjoub and Ahmad (2017) used cost of capital as a moderating variable to examine the relationship between inventory management variables and firm performance in Jordan. A sample of 48 listed firms were collected within the period of 2010 to 2016 amounting to 279 firm-year observations and analysed using Pearson Correlation and Panel Generalized Method of Moments (GMM) estimation. The empirical result show that work-in-progress exerts a significant positive effect on firm performance while cost of capital has a moderating and significant relationship between inventory management and firm performance. Lyndon and



paymaster (2016) conducted a study on the effect of inventory cost management on profitability in Nigeria. The aim of the study is to examine the effect of raw material cost, work-in progress cost and finished goods cost on profitability. The study made use of longitudinal research design to sample listed brewery firms NGX covering the period of 2005 to 2014, and the multiple regression technique was used to analyse the data. The empirical result showed that work-in-progress exhibit a significant positive effect on profitability while raw material cost and finished goods were insignificant. Eneje et al. (2012) used cross-sectional data covering the period of 1989 to 2008 to examine the effects of raw materials inventory management on profitability of brewery firms in Nigeria. The OLS regression technique employed to test the hypothesis. The findings showed that raw materials inventory management has a significant positive effect on the profitability of the brewery firms in Nigeria.

Theoretical Framework

The theoretical framework linked to this study is the Activity Based Costing (ABC) analysis classification system theory, propounded by Vilfredo Pareto in 1923. Bloomberg et al. (2002) opined that Activity Based Costing (ABC) analysis is an inventory classification model that deals with the categorization of product-based system. The ABC analysis categorised finished goods based on importance ranging from cash flows, lead time, stock-outs, stock-out costs, sales volume, or profitability level. According to Ballou (2004), the ABC classification system theory helps to classify finished goods in a warehouse, or other stocking point, in a limited number of categories where they are then managed with different levels of stock availability. This theory is relevant to this study because, it provides explanation on the need of ensuring that the appropriate level of inventory is held to avoid stock out cost and prevent high carrying costs.

3. Methodology

The research design adopted for this study is the expo-facto research design. The justification for using ex-post facto research design is because it enables the researcher to gather secondary data within the time frame. The population for the study consists of all twenty-one (21) quoted consumer goods in the Nigerian Exchange Market. In line with the studies of Ogbaisi and Aronmwan (2022); Ogbaisi et al., (2022); Ukarin et al., (In Press), filtering method was applied to select sixteen (16) companies because the non-selected five (5) companies were unable to publish their financial statements for seven consecutive years within the period 2018- 2024.



The study adopted the model of Mamuda and Adamu (2023). The functional model is represented in equation 3.1 below:

$$\text{PERF} = f(\text{RMIC}, \text{WIPIC}, \text{FGIC}) \dots\dots\dots (3.1)$$

The regressions with error term (e_t) is expressed in the econometric equation below;

$$\text{PERF} = \beta_0 + \beta_1 \text{RMIC} + \beta_2 \text{WIPIC} + \beta_3 \text{FGIC} + e_t \dots\dots\dots (3.2)$$

Where;

PERF= Performance of consumer goods firms. It was measured by profit after tax scaled by total asset * 100% (Mamuda & Adamu, 2023).

RMIC = Raw material inventory control. It was measured by the value of raw material costs scaled by total revenue for the periods 2018 to 2024 (Ogah et al., 2021).

WIPIC=Work-in-progress inventory control. It was measured by the value of work-in-progress costs scaled by total revenue for the period 2018 to 2024 (Mamuda & Adamu, 2023).

FGIC = Finished goods inventory control. It was measured by the value of finished goods cost scaled by total assets for the period 2018 to 2024 (Yankah et al., 2022).

e_t , = Error term

The robust least square regression technique was used in analysing the data of this study. The study also conducted descriptive statistics and correlation analysis. Diagnostic tests were also conducted in the study. The analyses in this study were conducted using E-views 9.0 econometric software.

4. Presentation and Analysis of Results

The descriptive statistics of the study is presented in the table below.

Table 1: Descriptive Statistics

Parameter	PERF	RMIC	WIPIC	FGIC
Mean	1.0068	0.1467	0.0159	0.0285
Median	2.1500	0.1002	0.0069	0.0203
Maximum	27.9300	1.7677	0.2621	0.1469
Minimum	-103.8000	0.0089	0.0000	0.0000
Std. Dev.	15.0042	0.2020	0.0341	0.0285
Skewness	-3.5325	5.5286	4.7965	1.8668
Kurtosis	24.8024	41.7965	30.3875	7.1799
Jarque-Bera	2319.908	7187.861	3719.301	138.7420



Probability	0.0000	0.0000	0.0000	0.0000
Sum	106.73	15.5581	1.6861	3.0217
Sum Sq. Dev.	23638.48	4.285782	0.1226	0.0853
Observations	112	112	112	112

Source: EViews 9.0 output (2025)

The result in the Table above showed that performance of consumer goods manufacturing firm (PERF) has a mean of 1.0069 with a corresponding standard deviation of 15.0043. Raw material inventory control (RMIC) has a mean of 0.1468 and standard deviation of 0.2020. Work-in-progress inventory control (WIPIC) has a mean of 0.0159 and standard deviation of 0.0342, and finished goods inventory control (FGIC) has a mean of 0.0285 and standard deviation of 0.0285. Finally, based on the probability of the Jarque Bera statistics, performance of consumer goods manufacturing firm, raw material inventory control, work-in-progress inventory control and finished goods inventory control were abnormally distributed with a probability value greater than 0.05.

