Effect of Inventory Management System on Operational Performance in Manufacturing Firms: Study of May and Baker Manufacturing Industry Nig Ltd, Lagos

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Abstract -- ***Inventory management has been a problem to many business organizations in Nigeria. Hence, it has become imperative to identify and enlighten management on the proper use of inventories. How inventory management systems affects operational performance in manufacturing firms is the primarily concern of this study. To further investigate the study and accurately analyze the result, three hypotheses were formulated. A descriptive research design random sampling techniques were employed where the sample size comprised of a total of sixty (60) staff were randomly selected from May and Baker Manufacturing Nigeria Limited in Lagos State. A non-parametric statistics of chi-square was employed to test for the relevant hypotheses. The outcome of this study reveals that, there is significance relationship between poor inventory management system and organizational performance. This study conclude that, failure to maintain a proper, adequate and accurate inventory control management will results in fall in profit and performance of May and Baker Nigeria Limited and vice-versa. It was recommended that, the organization should avoid the dangers that are inherent in keeping too little or too much of stock. There is also the need for organizations to train their personnel in the area of inventory control management. In general, the findings that emerged from this study have indicated that organizations stand to gain a lot from effective inventory control management system. Some of this benefit include optimal use of resources, cost reduction, improved profitability, reduction of waste, transparency and accountability, easy storage and retrieval of stock amongst others.***

Indexed Terms *-- **Effect, Inventory, Management, Operational Performance***

I. INTRODUCTION

Inventory management systems have been of concern for many years to business firms worldwide. Inventory management systems play a crucial role in enhancing effectiveness and efficiency in handling inventory of business firms. Companies have been continually in search for sources of sustainable competitive advantage in their operations. Therefore, there is need for business enterprises to embrace effective inventory management practices in order to improve their competitiveness (Rajeev, 2008).

In 1980s inventories of raw materials, work-in-progress components and finished goods were kept as a buffer against the possibility of running out of needed items (Salawati, Tinggi, & Kadri, 2012). However, large buffer inventories consume valuable resources and generate hidden costs (Salawati *at. el.*, 2012). Too much inventory consumes physical space, creates a financial burden, and increases the possibility of damage, spoilage and loss (Nyabwanga & Ojera, 2012). On the other hand, too little inventory often disrupts business operations (Dimitrios, 2008).

The scope of inventory management concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an on-going process as the business needs shift and react to the wider environment (Ghosh and Kumar, 2003).

With the increasing demand in today's competitive environment, providing accurate real-time inventory information is key to survival. This is particularly true for situations involving inventories of perishable

items like paper products, farm produce and pharmaceuticals. Given the limited shelf life of these goods, it is essential to have the ability to visualise the logistics flow of these items at pallet level in real-time. Typically, such information is captured with the use of barcode scanning or even extensive manual record keeping. However, these approaches are time-consuming, labor-intensive and error prone (Zipkin, 2000; Sellitto, Burgess and Hawking, 2007; Hamilton, Michael and Wamba, 2009).

In Nigeria, the size of industry, small, medium, and large scale, has a significant effect on both the numerical strength of staff and level of involvement in inventory management of both raw material and the finished product. The type of inventory system in practice in any organization depends on many factors among which are economic stability of the place, infrastructural facilities available, transportation network and many more which are called constraints. (Ogbo, Onekanma and Wilfred, 2014).

II. STATEMENT OF THE PROBLEM

Historically, inventory management has been referred to as excess inventory and inadequate management or shortage of inventory and adequate management practice. Several penalties could be apportioned to excesses in either direction. Inventory management has been a problem to many business organizations in Nigeria.

Inventories provide a significant link between production and sales of product and constitute a large percentage of the cost of production. It is one of the most expensive and important assets of many manufacturing companies, representing a considerable percentage of the total invested capital. The situation is more acute in developing countries such as Nigeria, where the practical application of operation research techniques in industry and business enterprise is in its infancy. (Ogbo, Onekanma and Wilfred, 2014)

However, to date in most organization, both Analysts and Managers have been relatively unsuccessful in convincing top management to give this area the due consideration that it logically deserves (Ogbo, 2011). Inventory problem has escalated as progress in technology increases the ability of organizations to produce goods faster in multiple design variation and greater quality (Letinkaya and Lee, 2000). How inventory management systems affects operational performance in manufacturing firms is the primarily concerned of this study.

In trading organizations, the term ‘stock’ or ‘inventory’ is used to describe goods or merchandise purchased and kept in the store for the purpose of resale or further production as in the case of a production outfit. There has been little acceptance till date as to how effective and efficient utilization of inventory could assist in achieving organizational objectives. Hence, it has become imperative to identify and enlighten management on the proper use of inventories. Therefore, the broad objective of this study is to examine the effect of inventory management systems on operational performance in manufacturing firms.

III. OBJECTIVES OF THE STUDY

The general objective of study is to determine the effect of inventory system on operational performance in manufacturing firms with particularly interest in May and Baker manufacturing industry Nigeria limited, Lagos

i. determining the extent to which poor inventory management system could affect organizations operation,

ii. investigate how incompatibility of organizational policy could affect inventories management system,

iii. To assess the extent to which inventory management system has reduce cost of production,

iv. To ascertain the relationship between operational feasibility, utility of inventory management in the customer related issues of the organization.

v. To determine the how inventory management systems affects profitability in an organization.

- Relevant Research Hypotheses

These hypotheses are stated in a null form:

H_{o1}: There is no significance relationship between poor inventory management system

and organizational performance in May and Baker Nigeria Limited.

H_{02}: There is no significant effect between incapability of organizational policy and inventory management system of May and Baker Manufacturing Nigeria Limited.

H_{o3}: There is no significant relationship between inventory management system and profitability in May and Baker Nigeria Limited.

IV. LITERATURE REVIEW

- Preamble

The scope of inventory management is broader than stock. Inventories provide a significant link between production and sales of product and constitute a large percentage of the cost of production. This chapter will be arranged in four fold, which include: theoretical framework, empirical review of the previous studies and the last will be conceptual framework which will be used to provide suggestions as well as answering the research questions. The following subheadings: concept and classification of inventory, functions of inventory, theory of EOQ, purpose of holding inventory, inventory management and apparitional performance will be reviewed in this chapter to substantial the argument.

