

# **THE EFFECT OF INVENTORY COST MANAGEMENT ON PROFITABILITY: A STUDY OF LISTED BREWERY COMPANIES IN NIGERIA**

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## **Abstract**

*This study examined the effect of inventory cost management on the profitability of listed brewery companies in Nigeria. Inventory cost management proxy by raw materials cost, work in progress cost and finished goods cost was regressed against profitability proxy by gross profit margin. Secondary time series data was collected from the annual reports and accounts of selected brewery companies from the Nigeria Stock Exchange from 2005 to 2014. A multiple regression technique using the computer software statistical package Windows SPSS 20 version to analyse the data obtained from NSE. The study revealed that efficient inventory cost management have positive influence on the profitability of brewery companies in Nigeria. Based on the findings, the study recommended that brewery companies should adopt effective and efficient inventory cost management practices; deploy appropriate modern technology for effective inventory cost management; and employ capable and qualified staff who should be trained regularly on proper and efficient inventory cost management.*

*Keywords: Raw Materials Cost, Work-In-Progress Cost, Finished-Goods Cost, Profitability Inventory Cost Management, Gross Profit Margin*

## INTRODUCTION

Efficient inventory cost management is vital for the successful functioning of manufacturing and retailing organizations. Inventory consist of raw materials, work in progress, spare parts or consumables, goods in transit and finished goods. It is not necessary that an organization will have all these inventory classes, but whatever may be the inventory items, they need efficient management as, generally, substantial share of the company's funds are invested in inventory.

The inventory cost management of any organization represents an important decision making function at all stages of the product manufacturing, distribution and sales chain. Apart from being a major portion of total current assets of many organizations, according to Moore, Lee and Taylor (2003) inventory often represent as much as 40% of the capital of industrial organizations. Sawaya and Giauque (2006) also stated that inventory represents 33% of a company's assets and as much as 90% of working capital. As inventory constitutes a major segment of a company's assets, it is crucial that good inventory management practice is put in place to ensure the organization's growth and profitability to sustain the business as a going concern. This means that the right materials are in stock in the right quantity, and are available at the required time. Proper and regular checks on stores inventory are conducted to avoid pilferage, wastage and loss of customers due to stock-outs. Making the right order for inventories (buying of stocks that are needed by customers) at all times would promote high turnover thereby improving the profit level of the organization.

Temeng, Eshun and Essey (2010) in a study on the application of inventory management principles to explosive products manufacturing and supply concerns, stated that organizations have historically ignored the potential savings from proper inventory management, treating inventory as a necessary evil and not as an asset requiring management. As a result, many inventory systems are based on arbitrary rules. It is therefore not unusual for some organizations to have more funds invested in inventory than necessary and still not be able to meet customers demand because of poor distribution of investment and inventory items (Temenget al, 2010).

Several studies conducted on this field in the past showed the lack of consensus among the findings of scholars, indicating a research gap. This study attempted to bridge that gap and contribute to existing literature by identifying a unique set of independent variables as proxy for inventory cost management.

The broad objective of this study was to examine the effect of inventory cost management on the profitability of the brewery industry in Nigeria. This study adopted raw materials cost (RAMCO), work in progress cost (WIPCO) and finished goods cost (FIGCO) as proxies for inventory cost management (the independent variables). While gross profit margin

(GOPMA) was used as proxy for profitability (the dependent variable). The specific objective of this study therefore was to examine the relationship between RAMCO, WIPCO, FIGCO and GOPMA.

The rest of this paper is structure as follows: Section two provides a review of empirical literature while section three deals with the study methodology. The study findings and discussion are presented in section four, and section five provides the conclusion and recommendations.

## REVIEW OF EMPIRICAL LITERATURE

This section presents the review of related literature in order to establish a basis for the investigation of the effect of inventory costs management on the profitability of brewery companies in Nigeria. The review covered previous empirical studies conducted in various countries on this subject.

Mohamad, Suraidi, Rahman and Suhaimi (2016) in a case study of a textile chain store in Malaysia, examined the relation between inventory management and company performance and found that there inventory days was significantly related to return on assets (used proxy for company performance). The study identified that the textile chain store company had unorganized inventory arrangement, large amount of inventory days and lacked accurate stores balances due to unskilled workers. Also, Victoire (2015) investigated the impact of inventory management on profitability in Rwanda using a manufacturing company as case study. The findings indicate that inventory management had significant impact on the company's financial performance.

