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A STUDY ON INVENTORY CONTROL AND MANAGEMENT TECHNIQUES

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ABSTRACT

This theory is concerned with the expansion of an intellectual inventory management system. The mean of the system is to link the extensive gap between the theory and the practice of inventory management and to assist industrial inventory managers to achieve an efficient and successful inventory management. The planned system attempts to accomplish this by providing regular pattern recognition and model assortment facilities.

In order to integrate the system into the established computer-based intellectual inventory management structure and make easy the function of the pattern identifier, a data administrator has been developed to influence the history data necessary for arithmetical analysis and to load the data keen on the system from other applications. In order to establish the system's model base, the swot up of the modelling of inventory and the type and growth of professional systems are reviewed. The published models which deals with similar inventory trouble have been compared based on its applicability, simplicity, and being fit to be computerised. It was necessary to further enlargement and modifies published models to fill up the gaps in the model base.

The overall arrangement and prominent features of the proposed system and the development of the system using ocular essential have been described. The system has been tested using actual life data supplied by the co-operating companies. At last, achievements and shortcomings of the system are discussed and some suggestions for additional study are outlined.

I. INTRODUCTION

The word inventory refers to the goods or resources used by a firm for the purpose of production and sale. It also includes the matter, which are used as helpful materials to ease production.

There are three basic types of inventory raw resources, work-in-progress and completed goods. Raw materials are the items purchased by firms for employ in production of finished manufactured goods. Work-in-progress consists of all items currently in the process of production. These are in fact partly man-made products. Finished goods consist of those items, which have already been shaped but not yet sold.

Inventory management is significant from the point of view that it enables to deal with following important issues:

- The firm has to uphold sufficient inventory for horizontal production and selling activities.

- Investment in inventory should neither be too much nor insufficient. It should be best possible. Maintaining optimum level of inventory is the most important aim of inventory management.

  In other prose, inventory is composed of resources that will be showed in future in the normal course of the business operations. The possessions which firms stock up as inventory in expectation of need are:
- Raw materials
- Work in process (Semi Finished goods)
- Finished goods
- Stores and Supply

II. IMPORTANCE OF INVENTORY MANAGEMENT

- The consequence or connotation of inventory management could be specified as below:
- Inventory management helps in maintaining an exchange between transport costs and ordering costs which results into minimizing the total cost of inventory.
- Inventory management facilitates maintaining adequate inventory for smooth production and sales operations.
- Inventory management avoids the stock-out difficulty that a firm otherwise would face in the lack of proper inventory management.
- Inventory management suggests the proper inventory control system to be applied by a firm to avoid losses, damages and misuses.

III. PROBLEM STATEMENT

A swot up of inventory management is undertaken in command to identify the inventory performance and position of the company and to recognize the potency and flaw and to assess the profitability of the company. Inventories constitute most important part of resources of large mainstream of the companies in India. Inventory a double edged sword is usually an asset of an organization, if not worn correctly it will become liability. It is therefore absolutely very important to handle inventories resourcefully and efficiently in order to overcome unnecessary investment. And to identify the trouble/challenges concerned in the Inventory Management Process.

IV. OBJECTIVES

- To study the tools and techniques of inventory management adopted to study the inventory control measures in inventory management.
- To Study the demand forecast of inventory Management.
- To study how ABC Analysis and aging schedule is implemented in inventory Management
- To determine the stock level in in inventory management.
- To identify problems related to inventory management and to find out suitable measures to overcome them.
- To study methods of valuation of inventory.

- To study the inventory management procedure.
- To make a comparative study of inventory management in last 5 years using radio analysis technique.

V. LITERATURE REVIEW

The study intends to review the available literature in order to gain an understanding of the inventory control processes followed by the different companies, as well as the strategies and factors affecting the success of inventory control.

The study was guided by three theoretical frameworks:

- Stock diffusion theory,
- Application control theory and
- Inventory control in theory and practice.

