Journal of Finance and Accounting, 2017, Vol. 5, No. 3, 75-79
Available online at http://pubs.sciepub.com/jfa/5/3/1
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DOI:10.12691/jfa-5-3-1

Inventory Management and SMEs Profitability. A Study of Furniture Manufacturing, Wholesale and Eatery Industry in Delta State, Nigeria

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Abstract Inventory constitutes bulk of current assets small and medium scale enterprises (SMEs) such as bakeries, fast food/eateries, chain stores and furniture making firms. SMEs need to understand the true costs associated with inventory management and poor inventory productivity so as to be able to review the benefits of alternative approaches. The objective of the study was to examine the effect of inventory management on profitability of SMEs in Nigeria. The study used a descriptive research design. The population consists of all SMEs operating in Delta State. The study used stratified random sampling. 10 SMEs were randomly selected from each stratum making a total of 30 firms for the study. Data for the study were obtained through the administration of a self-designed questionnaire to managers or accountants of the sampled firms. The questionnaire was structured to elicit information about the trading and financial activities for the last two accounting years. A multiple regression analysis was conducted to test the model established for the study. Findings of the study reveal that inventory turnover has a significant positive relationship with financial performance of SMEs. The study also reveals that there is a negative relationship between inventory conversion period and profitability; and no significant positive relationship between inventory leanness and profitability. The study concludes that inventory management has a great role to play in corporate financial performance of firms hence firms' inventory systems must maintain an appropriate inventory levels to enhance profitability and reduce the inventory costs associated with holding excessive stock in the warehouses. In line with the findings of the study, it is recommended that firms should embrace modern production technology that will enhance faster production to shorten inventory conversion period which will in turn improve inventory turnover and profitability.

Keywords: *inventory management, Small and Medium Sized Enterprises, profitability*

Cite This Article: Otuya Sunday, and Eginiwin E. Joseph, "Inventory Management and SMEs Profitability. A Study of Furniture Manufacturing, Wholesale and Eatery Industry in Delta State, Nigeria." *Journal of Finance and Accounting*, vol. 5, no. 3 (2017): 75-79. doi: 10.12691/jfa-5-3-1.

1. Introduction

Inventories are working capital component of assets or items held in the normal course of business that will be consumed or used in the production of goods for resale. Pandey [1] defines inventory as the stocks of raw materials, work in progress, finished goods and supplies held by a company to facilitate operations in the production process. Inventory management on the other hand, is a systematic process which aims at discovering and maintaining optimum levels of investment in all types of inventories and making best use of the flow of goods, information and other related resources like people and energy from the point of origin to the point of final consumption [2].

Issues of inconsistencies of inventory levels with the resultant effects of losses that come due to over, under-stocking, expired stock, failure to meet targets and low morale of the company workers have raised questions for management about the efficiency of inventory management procedures in place. The task of inventory management has often been associated with either overstocking and too little management or under-stocking and too much management [3]. Each extreme has severe penalties in either direction.

Studies [3-13] acknowledge that inventory management plays an important role in every organization as any unproductive inventory system will lead to delivery delays, production disorganization or loss of customers and sales. Wanke [14] states that inventory management approaches are a function of product, operational and demand related variables such as delivery time, obsolescence, coefficient of variation of sales and inventory turnover and that logistics managers are more likely to decentralise inventory in order to stock product close to the customer's facility if the customers demand a reduced delivery time.

In traditional settings, stock of raw materials, spare parts, work in progress, components and finished goods

are reserved as a cushion against the possibility of running out of stock items. However, in recent times, it has been discovered that keeping large buffer inventories leads to incurring inventory costs in terms of warehouse space, security personnel, insurance and the risk of deterioration and obsolescence. Consequently, corporate organisations are embracing a different approach to production and inventory management. Since early 1980s, an inventory management system which leads to inventory reduction has become the primary target, as is often the case in just-in-time (JIT) systems where raw materials and parts are purchased or produced just-in-time to be used at each stage of the production process [15,16].

Small and Medium Sized Enterprises play a significant role in the economic development of any nation. However, Otuya and Akporien [17] assert that in spite of their strategic importance there is still a large number of SMEs that perform poorly due to incompetent management. In recent years, SMEs have encountered numerous challenges especially in inventory management or material control, thus affecting their financial performance. There have been cases of materials overstocking which eventually get expired or out dated, under stocking, lack of stock-taking, theft of materials by workers and delays in deliveries of materials into the organizations among others [6,17,18,19].