- Theoretical Framework of the Study

Theory of Economic Order Quantity Model

Inventory modeling has been an area of intense inquiry in operations management and operations research. Starting from a simple deterministic Economic Order Quantity (EOQ) model dating from over a century ago, the field of operations management has developed much more advanced inventory models that incorporate stochastic and correlated demands, multiple products and multiple echelons of inventory. Some widely used inventory models are described in Zipkin (2000), Porteus (2002) and Cachon and Terwiesch (2005).

Undoubtedly, the best-known and most fundamental inventory decision model is Economic Order Quantity Model. Its origin dated back to the early 1900s. The EOQ has been previously defined by Schroeder (2000), Coleman (2002) and Ogbo (2011) as the ordering quantities which minimizes the balance of cost between inventory holding costs and re-order costs.

Economic Order Quantity Assumptions

Ogbo (2011) stressed further that to be able to calculate a basic EOQ, certain assumptions are necessary:

- That there is a known, constant, stock holding costs;
- That there is a known, constant ordering costs;
- That the rate of demand is known;
- That there is a known constant price per unit;
- That replenishment is made instantaneously, that is, the whole batch is delivered at once;
- No stock-outs are allowed.

It would be apparent that the above assumptions are somewhat sweeping and that they are a good reason for treating an EOQ calculation with caution. Also, the rationale of EOQ ignores buffer stocks, which are maintained to cater for variations in lead-time and demand. The above assumptions are wide ranging and it is unlikely that all could be observed in practice. Nevertheless, the EOQ calculation is a useful starting point in establishing an appropriate reorder quantity.

Mathematical models have been developed within the scope of operations management to determine the optimal inventory level. The most widely used model is the EOQ model. This model was developed by F. W. Haris in 1913. But still R.H. Wilson is given credit for his early in-depth analysis of the model (Arsham, 2006). The model is also known as the Wilson EOQ model. According to this model, some costs (ordering costs) decline with inventory holdings, while others (holding costs) rise and that the total inventory-associated cost curve has a minimum point. This is the point where total inventory costs are minimized. The economic order quantity is the level of inventory that minimizes the total of the inventory holding cost and ordering cost.

The EOQ formula is given below; it's derivation and graphical presentation.

EOQ = 2CoD ……..….. 1

Cc

Where Co, Cc and D denote the ordering costs, carrying cost and annual demand respectively.

Note also that Annual stock = Q/2,

Total annual carrying cost = CcQ/2,

Number of orders per annum = D/Q,

Annual ordering costs = CoD/Q and

Total cost = CcQ/2 + CoD/Q ---------- 2

In the above formula, Q is defined as the result of the calculated EOQ.

The order quantity, which makes the total cost (TC) at a minimum, is obtained by differentiating with respect to Q and equating the derivative to zero the above total cost equation 2. Thus, dTc/dQ = Cc/2 – CoD/Q2 and when dTc/dQ = 0 cost is at minimum.

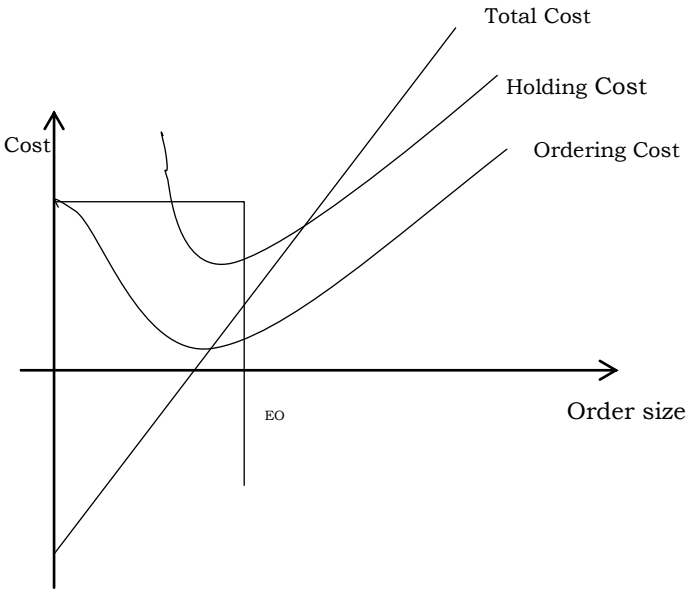
DCo/Q2 = Cc/2

Q2 = 2DCo / Cc and Q which represent the EOQ formula would now be The EOQ formula is given below; it's derivation and graphical presentation.

EOQ = 2CoD

Cc

The graphical representation of EOQ model is shown in figure below:



Theory of Constraints

The theory of constraints is a management philosophy that seeks to increase manufacturing throughput efficiency or system performance measured by sales through the identification of those processes that are constraining the manufacturing system (Goldratt, 2004). Kazim, (2008), argues that theory of constraints is based on the principle that a chain is only as strong as the weakest link or constraint and to elevate and manage the constraint as necessary.

The difficulties in the theory of constraints are: very long lead times, large number of unfulfilled orders or they are executed with much extra effort (overtimes), high level of unnecessary inventories or lack of relevant inventories, wrong materials order, large number of emergency orders and expedition levels, high levels of devolution, lack of key customers engagement, frequent changes or absence of control related to priority orders, which implies on schedule conflicts of the resources (Goldratt, 2004). The theory is founded on the belief that an organization that maximizes the output of every machine will not perform as well as one that ensures optimization of the flow of materials and value created through its operational performance.

Theory of constraints emphasizes focus on effectively managing the capacity and capability of these constraints if they are to improve the operational performance of their organization. Companies have struggled to invest in the technology and organizational structures needed to achieve to-date systems synchronization that enable coordinated inventory flows (Fawcett, Ogden, Magnan, & Cooper, 2006). Theory of constraints is a methodology whose basis is applied to production for the minimization of the inventory.

Under Theory of Constraints, performance measurements are based on the principles of throughput, inventory dollar days and operating expenses (Umble, Umble, & Murakami, 2006). Theory of Constraints measurements are based on a simple relationship that highlights the effect of inventory control system on progress toward the operational performance. The proof of effectiveness for any inventory control system is the degree to

which it improves operational performance of business firms.