Prempeh (2015) studied the impact of efficient inventory management on the profitability of manufacturing firms in Ghana, using raw material inventory management and profit as variables. Cross sectional data from the annual reports of four manufacturing firms listed on the Ghana Stock Exchange were analysed using Ordinary Least Squares (OLS) and multiple regression techniques. The study found a significantly strong and positive relationship between raw material inventory management and profitability. Also in Ghana, Ebenezer and Asiedu (2013) examined the effect of working capital management on profitability of manufacturing companies. Among the independent variables adopted inventory days had influence on profitability.

In a related study, Sitienei and Memba (2015) using similar analysis techniques examined the effect of inventory management on the profitability of cement manufacturing companies in Kenya. Their study findings revealed that inventory turnover, inventory conversion period, and inventory storage costs were negatively related to profitability. Also in Kenya,

Budambula (2014) in a case study of a tea trading company examined the effect of working capital management on profitability. The study adopted profitability as the dependent variable, and inventory, debtors, creditors and overdraft management practices were the independent variables. The study found that inventory was the third independent variable that had significant effect on profitability. Using a case study of a dairy company in Kenya, Keitany, Wanyoike and Richu (2014) examined the effect of raw materials management on performance. Employing descriptive statistical tools as method of data analysis, the study found materials management influenced increased organizational performance. Lwiki, Ojera, Mugenda and Wachira (2013) examined the impact of inventory management on the financial performance of sugar manufacturing firms in Kenya. Both primary and secondary data collected were analysed using descriptive statistics and correlation analysis, and they found inventory management had positive correlation with financial performance.

Ogbo, Onekanma and Ukpere (2014) examined the relationship between effective inventory management and organization's performance in Nigeria. This case study of a bottling company using descriptive statistics and *Chi-Square* non-parametric test found that inventory management enhanced the return on investment. Augustine and Agu (2013) studied the effect of inventory management on organizational effectiveness and profitability of manufacturing companies in Nigeria. Using Pearson product moment correlation coefficient and linear regression techniques, the study found positive correlation between inventory management and profitability. Okwo and Ugwunta (2012) studied the impact of input costs on firm profitability of the breweries industry in Nigeria. The study adopted the ratios of selling and general administrative expenses, cost of goods sold (inventory), receivables, payables and depreciation as independent variables; and profitability as dependent variable. Using Ordinary Least Squares and multiple regression techniques, they among others found that cost of goods sold (inventory) had positive significant relationship with profitability. Abdulraheem, Yahaya, Isiaka and Aliu (2011) studied the impact of inventory management on the performance of small businesses in Nigeria, using multiple regression technique. The study found that inventory management had a strong positive impact on profitability among small businesses in Nigeria. Falope and Ajilore (2009) used a sample of 50 Nigerian quoted non-financial firms for the period of 1996-2005. Their study utilized panel data econometrics in a pooled regression where time series and cross sectional observation were combined and estimated. They found a significant negative relationship between operating profit and the inventory turnover in days for a sample of 50 Nigerian firms listed in the Nigerian Stock Exchange.

Hassan, Imran, Amjad and Hussain (2014) examined the effect of working capital management on the performance of listed non-financial firms in Pakistan. Ordinary Least

Square technique was employed to analyse data collected from non-financial firms listed on the Karachi Stock Exchange for the period 2007 to 2010. Among the independent variables used as proxy for working capital management, average age of inventory had a positive insignificant relationship with gross profit margin and return on assets, but had a negative insignificant effect on return on equity. Raheman and Nasr (2007) studied the effects of inventory turnover in days and current ratio of the net operating profit of Pakistani firms. They selected a sample of 94 Pakistani firms listed on the Karachi Stock Exchange for a period of six years from 1999-2004 and found a strong negative relationship between inventory conversion period and profitability of the firms.

Sekeroglu and Altan (2014) investigated the effect of inventory management on the profitability of firms in the weaving, food, wholesale and retail industries in Turkey from 2003 to 2012. The study employed regression and correlation techniques using the computer software SPSS 20 version to analyse data collected from the income statements of the selected firms. The results showed positive relationship between inventory management and profitability in the food industry, but no relationship in the weaving, wholesale and retail industries. Panigrahi (2013) examined the relationship between inventory conversion period and the profitability of cement companies in India for the period 2001 to 2010. The study adopted gross operating profit as the dependent variable and proxy for profitability and inventory conversion period as the independent variable. In addition, current ratio, size of the firm and financial debt ratio were used as control variables. The study found significant negative linear relationship between inventory management and profitability. Deloof (2003) studied the relationship between inventory conversion period and corporate profitability, using a sample of 1,009 large Belgian non-financial firms for a period of 1992-1996. The study employed correlation and regression analysis techniques to data and found a significant negative relationship between gross operating income and inventory turnover days of Belgian firms.

