Study of Inventory Techniques

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1. **Abstract**

Abstract

Inventories constitute the most significant part of current assets of the business concern. It is also essential for smooth running of the business activities. The major concern about financial management in any business is if there is a sound inventory management not to worry. A sound inventory management brings effectiveness in financial viability in business. In today's economy era TQM plays a very important role in business development in respect of inventory. A proper planning of purchasing of raw material, handling, storing and recording is to be considered as a part of inventory management. Inventory management means, management of raw materials and related items. Inventory management considers what to purchase, how to purchase, how much to purchase, from where to purchase, where to store and when to use for production etc.

KEYWORD: Inventory, Management

2. **Methodology & Research Design**

The present study is a descriptive in nature. The descriptive study is a fact finding investigation with adequate interpretation and simple, more specific & concentrate on particular aspect or dimension of the problem. This study is simpler in terms of gathering the information through observation, face to face conversation, and published source. Despite of this research is almost accurate in terms of interpretation; it does not gather the causes behind a situation. Descriptive research is mainly done which a researcher wants to gain a better understanding of topic i.e. Inventory Management & Total Quality Management.

3. **Introduction**

Inventory management is a science primarily about specifying the shape and percentage of stocked goods. It is required at different locations within a facility or within many locations of a supply network to precede the regular and planned course of production and stock of materials. 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.

Inventory management involves a retailer seeking to acquire and maintain a proper merchandise assortment while ordering, shipping, handling, and related costs are kept in check. It also involves systems and processes that identify inventory requirements, set targets, provide replenishment techniques, report actual and projected inventory

status and handle all functions related to the tracking and management of material. This would include the monitoring of material moved into and out of stockroom locations and the reconciling of the inventory balances. It also may include ABC analysis, lot tracking, cycle counting support, etc. Management of the inventories, with the primary objective of determining/controlling stock levels within the physical distribution system, functions to balance the need for product availability against the need for minimizing stock holding and handling cost

The overseeing and controlling of the ordering, storage and use of components that a company will use in the production of the items it will sell as well as the overseeing and controlling of quantities of finished products for sale. A business's inventory is one of its major assets and represents an investment that is tied up until the item is sold or used in the production of an item that is sold. It also costs money to store, track and insure inventory. Inventories that are mismanaged can create significant financial problems for a business, whether the mismanagement results in an inventory glut or an inventory shortage.

4. **Conceptual Framework:**

The dictionary meaning of the inventory is stock of goods or a list of goods. In accounting language, inventory means stock of finished goods. In a manufacturing point of view, inventory includes, raw material, work in process, stores, etc.

4.1 Kinds of Inventories

Inventories can be classified into five major categories.

A. Raw Material

It is basic and important part of inventories. These are goods which have not yet been committed to production in a manufacturing business concern.

B. Work in Progress

These include those materials which have been committed to production process but have not yet been completed.

C. Consumables

These are the materials which are needed to smooth running of the manufacturing process.

D. Finished Goods

These are the final output of the production process of the business concern. It is ready for consumers.

E. Spares

It is also a part of inventories, which includes small spares and parts.

4.2 Objectives of Inventory Management

Inventories occupy 30–80% of the total current assets of the business concern. It is also very essential part not only in the field of Financial Management but also it is

closely associated with production management. Hence, in any working capital decision regarding the inventories, it will affect both financial and production function of the concern. Hence, efficient management of inventories is an essential part of any kind of manufacturing process concern.

The major objectives of the inventory management are as follows:

• To efficient and smooth production process.

• To maintain optimum inventory to maximize the profitability.

• To meet the seasonal demand of the products.

• To avoid price increase in future.

• To ensure the level and site of inventories required.

• To plan when to purchase and where to purchase

• To avoid both over stock and under stock of inventory.

4.3 Techniques of Inventory Management

Inventory management consists of effective control and administration of inventories. Inventory controls refers to a system which ensures supply of required quantity and quality of inventories at the required time and at the same time prevent unnecessary investment in inventories. It needs the following important techniques.

