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The Role of Inventory Management on Productivity in the Manufacturing Sector

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Abstract
Organizations rely on inventory to balance supply and demand, and to buffer uncertainties in the supply chain. However, inventory can be one of the most expensive assets of an organization; hence it must be managed closely. Wisner et al (2009) has opined that the right amount of inventory supports business operations, but too little of it can adversely affect customer service. Conversely, excess inventory does not only lead to unnecessary inventory carrying cost but also hides production problems and other flaws in a company. This study seeks to describe and understand the inventory management policies currently in use at GHACEM. It was also the objective of this research to determine whether or not the inventory management policies in GHACEM are plagued with some challenges. And finally, this study seeks to explore and understand the extent to which the inventory management systems and policies at GHACEM has enhanced productivity and improved profitability. Literature was reviewed from books, journals, articles, and the internet. The study used a case study of a company with a target population of thirty (30). A simple random sampling was used to draw 66.7% sample from the target population, consisting of twenty (20) members from the company, and was based on a lottery system. A questionnaire was used for the collection of data and has been analyzed in a form of a frequency table and diagrams. The key conclusion of this study was that for an organization to enhance productivity, it needs to effectively and efficiently manage its inventory, as inventory is a very important asset of an organization. The main recommendation was centered on how the company should ensure periodic review of all items in order to update the demand pattern of all items held, thus helping the organization to keep the right level of inventory, and thereby lead to reduction in overstocking and under stocking. Also, the company should gradually fade away the manual system of stock records such as the bin cards and introduce the computerized system of stock records such as the "Ebiz Frame-Enterprise Resource Planning software".

I. INTRODUCTION

Organizations rely on inventory to balance supply and demand, and to buffer uncertainties in the supply chain. However, inventory can be one of the most expensive assets of an organization; hence it must be managed closely. Carter (2009) have stated that the right amount of inventory supports business operations, but too little of it can adversely affect customer service. Conversely, excess inventory does not only lead to unnecessary inventory carrying cost but also hides production problems and other flaws in a company. According to Lysons and Gillingham (2003), inventory is an American term describing the value or quantity of raw materials, components, assemblies, consumables, work in progress and finished goods that are kept and used as the need arrives. Jessop (2011) has also expressed that inventories are the goods or materials that are waiting to be used or dispatched for sale. He opined that at any level of a firm, inventory is among the largest investment made and therefore logically deserves to be well managed to ensure that customers are satisfied, and for the organization to remain in operations through minimization of losses. Over the years, this realization has led to the development of the inventory management concept. Fearon et al (1993) argued that inventory management has benefited possibly to a greater extent than other operational function in today's organization as a result of global competition. They emphasized that the recognition of the importance of inventory functions has increased, with the management of virtually all organizations acknowledging inventory management as a more vital part of their strategic operations. Inventory management is balancing the cost of inventory and the required customer service resulting in enhanced productivity and profit maximization (Kondo 1997). He stated that good inventory management frees up cash that the company could use to invest in future opportunities. He further expressed that Inventory is associated with many costs, and that it must be paid for, stored, received, counted, controlled, insured and taxed. It can also be stolen, spoiled or damaged.

According to Cavinato and Kauffman (2000), Stock represents the capital of the organization and must be controlled, properly managed and accounted for as such to achieve efficiency. He however opined that stock must be held in order to meet production needs and sales needs. This according to him is because, if an organization fails to hold stock in sufficient quantities, they will run the risk of stock out resulting in short of finished goods thereby leading to loss of customers and money. For an organization not to face the above problems, they should be able to strike a balance between too much stock (over inventory) and carrying too little stock (under inventory). In Ghana Cement (GHACEM), inventory for operations consist of forty per cent of its working capital. Because of this huge percentage that inventory represent, inventory management is considered one of the vital functions within its setup. There is therefore the need for GHACEM to effectively manage its inventory in order to enhance productivity and improve profitability.