## **METHODOLOGY**

The study examined the effect of inventory costs management on the profitability of the brewery industry in Nigeria, using secondary data collected from the annual reports and accounts of brewery companies listed on the Nigerian Stock Exchange from 2005 to 2014. This source of data is reliable and dependable for the study because the accounts have been prepared in line statutory requirement and have been audited and certified. The availability of the relevant data required for the analysis was a primary consideration for the inclusion of each company selected for the study. The study adopted longitudinal research design using time series panel

data for the ten years period which was considered good enough in determining the long term effect.

The study employed multiple regression analysis technique using the computer software SPSS-20 version to examine the correlation between inventory costs management and profitability of the brewery industry in Nigeria. Raw materials cost (RAMCO), work in progress cost (WIPCO) and finished goods cost (FIGCO); three elements of inventory costs management were identified and employed as the independent variables. (Prempeh,2015) and (Keitany, Wanyoike & Richu, 2014) used raw materials management as proxy for inventory management and independent variable in their studies, but (Okwo & Ugwunta, 2012) used cost of goods sold, a combination of all three elements of inventory cost as independent variable in their study. While gross profit margin (GOPMA) was employed as proxy for profitability of brewery companies in Nigeria. Gross profit margin sometimes referred to as gross operating profit or gross operating income was used as proxy for profitability and dependent variable by (Hassan, Imran, Amjad&Hussain, 2014), (Panigrahi, 2013) and (Deloof, 2003).

### Model Specification

A multiple regression model of the following form was developed to capture the relationship between RAMCO, WIPCO, FIGCO and GOPMA using SPSS-20 version:

$$GOPMA=f(RAMCO, WIPCO, FIGCO)$$

The above model was explicitly translated into a multiple linear regression equation for easy empirical verification as stated below:

$$GOPMA= \alpha+\beta_1RAMCO+ \beta_2WIPCO + \beta_3FIGCO + \mu \quad \text{equation 1}$$

Where,

*GOPMA* = Gross profit margin, proxy for profitability and dependent variable.

*RAMCO*= Raw material cost

*WIPCO*=Work in progress cost

*FIPCO*=Finished goods cost

$\alpha$  = the constant term

$\beta_1, \beta_2, \beta_3$ = the coefficients of the independent variables to be determined

$\mu$ = the error term of the equation

The above regression model form was employed in the studies carried out by (Prempeh, 2015), (Ebenezer & Asiedu, 2013), (Sitienei & Memba, 2015), (Okwo & Ugwunta, 2012), (Abdulraheem, Yahaya, Isiaka & Aliu, 2011) and (Panigrahi, 2013).

## FINDINGS AND DISCUSSION

The study examined the relationship between RAMCO, WIPCO, FIGCO (independent variables) and GOPMA (dependent variable). Table 1 below is the summarized aggregate values of the variables (expressed in percentages) of the data collected from the annual reports and accounts of the selected brewery companies listed on the Nigerian Stock Exchange from 2005 to 2014.

Table 1: Aggregated Annual Values of GOPMA, RAMCO, WIPCO and FIGCO of Brewery Companies in Nigeria Expressed in Percentages from 2005 to 2014.

Year	Dependent Variable		Independent Variables	
	GOPMA (%)	RAMCO (%)	WIPCO (%)	FIGCO (%)
2005	11.53	7.21	00.54	3.81
2006	13.87	12.77	00.67	4.13
2007	17.17	10.01	00.67	10.95
2008	17.15	8.92	00.57	2.76
2009	15.19	1.01	1.01	1,76
2010	12.56	8.29	1.09	0.11
2011	14.50	7.55	1.19	2.27
2012	11.62	9.14	1.16	3.81
2013	12.73	11.16	1.20	5.43
2014	14.56	12.35	1.52	7.25

Source: Nigerian Stock Exchange, Computed by the Researcher from the Annual Reports and Accounts of listed brewery companies, 2005 – 2014

The highest GOPMA was recorded in the year 2007 with GOPMA of 17.17% and the lowest in 2005 with 11.53% for the period covered. It can also be observed that the profitability (GOPMA) nature has not been steady, going up and up and down over the period. This could be due to the changing nature of the independent variables; with RAMCO and FIGCO also exhibiting the same characteristic, while .WIPCO showed steady increase over the period. A summary of the multiple regression results are presented in table 2 below.