In some SMEs such as eateries, supermarkets and furniture manufacturing companies, nearly 60% to 70% of the total funds employed are tied up in current assets, of which inventory forms the most significant component [5,8,13]. Thus, it should be managed in order to avail the inventories at right time in right quantity. Small and Medium Scale Enterprises (SMEs) need to understand the true costs associated with inventory management and poor inventory productivity so as to be able to review the benefits of alternative approaches.

2. Statement of Problems

Many companies face challenges of inconsistent inventories, wrong estimate, poor reaction to customers' demand and lack of proper accounting recording systems resulting to low performance [6]. Similarly, Abdulrasheed, Khadijat, Sulu and Olanrewaju [19] observed that companies face problems of inconsistent deliveries, reduced consumer effective demand and high cost of production due to poor inventory management techniques leading to poor performance. Duru, Okpe and Udeji [18] posit that inventory is the livewire of any manufacturing firm. They maintain that because of shortage of materials to meet sudden increase in customers demand, reduction in profit margin, low returns on equity, wastages of materials, pilferage arising due to excess stock and sleep in communication chains that exist in most industries, inventory management has become mandatory on each and every manager responsible for production in an organization.

Inventory is one vital resource that any corporate organization needs. Like any other business resource, inventory is limited in supply; hence it requires effective management rather than neglect. The cost of procurement of materials (inventories) is also important on one hand, for the fact that over stocking will imply tying down capital and risk of becoming obsolete while on the other, under stocking could lead to shortages and production bottle neck. The challenge then is to determine how all these affect the financial performance of the firm. Knowledge of the optimum inventory management techniques will enable business managers to strike a balance on what quantity to buy, when and where to buy on a regular basis devoid of scarcity, how to go about the procurement and the amount to invest on inventory towards maximizing profit. This is the concern and focus of this study.

The effect of inventory management on financial performance of firms has been a subject of debate by academic scholars and corporate managers for a long time. A number of these studies have come up with divergent and mixed results [4,5]. In the developing economies of Africa and Asia [3,6,7,8,13] have also conducted some empirical studies. Eneje, Nweze and Udeh [20], Duru, Okpe and Udeji [18] have also carried out some studies in Nigeria with emphasis on Engineering firms, manufacturing and cement industries. This study departs from these previous works by placing emphasis on wholesale/superstores, fast food, eateries and furniture manufacturing firms which have rarely been used by previous researches in Nigeria. Besides, these SMEs are considered to have bulk of their working capital in inventories.

3. Objectives of the Study

The broad objective of the study is to examine the effect of inventory management on profitability of SMEs in Delta State. Specifically, the study seeks to:

(i) examine the relationship between inventory turnover and profitability of SMEs.
(ii) determine to what extent inventory conversion period affect profitability of SMEs.
(iii) ascertain the influence of inventory leanness on profitability of SMEs..

4. Research Questions

The study will provide answers to the following questions:

(i) To what extent does inventory turnover affect profitability of SMEs?
(ii) What is the relationship between inventory conversion period and profitability of SMEs?
(iii) To what extent does inventory leanness affect profitability of SMEs?

5. Research Hypothesis

In order to answer the research questions and achieve the research objectives, the study has postulated the following hypotheses in the null form:

Ho1: There is no significant statistical relationship between inventory turnover and profitability of SMEs.

Ho2: There is no significant statistical relationship between inventory conversion period and profitability of SMEs.

Ho3: There is no significant statistical relationship between inventory leanness and profitability of SMEs.

6. Methodology

The study adopted descriptive research design. Descriptive research is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way [21]. The population consists of all SMEs operating in Delta State. The study used stratified random sampling. The strata are necessary because the target population is heterogeneous in nature. The strata consisted of fast food/eateries, supermarkets and furniture making firms. 10 SMEs were randomly selected from each stratum making a total of 30 firms for the study. Data for the study were obtained by the help of three research assistants through the administration of a self-designed questionnaire to managers or accountants of the sampled firms. The questionnaire was structured to elicit information about the trading and financial activities for the last two accounting years.

Regression analysis was conducted to examine the form of relationship between dependent variable and the independent variables. To test the hypotheses developed, a liner regression model which expresses the SMEs profitability as a function of inventory management is stated in functional form as follows:

$$PFT = f\left(IT, ICP, ILN\right)$$

This can be written in explicit econometric form as:

$$PFT_{it} = \beta_0 + \beta_1 IT_{it} + \beta_2 ICP_{it} + \beta_3 iILN_{it} + e_{it}$$

Where:

PFT = Profitability; IT = Inventory Turnover; ICP = Inventory Conversion Period and ILN = Inventory Leanness. i represents sampled SMEs; t represents the time dimension; β_0 = Constant or Intercept. $\beta_{1\text{-}3}$ = Coefficients to be estimated or the Coefficients of slope parameters and e = Stochastic or disturbance term.