For manufacturing industry to ensure that the bottlenecks on their operations run smoothly they have to embrace the use of inventory control systems that can facilitate operational efficiency. This may result in the acquisition of additional capacity or new technology of inventory control systems that lift or break the constraints. Improving the performance of the constraint leads to improvement in the operational performance of the entire system. The theory of constraints contributes a lot to the building of literature in this study.

Boyd & Gupta, (2004) in their studies introduced a theoretical model for Theory of Constraints on Manufacturing Resource Planning and Just-In-Time in manufacturing firms, they suggest that a positive relationship between each of the three Constraints principles and ideas can be used to improve operational performance.

Gupta & Boyd (2008) in their research on 'theory of constraints can serve as a general theory in operations' revealed that theory of constraints provides approaches to operations that avoid pitfalls of local optimization by reaching a cross functional boundaries in organizations. They also noted that while the theory appears to meet the criteria of a good theory, it has not been empirically tested for the most part. Criticism that has been leveled against theory of constraints includes its sub optimality.

Trietsch, (2005), argues that the theory is inferior to competing approach. The theory to establishing an optimal product mix that is likely not to yield optimum results Linhares (2009).

- Empirical Review of previous work

Roumiantsev and Netessine (2005) investigated the association between inventory management policies and the financial performance of a firm. The purpose of the study was to assess the impact of inventory management practices on financial performance across the period 1992-2002. They used conventional firm specific variables (inventory levels, margins, and lead times) as explanatory variables. They found no evidence that smaller relative levels are associated with financial performance as measured by return on assets. Eckert (2007) examined inventory management and role it plays in improving customer satisfaction. He found a positive relationship between customer satisfaction and supplier partnerships, education and training of employees, and technology. In Greece, Koumanakos (2008) studied the effect of inventory management on firm performance 1358 manufacturing firms operating in three industrial sectors in Greece, food textiles and chemicals were used in the study covering 2000 – 2002 period. The hypothesis that lean inventory management leads to an improvement in a firm's financial performance was tested. The findings suggest that the higher the level of inventories preserved (departing from lean operations) by a firm, the lower the rate of return. In conclusion, most of the studies reviewed concentrated on conventional firm level variables such as inventory levels, demand and lead time.

In the theoretical literature, a vast array of inventory management best practices (for example, just in time, vendor managed inventory, collaborative planning, forecasting and replenishment, automatic replenishment, agile system, and material requirement planning) abound. But experience and empirical evidence has revealed that there is limited knowledge and understanding of these practices, their mode of operation, and practical relevance in the Nigerian manufacturing industry (Adeyemi and Salami, 2010; Alao, 2010).

In an anniversary article, Wagner (2002) examines the issues of aggregation and data availability. He points out that product-level theoretical modeling historically dominated the field of operations research, whereas industry-level data modeling was widely used in economics.

As a result, there are few if any implementable solutions at the product level and especially at the firm level of aggregation.

He also suggests that the field of inventory management started getting more attention when more product-level and firm-level data became available at the SKU level and when effects that are very often beyond the scope of classical inventory models became obvious (e.g., skewness and

discontinuity of demand, promotions, competition, etc.). Wagner suggests that the pure operations research model "is blind to data issues" and that "the objective should be stocking and replenishing logic that is driven by such data."

At the same time, only a few papers in operations management analyze inventories empirically and try to reconcile the inventory behavior observed in practice with the behavior predicted by the models. Rajagopalan and Malhotra (2001) study trends in inventory levels at US firms over time to test the widely held belief that inventory management has improved due to the introduction of just-in-time (JIT) practices and IT system implementations. Using a large sample of firms from the US Census Bureau including both private and public companies, they find that material and work-in-process inventories decreased in the majority of the two-digit SIC industries from 1961 to 1994.

Rajagopalan and Malhotra (2001) also find that inventories of finished goods decreased in only a few industry segments. Chen, Frank, Wu (2005a and 2005b) analyze inventory trends for US public companies in the manufacturing and retailing sectors. They find that between 1981 and 2001 median manufacturing inventory levels declined from 96 days to 81 days, with an average rate of reduction of 2% per year.

In the retail and wholesale segment, the median inventory levels decreased from 72 days to 52 days. Moreover, Chen et al. (2005a, 2005b) show that public companies with abnormally high inventory levels have experienced abnormally low levels of financial returns, but on average lower inventory levels are not associated with higher financial returns. Lai (2006) reports evidence that, when the market discounts high inventory firms, firms decrease inventory, and vice versa.

Gaur, Fisher and Raman (2005) examine firm-level inventory behavior in retailing companies. They propose a model explaining differences in inventory turns across companies and create an adjusted measure of inventory turns that is better suited to gauging the operational metrics of retailers.

Gaur et al. (2005) also find that inventory turnover for retailing firms is positively correlated with capital intensity and sales surprise and, similar to our result, is negatively correlated with gross margins. Although all of these studies deal with aggregate companies' inventories, they pursue different goals and, with the exception of one hypothesis in Gaur et al. (2005), do not test the implications stemming from classical inventory models.

In this direction, Dave (2001) presents an inventory model for calculating optimal order quantity that used the Economic Order Quantity (EOQ) method. He points out that many companies are not using the EOQ method due to poor results arising from inaccurate data input. He clarifies that many errors in the calculation of EOQ in the computer software package are due to the failure of the users in understanding the data inputs and system setup that control the output. Dave (2001) posited that EOQ is an accounting formula that determines the point at which the combination of order costs and inventory cost are the least.

Farzaneh (2012) presents a mathematical model to assist companies in their decision to switch from the economic order quantity (EOQ) to the Just in Time (JIT) purchasing policy. The author highlights that the economic order quantity model focuses on minimizing the inventory costs rather than on minimizing the inventory. From the mathematic model presented, Farzaneh (2012) concludes that JIT can eliminate the storage, capital, insurance, ordering, and transportation costs.

Kisaka (2006) analyzed the role of Economic Order Quantity model in reducing the cost of raw material inventory at a dairy farm Project. He compared total costs of raw material inventory incurred through the project-employed method with the total costs of raw material inventory which could have been incurred under the EOQ application. Kisaka found that there was a cost saving which could have been observed through employing the EOQ model.

