Optimization of Effective Inventory Control and Management in Manufacturing Industries: Case Study of Flour Mills Company Calabar, Nigeria

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Abstract
For various manufacturing industries in Nigeria, inventory remains the prevalent asset on the balance sheet at any given time; therefore, there is the need for it to be properly managed. The researcher identifies some of the challenges hindering effective inventory management and control using Flour Mills Company as a case study. Although, effectiveness was seen in this research as the ability to achieve stated inventory levels, judge in terms of financial measures like inventory turnover. And for any company to claim to be effective, it inventory management decisions made by management must be ascertained and certified. The key source of information gathering which the research employed was the used of primary data through a well structured questionnaires and personal interviews. The data so obtain was analyse through qualitative technique, using descriptive statistics method by quantifying the level of frequency and determining the percentages of respondents and weighted mean scores. This method was considered more appropriate and convenient by the author because it helps to establish the objectives of the research. The results has help to proffer solution to the problem of lead time of delivery or delay in supply of goods or material, the interruption in production and stock out of goods or materials during production and problem of when to order and how much to order as it affects manufacturing industries in Nigeria. Conclusions were drawn and recommendations was made for the best practices that will ensure effective inventory control of stock and customers satisfaction and retention in both public and private industries in Nigeria.

Keywords: effective, optimization, inventory, manufacturing, flour mills

INTRODUCTION
It is indisputable fact to argue that we live in the age of the educated consumer, meaning that a retailer should be able to offer first class service in terms of the availability of its products, as consumers can very easily take their business to a different place. The contemporary business environment of escalating rivalry implies that all companies need to be as efficient as possible at every level, which includes effective inventory control and management. The most important objective of inventory management, therefore, is to have adequate quantities of high quality inventory available to serve customer needs, while also minimising the costs of carrying inventory (Brigham & Ehrhard, 2005).

Waters (2008), in his view of inventory regards it as a number of items that are held in stock, while stock are those materials or goods that organisation keep for future use. But often, people use the two different words to mean the same thing. Each and every one of us hold stock and controls inventory be it at home or work place consciously or unconsciously ranging from the food we eat, cloths, money, papers etc. Manufacturing, warehouse, retail and service organisations are face with a lot of challenges, arising from different product, parts, processes as well as uncertainties to manage, constantly shifting unpredictable demands and priorities. The business world is changing dramatically. “Companies today face the challenge of increasing competition, expanding markets, and raising customer expectations. This increases the pressure on companies to lower total cost in the entire supply chain, shorten throughput times, drastically reduced inventories, expand product choice, provide more reliable dates and better customer service, improve quality, and efficiently coordinate global demand, supply and production” (Umbel et.al 2008).

Andrew Blatherwick, (2006) in his exposition, view inventory management to be just more than merely forecasting and replenishment, excellent inventory management is the management of inventory to optimize service and profit. It has to embrace the use of refined business modelling techniques to understand the clear-cut effects of changes in lead times, shipping quantities, or stockholding policies. We need to establish what makes good economic order quantities, with special attention to all aspects of the supply chain, and set the proper service level in full understanding of the effect on stockholding. Every single one of these factors will influence choice of the most appropriate chain, be it stock held, cross dock or direct store delivery. Only by having the ability and good quality information can the company have the control to achieve the much-repeated balance of stock and service at a profit.
AIM
The primary aim of this research is to investigate the extent of awareness, application of effective inventory control and management systems in manufacturing industries in Nigeria using Flour Mills Company Calabar, as a case study.

OBJECTIVES OF THE STUDY
1. To investigate on various mechanisms that will lead to the total reduction of inventory in Flour Mills Company.
2. To create value and interest to develop the culture of proper inventory implementation in organisations.
3. To maximise profit and achieve customers satisfaction and retention despite low inventory level.
4. Analyse the present challenges in inventory control with a view to suggesting possible remedies for future benefits.

RESEARCH QUESTIONS
(1) How can we achieve customer satisfaction and retention despite low inventory level without incurring extra cost?
(2) What are the present challenges in implementing effective inventory management and control?
(3) What is the applicable measures use in the control of inventory in the organisation?
(4) What is the method in used to records and keep inventory data in the organisation?

RESEARCH OUTCOMES
The research outcome expected by the author at the end of this research work but not limited includes the following:
- Development of a cost effective but customer focused strategy for inventory management.
- Establishment of management challenges/difficulties in solving inventory problems.
- Recommend methods and techniques to be used for effective inventory records and management.
- Recommendation of the use of new technologies and techniques in inventory management.

