

JIT: A Strategic Tool of Inventory Management

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Abstract

Investment in inventory absorbs a large portion of the working capital of a company and often it represents a large portion of the total assets of a business. By improving return on investment by increasing the rate of inventory turnover, management often wants to ensure economic efficiency. Effective inventory management enables a firm to provide lower costs, rapid response and flexibility for its customers. Just-in-time (JIT) philosophy is most widely adopted and practices in the recent years worldwide. It aims at reducing total production costs by producing only what is immediately needed and eliminates wastes. It is based on a radically different concept, deviating substantially from the existing manufacturing practices in many respects. It is a very effective tool to reduce the wastage of inventory and manage it effectively. It has the potential to bring substantial changes in the existing setup of a company; can give it a new face, broaden its acceptability and ensure a longer life. It can strategically change the atmosphere needed for longer survival. JIT is radically different from MRP and goes beyond materials management. The new outlook acquired by the company can meet global expectations of the customers. JIT happens to provide global markets. The present paper examines the strategic role of JIT in inventory management. Information technology helps JIT in managing inventory effectively, as it helps in integrating the components of supply chain network. Quality aspect of inventory management has also been discussed.

Keywords: Inventory, Inventory management, ABC Analysis, JIT, Information system, Quality, Supply chain network, SCM.

Introduction

Inventory represents a detailed list of movable items in the form of raw materials, in-process or finished products, which are needed in the manufacture of goods or to maintain the machinery and equipment in good working condition. It is an essential part of an organization.

Inventory serves as a cushion, as it absorbs fluctuations in demand or supply of goods which disturb the schedule of the enterprise. It helps in maintaining manufacturing activities uninterrupted,

which leads to better utilization of men and machines besides economy. Hence for the smooth working of the organization, inventory is a must, and an organization can not survive without it.

Inventory incurs some costs, as it requires valuable space, capital and other overheads to maintain it. In fact, it constitutes a significance part of the total cost of a product. The invested money gets blocked as long as the stocks are not getting consumed. Excessive inventory involves more blockage of money, which can be used elsewhere for other useful purposes. Hence inventory needs to be managed effectively and efficiently. Managing inventory is an art; needs careful consideration and thus offers a strategic advantage. Excellent in-house inventory management reduces the overall production costs drastically along with maintaining inventory at the most desired level.

Inventory control is the scientific method of finding the right quantity of inventory to meet the manufacturing requirements on time and to reduce the overall cost of production. The purpose of inventory control is to ensure that a proper reserve of goods is available according to the manufacturing plan based on the sales requirement. One of the key functions of inventory control is to minimize the amount of inventory held by the company in terms of materials, work-in-process and finished goods [1]. Effective inventory control offers many benefits. It ensures smooth flow of production activities, reduces delivery time and reduces price fluctuations. Losses from improper inventory control include purchases in excess than what is needed, the cost of slowed up production resulting from material not being made available at the time of requirement. Each time, a machine may be required to shut down for lack of materials or each time, a sale is postponed or cancelled for lack of finished goods. Both situations are not good for a company, as they adversely affect its functioning.

ABC Analysis of Inventory Management

One of the elementary methods of inventory control is ABC analysis, which classifies inventory into three groups according to their worth and number. Class A inventory includes high valued items which roughly lie in the range of 10 to 20 % of the total items. Class B inventories are medium valued items contributing about 30 % of the total items. And finally, Class C inventories are least

valued items in large number, roughly 50 % of the total items. Hence a greater degree of control is required and exercised for Class A inventories and least control for Class C inventories. Although the analysis segregates the inventories for their better management, but also incurs high holding cost, which can not be reduced below a certain limit?

JIT Inventory Management

JIT philosophy is based on simple idea that wherever possible no activity should take place in a system until there is a need for it. It requires the parts to make available at the time of their requirements and not before. It seeks to produce only the required items at the required time, and in the required quantities. Hence, it is one of the effective means to control inventory flow, prevent its storage and manage it effectively. JIT inventory management strikes a balance between optimum inventory quantity and its holding cost. Inventory made available in right quantity at right price and in right time is the primary objective of JIT. JIT is a technique in which stock held by the company is measured in terms of hours of production rather than in days or months [2, 3]. It eliminates waste through simplification of manufacturing processes [4, 5], eliminates excess inventory in order to reduce related production cost and emphasizes on the use of small lot size so as to meet quick customer requirements. Inventory managed on JIT basis removes many types of uncertainties in a production system. It ensures timely delivery of customized products to the customers and thus helping the organization in the long run to acquire its brand status.

Supply Chain Management and Inventory Management

Inventory management is closely linked to supply chain management. A supply chain is defined as a network of facilities and distribution options between start and end points that include the functions of procurement of raw materials, transformation of these materials into intermediate and finished products, and the distribution of the finished products to the end users [6].

Supply chain management (SCM) effectively integrates the information and materials flow within the supply chain network starting from product design to delivery [7]. Integration of related activities of a production system facilitates smooth flow of materials within the system, thereby cutting the level of in-process inventory drastically. As a result of effective supply chain management, right product is made available at right time to the customer, which is mainly due to reduced cycle times because of simplified and accelerated operations [8, 9]. This is in tune with the working with JIT. The productivity is found to be increased significantly with the improvement in the supply

chain network. At the same time, SCM helps in cutting business costs and increasing profits through reduced level of inventory.

