RESEARCH ARTICLE

EFFECT OF EFFICIENT INVENTORY MANAGEMENT ON PROFITABILITY: EVIDENCE FROM OF SELECTED BREWERY FIRMS IN NIGERIA

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ARTICLE INFO	ABSTRACT
	Given the important contributions of the brewerysector to the Nigerian economy, this research deems it necessary to evaluate the effect of raw materials inventory management on the profitability of brewery firms in Nigeria. A cross sectional data from 1989 to 2008 was gathered for the analysis from the annual reportsof the sampled brewery firms. Measures of profitability were examined and related toproxies for raw materials inventory management by brewers. The Ordinary Least Squares (OLS) stated in the form of a multipleregression model was applied in the analysis. The study revealed that the focal variable raw materials inventory management designed to capture the effect of efficient management of raw material inventory by a company on it's profitabilityis significantly strong and positive and impacts on the profitability of the brewery firms in Nigeria. Therefore, efficient management of raw material inventory is a majorfactor to be contained with by Nigerian brewers in enhancing or boosting their profitability.

INTRODUCTION

The importance of proper management of inventory need hardly be emphasized. In any manufacturing industry, nearly 60% to 70% of the total funds employed are tied up in current assets, of which inventory is the most significant component (Carter, 2002). In the cost structure of most of the products, raw materials constitute about 50 percent of the budgeting and control of materials Zanto (2008). The objective of any commercial organization is to get the best mileage out of every naira invested in the company. According to Pandey (2005) management through their policies, coordination, decision and control mechanisms must maximize the return on investment (ROI). Peterson and Joyce (2007) while supporting Pandy (2005) states that it is clear that ROI can be maximized either by increasing profit margin or by reducing the capital employed or by both. In the market situation, sales price cannot be increased (rather there is a demand to reduce it) and as such profit can be increased only by reducing the material costs. On the other hand, the opportunity to reduce the overheads and capital employed is more by inventory reduction (Drury, 2002). It is thus evident that the ROI can be maximized by either reducing the material cost or reducing the current assets by way of inventory of materials or can be optimized by increasing profits. Peterson and Joyce (2007) maintain that it is evident that the inventory management can make a direct contribution in increasing profitability in the following ways:

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(a) By deciding inventory norms nationally and through control systems. Inventory turnover can be maximized which in turn will maximize current assets turnover and ROI.

(b) By proper planning and control of spare parts, capacity utilization can be increased which will increase the turnover of fixed assets and consequently increase ROI.

(c) By developing dependable sources and purchasing quantity materials at competitive prices. Materials cost per naira of sales can be brought down which will increase the profit margin.

(d) By developing proper systems and control on issue of materials, the consumption can be minimized, reduction in wastes and rejects, resulting in reducing the materials cost, which will increase the profit margin.

(e) Establishment of farms to grow the major raw materials and less dependent on importation.

Unless operators in the brewery industry understand the true costs associated with inventory management and poor inventory productivity, and can review the benefits of alternative approaches, they will continue to be inventory complacent, accepting mediocrity profit instead of stellar performance (Grupo, 2010). This paper is of the opinion that the operators in the industry adopting a holistic operating model that improves inventory productivity, enhances sales margin, and saves millions of naira in operating costs especially on costs associated with inventory starts with a comprehensive organizational focus on inventory management. Therefore, the focus of this study is achieving profitability through effective management of inventory with emphasis on procurement, receipt of materials, holding and ordering costs, inventory control, and foreign currency for

import. The rest of the paper is divided into four sections. Section two is concerned with the theoretical framework and review of related literature. Section three elucidates the methodological framework while section four discusses the findings and section five concludes the paper.

Review of related literature

In the brewery industry, inventories constitute the second-largest category of assets shown on the balance sheet exceeded only by physical facilities and equipment (Armstrong, 1985). Given the size of inventories maintained by manufacturing firms, a considerable amount of funds is required to be committed to them. Famurewa and Orekoya (2009) supporting Armstrong (1985) opines that it is, absolutely imperative to manage inventories efficiently and effectively in order to avoid unnecessary investment. A firm neglecting the management of inventories will be jeopardizing its long-run profitability and may fail ultimately. It is possible for a company to reduce its levels of inventories to a considerable degree without any adverse effect on production and sales, by using simple inventory planning and control techniques. The reduction in excessive inventories carries a favorable impact on a company's profitability. Sharma (2003) defines inventory as the quantity of goods, raw materials, or other resources that are idle at any given point of time. From the definition above, inventories consist of raw materials, component parts, supplies or finished assemblies etc which are purchased from an outside source, and goods manufactured in the enterprise itself. In simple words, inventory refers to stocks held by a firm. Relating the definition to the brewery industry, this paper defines inventory as the stock of the product a company is manufacturing for sale and components that make up the product. The various forms in which inventories exist in brewing company are: Raw and packaging materials; finished products/ bottled beer; empty bottles and containers; spare parts; beer in process / product in process, stock in transit. David (2004) grouped the afore mentioned brewery inventories into four to include:

(1) Production Inventories; they are raw materials, parts and components which enter the breweries products in the production process.