A. Statement of the problem

The lifeblood of any organization, whether private or public, whether productive or service organizations is inventory. In this case, inventory management has become mandatory on each and every manager responsible for production in an organization. Inventory is one vital resource that any organization requires and just like any other resource requires effective management rather than neglect. The fundamental problem of inventory is overstocking and under stocking of stocks due to the absence of an effective inventory control system. Overstocking locks up the capital of the organization and also increase the cost of storage and the risk of stock becoming obsolete and redundant. Under stocking leads to stock out or nil stock leading to production bottleneck and for that matter halting organizational operations. The effects of stock out are production inefficiency, loss of sales, loss of profit, the cost of employing labor who cannot produce and the reputational damage that the company will face as a result of the failure to meet customer needs and requirements. The researchers have therefore found the need to study into this area and bring to bear how inventory management can affect the productivity and profitability of an organization

II. LITERATURE REVIEW

Inventories are the assets that are held; for sale in the ordinary course of business or in the process of production for such sale or in the form of materials or supplies to be consumed in the production process or rendering of services (Kagiri 2006) however according to Lysons and Gillingham (2003) Inventory is described as " an American term describing the value or quantity of raw materials, components, assemblies, consumables, work in progress and finished goods that are kept and used as the need arrives. They emphasized that the effective and efficient functioning of a productive system requires the regular demand and supply of inventory at the input transformation and output phases of the production process. In this case, stock must be held in order to meet production needs and to meet customer needs as well.

A. Definition of inventory management

Lysons (1993) refers to inventory management as the use of techniques in ensuring that stocks of raw materials or other supplies, work in progress, and finished goods are kept at a level which provides maximum service levels at minimum cost. Tibur (2008), on the other hand believes that Inventory control is not a Science, more nearly it is a set of methods for figuring out how much stock to order, when and how to receive it. Also, Lenders R. (1993) had another view of "inventory control" as they believe it is the process of planning, ordering and scheduling of materials used in the manufacturing process. It exercises control over three types of inventories; raw materials, work in progress and finished goods.

B. Functions of inventory

The functions of inventory have been summarized by Cavinato and Kauffman (2000). First of all, inventory serves as Anticipation inventory which built up looking forward to a future event, such as high seasonable demand, a special promotion, vacation shutdowns, or disruptions in production caused by plant moves or labor problems. Fluctuation inventory is another function of inventory where reserves or safety stocks are carried to compensate for sales or production delays that cannot be accurately forecasted. In addition to the above functions, inventory functions as a Lot size inventory: these are Items that are obtained in larger quantities because of economies in Set-up costs, hedge buying, and price.

The authors gave the last function of inventory as Transportation inventory which results from a supply chain with multiple locations. However, in contrast to Cavinato and Kauffman view, Wisner et al (2009) simply gave the function of inventory as a buffer uncertainty in the marketplace and to decouple, or break the dependencies between stages in the supply chain.

C. Forms or classes of inventory

Cavinato and Kauffman (2000) classified inventory into: Raw materials that are unprocessed purchased inputs or materials for manufacturing the finished goods. Raw materials become part of finished goods after the manufacturing process is completed. According to Wisner et al inventory could also be classified as Work-in-process (WIP): This describes materials that are partially processed but not yet ready for sales. One reason to keep WIP inventories is to decouple processing stages or to break the dependencies between work centers. Finished goods are another means of classification according to the authors. These are completed products ready for shipment. Finished goods inventories are often kept to buffer against unexpected demand changes and in anticipation of production process downtime; to ensure production economies when the setup cost is very high; or to stabilize production rates. Maintenance, repair and operating (MROs) supplies is another way of classifying inventory MRO's are materials and supplies used when producing the products but are not parts of the products. Solvents, cutting tools and lubricants for machines are examples of MRO supplies.