The first three sections survey the principal domains: inventory modelling, decision support systems (DSS), and expert systems (ES). This is followed by a discussion of the intelligent decision support system (IDSS) which integrates the two fields: DSS and ES. Section reviews the intelligent (or knowledge-based) inventory systems developed in recent years. The study concludes with a critique of the published intelligent inventory management systems.

The first mathematical inventory model is generally referred to as the Economic Order Quantity (EOQ) model which was developed by Harris in 1913. The first full length book attempts to explain how various extensions of EOQ can be used in practice is Raymond's. Further research works showed that the EOQ model appears to be quite insensitive to errors in the specification of the appropriate cost parameters and the estimation of demand. The importance of the EOQ model is not only from the historical point of view but also because many other models designed to cope with different situations have been based on this model. However, this mathematical modelling technique of inventory management had very little application at that time. Perhaps this was because the new conceptions always need a period of maturation during which details can be improved upon and the original claim about increased productivity and performance can be proven through the test of time.

VI. CLASSIFICATIONS

Based on similarities of approaches used by the researchers, various papers reviewed were grouped in six categories:

- Models for deterministic optimum inventory policies,
- Lot-size optimisation,
- Optimisation of various specific management objectives,
- Models for optimising highly specialised inventory situations,
- Applications of advanced mathematical theories,
- Models bridging the gap between theory and practice.

The main contribution of Tinarelli's survey to the theory of inventory management is that the author referred to the publications in a systematic manner by classifying them into six groups:

- Stochastic models,

- Dynamic demand models,
- Models for perishables,
- Joint-ordering systems,
- Capital and/or volume constraints,
- Inventory control and devaluation.

To promote the application of the published inventory models, some researchers have started classifying the inventory systems to help inventory managers to find an appropriate model from the extensive inventory literature for a given condition.

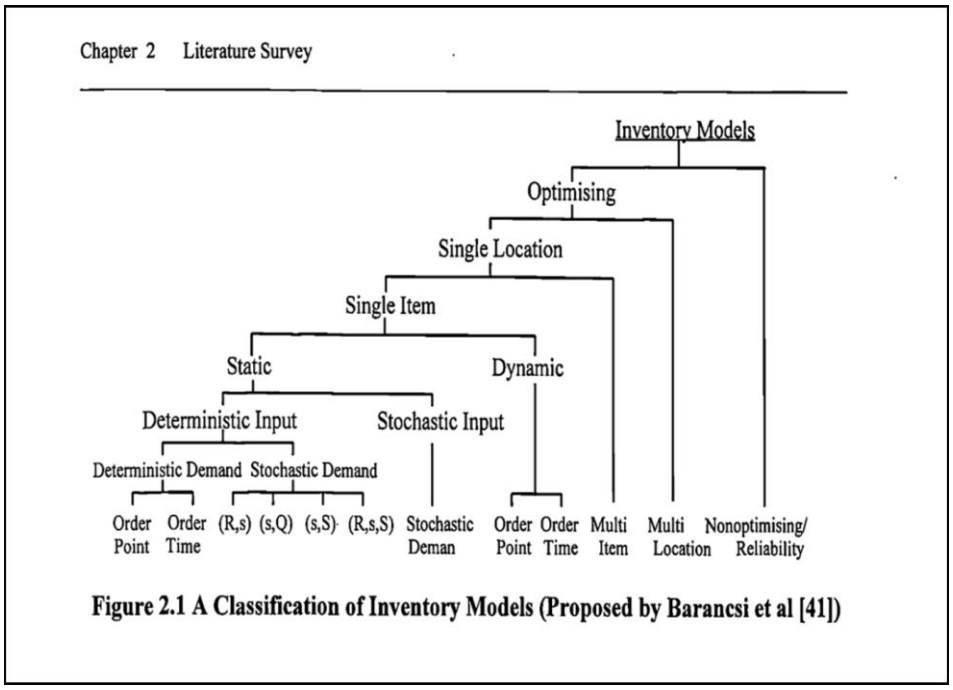

Figure 2.1 A Classification of Inventory Models (Proposed by Barancsi et al [41])

VII. INVENTORY CONTROL SYSTEM

An inventory lays a very important role in the determination of the profile of the Business. The management should make a decision to when the quantities to order according to the requirement & the number of units to be kept in hands. There are three types of inventories that are raw material, work in process, & finished goods.