Wild and Axsater (2005), used inventory technique methods in solving real inventory issues for business in a variety of industries from aerospace to retail consumables and from automotive to process

chemicals. They noted that appropriate database was a prerequisite for the application of the techniques. This implies that manufacturing entities need to have a well identifiable database for the application of more sophisticated inventory models.

In order to further examine the contributing effects of inventory management practices towards enhancing efficiency in manufacturing operations, this position is supported by quite a large number of previous and extant inventory management research (see Bloomberg, Lemay and Hanna, 2002; Chandra and Kumar, 2001; Chen; 2005). Bloomberg, Lemay and Hanna (2002) reported that effective management of inventory has enormous potentials for improving the efficiency of organizations, and firms that use scientific inventory control practices have a significant competitive advantage in the market.

Inventory Management and Operational Performance
There have been numerous attempts to explain operational performance of companies in the fields of strategic management, accounting, finance, marketing and management science. Naturally each of these areas concentrates on different explanatory variables and therefore this study limits the survey to papers that are perceived as immediately relevant.

In the US, Sanghal (2005) studied the effect of excess inventory on long term stock price performance. The study estimated the long-run price effects of excess inventory using 900 excess inventory announcements made by publicly traded firms during 1990-2002.

These announcements are clear and unambiguous acknowledgement by affirm that it is suffering from excess inventory. Examples include instances of production curtailment, temporary shutdowns, price mark downs, promotion to liquidate inventory and inventory write- offs to deal with excess inventories.
He found evidence suggesting that stock market partially anticipates excess inventory situations and that firm do not recover quickly from negative effects of excess inventory. He further noted that the negative effect of excess inventory is economically and statistically significant.

In Malaysia, Agus and Noor (2006) examined the relationship between inventory management practices and financial performance. The study measured he manager's perceptions of inventory and supply chain management practices and the level of performance in the industry.

The practices include lean inventory systems, Technology and strategic supplier partnerships. They employed a structured questionnaire, which was designed to assess the companies in terms of the described dimensions.

The sample companies were randomly chosen from manufacturing companies (non- food based manufacturing companies with medium to high technology) in Klang valley, Malaysia. The findings suggest that inventory management practices have significant correlations with profitability and Return On Sales (ROS).

- Conceptual Framework of the Study

Concept of Inventory Management Control
Uncertainties are one example why most parties within the supply chain keep inventories. Inventories function as a buffer to cope with uncertainties as described above (Waters, 2003). Inventories are kept at all most each party within a chain of supply. This section will elaborate on inventory management in more detail.

Ghosh & Kumar (2003) defined inventory as a stock of goods that is maintained by a business in anticipation of some future demand.

Basically inventory management can be defined as the "management of materials in motion *and* at rest" (Coyle, Bardi, Langley, 2003). The following activities all fall within the range of inventory management (Wikipedia, 2009): control of lead times, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods and demand forecasting.

According to Kotler (2000), inventory management refers to all the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (work-in-progress) and finished

good so that adequate supplies are available and the costs of over or under stocks are low inventory control.

Inventory management involves planning organizing and controlling the flow of materials from their initial purchase unit through internal operations to the service point through distribution (Smaros, Smaros, Lehtonen, Appelquist and Holmstrom, 2003).

Kotler (2002), posits that inventory management refers to all the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (working-progress) and finished good so that adequate supplies are available and the costs of over or under stocks are low.

Inventory management basically serves two main goals (Reid & Sanders, 2007). First of all good inventory management is responsible for the availability of goods. It is important for running operations that the required materials are present in the right quantities, quality and at the right time in order to deliver a specific level of service. The second goal is to achieve this service level against optimal costs. Not all items can be held in stock against every cost for example and therefore choices have to be made.

The scope of inventory management also concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an on-going process as the business needs shift and react to the wider environment (Ghosh and Kumar, 2003).

Inventory management therefore has been defined in many ways by many authors. As expected, these authors defined inventory management based on their perception of the subject matter. Nwandu, (2006) defines inventory management as a form of administration control that is particularly essential in all manufacturing, wholesale and retail organizations. The essence of inventory according to Nwandu is, "to have the right goods quality and quantity, at the right place and time". The essence of inventory management for a contemporary organization.

Inventory control can be defined as the policies and procedures which systematically determine and regulate which things are kept in stock and what quantities of them are stocked (Rushton, Phil, & Baker, 2011). For each item stocked decisions are needed as to the size of the requirement, the time at which further supplies should be ordered and the quantity which should be ordered. Inventory control is the supervision of the storage, supply and accessibility of items to ensure an adequate supply without excessive oversupply (Miller, 2010).

Eni (2001) defines inventory control as the problems of verifying the quantity, the value and the balance of the entire range of materials held in Stock, so that it would be easy and possible to give the exact quantities of Materials in the Store at any given time. It helps the store-keeper (or the inventory controller, as the case may be) to tell how much was ordered (requested for), how many have been used, what is remaining and when to place the next order so that the enterprises would not lack Materials to work with at any point in time.

According to Miller (2010), inventory control is the activity which organizes the availability of item to the customers. It coordinates the purchasing, manufacturing and distribution functions to meet the marketing needs. Similarly, Sharma (2004) views inventory control as the means by which Materials of the correct quantity and quality is made available as at when required with due regard to economy in terms of storage and costs (both ordering and working Capital). He also opines that inventory control is the systematic ways of locating; storing and recording of goods in such a way that desired degree of service can be made to the operation shops at minimum ultimate cost.

Orga (2006), defines inventory control as a process of ensuring that the right quality of the relevant stock is available at the right time and in the right place. Nweze (2004), on his own part defines inventory control as the means of ensuring that actual flow of

inventory in an organization conforms with plan. From the foregoing therefore, one infers that inventory management is the act of ensuring that balanced items of stock are maintained at the right quantity, quality, place and time in an organization, to ensure organizational business continuum.