7. Operationalization of Variables

The table below shows the measurement of the variables:

Table 1. Measurement of Variables

Variables	Measurement	*A priori* Sign	Notation
Profitability	Profitability is taken as Gross Profit Margin (GPM). To be measured as the gross profit scaled by turnover.	+	PFT
Inventory Turnover	Measured as Cost of Sales scaled by Inventory	+	IT
Inventory Conversion Period	This is measured as 365 days divided by inventory turnover ratio.	-	ICP
Inventory Leanness	Measured as a percentage of closing inventory on total asset	-	ILN

8. Data Presentation and Analysis

Table 2. Descriptive Statistics for the Variables

	GPM	IT	ICP	ILN
Mean	20.90000	19.08333	24.36667	33.33333
Median	19.55000	18.25000	18.00000	32.50000
Maximum	34.40000	47.40000	56.00000	67.00000
Minimum	-11.80000	6.500000	17.00000	16.00000
Std. Dev.	8.903080	11.33609	13.07138	13.49670
Skewness	-1.425545	1.405804	0.815505	0.862255
Kurtosis	7.157843	5.223654	2.442479	3.462049
Jarque-Bera	31.77046	16.06222	3.713780	3.984278
Probability	0.000000	0.000325	0.000000	0.136403
Sum	627.0000	572.5000	731.0000	1000.000
Sum Sq. Dev.	2298.680	3726.702	4954.967	5282.667
Observations	30	30	30	30

Source: An extract from the result output analyzed with E-View 7.0
KEYS: GPM = Gross Profit Margin; IT= Inventory Turnover;
ICP = Inventory Conversion Period; ILN = Inventory Leanness

The above displays the descriptive statistics for the data. The descriptive statistics considered were minimum, maximum, mean and standard deviation, Jarque-Bera along with their probability values. The GPM has a mean of 20.9 percent. The minimum and maximum values are -11.8 and 34 percent respectively with a standard deviation of 8.9. The standard deviation measuring the spread of the distribution is low and indicates considerable dispersion from the mean and that the distribution is inclusive of SMEs with significant variations in their profitability level. The Jarque-Bera stood at 31.77 with a p-value of 0.000 which indicate that the data satisfies normality.

Further, IT and ICP have mean values of 19 and 24 respectively. The implication is that on the average, sampled firms turn over the inventory about 19 times in any year. It also means that it takes about 24 day to convert stock from raw materials to finished goods for sale. The statistics also shows that the IT and ICP have minimum values of 6 and 17 respectively. The maximum values for the variables also recorded 47 and 56. The standard deviation also stood at 11 and 7. The standard deviation for IT is large indicating that there is not much deviation among the SMEs sampled in terms of number of days stock is turned over. However, the standard deviation for ICP is low compared to the mean value which means that there is significant variations in the number of days SMEs in the study hold stock. The Jarque-Bera values of 16 and 13 for IT and ICP respectively along with their probability values of 0.0000 indicates that the data satisfies normality and suitable for further regression analysis.

The descriptive statistics of the firms' Inventory Leanness as indicated in table shows that the mean proportion of the inventory leanness was 33.3 percent. Results from the table further indicate a maximum and minimum of 67 and 16 percent respectively. The standard deviation o 13 percent also shows a significant disparity among the SMEs in volume of inventory as a percentage of total assets of the firm. The Jarque-Bera value of 3.9

with a p-values of 0.13 (p>0.05) indicate that the distribution fails the normality test (p<0.05). The analysis of the descriptive statistics indicates that all the variables except Inventory leanness satisfy the normality criterion as their respective Jarque-Beras were all significant and the p-values less than the 5% significant level.

Table 3. Correlation of the Variables

	GPM	IT	ICP	ILN
GPM	1.000000			
IT	0.035868	1.000000		
ICP	-0.071084	-0.259663	1.000000	
ILN	0.010733	0.271888	-0.272989	1.000000

Source: An extract from the result output analyzed with E-View 7.0
KEYS: GPM = Gross Profit Margin; IT= Inventory Turnover; ICP = Inventory Conversion Period; ILN = Inventory Leanness

The table shows the relationship among the variables. GPM is observed to correlate positively with ILN (r=0.0107). This implies that increase in inventory by 1.07%, will bring about a unit growth gross profit margin of small businesses. The correlation also shows that GPM has a negative relationship with IT (r=-0.0358) and ICP (r=-0.0710). The implication of this is that as inventory turnover rates and inventory conversion period grow by 3.5% and 7 days respectively, the gross profit margin of SMEs shrinks by 1%.

