

An Assessment of Inventory Management in Small and Medium Scale Industrial Enterprises in Nigeria

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Abstract

Inventory is a vital asset, necessary for effective operation of any business organisation. The absence of good inventory management practices in the Small and Medium Scale Industrial Enterprises (SMEs) necessitates a study to determine the actual reasons for non application of scientific inventory management techniques in the SMEs. Three hundred and twenty SMEs in Food, Textiles, Wood and Metal Products sectors in South Western Nigeria were selected for the study. Two hundred and twelve organizations returned the questionnaire. It is established that non usage of scientific inventory techniques for better inventory decision was due to lack of skilled personnel and inadequate data to use inventory models; and low level of ICT in the SMEs. It is recommended that the SMEs should institute structure to improve the knowledge of their personnel about using quantitative inventory decision models and the SMEs should make the application of Information Communication Technology (ICT) for data management a priority.

Keywords: Inventory, Just-In-Time, organisation, Economic- Order- Quantity, Re-order- Quantity, Profitability

1.0 Introduction

Inventory constitutes a very significant portion of the current assets of manufacturing organisations. Considering the level of investment required for inventory in manufacturing organisations it is imperative to manage inventory efficiently and effectively in order to avoid idle resources and also ensure production continuity. Inefficient management of inventory can lead to underutilisation of capacity and loss of profit. The under utilisation of capacity can aggravate the unemployment problem in any economy. In many developing economies, small and medium scales enterprises employ substantial number of the work force Therefore, efficient management of inventory in small and medium scale manufacturing firms is imperative for meaningful economic growth of any country.

1.1 Statement of the Problem

Efforts of many countries to encourage small and medium scale industrial enterprises have been directed towards provision of fund; however, in most cases the crucial problem of management has not been addressed. There is no doubt that small and medium scale manufacturing organisations contribute significantly to the nation economic growth and that inventory is crucial to the sustenance of their operations. Small and Medium scale manufacturing industries are in most cases faced with the problems of inadequate inventory of raw materials and spare parts. These shortages often lead to breaks in production schedule, machine breakdown and low capacity utilisation and thus constituted a barrier to their effective growth. This paper therefore examined these inventory management problems and their impact on the performance of small and medium scale manufacturing organizations.

1.2 Objectives of the Study

Considering the strategic importance of inventory to effective operations of an industrial enterprise and in view of the problems highlighted above, this study was to examine the different inventory management practices in the small and medium scale industrial enterprises and assess their impact on the inventory decisions on the organizations.

2.0 Materials and Methods

Small and Medium Scale Enterprises as a concept defies universal definition both among academics and practitioners. It has been both relative and dynamic, varying from country to country, even over time and among industries. The development of small and medium scale industries is very important to the growth of a nation especially a developing country. Ogunleye (2000) stated that small and medium scale enterprises are particularly relevant in creating employment opportunities, mitigating rural urban drift, producing specialized items in small quantities to meet diverse needs, mobilization of local resources as well as stimulation of technological development and innovation. This view was also expressed by Edwardson (1989). (Loveman and Sengenberger, 1992) acknowledged the superiority of small-scale industrialization strategy in promoting economic growth. As a matter of fact, a positive correlation between the emergence of an active small-scale industrial sector and the commencement of rapid economic growth and development can always be established. A practical illustration is the recent transformation of some South East Asian economies from rudimentary states to high-industrialized ones in the second half of the last century.

To achieve the desired contribution of SMEs to the industrial growth of a nation, the management of inventory in these organisations is of utmost importance. Inventories are goods that are kept to meet future demand and to ensure production continuity. It is a very important asset in any business organisation. The management of this vital asset is very important for the efficiency, effectiveness and profitability of the business. Forgiogne (1986), Adeyemi and Salami (2010) claimed that the astute manager who understands the virtues of each of the component of inventory could use them selectively to implement corporate strategy in the market place. An organisation can strategically build up inventory for market promotion and also to stabilise production schedule. Inventory management is crucial to organisation success since holding too little or too much stock has negative effect on the organisation's performance.