Inventory management techniques may be classified into various types:

4.3.1 Techniques based on the order quantity of Inventories

Order quantity of inventories can be determined with the help of the following techniques:

Stock Level

Stock level is the level of stock which is maintained by the business concern at all times. Therefore, the business concern must maintain optimum level of stock to smooth running of the business process. Different level of stock can be determined based on the volume of the stock.

Minimum Level

The business concern must maintain minimum level of stock at all times. If the stocks are less than the minimum level, then the work will stop due to shortage of material.

Re-order Level

Re-ordering level is fixed between minimum level and maximum level. Re-order level is the level when the business concern makes fresh order at this level.

Re-order level=maximum consumption × maximum Re-order period.

Maximum Level

It is the maximum limit of the quantity of inventories, the business concern must maintain. If the quantity exceeds maximum level limit then it will be overstocking.

Maximum level = Re-order level + Re-order quantity – (Minimum consumption × Minimum delivery period)

Danger Level

It is the level below the minimum level. It leads to stoppage of the production process.

Danger level=Average consumption × Maximum re-order period for emergency purchase

Average Stock Level

It is calculated such as,

Average stock level= Minimum stock level + ½ of re-order quantity maximum level

Lead Time

Lead time is the time normally taken in receiving delivery after placing orders with suppliers. The time taken in processing the order and then executing it is known as lead time.

Safety Stock

Safety stock implies extra inventories that can be drawn down when actual lead time and/ or usage rates are greater than expected. Safety stocks are determined by opportunity cost and carrying cost of inventories. If the business concerns maintain low level of safety stock, it will lead to larger opportunity cost and the larger quantity of safety stock involves higher carrying costs.

Economic Order Quantity (EOQ)

EOQ refers to the level of inventory at which the total cost of inventory comprising ordering cost and carrying cost. Determining an optimum level involves two types of cost such as ordering cost and carrying cost. The EOQ is that inventory level that minimizes the total of ordering of carrying cost.

EOQ can be calculated with the help of the mathematical formula:

EOQ = 2ab/c

Where,

a = Annual usage of inventories (units)

b = Buying cost per order

c = Carrying cost per unit

4.3.2 TECHNIQUES BASED ON THE CLASSIFICATION OF INVENTORIES

A-B-C analysis

It is the inventory management techniques that divide inventory into three categories based on the value and volume of the inventories; 10% of the inventory's item contributes to 70% of value of consumption and this category is known as a category. About 20% of the inventory item contributes about 20% of value of consumption and this category is called category B and 70% of inventory item contributes only 10% of value of consumption and this category is called C category.

Aging Schedule of Inventories

Inventories are classified according to the period of their holding and also this method helps to identify the movement of the inventories. Hence, it is also called as, FNSD analysis—

Where,

F = Fast moving inventories

N = Normal moving inventories

S = Slow moving inventories

D = Dead moving inventories

This analysis is mainly calculated for the purpose of taking disposal decision of the inventories.

VED Analysis

This technique is ideally suited for spare parts in the inventory management like ABC analysis. Inventories are classified into three categories on the basis of usage of the inventories.

V = Vital item of inventories

E = Essential item of inventories

D = Desirable item of inventories

HML Analysis

Under this analysis, inventories are classified into three categories on the basis of the value of the inventories.

H = High value of inventories

M = Medium value of inventories

L = Low value of inventories

4.3.3 TECHNIQUES ON THE BASIS OF RECORDS

A. Inventory budget

It is a kind of functional budget which facilitates the estimated inventory required for the business concern during a particular period. This budget is prepared based on the past experience.

B. Inventory reports

Preparation of periodical inventory reports provides information regarding the order level, quantity to be procured and all other information related to inventories. On the basis of these reports, Management takes necessary decision regarding inventory control and Management in the business concern.