RESEARCH LIMITATION
This research was limited to the inability of some respondents to give the desired responses as they were not well equipped with adequate knowledge on inventory control and management. There was also fear of the unknown and suspicion by respondents who saw the researcher as a secret investigator and were not willing to give the researcher maximum information as required. However the researcher surmounted this problem by assuring them of adequate protection of the corporate image of their organisation.

LITERATURE REVIEW
The ability to identify and do certain things in a special way that will contribute positively to the organisation can be views as been effective. According to Dumas (2008), Redshaw (2010) being effective in terms of organisational set up can be viewed by effective internal processes of an organisation. Therefore the degree to which target can be achieved by an organisation is defined as being effective. ‘Accountants and senior managers tend to want to measure results of most, if not all, organisational activities in monetary terms so it is no surprise that many organisations rely on financial measures of effectiveness such as ROI or ROA’ (Dumas 2008).

For the purpose of this research ‘effective’ will be defined as the ability to achieve positive inventory levels, judged in terms of financial measures like inventory turnover. This study posits that the effectiveness of a given organisation may be ascertained from the effectiveness of the inventory management decisions made by its management. Inventory management is critical to financial performance of organisations and therefore should be managed efficiently with effective inventory management practices.

To determine the physical wealth of any nation, you measure the gross national product by the output of goods and services that are produced based on a given period and time. Goods are tangible in their nature that is because you can feel, see, or touch them, “but services are less tangible product that involves the performance of an act based on the knowledge, skill, or capabilities” (Tersine, 2004). Effective inventory control and management of products is vital to measure the performance of many organisations.

Inventory control is regarded as a management function; determining requirement, forecasting, setting targets and issuing instructions. Leeuw et al (2011) argued that inventory is a central issue of operations management (OM) which comprises a significant cost in the supply chain. “The theory of inventory management is to define minimal inventory levels given certain exogenous variables such as supply and delivery lead- times, supply and demand uncertainty, batch sizes and product variety” (Rumyantsev and Netessine, 2007) cited in (Leeuw et al, 2011). Business realities often are not reflected in these theories. For instance, Debelaar et al (2011), found that inventory in fashion supply chains is not related to demand uncertainty which is the key factor of inventory management theory.

Leeuw et al (2011), explain that, the complexities of supply chains encountered in practice, caused by
aspects such as competitive behaviour, localised decision making, incentives or business cycles, and are largely ignored in most traditional models.

However, a lot of studies related to inventory is focus on manufacturing and procurement related processes upstream of the original equipment manufacturing (OEM), while few attention has been paid to the management of finished goods from the assembly down to the customer (Cachon and Olivares, 2010)

Despite the global acceptance of just-in-time (JIT) and logistics concept in academia and industries from the 1990s to date, a lot of empirical studies have not been able to achieved any meaningful decrease in finish goods inventory levels in many different industries, which work in progress inventory and raw material stocks have consistently decreased over time (Leeuw et al, (2011), Rajagopalan and Malhotra (2011), Hendricks and Singhal (2008). To be more precise, Chen et al (2005) reports that, inventory finish goods (measured in number of day’s sales in inventory) is seen to increase in different industries including the manufacturing and service industries between 1981 and 2000. “Only two industries; pharmaceuticals and electronics reportedly experienced a decline in finished goods inventory” (Leeuw et al 2011).

The flow of product and inventory control in supply chain is dependent on two matter, “When to order/deliver” and “How much to order”. There have been different ways developed over the years in handling this matter, which some are already in used in industries. Stig-Arne Mattsson (2007) however argued that apart from the method build on Kanban and the visual control signals a good majority of those that are presently in used were developed in the beginning and middle of the twentieth century.

Evaluating Performance of Existing Inventory

Are we really getting the desired inventory turnover in our inventory policies? How perfect and well is our inventory management performance? If we decide to add another warehouse, how much of that inventory will it be? If we increase the inventory turns, what impact will it have in the total investment? This and many more are the kind of questions top management ask them self concerning inventories.

Ronald H. Ballou (2000), in evaluating inventory management performance affirm that inventories represent a significant investment by many organisations with a caring cost of about 20 – 40 % of inventory value annually, proper management of this inventory is therefore the priority of the top management.