The problem of inventory has continued to receive much attention in most businesses. Inventory levels of raw materials, semi-finished and finished goods need to be effectively managed to control the cost of inventory (Kotler, 2002). It is common to find the balance sheet of an average company having inventory running to 60% of its current assets as capital tied down Pandey (2005). Apart from this, much has to be expended additionally to keep it useful. To keep production going, some level of inventory is desirable. Despite the marvel of computer, automation and scientific management, the production process and marketing activities cannot still avoid the need to have inventories.

Jegade (1992) stated that the necessity of keeping stock arises because of the time lapse between purchasing, production and eventual sale to customers. The major concern is how inventory can be controlled to minimise waste and cost. Thus an efficient inventory policy is always an important requirement for the successful management of manufacturing and distributing enterprises.

Inventory planning is a major tool of capacity planning and every organization must ensure effective inventory planning to enhance efficient and effective capacity utilization. Orlicky (1975) identified the main purpose of a basic material requirement planning as to control inventory level, assign operating priorities for items, and plan capacity to load the production system as well as to order the right part, order the right quantity and order at the right time. In their contribution to importance of inventory Chase and Aquiliano (1985) mentioned that the objectives of inventory management under the material requirement planning system are to improve customers' service to minimize inventory investment, and to maximize production operating efficiency. Garrison and Noreen (2000) opined that the selection of the right level of inventories involves balancing three groups of costs. These cost are: inventory ordering cost, inventory carrying costs, the cost of not carrying sufficient inventory and opportunity cost. Plane (1994) observed that if inventory levels are low, the cost associated with keeping inventory on hand is small, but orders are place more frequently to replenish items, to avoid running out of stock always.. If inventory levels are very high, maintaining these inventories is expensive but there may be benefits from obtaining larger lot sizes from suppliers. Schreibfeder (2001) stressed that cost of carrying is a critical factor in deciding what products to stock and when to re-order them as well as the best quantity to order. However, companies and organization often use an imprecise 'rule of thumb' to estimate their cost of carrying inventory and the resultant effect is bad inventory management.

Just in time inventory (JIT) is the modern concept in inventory management aimed at reducing inventory costs. With just in time inventory, the exact amounts of good items arrive at the moment they are needed. Adam and

Ebert (1993) defines Just in Time as a manufacturing system whose goal is to optimize processes by continuously pursuing waste reduction. Chase and Aquilano (1985) stated that Just In Time (JIT) requires the production department to project precisely the necessary units in the necessary quantities at the necessary time with the objectives of achieving plus or minus zero performance to schedule; it means that production of one extra piece is just as bad as being one piece short. Anything over the minimum amount necessary is viewed as waste. The idea of JIT is to drive all queues toward zero in order to minimize inventory investment, shorten production lead time, react faster to demand changes and uncover any quality problem. Barker (1989) opined that the JIT is a dynamic approach introduced in recent years that demand total commitment from management. Kaynak and Pagani (2003) stated that production and operations research has shown that JIT Purchasing can potentially have benefits to the firms in the form of increasing product quality, improving supplier/buyer relationships, and increasing sales. Akintoye (2004) stressed that the closeness of a company to the ideal JIT situation depends on the type of production process and the nature of suppliers industries.

Inventory decisions are of interest to many functional and line managers in every organisation since these decisions may have direct impact on their departmental performance. Forgionne (1986) stressed that inventory policy involves resolving organisational conflicts since all departments connected with inventory in the organisation have different views of what quantity of inventory to keep. Sound management should consider all view points and develop a policy that minimise total related inventory cost. Dominiak and Louderback (1997) in their contribution to the issue of conflict of functional department in respect of inventory levels to be maintained noted that sales managers, finance manager and production managers have different views on the desirable inventory level. This conflict of inventory objective is always resolved with great difficulty in a manufacturing environment. Brigham (1983) opined that proper inventory management require close coordination among the sales, purchasing, production and finance departments since improper co-ordination among the departments can lead to disaster and sub optimisation.