Correlation Analysis

The correlation analysis of the study is presented in Table 2 below;

Table 2: Correlation analysis

Parameter	PERF	RMIC	WIPIC	FGIC
PERFF	1.0000	-0.0394	-0.1000	-0.0724
RMIC	-0.0394	1.0000	0.6752	0.0399
WIPIC	-0.1000	0.6752	1.0000	0.0998
FGIC	-0.0724	0.0399	0.0998	1.0000

Source: EViews 9.0 output (2025)

The correlation analysis revealed that raw material inventory control (RMIC) has a negative coefficient (-0.0394) and weakly associated with the performance of consumer goods manufacturing firm (PERF). Work-in-progress inventory control (WIPIC) has a negative coefficient (-0.1001) and weakly associated with the performance of consumer goods manufacturing firm (PERF) and finished goods inventory control (FGIC) has a negative coefficient (-0.0724) and weakly associated with the performance of consumer goods firm (PERF). Looking at the correlation coefficient, none of the explanatory variable is perfectly correlated. This indicates the absence of multicollinearity problem in the regression result.



Regression Diagnostic Tests

Some underlying assumptions are required to be met in order for a regression to give a valid result. Diagnostic tests were conducted to ensure that the basic assumptions underlying regression modelling are not violated. The tests include: Heteroskedasticity test and the Ramsey RESET Test for model (mis)specification which helps to clearly show if the model is rightly or correctly specified. The result is presented in Table 3 below.

Table 3: Diagnostic Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.140954	Prob. F(3,102)	0.3362
Obs*R-squared	3.441602	Prob. Chi-Square(3)	0.3284
Scaled explained SS	37.08439	Prob. Chi-Square(3)	0.0000
Ramsey RESET Test			
	Value	df	Probability
t-statistic	1.848012	101	0.0675
F-statistic	3.415148	(1, 101)	0.0675
Likelihood ratio	3.524949	1	0.0605

Source: Eviews 9.0 Output (2025)

Table 4.3 showed the Breusch-Godfrey Heteroskedasticity test for the presence of heteroskedasticity problem. The outcome revealed that the probabilities (F-statistics & Obs*R-squared) were greater than 0.05 which indicates the absence of heteroskedasticity problem in the regression results. In the second layer of the table, the outcome of the Ramsey reset test of model specification was reported to test the accuracy of the regression models. The results of the test reported an F-statistic of 3.4151 and probability value of 0.0675 was greater than 0.05 meaning that there was no evidence of miss-specification.

Regression

The regression result is presented in Table 4 below.



Table 4: Regression result

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	3.773614	1.152024	3.275637	0.0011
RMIC	-4.318535	4.913355	-0.878938	0.3794
WIPIC	-81.76700	29.16153	-2.803934	0.0050
FGIC	7.752462	25.80662	0.300406	0.7639
R-squared	0.040853	Adjusted R-squared		0.012643
Rw-squared	0.134227	Adjust Rw-squared		0.134227
Akaike info criterion	220.2475	Schwarz criterion		230.8163
Deviance	5424.400	Scale		5.056400
Rn-squared statistic	22.00136	Prob(Rn-squared stat.)		0.000065
Mean dependent var	1.006887	S.D. dependent var		15.00428
S.E. of regression	15.35632	Sum squared resid		24053.30

Source: EViews 9.0 output (2025)

The regression results reveal that R^2 value of 0.040853 that about 4% of the systematic variations in performance of consumer goods firm was jointly explained by raw material inventory control, work-in-progress inventory control, and finished goods inventory control while the remaining 96% was captured by other variables not capture in this model. The Rn-squared statistic value of 22.00136 and its associated p-value of 0.000065 showed that there exist a significant relationship between the dependent variable and the independent variables.

Raw material inventory control (RMIC) has an insignificant negative impact on performance of consumer goods manufacturing firm at p-value > 0.05 level of significance. This indicates that changes in raw material inventory control would lead to a decrease in performance of consumer goods firm but not statistically significant. Work-in-progress inventory control (WIPIC) has a significant negative impact on performance of consumer goods firm at p-value < 0.05 level of significance. This indicates that changes in work-in-progress inventory control would significantly lead to a decrease in performance of consumer goods firm but statistically



significant. Finished goods inventory control (FGIC) has no significant positive impact on performance of consumer goods firm at $p\text{-value} > 0.05$ level of significance. This indicates that changes in finished goods inventory control would lead to an increase in performance of consumer goods firm but not statistically significant .

Discussion of Findings

Raw material inventory control has no significant impact on performance of consumer goods manufacturing firm. The result is in tandem with the findings of Lyndon and paymaster (2016) which revealed that raw material cost has no significant impact on performance. Work-in-progress inventory control has a significant negative impact on performance of consumer good firm. The result is consistent with the findings of Alrjoub and Ahmad (2017) which revealed that work-in-progress exerts a significant positive effect on performance of consumer goods firm. Finished goods inventory control (FGIC) has an insignificant positive impact on performance of consumer goods firm. The result is in consonance with the findings of Mamuda and Adamu (2023) which revealed that finished goods inventory control exerts a positive and no significant effect on performance of consumer goods firm.

5. Conclusion and Recommendations

The study investigated inventory control system and performance of consumer goods in Nigeria. The study concluded that raw material inventory control has an insignificant negative impact on performance of consumer goods firm, work-in-progress inventory control has a significant negative impact on performance of consumer goods firm, and finished goods inventory control (FGIC) has an insignificant positive impact on performance of consumer goods firm. The following recommendations are hereby made: Management of firms in Nigeria should ensure that work-in-progress inventory is kept at a minimum level in order to cushion the adverse effect on performance; Finished goods inventory control should be at optimum level for the purpose of driving the performance of consumer goods firms in Nigeria overtime; Management should ensure that there is no delay of raw material arrival in order to enhance performance.



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