Ahuja (2002) and Martand (2009) have identified the objectives of inventory control to include: (i) to minimize the costs involved in purchasing, stocking and issuing of the supplies, (ii) to reduce the frequencies of ordering for stock items, (iii) to decrease pilferage, waste and over stocking; (iv) to minimize the investment and fluctuations in Inventories while at the same time providing prompt order filling services for customers, (v) to integrate and deploy within the logistical system the minimum amount of inventory consistent with desired delivery capability and total cost expenditure; (vi) to ensure adequate supply of products to customer and avoid shortages as far as possible, (vii) to provide a scientific base for both short term and long term planning of materials, and (viii) to provide a reserve stocks for variations in lead of delivery of materials.

According to Arora (2000), the factors to be considered in Inventory Control include, procurement costs, inventory carrying costs, cost of spoilage and obsolescence, cost of running-out of stock and set-up cost. A good inventory control system minimize the possibility of delays in production that are caused by lack of materials, permits a company to exercise economics in purchasing, essential for an efficient accounting system is deterrent to people who might steal materials from factory is desirable to expedite the production of financial statement; allows for possible increase in output; insure advantage of quality discount, creates buffer between input and output; insures against scarcity of materials in the market and avoid inventory build-up (Carter, 2002).

Poor inventory control has the following symptoms: high rate of order cancellations, excessive machine downtime due to material shortage, large scale inventories written down because of price decline, distress sales, widely varying rate of inventory losses, large writing down at the time of physical inventory taking, continuous growing inventory qualities; liabilities to meet delivery schedules and even production rate (Menon, 2006).

Classification of Inventories

According to Pandey (2005), inventories can be classified into raw materials, work-in-progress and finished goods. Raw materials inventories are those items in their natural forms.

Inventories are basically stocks of resources held for the purpose of future production and sales. Inventories may be viewed as an idle resource which has an economic value. Better management of inventories would release capital for use elsewhere productively, (Ghosh and kumar, 2003).

Ile (2002), opines that inventory is classified into three types which include;

i. Raw Material inventory
ii. Work-in-progress inventory
iii. Finished goods inventory

- Raw material inventory

This includes all items purchased by an organization for processing. For instance, Flour, yeast, eggs etc. are all part of raw materials inventory of a confectionary organization.

- Work-In-Progress Inventory

Work-in-progress inventories refers to partly finished goods and materials which are between manufacturing stages. In other words any materials which have been processed half way but is yet to take the shape of finished goods.

This is also called goods-in-progress inventory. This is an intermediate stage of raw material inventory that is yet to be finished by the plant to enter into another stage of processing. These are materials that have been partly processed but are yet uncompleted.
Finished Goods Inventory

This is the stock of finished goods. These could be stock of goods awaiting shipment or in the warehouse, the level of finished goods stock is a matter of co-ordination between the production and sales departments of the organization.

These are perfectly completed goods ready for sale or distribution. Finished goods could be described as those outputs from the production process.

- Purposes for Holding Inventory

Inventories perform significant functions in the total production system and since "it is physically impossible and economically impracticable for each stock of item to arrive exactly where and when it is needed", there is need to keep some amount of inventory at any point in time. According to Banjoko (2004), manufacturing organizations carry inventories for a variety of reasons. Banjoko outlined seven reasons for holding inventories, which include;

1. To enhance uninterrupted flow of production
2. To meet variations in product demand.
3. To allow flexibility in production scheduling
4. To decouple successive stages of operations
5. To level production activities
6. To provide a means of hedging against future prices and delivery uncertainties
7. To provide a means of obtaining economic lot size and gaining quantity discounts.

- Functions of Inventories

Having (an amount of) stock is costly and can cause various additional risks. Waters (2003) states the following: "stocks are expensive, because of the costs of tied-up capital, warehousing, protection, deterioration, loss, insurance, packaging, administration and so on". He therefore also wonders why inventories are being maintained by organisations at all.

According to the Just-in-Time principle (JIT) when all materials arrive just in time, no stock will be needed and thus inventory management will not have to deal with the temporary storage of all these goods (Coyle et al., 2003). This is how managers often explain the JIT-principle. Unfortunately the JIT-principle cannot always be applied and JIT is just a way of control in a situation where production takes place based on an order (no mass production). JIT does not mean there are no inventories at all, but aims at elimination of unnecessary stocks during production (Dijk et al., 2007).

Inventories will probably always exist due to several reasons. There are three main reasons why stocks are necessary or sometimes even inevitable: Uncertainties are the most important reason to keep inventories (DHL, 2009). Another important source of uncertainties is caused on the demand side; the expected orders placed by the clients are hard to predict (Wild, 2002). In order to guarantee deliveries and a certain level of service to the clients also a stock is often maintained to cope with uncertainties on the demand side. To summarize, stocks thus allow for variation and uncertainty in both supply and demand, which lets operations continue smoothly when problems arise (Waters, 2003). In relation to uncertainties, time also plays a role. Time lags which are present in the supply chain can be intercepted by maintaining stock. A certain amount needs to be kept in stock, to use during this 'lead time'. When something is ordered, it usually takes a while before the goods are actually delivered; during this period the production cannot stand still and therefore the stock will function as a buffer to overcome this period. Time lags in deliveries can lead to very large fluctuations and are exaggerated down the supply chain: this effect is called the Bullwhip effect (Fawcett, Ellram, Ogden, 2007), (Johnson & Pyke, 2001). Inventories are thus a means to protect oneself against this effect (Klundert, 2003). Finally it may sometimes be cheaper to keep some stock. Economies of scale for example are a reason why inventories are kept.

Buying bigger quantities is often more beneficial than ordering small amounts, due to the related discounts (Waters, 2003), (Coyle et al., 2003). Additionally ordering one unit at a time that has to be delivered to a specific place every time the user needs it, requires more logistic movements and accordingly raises high costs as well. Also fluctuating prices may form a reason to keep a stock: buying a product at a low price can provide a benefit (Waters, 2003). That is off course when the total costs of keeping additional goods in stock is cost-efficient compared to buying at a higher price, otherwise high stocking costs will immediately diminish the intended profit. In addition to this list seasonal goods can be added (DHL, 2009): crops for example can mostly only be harvest once a year, which makes it impossible to produce according to the just-in-time principle.

V. RESEARCH METHODOLOGY

- Research Design

A descriptive research design: it attempts to describe and explain condition of the present by using many subjects and questionnaires to fully describe a phenomenon. This study intends to fully describe and explain condition the effect of inventory management systems on operational performance in manufacturing firms. Therefore, a descriptive research design will be adopted in this study.