In every stocking point, the replenishment rule in managing every item in inventory is practically common by application. Some of these procedures includes the just-in-time (JIT) as in material requirement planning (MRP), the option of pull and push system and economic order quantity (EOQ).

Applying this method brings about a holistic inventory level judge by top management as inventory turnover, that is annual sales over average inventory.

To ascertain in general the performance of this policies or foretelling the effect of a change in policy is difficult if there are numerous of items in inventory at several locations and item-level methods are used (Ballou, 2000).

Ballou (2000) however confirm that inventory management performance auditing is possible using the formula he first used in 1981 described as the turnover curve, generally given as:

\[ I_t = \sum_{i=1}^{N} \left( W_i + mD_i + aD_i^2 \right) \]

Where:
- \( I_t \) = is given as total network inventory, units or $,
- \( D_i \) = is annual stocking point throughput at location \( i \), unit or $,
- \( N \) = is the number of stocking point at which the product are held and,
- \( W_i, m, a, b \) = constant to be determined from the particular inventory being modelled can be used to estimate the total amount of inventory in a multiple stocking point network. The formula replicates the inventory policies used in practice.

The interpretation of terms used in the equation has the following general meaning:
- \( W \) = the standard measure of promotional, speculative, obsolete or production overrun stock at a stocking unit.
- \( mD_i \) = the sum of safety stock at stocking point \( i \)
- \( aD_i \) = the sum of usual stock at stocking point \( i \), but may also represent some safety stock.

In view of the fact that the coefficient surrounded by the model are determined by fitting the formula to the inventory turnover ratios at the stocking points in the logistics network, the formula is referred to as turnover curve.

Just in Time

One fundamental technique use by companies is the just in – time (JIT). “The Japanese manufacturing success with increased productivity, low product cost, and often superior quality products can be very much attributed to just-in-time manufacturing method JIT” (Waller, 2003). JIT stands for;
Producing that quantity of units that is needed no more and no less.

Produce them at the date and time required not before and not after.

A supplier delivers the exact quantity demanded, at the scheduled time and date.

JIT focus directly on the reduction of lead time in production, it’s advantages cannot be over emphasised. For instance, “a short lead time relative to competitors in the market place allows sales offices to quote shorter delivery time - an important competitive advantage in today’s business environment” (Browne et al, 2006). From the perspective of manufacturing planning, short lead times reduce the manufacturing plant dependence on forecast and allow the plant to operate using a shorter planning horizon and consequently a more accurate master schedule.

Garner (2012) observed that there are two distinctive ways in which JIT could be view: as a general philosophy for the reduction of waste and the enhancement of throughput efficiency or as a means of controlling work on the shop floor by means of a pull system. The philosophy of JIT can be applied to whatever kind of manufacturing circumstances. But it is worthy of note that, as an operational system, JIT is most appropriate for the volume production of relatively simple products.

Wei Weng et al (2012) maintained that in terms of production processes, just-in-time (JIT) completion of jobs helps reduce both the inventory and late delivery of finished products. Manufacturing industries have their production processes normally carried out in shops which are linked as a production chain. For every shop along the chain, temporary inventory of finished products will be produced if jobs are completed earlier than the time when they can be delivered to the successor shop, and late delivery of finished products will be caused if jobs are completed later than the time mentioned above. This indicates that only when each job is completed on time can the inventory and late delivery of finished products be minimized simultaneously. The same applies to the flow of products between the parties along a supply chain, as JIT job completion can lead to zero inventory of finished products for the manufacturer as well as timely delivery of products to the downstream customer.

Schonberger (2008), maintained that the basic idea behind JIT is very simple: Produce and deliver finished goods just in time to be sold, sub-assemblies just in time to be assembled into finished goods, fabricated parts just in time to go into the subassemblies and purchased materials just in time to be transformed into fabricated parts. Where problems occur is in establishing the implications for an organisation of adopting this ideology. From the microscopic idea of the term, JIT can be seen as a system of stock or inventory control. “The necessary consequence of producing, assembling and receiving goods just in time is that stock levels – whether held as finished goods, work in progress or raw materials – will be reduced, if not to zero, then to a bare minimum” (Procter, 2004). Base on “established” study of stock holding as regards to the principle of the economic order quantity (EOQ) such an advance makes minute sense: although the costs of holding stock are reduced to a minimum, any savings would be more than offset by much higher reorder costs.