(2) In-process inventories; They are beer in process that need refinement before they become brewed products in the form of lager, stout, malt, soft drink and spirits etc.

(3) Finished goods inventories; Completed brewed product ready for sale.

(4) Maintenance, repair, and operating supplies which are consumed but do not become part of the brewed products such as plant cleaning materials, lubricating oil, spare parts, engineering parts etc but they are necessary for production process.

In other words, inventory is a quantity or stock of goods that is held for some purpose or use. Inventory management or inventory control, is an attempt to balance inventory needs and requirements with the need to minimize costs resulting from obtaining and holding inventory. Zikmund and D'Amico (1993) define inventory management as the activities involved in bringing raw materials and supplies to the point of production and moving in process inventory through the firm. Though this definition captures some of the activities of inventory management, it leaves out some vital issues that

concern the function. The definition rightly points out the important activities of inventory management in relation to the sourcing, procurement, and movement of raw materials, supplies and work-in-progress inventories through the company. However, it leaves out the very vital issues of the economic storage and deployment of the materials in order to ensure that they serve the benefits of the company concerned. The role of inventory management is to ensure that the needed materials and spare parts are made available at the places, time, proportions, and conditions necessary for production to turn out the desired outputs. Inventory management is all about ensuring the availability of the production inputs of materials and effectively and efficiently controlling the costs of the operation (Olakunle, 2004). As the buyers' market is gradually emerging and taking over in many of our industries, the competition for raw materials and component parts now need to be sourced from very many and far places as the location of industries is now mainly determined by market forces rather than the sources of materials inputs (Olakunle, 2004). NAFDAC (2006) study reveals that with the global economic recession of the early 1980s and the introduction of the Structural Adjustment Programme (SAP) in Nigeria in 1986, the costs of both imported and locally-sourced material production inputs have increased tremendously.

Added to this is the problem of galloping inflation which is ravaging the economy, despite all the efforts made to curb it. The government on its own has made things more complex by its discordant economic policies and programmes which offer incentives to business with the left hand while using the right hand to strangulate it. As the economic scenario becomes chearer due to the high prevalence of business collapse (such as breweries) and mistrust reigns. Long-term supply contracts, credits facilities, and non-cash transactions are becoming more and more difficult to obtain. In the midst of all these, the markets are expanding (both locally and internationally), and this means that more resources are required to be invested on material input. As competition for consumers' patronage increases, price is becoming a major tool of competition (as we presently have it in the telecommunication, food and drinks sectors, among other). Danna (2003), posit that consumers are no longer ready to take just any product they are offered. They have a choice and are ready to exercise it to great lengths.

Organizations that fail to provide the products that closely meet the satisfaction of consumers will no longer have a place in the market. All these go to show the great need for more prudence in purchasing the right materials for production and must be obtained and made available where and when needed to ensure that the output will satisfy consumer (Ogbonna, 2008). The management of inventory is very important in the operations of organizations as most manufacturing firms invest up to sixty percent of the costs of production on inventory alone (Olakunle, 2006). This means that efficient inventory management can serve as a major and more proficient avenue for cost saving. Inventory control is the means by which material of the correct quantity and quality is made available as and when required with due regard to economy in storage and ordering costs, and working capital (Sharma 2003). It may also be defined as the systematic location, storage and recording of goods in such a way that desired degree of service can be made to the operating shops at minimum ultimate cost. Inventory control in a brewery

industry is not an easy task, most especially as it relates to production and MRO inventories. In the first place, inventories are of different categories. This calls for a clear cut differentiation, description, and separation of every class of inventory where possible. Again, each category of inventory has a large number of different items with each having its own quantity which may differ from others. In large manufacturing and marketing companies like Guinness Plc and Nigerian breweries Plc, up to 50000 different items of varying quantities may be kept at a time (Olakunle, 2004). For Guinness Nigeria Plc and Nigerian Breweries Plc that manufacture many alcoholic and non-alcoholic drinks, bottles, crates and cans, parts and components, one can imagine the number of items they would have to have as production and MRO inventories. The Management of such a huge and diversified number of inventories cannot be expected to be easy. To facilitate the control (and management) of inventories, a systematic approach would have to be adopted. A good knowledge about each of the individual inventory items and the finished products it assists in making is necessary-when planning for and executing the control programme for inventories. This makes it necessary to fully document the inventories.