- Population of the study

The population of the study will comprise all the manufacturing firms in Nigeria where inventory control and management is paramount to the performance and growth of the organization. For the purpose of this study, all senior staff of May and Baker manufacturing industry Nigeria limited, Lagos will be targeted.

- Sampling, Procedure and Size

The sample size for this study will comprise of 60 senior staff members of May and Baker manufacturing industry Nigeria limited, Lagos. The respondents will be randomly selected.

Instrument and Instrumentation for data collection

The researcher will employ a self-developed and well-structured questionnaire as the major instrument for this study. Research instrument will be used in obtaining, gathering, measuring and assessing data. A suitable questionnaire will be structured along with a five-point likert-type scale (summated) of strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1) to gather data for the study. It is a set of attitude items, all of which are considered of approximately equal "attitude value" and to each of which subjects respond with degree of agreement or disagreement (intensity). Section "A" of the research questionnaire will describe respondents' background information. While section "B" will comprise of possible methodological competencies. The questionnaire will be made simple for a straightforward understanding because different categories of people will be chosen as respondents.

The researcher will administer the questionnaire designed to gather information for the purpose of this study to analyze the result which will be used to answer the research questions and test for the relevant hypotheses as outlined in chapter one of this study. The instrument will be validated by the researcher's supervisor, lecturers in the department and colleagues who are vested on the field for necessary suggestions, modifications and corrections.

- Method of Data Analysis

The entire data will be analyzed with the help of the computer software called statistic packages for social sciences (SPSS) version 20. The following statistical tools will be employed in data analysis and presentation.

(i) Frequency distribution table

(ii) Simple percentage

(iii) Chi - Square

Frequency distribution table and simple percentage will be used to analyze the bio-data and section B of research questionnaire, Chi-Square statistical method will be employed to test the hypotheses. The Chi-Square formular is as shown below:

$$\chi^2 = \frac{\sum [O - E]^2}{E}$$

Where: O = Observed Frequency

E = Expected Frequency

χ^2 = Chi-square notation

The study will be at 5% level of significance and the model for the degree of freedom is (r – 1) (c – 1).

Where: r = row number

c = column number

A null hypothesis will be accepted if $\chi_{cal} < \chi_{tab}$ and alternative hypothesis will be rejected, and alternative hypothesis will be accepted if $\chi_{cal} > \chi_{tab}$ and Null hypothesis will be rejected.

VI. LIMITATION OF THE METHODOLOGY

The methodology in this study is limited to a controllable size due to the following constraint: cost, time and limited resources at the disposal of the researcher.

Test of hypothesis I

H_o: There is no significance relationship between poor inventory management system and organizational performance in May and Baker Nigeria Limited.

Table 1:

Chi-Square computation between poor inventory management system and organizational performance in May and Baker Nigeria Limited

χ^2-cal	χ^2-tab	D.F.	Sig. Level	Decision Rule
48.36	**36.42**	**24**	**0.05**	**Reject H_0**

The analysis of chi-square computation between the *poor inventory management system and organizational performance in May and Baker Nigeria Limited* as presented in table 26 above shows that chi-square calculated value of 48.36 is greater than the table value of 36.42 with degree of freedom 24 at 0.05(5%) significant level. Based on the above result, the null hypothesis which states that, there is no significance relationship between poor inventory management system and organizational performance in May and Baker Nigeria Limited is hereby, rejected. We accept the alternative hypothesis and conclude that, there is significance relationship between poor inventory management system and organizational performance in May and Baker Nigeria Limited. If good and proper inventory control management is not maintained in May and Baker there would be an adverse effect on its performance. This is in line with Rajeev (2010) who argues that inventory management practice is a way of acquiring competitiveness.

Test of hypothesis II

H_0: There is no significant effect between incapability of organizational policy and inventory management system of May and Baker Manufacturing Nigeria Limited.

Table 2:

Chi-Square computation between incapability of organizational policy and inventory management system of May and Baker Manufacturing Nig. Ltd.

χ^2-cal	χ^2-tab	D.F.	Sig. Level	Decision Rule
93.19	**36.42**	**24**	**0.05**	**Reject H_0**

Table 27 above presents the result obtained from the information gathered on *the incapability of organizational policy and inventory management system of May and Baker Manufacturing Nigeria Limited* from the respondents through a structured questionnaire. The chi-square calculated value of 93.19 is greater than the table value of 36.42 at 5% alpha level. The null hypothesis which states that, there is no significant effect between incapability of organizational policy and inventory management system of May and Baker Manufacturing Nigeria Limited is rejected. This signifies that the incapability of organizational policy will impact inventory management system of May and Baker Manufacturing Nigeria Limited. It is further stated that, if the organizational policy is not effective enough, the organization will find it difficult to keep and practice proper inventory control management.

Test of hypothesis III

H_{o3}: There is no significant relationship between inventory management system and profitability in May and Baker Nigeria Limited.

Table 3:

Chi-Square computation between inventory management system and profitability in May and Baker Nigeria Limited

χ^2-cal	χ^2-tab	D.F.	Sig. Level	Decision Rule
111.40	**36.42**	**24**	**0.00**	**Reject H_0**

From the table above, χ^2 – calculated value = 111.40, χ^2 – table value = 36.42, degree of freedom = 24 and significance level = 0.05 (5%). From this presentation of result, null hypothesis is rejected. By follow the conventional rule of chi-square interpretation of result as stated in chapter three of this study. The null hypothesis should be accepted will the calculated valued less than table value and reject the alternative hypothesis and vice-versa. There is significant impact of inventory management system on profitability in

May and Baker Nigeria Limited. Failure to maintain a proper, adequate and accurate inventory control management will results in fall in profit of May and Baker Nigeria Limited and vice-versa.

VII. CONCLUSION

The findings of this study shows that, there is significance relationship between poor inventory management system and organizational performance in May and Baker Nigeria Limited. If good and proper inventory control management is not maintained in May and Baker there would be an adverse effect on its performance. Effective inventory control management is recognized as one of the areas management of any organization should acquire capability.