Stephen J. Procter, (2004), on his part further argued that for organisation to adopt JIT, therefore, implies that an increase in the total cost of holding stock is more than compensated for by other, attendant benefits. For organisation to try to play down the level of stock, rather than the cost of holding stock, implies that rather than being looked at in isolation, the question of stock control is regarded as part of the more general problem of the management of the firm as a whole. Thus, JIT production is most often taken as being one of a set of practices which together are considered to be characteristic of the most successful parts of Japanese manufacturing industry. It can be considered alongside cellular manufacture, total quality management (TQM), and the development of co-operative rather than adversarial buyer-supplier relations. Cellular manufacture, for example, if introduced as an alternative to a process layout, can give rise to the simple work flows required by JIT. Similarly, TQM is necessary once the comfort of the buffer provided by stocks is removed, while adversarial supplier relations would render redundant any internal progress towards JIT.

It can be argued that, for effective just-in-time (JIT) system, there are five pillars supporting it which is then seen as a requirement to the implementation of any form of JIT. This requirement is represented as shown in figure 1.0 below:

![Five Pillars of Just in Time](image-url)
The unique aspect of just-in-time (JIT) is that it gets rid of waste by organising operations to occur at precisely the time they are required (Waters, 2008). This operations are finished too early so that the product and materials are not kept hanging for a long period before there are needed and there are not done too late as to give rise to poor customer service.

An effect of just-in-time (JIT) could be seen when you call a cab driver to pick you up for an occasion you are to attend by 4.00 pm. If the cab driver arrives at 3.30 pm you are yet to be ready, it is a waste of time as he is waiting for you; if it comes beyond 4.00 pm you are not happy and will not use the service again. But when the cab driver arrives at 4.00 pm just-in-time to pick you, there is no time wasting or waiting, which makes you very happy that the cab arrives at exactly just-in-time. In terms of stock for instance, JIT automatically view stock as a waste of resources that has a waste of resources that has no effect as the materials are just sitting and waiting to be used. Therefore it searches for ways of eliminating this waste.

**Benefit of Just-in-Time (JIT)**

We have enumerated the role played by just-in-time in the reduction of work in progress (WIP) and stocks of raw materials. (Waters, 2008) maintain that a good number of organisations have reduced these by 90%, giving it a related benefits such as space reduction to about 40%, lower procurement cost to about 15%, a smaller amount stocks investment etc. To get a working system, there are other benefits of JIT that come from reorganisation which includes the following:

- Shorter leads time;
- Less scrap and wastage;
- Lower stock of raw materials and work in progress
- Shorter time needed to make a product
- Better relationship with suppliers;
- Improve quality of materials and product
- Higher productivity;
- Simplified planning and scheduling;
- Emphasis on solving problems in the process;
- Less paper work;
- Better morale and participation of the workforce;
- Higher equipment capacity and utilization.

It is apparent that JIT has all-inclusive advantages for businesses, but that strong interactions with suppliers are required to guarantee the effectiveness of the system.

**Safety Inventory (stock)**

Investigation has shown that often time customers fail to provide information of their demand in advance. As a measure therefore, there are two possible ways to compensate for this short coming on the part of the customer. First, get the customer organise to always forward information in advance. Second, hold enough stock at hand to cope with excess or unexpected demand.

According to Wild (2008) and Hadley (2004) “safety or buffer stock are the extra inventory kept as a cushion against stockout due to random perturbations of the nature or the environment”. There are use to protect the inability to predict demand. In respect to this therefore, it can be put across that “safety” is the quantity of inventory that has to be reserved in order to guard the system from random variables such as stockout, arising as a result of error in forecasting or deviation from normal demand during lead times (Zika2005). The task before us now, is how to establish the least possible quantity of safety inventory needed to accomplish all of the service level targets in line with the objective of this study. The calculation of safety inventory is invariably the same with that of reorder point, the merely difference is that, in over-time planning and most time in MRP safety inventory is express as safety time and calculated by dividing the inventory by demand per period, while the reorder point, the following formula is used.

\[
R = d_t + \sigma_L (ii)
\]

Inventory level is continuously monitored by a fixed order quantity system which places a new order once the inventory attains the reorder point (R). In lead times (L) deviations (\(\sigma_L\)) occur, thus this deviation (\(\sigma_L\)) is calculated using the formula:

\[
\sigma_L = \sqrt{\sigma_1^2 + \sigma_2^2 + \ldots + \sigma_L^2} \quad (iii)
\]

Dumas (2008) and Hadley (2004) in clarity point out that the amount of standard deviation of safety stock \((z)\) is related with the likelihood of not running out of inventory in the lead time, however in calculating the safety of inventory level, the following question should be before hand:

“How much inventory is required so that at least 2% of the demand is met in y% of the time periods? For instance, how much inventory is required to meet 95% of monthly demand 99% of the time?”