VIII. ESSENTIALS OF INVENTORY CONTROL SYSTEM:

- Maintenance of proper record with regard to the units and the value of Various Items of the Inventories.
- To ensure proper control over the receipt and of issue of the materials.
- Materials should be properly identified and proper storage of facilities should be made.

IX. INVENTORY CONTROL TECHNIQUES

Inventory control techniques are employed by the inventory control organization within the framework of one of the basic inventory models, viz. Fixed order quantity systems or fixed order period system. Inventory

control techniques represent the operational aspect of inventory management and help realize the objectives inventory management and control.

The techniques are most commonly used are the following,

. Always better control (ABC) analysis
. Fast moving, slow moving and Non-moving (FSN) analysis
. Economic Order Quantity (EOQ)
. Maximum - Minimum technique
. Bin card system (KAN – BAN)
. Materials Requirement Planning (MRP)
. Just In time (JIT)
. VED Analysis

9.1 Abc Analysis

ABC analysis is based on Pareto principle (80-20 rule) which states that 80% of the overall consumption value (expense) is based only on 20% of the total items i.e. small portion of the items may typically represent the bulk of money value, while a relatively large number of items may form a small part of the money value.

"A" items : money value is highest 70%, represent only 10% of items
"B" items : money value is medium 20%, represent about 20% of items
"C" items : money value is lowest 10%, represent about 70% of items

- A-items should have tight inventory control under more experienced management. Re-orders should be more frequent.
- B-items require medium attention for control. An important aspect of class B is the monitoring of potential evolution toward class A or, in the contrary, toward the class C.
- C-items require minimum attention and may be kept under simple observation. Re-ordering is less frequent.

9.2 Advantages of ABC Analysis

- Helps to exercise selective control over such items, which are having a sizable investment.
- Helps to point out obsolete stocks easily.
- Provides sound basis for allocation of funds & human resources.
- It enables the maintenance of high inventory turnover rate.

9.3 Disadvantages of ABC Analysis

- Considers only money value of items & neglects the importance of items for the production process or assembly or functioning.
- It does not categorize the items based on their critical needs, hence sometimes the purpose of ABC categorization may be defeated.

9.4 Fsn Analysis (Based On Turnover Ratio)

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In any manufacturing industry, not all items are required with the same frequency. Some materials are quite regularly required, yet some others are required very occasionally and some materials may have become obsolete and might not have been demanded for years together.

FSN analysis groups them into three categories as Fast-moving, Slow-moving and Non-moving (dead stock) respectively. Inventory policies and models for the three categories have to be different. While performing this particular analysis the turnover ratio of each item has to be calculated because the items are sorted and analyzed according to the turnover ratio it possesses.

9.5 Economic Order Quantity

Economic order quantity (EOQ) is the order quantity that minimizes the total inventory holding costs and ordering costs. It is one of the oldest classical production scheduling models. The framework used to determine this order quantity is also known as Wilson EOQ Model, Wilson Formula or Andler Formula. The model was developed by Ford W. Harris in 1913, but R. H. Wilson, a consultant who applied it extensively, and K. Andler are given credit for their in-depth analysis.

9.6 Kanban

Kanban is a scheduling system for lean and just-in-time (JIT) production. Kanban is a system to control the logistical chain from a production point of view, and is an inventory control system. Kanban was developed by Taiichi Ohno, an industrial engineer at Toyota, as a system to improve and maintain a high level of production. Kanban is one method to achieve JIT.

Kanban became an effective tool to support running a production system as a whole, and an excellent way to promote improvement. Problem areas are highlighted by reducing the number of kanban in circulation. One of the main benefits of kanban is to establish an upper limit to the work in progress inventory, avoiding overloading of the manufacturing system.