When the detail about each inventory item is documented, access to knowledge about each item becomes easy even when personnel are changed. The documentation of the inventories of a firm is achieved by developing a complete catalogue. Many researchers have studied working capital from different views and in different environments. The following ones were very interesting and useful for this study: Raheman and Nasr (2007) studied working capital management and profitability case of Pakistani firms. The study sought to establish the effect of working capital management on liquidity as well on profitability. The researchers made use of regression analysis and time series data. It was found that most Pakistani firms have large amount of cash invested in working capital and a significant negative relationship between net operating profit and average collection period. Amadasu (2003) investigated the management of pharmaceutical sector inventory in the Nigeria health industry. The study sought to establish the effect of material inventory management in pharmaceutical firms' implication on profit and business survival in times of economic expansion.

The research made use of personal interview. It was found that to be on the safe side proper inventory management should be instituted out with alternative installation of the periodic inventory system for its large accommodation of safety stock and avoidance of shortage. Oko, Mgbonyebi and Umeadi (2008) carried out a research on the association of inventory control in enhancing business growth in Nigeria a survey of five selected manufacturing companies in port Harcourt metropolis. They made use of simple percentage and chi-square. The analysis revealed significant relationship between inventory control and business growth. Lazaridis and Trytonidis (2005) investigated the relationship of corporate profitability and working capital management. They used a sample of 131 companies listed in the Athens Stock Exchange (ASE) for the period of 2001 – 2004. Their purpose was to establish a relationship that is statistical significant between profitability, the cash conversion cycle and its components for listed firms in the ASE. They made use of regression analysis.

The results of their research showed that there is statistical significance between profitability, measured through gross operating profit, and the cash conversion cycle. Moreover, they were of the opinion that managers can create profits for their companies by handling correctly the cash conversion cycle and keeping each different component (accounts receivables, accounts payables, inventory) to an optimum level. Ramachandran, and Jarakiraman, (2009) analysed the relationship between working capital management efficiency and EBIT of the paper industry in India during 1997 – 98 to 2005 – 2006. They made use of regression analysis. The study revealed that the paper industry has managed the working capital satisfactorily. Garcia – Teruel, and Martinez – Solano (2004) carried out empirical evidence about the effects of working capital management on the profitability of a sample of small and medium sized Spanish firms of 8,872 SMEs covering the period 1996 – 2002. The study made use of correlation analysis. The results, which are robust to the presence of endogeneity, demonstrate that managers can create value by reducing their firm's number of day's accounts receivable and inventories. Equally, shortening the cash conversion cycle also improves the firm's profitability. Ghost and Maji (2003) examined the efficiency of working capital management of the Indian cement companies during 1992 – 1993 to 2001 – 2002. For measuring the efficiency of working capital management, performance, utilization, and overall efficiency indices were calculated instead of using some common working capital management ratios.

It was found that the Indian cement industry as a whole did not perform remarkably well during those periods studied. Furthermore, Shin and Soenen (1998) studied again a large sample of 58,985 firms for a period of twenty years and found a strong negative relationship between what they called the net trade cycle and corporate profitability of listed companies in America, and opined that, managers can increase the value of their shareholder wealth by reducing the cash conversion period to a reasonable minimum. Smith and Begemann (1997) evaluated the association between traditional and alternative working capital measures and return on investment (ROI) specially, in industrial firms listed on the Johannesburg Stock Exchange (JSE). They made use of regression analysis. The statistical test results showed that a tradition working capital leverage ratio, current liabilities divided by funds flow, displayed the greatest associations with return on investment. Well known liquidity concepts such as the current and quick ratios registered insignificant associations while only one of the newer working capital concepts, the comprehensive liquidity index, indicated significant association with return on investment. From the findings of the empirical works reviewed above, improvement on management of Brewery inventory remains the major influence in determination of profit rather than reduction in inventory level.

METHODOLOGY

This research covers quoted brewery companies in Nigeria. The population of quoted brewery companies listed on the Nigerian stock exchange is seven companies out of which a sample of two brewery companies was purposively selected using judgment sampling techniques based on the researcher's knowledge of the population. The two brewery companies chosen are those companies whose published financial reports and required data were available for the whole period under

review. The data for the measure of the variables were collected from annual financial statement of the sampled companies and non-quoted companies were excluded due to non-availability and non-disclosure of their financial reports respectively. The analyses were carried out in two stages. First, we applied Pearson correlation to determine the strength and significance of the relationship between raw material management and profitability of brewery companies in Nigeria. Secondly, data collected were analyzed using multiple regression analysis to ascertain the impact of raw material management on profitability of brewery firms in Nigeria. The multiple regressions is stated thus:

$$P = \beta o + \beta iRM + \beta 2SCt + \beta 3Fxt + \beta 4IM + Ui \quad \ldots\ldots\ldots (1)$$

Where;
P = Profit (dependant variable)
RM= Raw Materials comprising of local and imported raw materials.
Sc = Storage costs 15% of cost of sales.
FX= foreign exchange costs (All the foreign currencies purchased for imports).
IM= maintenance repairs and operating supplies (addition of Engineering spares and sundry materials).
βo = is the intercept of the regression and βi, $\beta 2$, $\beta 3$, $\beta 4$ are the coefficient of the regression
Ui= is the error term capturing other explanatory variables not explicitly included in the model
t = denotes time.