To compute the required inventory amount in other to shut the gap between coverage and the desired service level, the coverage \((z)\) is mathematically express as:

\[
\text{Coverage (z)} = \frac{\text{Actual inventory}}{\text{Actual demand}}
\]

In view of the aforementioned, safety inventory can thus be calculated according to Chase et el. (2006) using this formula thus:

\[
SS = Z_{zL} \quad (iv)
\]
For example, in calculating the safety of inventory value, let us assume that:

- Lead time in days \( (L) = 5 \)
- Forecast average daily demand \( (d) = 114 \)
- Standard deviation of demand \( (\sigma) = 4 \)
- Current inventory level \( (I) = 196 \)

Therefore, substituting the values into the formula stated earlier, we have thus:

\[
\sigma_L = \sqrt{\frac{\sigma_1^2 + \sigma_2^2}{2} + \frac{\sigma_3^2}{2} + \frac{\sigma_4^2}{2} + \frac{\sigma_5^2}{2} + \frac{\sigma_6^2}{2}}
\]

\[
\sigma_L = \sqrt{80}
\]

\[
\sigma_L = 8.94
\]

Similarly,

Coverage \((z) = \frac{\text{Actual Inventory}}{\text{Actual demand}}\)

Coverage \((z) = 1.71\)

Therefore,

\[
SS = Z_{PL}
\]

\[
SS = (1.71)(8.94)
\]

\[
SS = 15
\]

From the example above, it can be shown that inventory safety value is 15 units.

The company’s inventory carrying cost will increase when holding safety inventory, although Langfield-Smith et al (2006) maintained that it potentially reduces cost due to shortage. “Business’s safety inventory policy will increase revenue through improved service levels while simultaneously reducing inventory carrying costs” (Dumas 2008). It will therefore be of immense advantage to have the right percentage of safety inventory at the right time and places in the supply chain because it is unquestionably an integral part of effective inventory control and management.

**METHODOLOGY**

This study relied on data collection; hence it is more objective than qualitative. The research method used was the quantitative method which is systematic and based on a positivism perspective as described by Swetnam (2010) to mean observation. This method was selected because it is possible for the same data to be collected elsewhere and results would be directly comparable. The researcher employs the use of structured questionnaire which is a form of data collection where each respondent is asked to respond to a set of same questions in a predetermined order (Saunders et al. 2007). Some of the motivations for the use of questionnaires included cost, because it is more affordable and convenient and respondents can complete it in their own time. The fact that the researcher was absent, lead to the respondents feeling unrestricted and free to answer honestly and without any pressure.

**DATA ANALYSIS AND DISCUSSIONS**

The method employ by the researcher is the qualitative technique, using descriptive statistics method by quantifying the level of frequency and determining the percentages of respondents and weighted mean scores calculated. This method was considered more appropriate and convenient by the author because it helps to establish the objectives of the research.
Investigations show that 73.3% representing the highest respondents are of the view that Niger Mills handle production inventory only. But verbal interview reveal that Flour Mills Company handle various forms of inventory to include: Production, Maintenance, Repairs, Operating and In-Process inventories. The reason adduce is that, the company is involved in a range of production of different brands of product with it raw materials source locally or imported. Therefore effective production could not have been possible without breakdown of equipment’s and machineries which are bound to be repaired or maintained, hence giving raise to inventories, or that finish product could be delayed in the warehouse due to customers inability to purchase on time, making it possible to hold this entire inventory by the company.

The overwhelming response of 70.0% shows that the company embarks on a measure of inventory forecast, perhaps what had inform this great response is born from the fact that forecasting support the company in making decisions relating to cost, effectiveness within the production system while 30.0% argue that there is no forms of inventory forecast embark upon by the company; hence the will not have been inventories in the process.

<table>
<thead>
<tr>
<th>Table 2:</th>
<th>What are the sources of inventory kept?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the above</td>
<td>27</td>
<td>45.0</td>
<td>45.0</td>
<td>2.3167</td>
<td></td>
</tr>
<tr>
<td>Control Depot</td>
<td>7</td>
<td>11.7</td>
<td>56.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Source</td>
<td>6</td>
<td>10.0</td>
<td>66.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director Imports</td>
<td>20</td>
<td>33.3</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The view of 33.3% respondent is base on the fact that, raw materials which are imported for production are on the waiting list or may be delayed on shipment, giving raise to inventory, while 45.0% of respondent whose opinion is on all of the above can be said to be correct because inadequacy in local sources as well as human factors in the control depot are all strong indications that can lead to generation of inventories.