The study was carried out in Southwestern states of Nigeria which include Lagos, Oyo, Ogun, Osun, Ondo and Ekiti states. The Southwestern states were chosen because of the existence of a good concentration of Small and Medium Scale Industries within the region. The sample size consist of 320 organisations selected within these states. In view of the relative sizes of the states, the purposive sampling method was adopted for the study in order to include dominant industries. The study covered companies engaged in Food and Beverages, Textiles and Wearing Apparels, Wood and Wood Products and Fabricated Metal Products. The questionnaire and oral interview techniques were adopted for this study. The questionnaire method was used to gather primary data, which was supplemented by oral interview with relevant officials of some of the organizations included in the sample. Out of the 320 organizations 212 returned the completed questionnaires. The data collected were subjected to statistical analysis. Simple percentage (%) and 5-point Likert rating. The ratings were tested using Duncan multiple range test.

3.0 Results and Discussion

3.1 Results

Table 1 shows the usage of inventory models and forecasting methods. About 25% responded positively to the use of Economic Order Quantity (EOQ) Model. The interview of some respondents revealed that the Economic Order Quantity Model was not used simply because of inadequate data to use the model. This was also confirmed in the response as 178 (83.96%) stated that their organizations could not generate sufficient data for stock cost which is necessary to use the model. Table 1 also reveals that application of other forecasting models was not common in the SMEs while executive judgment was the major approach (88.68%) used for determining production inventory levels. Table 2 shows that 134(83.75)% of the respondents indicated inadequate knowledge for not using the EOQ model while (1.25%) indicated that non usage was due to its non relevance to their operations. The result suggested that majority of the SMEs staff have not been exposed to the use of inventory models for inventory management. The result obtained on the usage of Economic Batch Quantity was not different from that of EOQ because only 26(12.26%) responded positively to the use of Economic Batch Quantity Model while the remaining 186 (87.73%) responded negatively. Majority of the organizations 130 (61.32%) adduced the reason for non usage to inadequate knowledge, while 14(7.53%), 8(3.77%) and 24 (12.90%) gave time wasting, inadequate data and non relevance to operations respectively as reasons for non usage of EBQ models.

The results in Table 3 shows that (49.66%) of the respondents did not use any regular valuation method, they only value their stock as and when necessary. This consist of 14.15%, 13.21%, 10.37% and 11.32% from Food and Beverages, Textiles and Wearing Apparel, Wood and Wood Products and Fabrication and Metal Products sectors respectively Annual valuation method was used by 72(33.98%) while only 24 (11.32%) used the perpetual valuation method. The remaining 12(7.67%) of the respondents did not specify any method. Perpetual inventory valuation is very ideal for early detection of fraudulent practices in the stores and organizations need to be encouraged to use this method of stock valuation. Table 5 further shows that 158 (74.53%) of the organizations used manual processing method while 40 (18.86%) used semi computerized and only 14 (6.60%) fully computerized their inventory processing. The table also reveals that out of the 74.53% that used manual processing method; 19.81%, 17.96%. 16.04% and 20.75% were from Food and Beverages, Textiles and Wearing Apparels, Wood and Wood Products and Fabrication and Metal Products sectors respectively. This shows that the use of manual processing by SMEs is prevalent in all sectors and also indicates a low level of application of modern information management technology to inventory by the SMEs despite the numerous advantages. The application of ICT to operations by SMEs could be very effective in improving their capability inspite of the low level of staffing.

The fixed quantity order system was embraced by most of the SMEs (42.50%). About 34% applied Material Requirement Planning system, 12.26% used Just In Time (JIT) system, 6.60% used Cyclical Order system while the 4.72% who did not respond to the question implicitly did not have any specific system. All the various ordering methods were used in all the sectors except JIT for which there was no response in the Food and Beverages sector. Some of the organizations that used JIT system were interviewed to really know if they understand the JIT concept. Explanations received from these organizations confirmed that they understood the concept and they believed their ordering method was more of JIT than any other ordering method, although they expressed that many constraints made the JIT system to be very difficult to practice due to instability in government policies. The fixed quantity system encourages tying down of capital. Those organizations that used them explained that despite the shortcoming, it was better because the source of supply and lead time cannot be very certain or accurately predicted. This indicates that they placed more emphasis on regular production and customer's satisfaction even at higher cost to the organization.