Findings

Pearson method of correlation was firstly applied to the sampled brewery firms to determine the relationship between raw material inventory management and profitability. The results are as presented in Table 1 below.

Table 1. Pearson Correlations for NB and Guiness Nigeria PLC

		P	SC	FX	IM	RM
Pearson Correlation	P	1.000	.788	0.15	.800	.942
	Sc	.788	1.000	.248	.608	.771
	Fx	.015	.248	1.000	.296	-.0058
	Im	.800	.608	.296	1.000	.859
	Rm	.942*	.771	-.058	.859	1.000
Sig.(1-tailed)	P	.	.000	.477	.000	.000
	Sc	000	.	.168	.005	.000
	Fx	.477	.168	.168	.125	.413
	Im	.000	.005	.125	.	.000
	Rm	.000	.000	.413	.000	.

Source:*Statistical package (SPSS)output.*

Key:*Profit (P); Storage Cost (Sc); Foreign Exchange Costs (Fx);*

Indirect Materials (Im); Raw Materials management (Rm)

The Pearson correlation as presented in Table 1 above reveals that the relationship between raw materials inventory management and brewery firms profitability is positive as indicated by the +tive sign for RM. The implication of this finding is that as brewery firms improve in the management of raw materials inventory, their profitability increases. The

strength of the relationship of 94.2 is strong as well as been statistically significant. The statistically significant result is strengthened with significance value of .000 <0.05 significance level. Having confirmed a positive relationship between raw materials management and profitability, the study hence tests the hypothesis that:

H_o: Raw materials inventory management has no significant effect on the profitability of brewing firms in Nigeria.
H_1:   Raw materials inventory management has significant effect on the profitability of brewing firms in Nigeria.

The above stated null and alternate hypothesis was tested by applying an ordinary least squares to the brewery data and the result is as presented in Table 2.

Table 2. Regression Result

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. error	Beta	t	Sig.
1 (constant)	1421464.340	227418		0.625	0.544
Rm	0.321	1.229	1.096	2.314	0.039
Sc	0.058	0.139	0.033	0.139	0.892
Fx	0.286	0.417	0.129	0.641	0.533
Im	-0.869	0.445	-0.200	-0.565	0.582
		1.536			

(a)Dependent Variable: Profitability. Source:*Statistical Analysis of SPSS output.*

The t and Sig (p) values gives a rough indication of the impact of each predictor variable on the predicted variable. An absolute t value > 2 and p value < 0.05 suggests that a predictor variable is having a large impact on the criterion or dependent variable. The table therefore shows that raw materials inventory management (RM) has a significant impact on the profitability of brewery firms in Nigeria. This is evidenced by RM tc = 2.314 > t* 2. The result is further strengthened with the RM significance value of 0.039 < 0.05. Given the above, we reject the null hypothesis while accepting the alternate and conclude that raw materials inventory management has significant effect on the profitability of brewing firms in Nigeria.These suggest strongly that adequate management of raw materials management enhances profitability for the brewery industry in Nigeria.

Conclusion

This paper measured the effects of raw materials inventory management on the profitability of firms in the Nigerian brewery sector. A cross sectional industry dataset of brewery firms in Nigeria during the period of 1989 to 2008 provided the basis for the econometric analysis. The industry has maintained its status as a pioneer in the manufacturing industry in Nigeria led by Nigeria Breweries Ltd and Guinness Nigeria Plc; the two heavy weight companies that drive the country's beer market. Findings from this study reveal that the focal variable raw material inventory management designed to capture the effectiveness of a company's management of part of working capital on profitability is significantly positive and impacts on profitability of the brewery firms in Nigeria. Our findings conform to the findings of Lazaridis and Trytonidis (2005) whose results of their research showed that there is statistical

significance between profitability and working capital management. From the results of the study, raw materials inventory management is the major variable that has significant positive relationship on the profitability of the brewery firms in Nigeria. Management of raw materials is therefore an important factor to be considered in enhancing or boosting the performance of brewers in Nigeria. It is therefore necessary that adequate management of raw materials inventory should be pursued by brewery firms in Nigeria. This can be achieved by encouraging large scale mechanized production of the major raw material - sorghum in Nigeria and training and re-training of staff from time to time to update their knowledge and skills in modern brewing techniques.

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