Also, Lysons and Farrington (2006) classified inventory into the following categories that bear some similarity with that of Cavinato and Kauffman: The first classification according to the authors is Raw materials: these include steel, timber, cloth, and so on in an unprocessed state awaiting conversion into a product. Components and subassemblies was the next classification of inventory given by the authors, they gave the following examples: ball bearings, gearbox, that are there to be incorporated into an end product. Inventory could also be classified as Consumables: these are all supplies in an undertaking classified as indirect and that do not that may be sub classified into production.eg: detergents, lubricating oil. All of these are also referred to as MROs items. Lastly, Lysons and Gillingham also classified inventory as finished goods which are products manufactured for resale that is ready for dispatch.

D. Reasons for holding stock

There are several reasons for holding stocks. Rushton et al (2010) outlined the following reasons for holding stocks: According to them, the first and foremost reason for holding stock is to keep down productions costs. Often it is costly to set up machines, so production runs need to be as long as possible to achieve low unit costs. Secondly, they also stated the accommodation of variations in demand as another reason for keeping stock. The demand for a product is never wholly regular so it will vary in the short term or by season. To avoid stock-outs, therefore, some level of safety stock must be held. The authors further gave taking account of variable supply (lead) times as another reason to hold stock. Additional safety stock is held to cover any delivery delays from suppliers. To take advantage of quantity discounts is one of the varied reasons for holding stock some products are offered at a cheaper unit cost if they are bought in bulk. Lastly, from the viewpoint of the authors, inventory is kept to account for seasonal fluctuations. These may be for demand reasons whereby products are popular at peak times only.

On other hand, Scott et al (2011) also gave their views on the reasons for holding stock as: Their first reason for holding stocking was to protect against uncertainty: Uncertainty can be caused by variations in demand or by restrictions in supply. So when inventories are kept it helps hedge against these uncertainties. Scott et al also considered Cost reduction as another major reason for stockholding: cost reduction through inventory is achieved when stock is held close to the customer. This is because the cost of transportation is decreased. Protection against quality defects is another vital reason for holding stock: A product that is faulty can be substituted quickly when inventory is held. If there was no inventory in the supply chain and a product was damaged on the way to its customer, the customer would have to wait a long time until a substitute was available. Furthermore, Stabilization of manufacturing activities is one of the major reasons for stockholding: For example, the demand for ice cream increases substantially in the summer. To be able to meet this demand, ice cream is produced throughout the year and kept in stock.

Besides the points stated above, Anticipation stock is another reason for holding inventory. This is used to compensate for the differences in the timing of supply and demand. Before the launch of a product innovation like the "I Phone", for which the level and rate of demand was fairly unknown, Apple Inc. might have decided to build up pre-launch anticipation stock to buffer against demand uncertainty. To summarize, managing inventory is essentially about balancing supply and demand. This job would be very easy in a situation where end customers tell us exactly how much they require and give us time to order from suppliers. Also, ideally suppliers deliver exactly when we need it and in full.

E. Inventory costs

Lysons and Farrington (2006) gave the following to be the cost associated with inventory: Acquisition costs: these are the cost incurred in placing an order. The ordering cost includes:

i. Preliminary costs: preparing the requisition, vendor selection, negotiation
ii. Placement costs: order preparation, stationery, postage
iii. Post-placement cost: progressing, receipt of goods, materials handling, inspection, certification and payment of invoices.

Holding costs: there are two types of holding costs

i. Cost proportional to the value of the inventory such as
    a. Financial costs, interest on capital tied up in inventory
    b. Cost of insurance
    c. Losses in value due to deterioration, obsolescence and pilfering

ii. Cost proportional to the physical characteristics such as
    a. Storage cost: storage space, stores rates, light, heat, power
    b. Labor costs: relating to handling and inspection
    c. Clerical cost: relating to stores' records and documentation

Cost of stock outs: this is the cost of being out of inventory. This includes:

- Loss of production output
- Cost of idle time and of fixed overheads spread over a reduced level of output.
- Cost of any action taken to deal with the stock out.
- Loss of customer goodwill due to inability to supply or late delivery.