<table>
<thead>
<tr>
<th>Table 3:</th>
<th>Is there any form of inventory forecast?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>18</td>
<td>30.0</td>
<td>30.0</td>
<td>1.7000</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>70.0</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The overwhelming response of 70.0% shows that the company embarks on a measure of inventory forecast, perhaps what had inform this great response is born from the fact that forecasting support the company in making decisions relating to cost, effectiveness within the production system while 30.0% argue that there is no forms of inventory forecast embark upon by the company; hence the will not have been inventories in the process.

<table>
<thead>
<tr>
<th>Table 4:</th>
<th>What system of inventory control do you operate</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the above</td>
<td>16</td>
<td>26.7</td>
<td>26.7</td>
<td>2.3167</td>
<td></td>
</tr>
<tr>
<td>All of the above</td>
<td>25</td>
<td>41.7</td>
<td>68.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclic Ordering system</td>
<td>3</td>
<td>5.0</td>
<td>73.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Order system</td>
<td>16</td>
<td>26.7</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In view of the above result, it can be said that the 26.7% respondent may have drawn their conclusion base on economic order quantity (EOQ) which demands the knowledge of the order size (Q) and the minimal stock level that signals the placing of an order. The reason why they could been a low response to cyclical ordering system as the only two system listed as represented by the 5.0% is perhaps the difficulty in this system, which requires a continues taking of physical inventory in the event that there is a replenishment cycles, and this cannot be possible especially if there is an ongoing work at hand. However, it has been established according to hierarchical statistical response shown by the 25 respondent that represent 41.7% that the company has a control system and is possibly the both. But 27.7% argued that there is none in existence. Further verbal investigation shows that the company lacks a strategic operating system for inventory control. The different shades of opinion are as a result of this fact.
Table 5:

<table>
<thead>
<tr>
<th>What ordering cost do you encounter?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>14</td>
<td>23.3</td>
<td>23.3</td>
<td>3.0667</td>
</tr>
<tr>
<td>Administrative costs</td>
<td>3</td>
<td>5.0</td>
<td>28.3</td>
<td></td>
</tr>
<tr>
<td>Import duties</td>
<td>8</td>
<td>13.3</td>
<td>41.7</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>35</td>
<td>58.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The transportation cost in inventory management as encountered by Flour Mills indicated by 58.3% can be seen as a result of the delay experience from bulk or unit purchase made from suppliers which adversely affects the lead time.

Table 6:

<table>
<thead>
<tr>
<th>Tools used in maintaining effective inventory records?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the above</td>
<td>41</td>
<td>68.3</td>
<td>68.3</td>
<td>1.4000</td>
</tr>
<tr>
<td>Computer</td>
<td>16</td>
<td>26.7</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>Inventory models</td>
<td>1</td>
<td>1.7</td>
<td>96.7</td>
<td></td>
</tr>
<tr>
<td>Inventory records</td>
<td>2</td>
<td>3.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It can be deduced from the degree of different responses as indicated in the table that above, there is actually an existence of inventory model adopted by the company for effective inventory records, although 26.7% argued that the computer is what the company uses for record purposes, but the overwhelming majority that represents 68.3% of the entire population believes that Flour Mills maintain effective inventory with all the tools as indicated. However, what matters hear is the ability to reduced discrepancies to the bearest minimum and the level of technical know-how applied by the users that will determine the effectiveness to the company.

Table 7:

<table>
<thead>
<tr>
<th>What method of stock taking is engage by the company?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the above</td>
<td>16</td>
<td>26.7</td>
<td>26.7</td>
<td>2.1167</td>
</tr>
<tr>
<td>Periodic</td>
<td>21</td>
<td>35.0</td>
<td>61.7</td>
<td></td>
</tr>
<tr>
<td>Perpetual/Continuous</td>
<td>23</td>
<td>38.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The degree of respondent here is so closely related to each other indicated by their valid percentage response, hence it goes on to show that the actually exist a method of stock taking in the company. However, for the purpose of clarity and avoidance of doubt, until records are set to be accurate, no inventory system can work effectively.