Valuation of Inventories

Inventories are valued at different methods depending upon the situation and nature of manufacturing process. Some of the major methods of inventory valuation are mentioned as follows:

1. First in First Out Method (FIFO)

2. Last in First Out Method (LIFO)

3. Highest in First Out Method (HIFO)

4. Nearest in First Out Method (NIFO)

5. Average Price Method

6. Base Stock Method

7. Standard Price Method

8. Market Price Method

5. Literature review in particular Subject:

Travis Tokar (2008) in their study " A review of inventory management research in major logistics journals: Themes and future directions", discussed that logistics researchers have focused considerable attention on integrating traditional logistics decisions, such as transportation and warehousing, with inventory management decisions, using traditional inventory control models.

Logistics researchers have more recently focused on examining inventory management through collaborative models C. Clifford Defee, Brent Williams, Wesley S. Randall, Rodney Thomas, (2010) in their research paper

"An inventory of theory in logistics and SCM research", analyzed the theoretical categories and presented to explain the type and frequency of theory usage. They concluded that over 180 specific theories were found within the sampled articles. Theories grouped under the competitive and microeconomics categories made up over 40 per cent of the theoretical incidences. This does not imply all articles utilize theory. The research found that theory was explicitly used in approximately 53 per cent of the sampled articles. Vikram Tiwari, Srinagesh Gavirneni, (2007) in their a rticle " ASP , The Art and Science of Practice: Recoupling Inventory Control Research and Practice: Guidelines for Achieving Synergy" focused on the widening disconnect between inventory - control research and practice, people debate the value of incremental theory building. While practitioners make decisions in a complex and uncoordinated environment, researchers often adopt a simplistic environment for the sake of rigorous analysis. The stakeholders" mismatched objectives and motivations

may cause this lack of synergy. Controlling and reducing this disconnects would benefit both practitioners and researchers. The existing empirical analysis of companies" business improvements based on academic inventory - management theories is inconclusive.

Even so, some businesses have successfully implemented inventory theory; however, in most cases, they have greatly modified the inventory models developed by academics.

Richard Pibernik, (2004) in his study "Advanced available – to - promise: Classification, selected methods and r equirements for operations and inventory management" gives the theoretical framework for the development of models and algorithms supporting order quantity and due date quoting. At first, alternative generic AATP systems will be identified on the basis of relevant classification criteria. Based upon this classification, the AATP planning mechanisms will be detailed for two generic AATP types. On the basis of the introduced AATP types and the description of selected models we finally derive requirements, which operations and inventory management have to meet in order to ensure a successful application of AATP. B.J. Grablowsky , (2005) in his paper

"Financial management of inventory" surveyed small business inventory management practices and compared with techniques commonly employed by large corporations. I t appears that smaller firms rely on simple controls. Large businesses rely more on quantitative techniques, such as

EOQ and linear programming, to provide additional information for decision making, while small firms are more likely to use management judgment without the quantitative back - up. Of those small firms which did not use quantitative methods for determining inventory order and stock levels, the most common qualitative methods were "past experience e" and "executive judgment," .

S. M. Disney and D. R. Towill (2003) in their research "The effect of vendor managed inventory (VMI) dynamics on the Bullwhip Effect in supply chain

" Compares the expected performance of a vendor managed inventory (VMI) supply chain with a traditional "serially linked" supply chain. The emphasis of this investigation is the impact these two alternative structures have on the "Bullwhip Effect" generated in the supply chain. We pay particular attention to the manufacturer's production ordering activities via a simulation model based on difference equations. VMI is thereby shown to be significantly better at responding to volatile changes in demand such as those due to discounted ordering or price variations. Inventory recovery an s measured by the integral of time×absolute error performance metric is also substantially improved via VMI. Noise bandwidth, that is a measure of capacity requirements, is then used to estimate the order rate variance in response to random customer demand. Finally, the paper simulates the VMI and traditional supply chain response to a representative retail sales pattern. The results are in accordance with "rich picture" performance predictions made from deterministic inputs.