Nevertheless, Wisner et al (2009) also gave their own concept on the cost associated with inventory. These costs have been explained below:
The first and most important cost associated with inventory, as identified by the authors is the direct costs. These are those costs that are directly traceable to the unit produced, such as the amount of materials and labor used to produce a unit of the finished good.

Secondly, they also considered indirect costs as another cost associated with inventory. Indirect costs are those cost that cannot be traced directly to the unit produced and they are synonymous with manufacturing overhead. Maintenance, repair and operating supplies; heating; lighting; buildings; equipment; and plant security are examples of indirect costs.

Again, fixed costs are one of the varied costs associated with inventory. Fixed costs are independent of the output quantity, but variable costs change as function of the output level. Buildings, equipment, plant security, heating and lighting are examples of fixed costs.

Once more Variable costs are also costs that can be attributed to inventories. These cost are dependent on the output quantity. Direct materials and labor costs are examples of variable cost.

Last but not the least, the authors identified Holding or carrying costs as one of the costs associated with inventory. Holding costs are the costs incurred for holding inventory in storage. Examples of holding costs include handling charges, warehousing expenses, insurance, pilferage, shrinkage, taxes and the cost of capital.

F. Inventory management systems/policies

In inventory management, different techniques have been developed to support the different methods of inventory management. These methods have been based on various features that can be adopted in inventory management. These techniques include;

- *ABC*
- *EOQ (Economic order quantity)*
- *MRP (Materials resource planning)*
- *ERP (Enterprise resource planning)*
- *JIT (Just-in-time)*

- ***ABC analysis***

Cavinato and Kauffman (2000) states that: ABC analysis is a system that ranks part numbers by the extended cost time's annual usage. ABC analysis is based on principles developed byan Italian economist, Vilfredo Pareto, in 1896. Pareto developed the theory that 20% of a country's population does 80% of the work. ABC or Pareto analysis shows that a ''vital few'' account for the majority of the activity. The value of ABC for the inventory manager is that the inventory of the vital few constitutes the only items that need to be reviewed closely. Figure 1 summarizes how ABC analysis can be used in inventory management.

Heinritz et al (1991) gave the Steps involved in implementing ABC plan:

i. Make a list of all the inventory items and determine the value by multiplying the unit cost to the number of items.
ii. Rank the items according to the annual expenditures, from highest to the lowest.
iii. Calculate the percentage of the total value for each item.
iv. Rate the items as ABC, from the highest.

Role of ABC analysis on productivity

Ranking of all the stock items according to their importance, value and operational role within the organization enables the allocation of the right level of organizational resources in controlling all the items. ABC analysis will enable the organization to order high value items on a frequent basis and in small quantities, thus preventing a stock out and also prevent over stocking of low value items which could lock up the company's capital. Thus the company is able to free cash that could be used in other investments.

- ***Economic order quantity (EOQ)***

Scott et al (2011**)** explained EOQ is the inventory level that minimizes the total cost of ordering and carrying costs. The aim of EOQ is to find the lowest acquisition cost that is the sum of the cost of ordering and the cost of holding stock. The factors affecting EOQ decisions are the reliability of estimated requirement and the availability of storage space.

Aims of EOQ:

- To keep stocks low as possible
- To order high value items frequently and in small quantities
- To order low value items in large quantities

The EOQ formula

There are many formulae for finding the EOQ. One of the most commonly used formulae is:

$$EOQ = \sqrt{\frac{2CR}{PF}}$$

Where:

2= constant
C = ordering cost per order
R = annual demand in units
P = purchase cost of one unit
F = annual holding cost as a fraction of unit cost
PF = holding cost per unit per year
Example:
C = GHC20 average order cost
R = 3,000 annual demand
P =GHC 12-unit cost of item
F =GHC 0.25 (25%) average holding cost