The study sought to know the impact of shortage of inventory on workers performance, machinery utilization and profitability of the organizations in the different sectors. Using Likert rating index, the result revealed that the mean rating of the impacts of shortage of raw materials on workers efficiency, machinery utilisation, and level of profitability were 2.63, 2.46 and 2.27 respectively for Wood and Wood Products sector which were negative (Table 4),were while that of textiles and wearing apparent sector for workers' efficiency, machinery utilisation and level of profitability were 2.53, 2.74 and 2.48 respectively which were also negative (Table 5). The results for the Food and Beverages sector and Fabrication and Metal products sector in Tables 6 and 7 show the same negative trend.

3.2 Discussions

The objectives of the study were to examine the different inventory management practices and access the impact on the inventory decisions in SME Good inventory decisions are necessary to enhance efficiency and profitability of various manufacturing organizations. It has been discovered in this study that there is a wide gap between theory and practice of using models in arriving at inventory decisions in SMEs in the area of study. The application of inventory models, ratios, valuation and processing in arriving at sound decisions in SMEs is generally very low. Most decisions are based on rule of thumb and experience. The non usage of perpetual inventory method as revealed by interview of some organizations was due to the manual processing of inventory records and lack of emphasis on a structured inventory process. The inadequate number of relevant staff for this exercise could also prevent organizations from adopting the perpetual method. This suggests the need for a computerized system in order to facilitate the perpetual inventory approach.

Based on the findings of this study in respect of the problems identified, the following suggestions and recommendations will be important to Small and Medium Scale manufacturing industries in order to enhance the needed contributions of this sector to the economic growth.

- (i) SMEs should institute structure to improve the knowledge of their personnel about using quantitative inventory decision models.

- (ii) Resultant upon the fact that inadequacy of data was one of the impediments to application of quantitative models for inventory, the SMEs should make the application of ICT for data management a priority.

It is expected that these recommendations would provide the requisite policy framework for effective inventory management in SMEs. This would enhance their contributions to economic development

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Tables

Table 1: Usage of Inventory Models and Forecasting Methods

	<u>No of Respondents</u>			
	Yes	%	No	%
Economics Order Quantity Model	52	24.52	160	75.47
Economics Batch Quantity Model	26	12.26	183	87.73
Ratio to Measure Stock Efficiency	38	17.92	174	82.08
Forecasting of Annual Demand of Material Input	46	21.70	166	78.30
Generation of Data for Stock Cost	34	16.04	178	83.96
Estimation of Annual Usage with Certainty	14	6.60	198	93.40
Executive Judgment Use to Determine Production Batch	188	88.68	24	11.32

- Multiple response options was responsible for total sum greater than 100%

Table: 2 Reasons for Non Usage of Inventory Models

	Inadequate Knowledge Response(%)	Time Wasting Response(%)	Inadequate Data Response(%)	Not Relevant to Operations Response(%)	Others Response (%)
Economic Order Quantity	134(83.75%)	8(5%)	16(20%)	2(1.25%)	-
Economic Batch Quantity	130(61.32%)	14(7.53%)	8(3.77%)	24(12.90%)	10(9.43%)