This is in line with a study carried out by Rajeev (2010) and argues that inventory management practice is a way of acquiring competitiveness. It was also reveals that the incapability of organizational policy negatively impacts inventory management system of May and Baker Manufacturing Nigeria Limited. It is further stated that, if the organizational policy is not effective enough, the organization will find it difficult to keep and practice proper inventory control management.

Finally, the outcome of this study, gathered that there is a positive and direct relationship between inventory management system and profitability in May and Baker Nigeria Limited. And conclude that failure to maintain a proper, adequate and accurate inventory control management will results in fall in profit of May and Baker Nigeria Limited and vice-versa.

The implementation of the practices respond to different specifically unique environments of each firm. There is generally positive correlation between each of inventory management practices. Specific performance indicators have been proved to depend on the level of inventory management practices. Since organization cannot relegate the importance of evolving and maintaining effective inventory control system to the background, there is the need for them to adopt proactive attitudes towards the issue. Being proactive requires maintenance of the right level of inventory at any point in time. Organizations should avoid the dangers that are inherent in keeping too little or too much of stock.

To achieve the above, it is recommended that organizations adopt the inventory keeping method that best suits their operation. Here, just-in-time method could be considered as an option as it has been proven to be effective in maintaining the right level of inventory and also prevent stock-outs. There is also the need for organizations to train their personnel in the area of inventory control management. What this means is that only trained professional with the requisite skill should be in charge of inventory management.

The reason is obvious as most organizations inventory control programmers failed to achieve the intended objectives due to lack of skilled and trained professionals to manage it. In the present day advancement in technology, inventory control management has been made easier with the use of software.

REFERENCES

[1] Adeyemi, S. L. and Salami, L.O. (2010). Inventory management: A tool of optimizing resources in a manufacturing industry. Journal of Social Science, 23(2); 135-142.

[2] Agus, A & Noor, Z.M (2006). Supply chain management and performance. An Empirical Study. A working paper university of Malaysia.

[3] Ahuja, K.K. (2002). Production control. India: Vikas Publishing Ltd.

[4] Alao, R. O. (2010). Productivity in the Nigerian manufacturing sub-sector: An error correction model (ECM).European Journal of Economics, Finance and Administrative Sciences, 20(5); 129-135.

[5] AOT Consulting (2003). Review of the GEM Purchasing E-procurement Business System. Perth, Australia: AOT Consulting. (AOT).

[6] Arora, M.M. (2000). A textbook Cost Accounting. New Delhi: CBS Publishing Limited.

[7] Bloomberg, J. Leymay, K and Hanna, E (2002). Production and operations management. London: Pitman Publishers.

[8] Boyd, L., & Gupta, M. (2004). Constraints management: What is the Theory. Intrnational journal of operations and production management, 350-371.

[9] Cachon G. and C. Terwiesch. 2005. Matching Supply with Demand: An Introduction to Operations Management. Second edition, The McGraw-Hill Companies.

[10] Carter S.A. (2002). Production and Inventory Control Handbook. New York: McGraw- Hill.

[11] Chandra I .J, and Kumar A. (2001). Towards a theory and conceptual background of inventory management. Journal of Operations Management. 12(2): 119–130.

[12] Chen H, M. Frank, and O. Wu. 2005a. What Actually Happened to the Inventories of American Companies Between 1981 and 2000? Management Science, Vol.51, 1015-1031.

[13] Chen H., M. Frank and O. Wu. 2005b. US Retail and Wholesale Inventory Performance from 1981 to 2003. Working paper, University of British Columbia.

[14] Chen I. J, (2005). Towards a theory of supply chain management: the constructs and measurements. Journal of Operations Management, 22(2); 119–50.

[15] Coleman, B. (2000). Determining the Correct Service Level Target. Production and Inventory Management Journal, 41(1):169-176.

[16] Consortium for Global Electronic Commerce (CGEC) (2002). Measuring and Improving Value of inventory control Initiatives. Madison, WI: University of Wisconsin-Madison, Consortium for Global Electronic Commerce.

[17] Coyle, J.J., Bardi, E.J. & Langley Jr., C.J., 2003. The Management of Business Logistics: A Supply Chain Perspective 7th edition. Ohio: South-Western.

[18] Dave, P. L (2001). Relationship between inventory, sales and services in a retail chain store operation. International Journal of Physical Distribution and Logistics Management, 31(2): 124-140.

[19] DHL, 2009. Discover Logistics: DHL Logbook - in cooperation with Technical University Darmstadt. [Online] Available at: http://www.dhl-discoverlogistics.com/cms/en/course/tasks_functions/ inventories/functions.jsp?pdf=1 [Accessed 8 June 2009].

[20] Dijk, E.v., Leeuw, S.d. & Durlinger, P., 2007. Voorraadbeheer in perspectief: Zeven invalshoeken van het vak. Deventer: Slimstock B.V.

[21] Dimitrios, P. (2008). The effect of inventory management on firm performance. International Journal of Productivity and Performance Management, 57.

[22] Eckert, S.G (2007) Inventory Management and its effects on customer satisfaction Journal of Public policy Vol 1no.3

[23] Farzaneh, D. P. (2012). The Effect of inventory management on firm performance. International Journal of Productivity and Performance Management, 57(5), 355-369.

[24] Fawcett, S. E., Ogden, J. A., Magnan, G. N., & Cooper, M. B. (2006). Organisational commitment and governance for supply chain success. International journal of physical distribution and logistics management, 36, 22-35.

[25] Fawcett, S.E., Ellram, L.M. & Ogden, J.A., 2007. Supply Chain Management: From Vision to Implemention. New Jersey: Pearson Education, Inc.

[26] Gaur V., M. Fisher and A. Raman. 2005. An Econometric Analysis of Inventory Turnover Performance in Retail Services. Management Science, Vol. 51, 181-194.

[27] Ghosh A.K. and Kumar P. (eds.) (2003). Production Management. New Delhi: Anmol Publication Pvt. Ltd.

[28] Goldratt, M. E. (2004). The Goal: a process of ongoing improvement. New York: North River Press.

[29] Gupta, C. M., & Boyd, H. L. (2008). Theory of constraints: a theory for operations management. International journal of

operations and production management, 28, 991-1012.