For this example, the EOQ would give:

$$EOQ = \sqrt{\frac{(2 \times 3{,}000 \times 20)}{(12 \times 0.25)}} = \sqrt{\frac{120{,}000}{3}} = 200$$

Thus, in this example the economic order quantity would be 200 units. The Optimum order quantity can be graphically represented at the point where the lowest total costs, consisting of ordering cost and inventory carrying costs, can be achieved. Still assumptions of EOQ have been summarized by Lysons and Farrington (2006) as:

- The demand is uniform- that is, constant and continuous over time.
- The lead-time is known and constant.
- There is no limit on order size, due to stores capacity or other constraint.
- The cost of placing an order is independent of the size of the order and quantity ordered.
- All prices are constants.

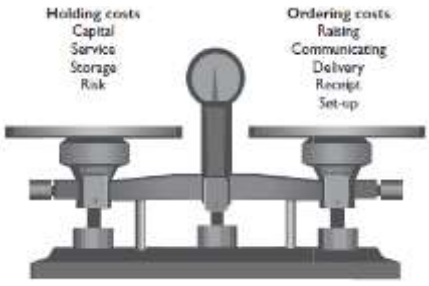

Figure 2.1. Source: Rushton et al (2010) The Economic Order Quantity Balance

The EOQ method is an attempt to estimate the best order quantity by balancing the conflicting costs of holding stock and of placing replenishment orders. This is illustrated in Figure 2.1. The effect of order quantity on stock-holding costs is that, the larger the order quantity for a given item, the longer will be the average time in stock and the greater will be the storage costs. On the other hand, the placing of a large number of small-quantity orders produces a low average stock, but a much higher cost in terms of the number of orders that need to be placed and the associated administration and delivery costs.

Weaknesses of EOQ are summarized by Lysons and Gillingham (2003)

Lysons and Gillingham observed that using EOQ has some demerits. The first weakness they identified was that the accurate calculation of EOQ is difficult. Many of the cost that needs to go into the calculations are different to estimate reliably. Also, they believed the EOQ formula gives a precise quantity that may not be practical as a purchasing quantity. Since EOQ is calculated based on the lowest price, and where price discounts are offered for minimum order quantities, the lowest possible total cost is not calculated. A last weakness of EOQ according to the authors is that EOQ is usually assumes that lead times are constant, orders are filled in one delivery, usage is constant and predictable and that price level is stable.

Role of EOQ on productivity
Control of inventory based on the optimum quantity will enable the organization to order and hold the most economic quantity, thus reducing inventory shortage. This ensures frequent availability of sufficient inventory to meet customer needs. It also reduces the ordering and holding cost as well, thus increasing the revenue of the organization and then the profit.

- ***Materials Requirement Planning (MRP)***

Lender et al (2006) in their book "purchasing and supply management" described MRP as an attempt to support activities of manufacturing, maintenance, or use by meeting the needs of the master schedule. In order to determine the need, MRP system needs an accurate bill of materials for each final product.