Table 3: Inventory Processing, Ordering and Valuation methods

	No of Respondents				
	Food and Beverages	Textiles and Wearing Apparel	Wood and Wood Products	Fabrication and Metal Products	Total
Inventory ordering method					
Cyclical order system	4(1.89%)	-	10(4.72%)	-	14(6.60%)
Fixed quantity system	36(16.98%)	22(10.38%)	14(6.60%)	18(8.49%)	90(42.5%)
Material requirement planning system	18(8.49%)	16(7.55%)	22(10.38%)	16(7.55%)	72(33.96%)
Just in time system	-	8(3.77%)	4(1.89%)	14(6.60%)	26(12.26%)
No response	2(0.94%)	-	-	8(3.77%)	10(4.72%)
Valuation Methods					
Annual stock taking	18(8.49%)	6(2.83%)	22((10.37%)	26((12.26%)	72(33.96%)
Perpetual stock taking	8(3.97%)	10(4.71%)	-	6(2.83%)	24(11.32%)
Stock taking when necessary	30(14.15%)	28(13.21%)	22(10.37%)	24(11.32%)	104((49.66%)
Others	4(1.89%)	2(0.94%)	6(2.83%)	-	12(17.67%)
Processing methods:					
Manual	42(19.81%)	38 (17.92%)	34(16.04%)	22(20.75%)	158(74.53%)
Semi computerized	12(17.67%)	4(1.89%)	16(7.55%)	8(3.97%)	40(18.86%)
Computerized	6(2.83%)	4(1.89%)	-	4(1.89%)	14(6.60%)

Table 4: Impact of Shortage of Raw Material on Performance (Wood and Wood Work Sector)

	5	4	3	2	1	Total Response	Weighted Score	Mean Rating
	High Positive Impact	Positive Impact	No Impact	Negative Impact	High Negative Impact			
Impact of Shortage of raw Materials on Workers' Efficiency	2(10)	2(8)	15(45)	5(10)	6(6)	30	79	2.63a
Impact of Shortage of raw Machinery Utilization	1(5)	2(8)	13(39)	8(16)	6(6)	30	79	2.46b
Impact of Shortage of raw on Profitability	1(5)	1(4)	5(15)	2(4)	2(2)	30	79	2.27a

* Mean followed by the same letter were not significantly different at 5% level of confidence

Table 5: Impact of Shortage of Raw Material on Performance (Textiles and Wearing Apparel Sector)

	5	4	3	2	1	Total Response	Weighted Score	Mean Rating
	High Positive Impact	Positive Impact	No Impact	Negative Impact	High Negative Impact			
Impact of Shortage of raw Materials on Workers' Efficiency	2(10)	1(4)	11(33)	2(4)	7(7)	23	58	2.52a
Impact of Shortage of raw Machinery Utilisation	1(5)	3(12)	13(39)	1(2)	5(5)	23	63	2.74a
Impact of Shortage of raw on Profitability	1(5)	1(4)	5(15)	15(30)	3(3)	23	79	2.48a

* Mean followed by the same letter were not significantly different at 5% level of confidence

Table 6: Impact of Shortage of Raw Material on Performance (Food and Beverages Sector)

	5	4	3	2	1	Total Response	Weighted Score	Mean Rating
	High Positive Impact	Positive Impact	No Impact	Negative Impact	High Negative Impact			
Impact of Shortage of raw Materials on Workers' Efficiency	-	1(4)	10(30)	11(22)	3(3)	25	59	2.36a
Impact of Shortage of Raw material on Machinery Utilisation	3(15)	5(20)	8(24)	5(10)	4(4)	25	73	3.92a
Impact of Shortage of raw Material on Profitability	1(5)	2(8)	5(15)	11(22)	6(6)	25	56	2.24a

* Mean followed by the same letter were not significantly different at 5% level of confidence

Table 7: Impact of Shortage of Raw Material on Performance (Fabrication and Metal Products Sector)

	5	4	3	2	1	Total Response	Weighted Score	Mean Rating
	High Positive Impact	Positive Impact	No Impact	Negative Impact	High Negative Impact			
Impact of Shortage of raw Materials on Workers' Efficiency	3(15)	7(28)	9(27)	2(4)	7(7)	28	81	2.89a
Impact of shortage of raw Machinery Utilisation	2(10)	5(20)	11(33)	5(10)	5(5)	28	78	3.92a
Impact of Shortage of raw on Profitability	-	8(33)	10(30)	3(6)	7(7)	28	75	2.24a

• Mean followed by the same letter were not significantly different at 5% level of confidence

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