Table 8:

<table>
<thead>
<tr>
<th>Nature of store keeping practice engaged by your company?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decentralized</td>
<td>3</td>
<td>5.0</td>
<td>5.0</td>
<td>1.9500</td>
</tr>
<tr>
<td>Centralized</td>
<td>57</td>
<td>95.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The nature of store keeping practice engage by Niger Mills Company is centralized according 95.0% of the total respondents. The centralized practice is beneficial to the company because it allows it to effectively employ it bargaining powers and resources as well as discount considerations.
Other reason induced from these overwhelming respondents is that, the discrepancies of records duplication, cost of inspection, purchasing and receiving are all reduced to bearable minimum. Centralized store keeping ensures a better control of activities and create uniformity in terms of purchase with standard costing. Proper usage of materials, lead time and transportation cost can all be achieved by centralized store keeping.

Table 9:

<table>
<thead>
<tr>
<th>What Purchasing policy is adopted by your company?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the above</td>
<td>10</td>
<td>16.7</td>
<td>16.7</td>
<td>2.9500</td>
</tr>
<tr>
<td>Piece purchase</td>
<td>11</td>
<td>18.3</td>
<td>35.0</td>
<td></td>
</tr>
<tr>
<td>Unit purchase</td>
<td>11</td>
<td>18.3</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td>Bulk purchase</td>
<td>28</td>
<td>46.7</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Statistical analysis from the table above shows that Flour Mills purchasing policy cut across piece, unit or bulk purchasing. Any of this purchasing policy could be adopted depending on the needs at hand, provided immediate satisfaction will be achieved.

Table 10:

<table>
<thead>
<tr>
<th>Evaluation of inventory performance?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>17</td>
<td>28.3</td>
<td>28.3</td>
<td>3.1167</td>
</tr>
<tr>
<td>Once a year</td>
<td>10</td>
<td>16.7</td>
<td>45.0</td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td>5</td>
<td>8.3</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td>5</td>
<td>8.3</td>
<td>61.7</td>
<td></td>
</tr>
<tr>
<td>Once a day</td>
<td>23</td>
<td>38.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There has been different opinion on the time frame for which inventory is evaluated and the standard lead time for receiving inventory from suppliers. A specific opinion on this issue cannot be drawn; however, analysis shows that there will be no reliable target on stock levels arising due to the inconsistency and poor customer relationship. Going by these claims, the unprecedented inventories that will be experience by the company will affect customer relationship as well as tight down capitals.

Table 11:

<table>
<thead>
<tr>
<th>Standard lead time for receiving inventory from suppliers?</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
<th>Weighted mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 days and more</td>
<td>18</td>
<td>30.0</td>
<td>30.0</td>
<td>3.4333</td>
</tr>
<tr>
<td>21-35 Days</td>
<td>3</td>
<td>5.0</td>
<td>35.0</td>
<td></td>
</tr>
<tr>
<td>14-21 Days</td>
<td>4</td>
<td>6.7</td>
<td>41.7</td>
<td></td>
</tr>
<tr>
<td>7-14 Days</td>
<td>5</td>
<td>8.3</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>1-7 Days</td>
<td>30</td>
<td>50.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The statistical findings relating to the above statement shows that, the inconsistency in lead time experience in the company will make it very difficult to set a reliable target on stock levels “or to provide good customer services if times are not known accurately” (Wild 2008). Therefore, going by the 30% respondents whose opinion is that the company leads time is 35 days and above, the implication of this longer lead time is that, it will be very difficult to forecast demand that will cover the supply period and the reliability of the supplier cannot be guaranteed. But when the supply lead time is shorter as observed by 50% respondents, there is that likelihood of forecasting more correct and errors will be minimize.

Nowadays, the rate of customers sensitivity to reliability supply is high, so changing suppliers in this circumstance is not even a guaranteed, instead a strategy should be put in place to guide against any supply that the delivery is not consistent so as to enhance customer’s satisfaction and retention in
line with objectives of this study. Based on the above result and discussions, extracted degrees of the overall measurement scales for different variables with the weighted mean scores was determined and represented as shown in figure 1.1a & b respectively.

CONCLUSION
The conclusion drawn from this research base on the findings shows that a reasonable number of working staff in Flour Mills Company lack the theoretical and practical understanding of inventory management theories, hence it cannot be said to be an effective inventory control system in the company. The experience here is not only associated with Flour Mills Company Plc., but with many other manufacturing SMEs in Nigeria.