The MRP system

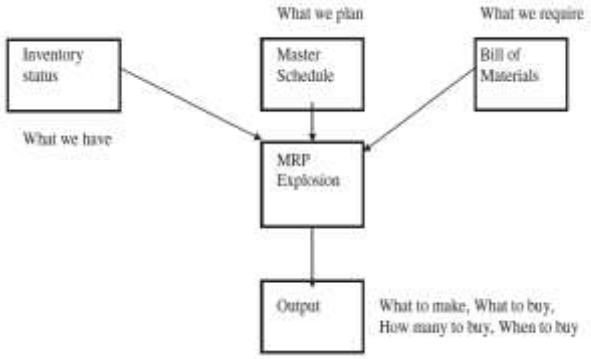

***Figure** 2.2. The MRP system **source:** Cavinato and Kauffman (2000)*

Fearon et al (1993) gave the inputs to the MRP system as follows: The first input that enters the MRP system is Master Production Schedule: the master schedule evolves from the order forecast and the production plan. It is schedule by date and quantity of top-level or planning bills of materials, which MRP term represents the production plan. Together with a forecast of independent demand requirements, the MPS feeds the bill of materials explosion, which is the heart of MRP. This is followed by the Inventory status: to make the MRP system work, it is necessary to know exactly what is in stock. Prior to implementing an MRP system, companies typically find that their inventory accuracy is at forty to fifty per cent level. To continue with, is the Bills of material*:* An MRP system requires that the master schedule be stated in the bill of material terms. It is planning logic depends on the quantified relationship between end items.
To sum up with is the Component lead time: The lead time on any manufactured or purchased part represents the amount of time required to replenish that item. It begins when the paperwork is initiated and extends until the item is received into inventory

Objectives of material requirement planning;
Lysons and Gillingham (2003) gave the objectives of MRP as:

- To maintain low levels of inventory, improve customer service, long planning range of operations and reducing stock outs and elimination of paper work.

- To ensure that ordering and delivery of materials and components commensurate with production requirement.
- To promote a cost of reduction strategy between buyer and supplier networks. The forecasting and projections of orders for instance can lead to reductions in the lead-time and reproduction costs of suppliers hence a reduction in inventory costs of the buyer.

Role of MRP on productivity

This is a control system that seeks to plan production o that the right materials are at the right place at the right time. It fulfills production demand, which in turn fulfills customer demand, and also minimizes inventory cost that could increase the profit margin of the organization. It also seeks to maintain delivery schedules with customer requirement, which could bring about customer satisfaction, which leads to repeated business, and then eventually increase sales, increased revenue and then increased profit.

- ***Enterprise resource planning***

According to Wisner et al (2009) ERP system is an umbrella system that ties together a variety of specialized systems, such as production and inventory planning, purchasing, logistics and warehousing, finance and accounting, human resource management, customer relationship management and supplier relationship management using a common, shared, centralized database.

A GENERIC ERP SYSTEM

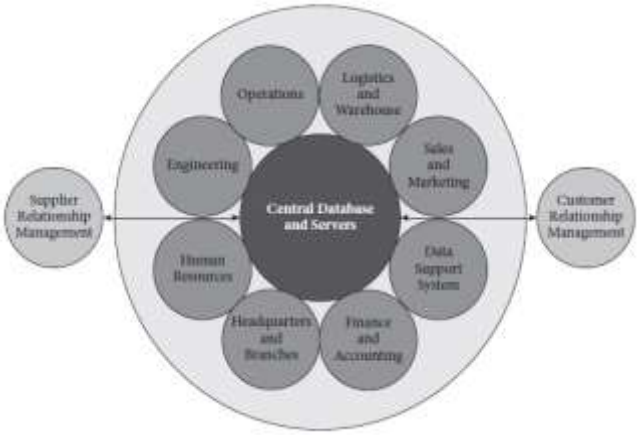

Figure 2.3 Source: Wisner et al (2009)

Figure 2.3. Illustrates a generic ERP system, where a centralized database and software application infrastructure are used to drive a firm's information systems and to link the operations of its branches, key suppliers and key customers with the firm's headquarters.

Muller (2011) attributed the following benefits to ERP

- Integration of financial information-all business units uses the same set of metrics.
- Standardization of manufacturing processes.
- Reduction of inventory –excess inventory is held to a minimum.
- It also brings about standardization of human resources information.

Disadvantages of ERP have been listed below by Lysons and Farrington (2006):

- ERP implementation is difficult: this is because it involves a fundamental change from a functional approach to a process approach to business.
- ERP systems are expensive: This is especially so when the customization of standard modules to accommodate different business processes is involved.
- Cost of training employees to use ERP systems can be high.

Role of ERP on productivity

ERP can improve customer service by providing the right product in the right place at the right time, which leads to customer satisfaction. Satisfied customers lead to repeated business that increases sale and eventually the company's profits. It also brings about quality of work, hence reduced or eliminates re-work, which is also cost.