[30] Hamilton, D., Michael, K. and Wamba, S.F. (2009), "Using RFID to overcome inventory control challenges: a proof of concept", Proceedings of The Sixth International Conference on Ubiquitous Intelligence and Computing (UIC-09), Brisbane, Australia, July, pp. 353-366

[31] Ile N. M. (2002), Management, A Functional Approach, Enugu: Ochumba Printing and Publishing Co. Ltd.

[32] Johnson, M.E. & Pyke, D.F., 2001. Supply Chain Management. Encyclopedia of MS/OR, p.edited by C. Harris and S. Gass.

[33] Kazim, S. (2008). inventory inaccuracy and performance of collaborative supply chain practices. Industrial management and data systems, 108, 495-509.

[34] Kisaka, J.F. (2006). The theory of power and conflict in channels of distribution. Journal of Marketing, 48 (3) 9-29.

[35] Klundert, J., 2003. Supply Chain Management en Technologie. Venlo: Mateum/Universtiteit Maastricht.

[36] Kotler, P. (2002). Marketing Management. 2nd Edition. New Delhi: Prentice Hill.

[37] Koumanakos, D.P (2008).The effect of inventory management on firm performance International Journal of productivity and performance Management, Vol 57 (pp 355-369) Emerald Group Publication

[38] Lai, R. 2006. Inventory and the Stock Market. Working paper, Harvard University.

[39] Letinkaya, S. & Lee, C.Y. (2000). Stock Replenishment and Shipment Scheduling for Vendor-Management Inventory System Management Science, 46(2): 26-32.

[40] Linhares, A. (2009). Theory of constraints and the combinatorial complexity of product-mix decision. International journal of production economics, 121, 121-129.

[41] Lysons, K and Gillingham, M. (2003). Purchasing and supply chain management. London:Prentice Hall

[42] Martand T. T. (2009). Production Management. New Delhi: Ram Nagar

[43] Menon, K. S. (2006). Purchasing and inventory control. New Delhi: Wheeler Limited.

[44] Miller, R. (2010). Inventors Control: Theory and Practice. New Jersey: Prentice Hall.

[45] Nwandu (2006), Principles of Management, Enugu: Allmark Publishing Ltd.

[46] Nweze A.U. (2004), Quantitative Approach to Management Accounting, Enugu: Amazing Grace Printing and Publishing Co.

[47] Nyabwanga, R. N., & Ojera, P. (2012). Inventory Management Practices and Business Performance for Small-Scale Enterprises in Kenya. Journal of Business Management, 4.

[48] Ogbo, A. I.,Onekanma I.V.and Wilfred I. U. (2014).The Impact of Effective Inventory Control Management on Organisational Performance: A Study of 7up Bottling Company Nile Mile Enugu, Nigeria.Mediterranean Journal of Social Sciences, MCSER Publishing, Rome-Italy, Vol 5 No 10. Pg. 109.

[49] Ogbo, A.I. (2011). Production and Operations Management. Enugu: De-verge Agencies Ltd.

[50] Orga C.C. (2006), Productions Management A Quantitative Approach, Enugu: Veamarks Publishes.

[51] Pandy, I. M. (2005). Financial Management (9th Ed.). New Delhi: Vikas Publishing Ltd.

[52] Porteus E.L. 2002. Foundations of Stochastic Inventory Theory. Stanford University Press.

[53] Rajagopalan S. and A. Malhotra. 2001. Have US Manufacturing Inventories Really Decreased? An Empirical Study. Manufacturing and Service Operations Management, Vol. 3, 14-24.

[54] Rajeev, N. (2008). an evaluation of inventory management in indian machine tool SMEs: An exploratory. 4th IEEE International Conference on Management of Innovation and Technology. Bank, Thailand: bank. Pp. 1412-1417.

[55] Reid, R. & Sanders, N.R., 2007. Operations Management: an integrated approach 3rd edition. New York: John Wiley & Sons.

[56] Rushton, A., Phil, C., & Baker, P. (2011). The handbook of logistics and ditribution management. London: Kogan page ltd.

[57] Salawati, S., Tinggi, M., & Kadri, N. (2012). inventory management in malasyian construcion firms: impact on performance. SIU Journal management, 2, 59-60.

[58] Schroeder RG 2000. Operations Management-Contemporary Concepts and Cases. USA: International Edition.

[59] Sellitto, C., Burgess, S. and Hawking, P. (2007), "Information quality attributes associated with RFID-derived benefits in the retail supply chain", International Journal of Retail & Distribution Management, Vol. 35, No. 1, pp. 69-87

[60] Sharma S. C. (2004). Materials Management and Materials Handling. New Delhi: Khana Publishers Limited.

[61] Simbo A. Banjoko (2004), Production And Operations Management, Ibadan: Oluseyi Press Limited

[62] Smaros S.J., Lehtonen, J.M. Appelquist, P. & Holmstrom, J. (2003). The Impact of Increasing Demand Visibility on Production and Inventory Control Efficiency International Journal of Physical Distribution and Logistics, 33(4): 445-465.

[63] Tersine, R. J. (1994). Principles of Inventory and Materials Management, 4th ed. New York: Elsevier North-Holland.

[64] Trietsch, D. (2005). From management by constaints to management by criticalities. Human systems management, 105-115.

[65] Umble, M., Umble, E., & Murakami, S. (2006). Implementing theory of constraints in trading Japanese manufacturing: The case of Hitachi Tool engineering . International Journal of production research, 1863-1880.

[66] Wagner H. 2002. And Then There Were None. Operations Research, Vol. 50, No. 1, 217-226.

[67] Waters, C.D.J., 2003. Inventory Control and Management - 2nd Edition. Chichester: John Wiley & Sons Ltd.

[68] Wikipedia, 2009. Inventory. [Online] Available at: http://en.wikipedia.org/wiki/Inventory#Origins_of_the_word_Inventory [Accessed 3 June 2009].

[69] Wild, H. and Axsater, S.P., Jr. (2006). Seasonal and cyclic forecasting for the small firm. Journal of Operations Research, 2(9): 371–382.

[70] Wild, T., 2002. Best Practice in Inventory Management 2nd edition. Oxford: Butterworth-Heinemann (imprint of Elsevier).

[71] Zipkin P.H. 2000. Foundations of Inventory Management. McGraw-Hill, Boston.