Further, the table also indicates that IT is positively correlated with ILN (r=0.0271 but negatively correlated with ICP (r=-0.259). It implies that increase in inventory turnover increases leanness by about 3% whereas higher inventory turnover reduces inventory conversion period by 2.59%. ICP is also observed to have a negative relationship with ILN (r=-0.0272) implying that increase in inventory leanness will reduce period stock is held by about 3 days. As shown in table, none of the variables is strongly correlated with each other (r>0.8).

Table 4. Regression Statistics for the Model

Dependent Variable: **GPM** Method: Least Squares Sample: 1- 30 Included observations: 30				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.77321	5.397219	4.404714	0.0002
IT	0.116768	0.123834	0.942937	0.0019
ICP	-0.095848	0.104408	-0.918016	0.0070
ILN	0.092360	0.107429	0.351398	0.5861
R-squared	0.617011	Mean dependent var		19.79333
Adjusted R-squared	0.415128	S.D. dependent var		7.181967
S.E. of regression	7.127437	Akaike info criterion		6.889346
Sum squared resid	1320.809	Schwarz criterion		7.076173
Log likelihood	-99.34019	Hannan-Quinn criter.		6.949114
F-statistic	1.148479	Durbin-Watson stat		2.540702
Prob(F-statistic)	0.000035			

Source: An extract from the result output analyzed with E-View 7.0
KEYS: GPM = Gross Profit Margin; IT= Inventory Turnover; ICP = Inventory Conversion Period; ILN = Inventory Leanness.

The summarized regression results in the table show that the multiple regression models is highly significant with R^2 value of 0.617 meaning that 61.7% of the variation in the dependent variable (gross profit margin) is explained by the independent variables while 38.3% is explained by other variables outside the model. Also, the F-Stat of 1.14 shows that the predictor variables are very significantly related with the response variables.

9. Discussion of Findings

The aim of this study is to examine the effect of inventory management on profitability of SMEs in Nigeria. In discussing the results, the ordinary least squares regression estimates are utilized to examine the relationship between inventory management and financial performance of 30 SMEs in Delta State. This study utilizes several measures as proxies for inventory management. Findings of the study are discussed below:

10. Inventory Turnover and Profitability

The regression estimation reveals that a significant positive relationship exists between IT and GPM (t=0.9429, p=0.0019<0.05). We therefore use this as some evidence to empirically state that inventory turnover has an effect on companies' financial performance, and hence we reject the null hypothesis and accept the alternative hypothesis. The implication is that small businesses that have higher inventory turnover tend to have better performance than those with lower inventory turnover. This result meets our *a priori* expectation and is consistent with findings of [22,23]. However, this finding does not conform to Sitienei and Memba, [24].

11. Inventory Conversion Period and Profitability

Findings from this study reveal an insignificant negative relationship between inventory conversion period and financial performance of brewery firms in Nigeria ((t=-0.958, p=0.0070<0.05). This implies that the longer days it takes SMEs to turn raw materials purchased into finished goods and sold to customers the lesser profits the firm will make. The result meets our *a priori* expectation and consistent with previous studies such as Gamze, Ahmet and Emin [10], Mogaka and Jagongo [25], Reyhani [26] and Sitienei and Memba [24].

12. Inventory Leanness and Profitability

The regression estimation reveals no significant positive relationship between ILN and GPM (t=0.9236, p=0.586>0.05). This implies that level of closing stock in the warehouse as at the end of a company's financial year does not really affect the financial performance of the firm. This did not meet our *a priori* expectation. This result does not conform to previous studies such as Koumanakos [4] and Eroglu and Hofer [27].

13. Conclusion and Recommendation

We have analyzed some simple descriptive statistics and we have used regressions and econometrical approaches, to verify whether inventory management impacts on the financial performance of SMEs in Nigeria. The study, using the results of the inventory management statistics and exploratory variables in a regression model showed that inventory turnover has a significant positive relationship with financial performance of SMEs in Nigeria during the period under review. The study also reveals that there is a negative relationship between inventory conversion period and profitability; and no significant positive relationship between inventory leanness and profitability. The study concludes that inventory management has a great role to play in corporate financial performance of firms hence firms' inventory systems must maintain an appropriate inventory levels to enhance profitability and reduce the inventory costs associated with holding excessive stock in the warehouses. In line with the findings of the study, it is recommended that firms should embrace modern production technology that will enhance faster production to shorten inventory conversion period which will in turn improve inventory turnover and profitability.

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