- ***Just in time***

Van Weele (2002) described JIT as "all materials and products become available at the very moment when they are needed in the production process, not sooner and not later, but exactly on time and in the exact quantity.

JIT is a demand-pull system in which manufacturing planning begins with the final assembly line and works backwards. JIT has several versions by such names as ZIPS (Zero inventory Production system), MAN (Materials as needed), DOPS (Daily Overhead and perfect supply) and nick of time.

Benefits of JIT

Lysons and Farrington (2006) gave the benefits of JIT as:

- Part costs- low scrap costs; low inventory carrying cost
- Quality- fast detection and correction of unsatisfactory quality and ultimately higher quality in purchased parts.
- Design- fast response to engineering change requirements.
- Administrative efficiency- fewer suppliers; minimal expediting and order release; simplified communications and receiving activities.
- Productivity- reduced rework; reduced inspection; reduced parts related delays.

Pitfalls of JIT as given by Lysons and Gillingham (2003) are:

- Faulty forecasting of demand and inability of suppliers to move quickly to changes in demand.
- JIT requires the provision of the necessary systems and methods of communication between purchasers and suppliers ranging from vehicle to EDI.
- Organizations with, ideally no safety stocks are highly vulnerable to supply failures.
- Purely stockless buying is a fallacy; lack of low cost 'C' class items can halt a production line as easily as a failure in the delivery of highly priced 'A' class item.
- JIT is not generally suitable for bought out items having a short life cycle and subject to rapid design change.
- JIT is more suitable for flow than batch production and may require a change from batch to flow methods with consequent changes in systems required to support the new methods.

Role of JIT on productivity

The goal of JIT is to maintain the right material in just the right place at just the right time to make just the right amount of product. It ensures easy identification of quantities and parts numbers which in turn leads to a reduction in manpower as well as savings in time and a reduction in overall waste, and also improves quality. JIT ensures that the cost of holding stock is completely eliminated which could free the organization's capital to be used elsewhere. JIT aims to meet demand instantaneously, with perfect quality and no waste'. JIT also improves the relationship between the buying firm and the supplier, and the supplier treats the buyer in a unique way, so it reduces the rate of supplier failure.

G. Stock record

Carter et al (2005) defined "Stock record is a formal set of records that contain information about the stock held within the store system".

Purposes of stock records have been summarized by Jessop and Morrison (1992) as:

- To indicate the amount of stock of any item at any given time without it being necessary for the stock to be counted physically.
- To establish a link between the physical stock and the stores accounts.
- To provide a means of provisioning, that is determining how much should be ordered to maintain stocks at the required level.

- To supply information for stocktaking, whereby the quantities of all items in the storehouse are ascertained by physical checking are compared with the corresponding quantity balances on the records.

Carter et al (2005) gave the Types of stock records as:

Manual system: In the past, all inventory information systems were of the manual type and were paper based. Bin cards were updated for receipt and issue and use to give perpetual inventory. A bin card is a card on which information or records in the stores are kept.

Computerized systems: Computers have the ability to store and recall information. The computer has to be programmed to perform the function of adjusting the stock records. The way in which the information is fed into the computer will depend upon the company and its operations and the basic means of data input into a computer system is as follows:

- Direct input capture system: In this system, the data required to update the stock record file is in a form that can be directly fed into the computer, without processed first. Such systems are becoming very popular as they eliminate the need for processing, which means that the stock record system can be more efficient and faster.

Jessop and Morrison (1992) gave the advantages of a computerized stock record system as:

- A computerized system will receive input data, carryout a computation or process on it and produce output quickly and efficiently.
- The computer in the simplest form can merely replace a set of stock record cards by maintaining a set of information on stock levels.
- Elimination of many hours of tedious clerical effort and minimized errors of transcription and calculation.