Information System in Inventory Management

Information system is a system of sharing information, and consists of computer hardware, communication technology and software designed to handle information related to business functions [10]. It serves to smooth many organizational functions. An effective information management system coupled with proper manufacturing planning will significantly reduce piling of stocks and lead time and ensure timely delivery of quality products to the customer, endorsing the very basic concept of JIT system. An SCM information system is designed to provide information and information processing capability to support the strategy, operations, management analysis, and decision-making functions in an organization's supply network. It provides high quality, relevant and timely information flow that effectively supports decision-making for inventory replenishment, capacity activation, and for synchronizing material flows at all tiers within the supply chain [11]. The use of telecommunication based networks such as Internet, Intranet, Extranet and EDI helps to gain competitive advantage for the organization. It has made sharing of information easier and faster and organizations using Internet have grown faster in a very short interval of time.

Since suppliers are scattered and far apart, it is essential to integrate their activities both inside and outside of an organization. This requires an integrated information system for sharing information on various value-adding activities along the supply chain. Information technology is like a nerve system for supply chain management [12]. Hence development and use of effective information system for supply chain management is of utmost importance. A supply chain network can fail in the absence of effective information system. The "Bullwhip Effect" is the most important effect caused due to inefficient supply chain network. It describes the propagation and amplification of orders from one reordering system to another upstream in a supply chain. This effect causes uncertainty in the supply chain management leading to increased on-costs as organizations in the supply pipeline mitigate against the potential risks in customer service levels by, say, increasing available capacity or increasing stock holding [13].

Inventory Management through Quality and JIT

The challenge for today's business is to produce quality products or services offered. Quality is the demand of the market and no manufacturer can afford to overlook it without loss of business.

Customer's awareness about quality has increased significantly in recent years. Quality has a key role in inventory management. It accelerates JIT implementation. Quality ensures defect-free products and reduces work-in-process (WIP) inventory drastically. It reduces inspection costs, which has a direct impact on production cost. It reduces lead time and ensures speedy delivery of products to a customer. A customer is more easily attracted towards quality products because of their ability to satisfy him to the maximum level [14]. Customer satisfaction through quality has become the necessity for a company to survive in the market. Quality is being used as a competitive weapon to excel. At the same time, the company registers increase in sales and profits due to increased level of quality driven customer satisfaction. Quality products have short stay and waiting time before being sold in the market and offer increased rate of consumption and hence increased circulation of material flow, which in turn, reduces the level of in-process inventory. On the other hand, poor quality products are more likely to be rejected and may affect the brandability of a company and thus losing the customer's goodwill. Also, poor quality products render the production system less productive as they increase machine down time and involve longer processing time. JIT particularly influences the quality dimension more directly connected to a production system. The principle of quality at source should be used where errors or defects in a product or service is detected and rectified at the source and not passed on to the customer. Quality at source starts with the quality of raw material. It will result in saving in inspection cost and the cost associated with replacing the defective items. Quality needs to be continuously improved upon to make it always relevant and in demand. And doing so will make the task of JIT implementation always easier. The recent trend towards JIT management systems and the ever-increasing pressure to reduce work-in-process inventories while simultaneously increasing quality has forced companies to install highly integrated, computerized manufacturing systems, such as flexible manufacturing system (FMS) and computer integrated manufacturing (CIM). CIM contributes in speedy implementation of JIT [15]. Flexible manufacturing system has the ability to react according to the needs of a customer in terms of products variation. An automated manufacturing system is useful to realize the goals of "Factory of the future", which is based on continuous improvements in production activities leading to manufacturing of high quality, customized products having higher level of customer satisfaction. The company gets strategic advantage to fulfill the requirements of world-class manufacturing [16].

Manufacturing Environment in Inventory management and JIT

Manufacturing environment plays a very important role in the successful implementation of JIT. It offers right kind of production atmosphere needed to produce right product at right time and in right quantity. As a result, wastes are eliminated and production cost is optimized. Reduced level of inventory, reduced lead time and increased product quality have unquestionable positive impact on raising the level of customer satisfaction. The increased customer satisfaction proves to be strong competitive weapon offering strategic advantages, helping a company to keep it always ahead of others in today's highly unstable market. Manufacturing environments such as preventive maintenance and product flexibility help in reducing inventory. Preventive maintenance reduce the untimely breakdown or failure of machine or its components, which may cause frequent interruption in the operation of a production system, leading to inventory pile-up, which is against the spirit of JIT. Regular maintenance measures ensure continuity in operations, helping the organization running smoothly, without thinking about in-process inventory. Manufacturing flexibility has increased scope of customization and hence higher level of customer satisfaction can be achieved. Customization, on account of its better acceptance possibility, has very positive impact on JIT implementation. Cellular manufacturing uses the principle of group technology (GT), where families of parts with similar manufacturing processes are grouped together, greatly helps in inventory management. It is an innovative approach to ensure variety in the production with additional benefits of reduced material handling, reduced work-in-process (WIP) inventory, reduced setup time and manufacturing lead time, and simplified planning, routing and scheduling activities [17].

Conclusions

JIT is an innovative management philosophy, which has potential to excel an organization in the most competitive and ever changing dynamic environment. It aims at rationalization of the production system, which can be achieved through elimination of wastes, reduction in defects, increase in machine's utility, improvement in man- power efficiency and reduction in other non-productive works. It is important to note that working with low level of inventory requires waste, breakdowns, process bottlenecks etc. to be essentially reduced to their minimum level. And JIT happens to work most effectively under this condition.

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