Table 2: Summary of Multiple Regression Results

Model	Unstandardized Coefficient		Standard Coefficient	T	Sig
	B	Standard Error			
Constant	18.046	43.126			
RAMCO	0.281	0.162	0.106	3.173	0.006
WIPCO	0.015	0.046	0.132	1.207	0.038
FIGCO	0.487	0376	0.522	9.298	0.002

Dependent Variable: Profitability (GOPMA)

R = .990, R<sup>2</sup> = 980, R<sup>2</sup> Adjusted = .955 F-Statistics = 37.284

F-Charge = 0.002, Durbin Watson (DM) = 2.020

The table above shows the summary of the regression results of the inventory management variables: RAMCO, WIPCO and FIGCO, and their effect on the profitability (GOPMA) of listed brewery companies in Nigeria. The results show that all the three elements of inventory costs management have significantly positive influence on (GOPMA) the profitability of brewery companies in Nigeria.

The explanatory power of the model as informed by  $R = 0.990$  (99%) and  $R^2 = 0.98$  (98%) is positively and statistically significant given the high value of the F-Statistic (37.284). This indicates that the model is a very good fit, and all three independent variables jointly influenced the dependent variable. The Durbin Watson (DW) value of 2.020 falls within the region of auto-correlation, which is understandable given the nature of the independent variables. However, this is unlikely to have adverse effect on the regression results.

The regression model demonstrates a good fit given that 95.5% of the variation in the dependent variables (profitability) is jointly explained by changes in the observed behaviour of raw materials cost, work-in-progress cost and finished goods cost. The relatively high adjusted  $R^2$  of 95.5% shows that the regression model fits the data well. About 4.5% variation in profitability can be explained by other unknown variables not capture in the present model. The high significant F-statistic value of 37.284, sig. 0.002 confirms that the high adjusted  $R^2$  did not arise by chance. Therefore the model is robust.

The test of significance shows that all the variables are significant when compared with the table value of 1.96 at 5% level of significance and the three independent variables are significant at 5% level. Specifically, a unit increase or decrease in RAMCO, WIPCO and FIGCO would lead to an increase or decrease in GOPMA (that is, the profitability) of brewery companies in Nigeria, with a margin of 0.281, 0.015, and 0.487 respectively. The study findings has shown empirically that raw material cost, work in progress cost and finished goods cost (as components of inventory costs management) have significant positive relationship with the profitability of brewery companies in Nigeria. Thus it has revealed that efficient inventory costs management have positive effect on profitability. The results agrees with the study findings of (Prempeh, 2015), (Keitany, Wanyoike & Richu, 2014), (Lwiki, Ojera, Mugenda & Wachira, 2013), (Augustine & Agu, 2013), (Okwo & Ugwunta, 2012) and Abdulraheem, Yahaya, Isiaka & Aliu, 2011).

## CONCLUSION AND RECOMMENDATIONS

This study examined the effect of inventory cost management on the profitability of listed brewery companies in Nigeria. Inventory cost management proxy by raw materials cost, work in progress cost and finished goods cost was regressed against profitability proxy by gross profit



margin. Secondary time series data was collected from the annual reports and accounts of listed brewery companies from the Nigeria Stock Exchange from 2005 to 2014. A multiple regression model was adopted to determine a linearity link of the variables and test the causality relationship between inventory cost management and profitability of brewery companies listed on the NSE. The study revealed that efficient inventory cost management have positive influence on the profitability of brewery companies listed on the NSE of Nigeria. Enhance it was proved that effective and efficient inventory cost management would lead to higher profitability, as the entire profitability of a brewery company is tied to the volume of products sold which has a direct relationship with the quality of the product.

Good inventory cost management practices in the breweries in Nigeria would save the companies from loss of profit, and disappointment of valued and loyal customers. However, a situation where proper and adequate inventory cost management practices are not maintained would lead to breweries experiencing loss of revenue and customer patronage.

Based on the findings, the study recommended that brewery companies adopt effective and efficient inventory cost management practices; as well as deploying appropriate modern technology for effective inventory cost management. It was also recommended that capable and qualified staff be employed and trained regularly on proper and efficient inventory cost management by the managers of brewery companies. The study suggested that further research be carried out in other industries as the results established for the brewery industry may not be appropriate to draw conclusions for other industries.

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