Disadvantages of computerized system

- Computer systems can be very expensive, which may prohibit smaller companies from adopting this type of system
- Computer control system is only as good as the staff operating them and the data processed and fed into the computer. Badly trained staff or faulty documentation will not be solved by installing a computer.

H. Inventory Management and Productivity at Ghacem

The effective and efficient functioning of a productive system requires the regular demand and supply of inventory at the input transformation and output phases of the production process. At Ghacem, the company has ensured that there is a free flow of materials at every stage of the production process through an effective and efficient of inventory in form of raw materials, work-in-progress and finished goods which constitutes a significant asset for their company. The major objective of their inventory management system is to discover and maintain optimum level of investment in inventory in order to reduce the unnecessary carrying costs and also to prevent production shut down.

III. CONCLUSION

A. Summary of findings

The research centered on how inventory management policies can affect productivity. The findings of the research revealed the following:

- The research revealed that GHACEM keeps all types of inventories in stores. It includes raw materials, components, work in progress, and finished products. The research also revealed that the company uses a centralized stores system to keep their various inventories. The company also has different inventory management systems in place. It includes MRP system, ERP system, economic order quantity, just in time, and ABC analysis.

- The research again revealed that inventory control policy of GHACEM covers all ranges of inventory kept, and that the policy achieves its purpose. The research also revealed that the company raises document to

confirm goods received and goods issued, that is the bin card. The company however faces problems with the use of the bin card and they also benefit from its use. The research revealed that the bin cards are always updated after every transaction.

- The research also revealed that GHACEM experiences overstocking, but it rarely affects their operations. They also face understocking which sometimes affects their operations, but to a minimum level. The research indicated that the company has a computerized system in place which mitigates the problem associated with the use of the bin cards.

- The research finally revealed low working capital as the very problem associated with the inventory management policy of GHACEM. It revealed that the company this problem affects the company's productivity through high plant equipment downtime. The company also benefits from the inventory management policy in place through the prevention of overstocking and the availability of appropriate stock levels for critical inventory. There is also reduction in maintenance cost.

B. Conclusions

The findings of this research attest to the benefits that accrue from the implementation of inventory management policies. It has shown that there are several inventory management systems in place which a company can deploy, and that those systems must cover all ranges of inventories held. It has also shown that for a company to benefit from its inventory management policies, then the policy must first achieve its purpose.

Again, it was evident from the research that the use of stock records system can also be another method of managing inventory. It showed that companies normally use bin cards to confirm goods received and goods issued. It again concluded that there are problems and as well as benefits associated with the bin card as a record system. However, by putting in place a computerized system of stock records, the problem of the bin card can be mitigated. It was evident again from the research that the issue of overstocking and understocking can have adverse effects on the operations of companies.

It can finally be concluded that effective and efficient management of inventory can indeed enhanced a company's productivity through appropriate stock levels for critical inventories, as well as increase in equipment uptime and reduction in maintenance cost.

C. Recommendations

It has become clear that effective implementation of inventory management systems can bring a lot of benefits to companies. Thus, in the light of the above discussion and findings drawn from the study, we wish to suggest the following recommendation that would help GHACEM their inventory management drive.

- First of all, to mitigate the problem of overstocking and under stocking at GHACEM, there should be periodic review of all items in order to update the demand pattern of all items held, thus helping the organization to keep the right level of inventory, and thereby lead to reduction in overstocking and under stocking.

- We also recommend that due to the high rate of technological growth and to ensure faster and efficient operations within the stores and the organization as a whole, GHACEM should gradually fade away the manual system of stock records such as the bin cards and introduce the computerized system of stock records such as the "Ebiz Frame-Enterprise Resource Planning software".

- Lastly, in order to ensure an effective and efficient implementation of the Enterprise Resource Production System within the stores department, all the other departments whose activities are linked with the stores, should also have their operations computerized, thus ensuring a complete co-ordination through the organization

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