In summary, we draw our conclusions on dual capacity. The first is that, it is very essential and obligatory to judged inventory performances at the level at which decisions are made. If making decision is in the total prerogative confine within the dealer or outlet level in the supply chain, then analysing overall supply chain decisions should include local decision making, as this decision-making behaviour is driven by a combination of soft and hard factors, and not necessarily identical for every dealer in the system. The conclusion here is of divergent view to most operations research models for integrated production-distribution inventory systems, where mostly all dealers are considered to be homogeneous, there by justifying the use of firm-level data as an outcome measure. The managerial implication of this is that decision making at the dealer level must be clearly fused in supply chain design. It is important to liaise with dealers in other to change the supply chain.

Second, the incentive structure that drives its operation must be clearly understood if one is to explain the level of inventory in a distribution system. Manufactures will naturally have a very different incentive structure from its retailers, which leads to local optimisation and underperformance at supply chain level. It is worthy of note here that, dealer incentives are naturally not part of inventory management theory but to a greater extend do influence inventory levels. A turn-and-earn allocation system where allocation is solely based on past sales performance may be slow to adapt to changing circumstances. Other sophisticated distribution mechanisms that encourage build-to-order, decrease lost sales and reduce inventory in dealerships are required. Any discussion of inventory performance, or even “optimality”, thus needs to be set in the context of the incentives that determine the behaviour of the decision-making actors in the supply chain. The implication of this is that if a manufacturing firm desires to lower supply chain wide inventory levels it is very difficult to achieve without proper incentives. One way to deal with this for
manufacturers is to slowly alter the supply chain and introduce changes at the moment of launching new products

RECOMMENDATIONS

In view of the findings made from the research, it has become imperative to make the following recommendations.

- There should be an aggressive and mass training of personnel’s on the theoretical and practical ethics of inventory management theories in order to reduce the possible and avoidable human errors that occur during records, documentation and reporting system.
- A systematic purchasing method should be adopted to avoid the issue of shortage between ordering and delivery. Order for materials should be place on due time beforehand. Ensure that you maintain a relatively low inventory before placing a reorder, but hold enough on hand that will satisfy immediate needs. There is cost associated with large inventories as well as if stock is depleted.
- Make someone responsible for checking the inventory. Delegate the responsibility for specific parts of the total inventory effort to the persons in the organization who are best qualified to do the job. Be sure those to whom you delegate responsibility know exactly what they are supposed to do.
- Be aware of inventory turnovers. Know what the turnover of each commodity is and if possible compare this with the turnover of the same items by other similar firms.
- In other not to keep duplicate records as a result of the variation in price, first in -first-out (FIFO) and last in-last out (LIFO) method should be adopted to reduce the possibility of different forms for a particular material because of variation in price.
- Maintain records of all stock kept in the warehouse and keep a review on the trend of weekly/monthly usage. Operating stock level should be established based on consumption and the stock level periodically reviewed. All slow moving stock should be reviewed at least quarterly with the unit and total value and the last movement date indicated.
- Unauthorised withdrawal of materials from the storeroom without a requisition card/ form from should be discouraged to give way for accountability. Cycle count should be set up for inventory records with a target of 95% accuracy. There should be a standard delivery date and time set for suppliers. This will help to check irrational deliveries of materials by the supplier, cost, stock and unnecessary delay.
- A ledger comprising all items of stock held in different units located from physical stock itself should be kept. The detailed entries of all issues should be reflected in such ledgers. They serve as check and balances on all the sub-units and as a good source for audit purposes.
- Acquire and install the latest time and money saving software’s and technologies from vendors such as ERP and MRPII that will incorporate all departments of the company for effective for effective inventory management and optimization.

If in the event that the aforementioned recommendation of inventory management and control project is implemented very successfully by organisations, it can go a long way to reduce operational cost, thereby generating more accurate demand forecasts, speed production/turn over cycles, and greatly enhance customer service- all of which can serve a company millions of naira over the long run.

FUTURE RESEARCH

In continuation for the quest in finding a lasting solution for effective inventory control and management especially in Nigeria SMEs, it is very important that the findings of this empirical research be evaluated in the light of certain limitations since acknowledgement of these limitations could suggest new directions for future studies. Future research should be tailored or focus on a broader sector of Nigerian economy since this research was limited only to a particular manufacturing company (Niger Mills Plc) in Calabar, Nigeria.

REFERENCES