Julius A. Sharma, Dinesh K. Sharma, Hari P (2004) discussed Supply Chain (SC), which involves the configuration, coordination, and improvement of sequentially related set of operations in establishments, integrates technology and human resource

capacity for optimal management of operations to reduce inventory requirements and provide support to enterprises in pursuance of a competitive advantage in the marketplace. This paper addresses the structures of supply chain management (SCM) and the activities involved in SCM decisions that help promote profound improvement in efficiency and effectiveness in business operations. In broader context, the paper examines the types of activities involved in SCM ` decisions; the dynamics of the traditional SCM, the complementarities of technology in achieving effective management of operations through enablers of electronic data interchange (EDI) and quick response (QR) disciplines to implement Just-in- Time (JIT) management techniques; and integrated SC and inventory control as it relates to capacity imbalances and transaction costs.

6. Inventory Reduction Tips:

- **Reduce Demand Variability** Get a better handle on what you are using, when, and make sure that you order consistently from your suppliers.

- **Improve Forecast Accuracy** Combine your improved insight into your current usage with upcoming marketing campaigns and market projections to forecast better. Then alter your order sizes and intervals as appropriate.

- **Re-examine Service Levels** How fast do you really have to service a customer if something breaks. If you're selling a key component in a production line, then you definitely have to do next day, if not same day, servicing and must have the part(s) in stock. But if you're selling tractors and Farmer Joe's breaks down on a Friday, I'm sure that, even if he is a little disgruntled, he can wait until Monday. And if you're selling iPods — guess what, your user can go without a replacement for a couple of days.

- **Address Capacity Issues** Make sure your low-lead time suppliers can produce enough products to meet unexpected demand spikes (that you sense on the front-end because you're carefully monitoring your sales data with amalgamated nightly feeds through your supply chain visibility solution).

- **Reduce Order Sizes** If you only use 100 a month, don't order 1000, even if the discount "looks" attractive — chances are, after you factor in the holding cost and the working capital cost, you're losing money.

- **Reduce Manufacturing Lot Sizes** Find a supplier who can produce smaller lot sizes economically, especially for items that you have low volume requirements for.

- **Reduce Supplier Lead Times** The faster you can get a product, the less of it you have to keep in stock. Work with your suppliers to reduce lead times as much as possible.

- **Reduce Manufacturing Lead Times** Select manufacturers who can quickly re-configure their production lines and who have short lead-time relationships with their raw material suppliers.

- **Improve Supply Reliability** Make sure that you either dual-source or have a back-up plan ready to go if something should happen to your primary supplier or its primary facilities.

- **Reconfigure the Supply Chain** Revise your distribution network to be as efficient as possible. Don't be afraid to deploy strategic sourcing or distribution network optimization solutions.

- **Reduce the Number of Items** Standardize on common components across your product lines and across your business units. One type of memory, one type of power supply, and one type of paper when one will do.

7. Findings:

By studying the various aspects of financial deepening in different research paper following facts are found.

1. Inventory management plays crucial role in the financial development of the businesses.

2. The effectiveness of Total Quality management is depends upon the efficiency of the Inventory management practices of the organisation.

3. The major aspects of the inventory management is requires the updating and innovation. The inventory management techniques play a very important role to cope up the uncertainties of business related to inventory.

4. The country like India is focuses on the inventory aspects like TQM, Quality assurance, Flexible Manufacturing System to cope the problem of inefficient supply change management.

8. Conclusion

Every organisation wants to show the concerns financial strength to their stakeholders. Creditors and financial institutions are the most important stakeholders of any business. The inventory management plays a very important role to develop the sound financial ratio of business. If any organisation does not have sound inventory management as well as quality control it affects the financial position of the business and the interest of the stakeholders. Adoption of new techniques of inventory management can help organisation to cope up with the financial clinches like overstocking and under stocking.

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