9.7 Kanban cards

Kanban cards are a key component of kanban and they signal the need to move materials within a production facility or to move materials from an outside supplier into the production facility. The kanban card is, in effect, a message that signals depletion of product, parts, or inventory. When received, the kanban triggers replenishment of that product, part, or inventory. Consumption, therefore, drives demand for more production, and the kanban card signals demand for more product so kanban cards help create a demand-driven system.

It is widely held by proponents of lean production and manufacturing that demand-driven systems lead to faster turnarounds in production and lower inventory levels, helping companies implementing such systems be more competitive.

9.8 Material Requirements Planning

Material requirements planning (MRP) is a production planning, scheduling, and inventory control system used to manage manufacturing processes. Most MRP systems are software-based, while it is possible to conduct MRP by hand as well.

An MRP system is intended to simultaneously meet three objectives:

- Ensure materials are available for production and products are available for delivery to customers.
- Maintain the lowest possible material and product levels in store Plan manufacturing activities, delivery schedules and purchasing activities.

  The basic functions of an MRP system include: inventory control, bill of material processing, and elementary scheduling. MRP helps organizations to maintain low inventory levels. It is used to plan manufacturing, purchasing and delivering activities.

  A few examples are given below:
- If a company purchases insufficient quantity of an item used in manufacturing (or the wrong item) it may be unable to meet contract obligations to supply products on time.
- If a company purchases excessive quantities of an item, money is wasted - the excess quantity ties up cash while it remains as stock and may never even be used at all.
- Beginning production of an order at the wrong time can cause customer deadlines to be missed.

  MRP is a tool to deal with these problems. It provides answers for several questions:
- What items are required?
- How many are required?
- When are they required?

  MRP can be applied both to items that are purchased from outside suppliers and to sub-assemblies, produced internally, that are components of more complex items.

9.9 Just-In-Time Manufacturing

Just-in-time (JIT) manufacturing, also known as just-in-time production or the Toyota production system (TPS) is a methodology aimed primarily at reducing flow times within production as well as response times from suppliers and to customers. Following its origin and development in Japan, largely in the 1960s and 1970s and particularly at Toyota, JIT migrated to Western industry in the 1980s, where its features were put into effect in many manufacturing companies—as is attested to in several books and compendia of case studies and articles from the 1980s.

But the wide use of the term JIT manufacturing throughout the 1980s faded fast in the 1990s, as the new term lean manufacturing became established as "a more recent name for JIT." As just one testament to the commonality of the two terms, Toyota production system (TPS) has been and is widely used as a synonym for both JIT and lean manufacturing.

9.10 Ved Analysis

VED (V-Vital, E-Essential, D-Desirable) classification is based on the criticality of the inventories, in contrast to ABC classification which is based on consumption value.

- **Vital (V):**

The medicines that are critically needed for the survival of the patients, which must be available in the hospital all the times. Vital items (V) are items like Oxygen which are vital for functioning of a health care establishment and whose shortage will have serious adverse effects on routine functioning of the organisation.

- **Essential (E):**

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Medicines with lower critical need, which may be available in the hospital. Essential items (E) are the items whose shortage or non– availability can only be afforded for a short time (such as intravenous sets & IV fluids in a hospital) and if their shortage continues for anything more than the shortest time, the functioning would be affected seriously and adversely.

- **Desirable (D):**

The remaining medicines with lowest critically, the absence of which will not be detrimental to the health of the patients. These are items whose shortage would not affect the routine functioning of an organisation even if the shortage is for a long time (such as Vit E capsules or sun screen lotions in a hospital's medical store)

X. CONCLUSION

In any business, make it big or small, we must understand that taking good care of our inventory is very important. If we as managers do not understand the concept of good inventory management, we must learn to be familiar with it and its applications. One of the reasons for the failure of a business is its inventory management. There are many ways to fight failure, and we can start from here. There are new technology that can help us maintain and supervise our inventory. What we can do is learn, implement and evaluate our business. And you can start with your INVENTORY!!!

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