

Chapter 2 : Literature Review

2.1 Introduction

Materials management can be understood as to cover all the activities and processes involved in logistics or narrowly confined to the management of materials as in the case of inventory management.

Logistics refers to managing the flow of both information and all kinds of materials including raw materials, components, sub-assemblies and finished goods from the source to the final consumer. This includes purchasing from suppliers, shipping, receiving, manufacturing distribution to warehouses or retailers and finally to the ultimate consumers (Tersine, 1982).

Inventory management refers to management of any stored resource that is used to satisfy a current or future need. Raw materials and components, work-in-progress and finished goods are examples of inventory (Heizer & Render, 1993).

2.2 Inventory management in various industries

The control and maintenance of inventory is a common problem to all organizations in any sector of the economy. Different industries have differences in their inventory management activities. These differences arise because of the various types and numbers of products and services in the market, different suppliers and customers, different nature of raw materials and other market factors (Baily & Farmer, 1982).

1. The first step is to identify the problem or goal. This involves understanding the current situation and what you want to achieve. It's important to be clear and specific about your objectives.

2. Next, you need to gather information. This could involve research, talking to experts, or looking at data. The more information you have, the better you'll be able to make a decision.

3. Once you have gathered information, you should consider the different options available to you. Think about the pros and cons of each option and how they might affect you in the long run.

4. After you've considered the options, it's time to make a decision. This is often the most difficult part, as you may have to choose between two or more good options. Trust your instincts and go with what you believe is the best choice.

5. Finally, you need to implement your decision. This involves putting your plan into action and taking the necessary steps to achieve your goal. It's important to stay focused and motivated throughout the process.

Service, marketing and manufacturing are three major industries whereby good inventory management is essential for their business viability. Each of them have their own characteristics and priorities when it comes to inventory requirement (Adam & Ebert , 1992) .

In the service industry e.g. TNB financial institution, government agencies and public utilities have a narrow range of products or services. Their concern with inventory management is to ensure that they have all the necessary materials at the right time place and cost effective to enable them to perform service to customers satisfactorily. The purchase of raw materials and equipment may be necessary to perform the service (Adam & Ebert , (1992) .

The marketing industry includes wholesaling and retailing. They perform the function of changing the ownership of the same input products i.e. purchasing products, selling and shopping until the final distribution. The input materials purchased are very wide in range many sources and varied in their prices. Generally the products bought are sold unchanged except in the packing size .

In the manufacturing industry, input consists of many items from many suppliers and the output are of many items to many customers. There are major flow of materials in and out of the manufacturing activity. Materials physically changed form in the process. Inventory of raw materials, work-in-progress and finished goods are closely associated with manufacturing industry.

2.3 Functions of Inventory

Inventory can serve several important functions that add flexibility to the operation of a firm (Heizer & Render , 1993) Three useful functions of inventory are :-

(I) the decoupling function

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- (ii) *a hedge against price changes and inflation*
- (iii) *quantity discounts*

2.3.1 The decoupling function

The decoupling function of inventory is to allow the treatment of various dependent operations (retailing, distributing, warehousing, manufacturing, purchasing, production and distribution) in an independent and economical manner. Inventories make it unnecessary to gear production directly to consumption or to force consumption to adapt to the necessities of production (Adam & Ebert, 1992). In the service industry like TNB the objective of reliability and maintenance is to maintain the capability of system through the use of inventory to decouple stages of the system. Generating units at SSAAPS can use oil or gas for its operation. For safety reasons and economy not all units operate on the same fuel system. One unit operates on gas while the other unit on oil. When Petronas (gas supplier) schedules their plant for maintenance, the gas supply will be limited. SSAAPS arranges extra oil inventory prior to Petronas's plant shut down. In this way units at SSAAPS will continue generating although there is a shortage of gas supply due to maintenance at Petronas plant .

2.3.2. A hedge against inflation

Inventory can be a hedge against price changes and inflation. Inventory is used to help organization of some protection from unanticipated or unplanned occurrences (Heizer & Render , 1993). Copper's price is very sensitive in the metal market. TNB uses a lot of cables for its construction activities throughout the year. Copper is used as a conductor in the cable manufacturing process. Inventory can be used to offset price inflation by buying cables at the right time.

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2.3.3. Quantity discounts

This economic factor permits the organization to take advantage of cost reduction alternatives. Many suppliers offer discount for large orders. Purchasing in large quantities can substantially reduce the cost of products. Note there are disadvantages in buying in large quantities. Higher costs due to storage, spoilage, damaged stock and theft will be incurred (Heizer & Render , 1993).

TNB's Central Store buys a lot of items in bulk before distributing them to district and power station stores . In this way TNB purchases at cheaper price as to compare to district and power station stores to buy on their own.

2.4 Inventory Control System

The objective of inventory management through inventory control system is to have the appropriate amounts of raw materials, suppliers and finished goods in the right place, at the right time, and at low cost. Inventory costs result from action or lack of action of management on establishing the inventory system. The inventory costs includes such as holding, ordering or set up, and stock out costs. Holding costs are the cost associated with holding or carrying inventory over time. It includes such as storage, insurance, handling, interest, extra staffing, shrinkage, obsolescence and deterioration (Noori , Radford ,1995)

Ordering costs or set up cost originates from the expense of issuing a purchase order. It includes such as costs of supplies forms, order processing, clerical support, and so faith when order are being manufactured, ordering costs are known as setup costs. Set up cost is the cost to prepare a machine or process for manufacturing an order.

Stockout costs result from external and internal shortage. External shortages result in backorder costs, present profit loss (potential sale) and future profit

loss (good will erosion). This can occur when a customer of the organization does not have his order filled. Internal shortages can result in lost production (idle men and machines) and a delay in a completion date. Internal shortages occur within the organization (Tersine , 1982).

An inventory control system is a coordinated set of rules that assist in answering two important questions of when to order and how much to order of an item Common types of inventory systems are mentioned below :-

2.4.1 Economic order quantity (EOQ) system

This is a perpetual system that keeps records of the account in storage, and it replenishes when the stock drops to a certain level. Under this system the reorder point and order quantity are fixed. The objective of this system is to minimize the total inventory cost. The cost is minimized when the holding cost is same as the ordering cost. This system require a continuous review or observation of inventory level (Noori , Radford , 1995).

2.4.2 Two-bin inventory system

This system is a fixed order size systems. The system does not require continuous monitoring as the EOQ system. The reorder point is determined by visual observation. When the stock in one bin is depleted, an order is initiated, and demands are then filled from second bin. This system can also be used with a single bin. An order can be triggered when an inventory level reaches a physical mark such as a pointed line or a given volume level (for liquid) . (Tersine , 1982)

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

2. Next, it is important to gather relevant information and resources. This may include researching existing solutions, consulting with experts, or collecting data.

3. Once the information is gathered, the next step is to analyze it and identify the key factors that influence the outcome. This often involves breaking down the problem into smaller, more manageable parts.

4. After analysis, a plan or strategy should be developed. This plan should outline the steps that need to be taken to solve the problem, taking into account any constraints or limitations.

5. The final step is to implement the plan and monitor the progress. It is important to be flexible and willing to adjust the plan if necessary, as new information or challenges may arise during the process.

2.4.3. *Periodic Inventory System*

In this system the number of items in storage is reviewed at a fixed time interval. With this system the quantity to be ordered is not fixed, and the quantity can be ordered to reflect changes in the demand rate. But a count must be taken of the goods on hand at the start of each period in order to determine the demand rate on next count (Tersine , 1982) .

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