

Business Environment in Inventory Management Strategy Largest Manufacturers Growth and Stability

Pooja Giradkar

Department of Master of Business Administration (MBA)
Radharaman Institute of Technology & Science, Bhopal (M.P.)

Abstract

Inventory management practices (IMP) are prevalent in managing and controlling inventory in an organisation. The study aims to measure the performance of steel manufacturing firms by determining the effect of Distribution turnover and inventory automation over competitive strength and operational efficiencies evident that the above relationship of the study are some key officials, viz. operations manager, production manager, purchase manager and warehouse manager from manufacturing firms. As per the need of the study, various statistical tools such as correlation, multiple regression, confirmatory factor analysis and. The outcome of the study concludes that IMP has significant impact on firm performance and also contributes to the existing body of knowledge by helping inventory management practitioners of manufacturing industry.

Keywords: Business Environment, management practices; IMP; manufacturing firms; firm performance; operational efficiency; productivity performance..

1. Introduction

We need a lot of things to survive in our daily lives. All of us are aware of our current demands, but frequently, we are unsure of our future needs. The items we use every day are either bought from retail stores or occasionally from wholesale warehouses. Inventory is the collection of items created to satisfy immediate and future needs. In other terms, "Inventory is defined as a stock of things held on hand by a corporation to use in meeting consumers' present-day and near-term demand. It is seen as an economy of a firm's idle resource.[1] Inventory is crucial to a business from both a financial and an operational standpoint. First off, any business must make a significant financial investment in its inventory. However, from an operational standpoint, inventories increase operational flexibility. Production is streamlined in manufacturing organisations by maintaining adequate supplies.[2] By maintaining adequate inventory, wholesalers and retailers

may provide good customer service and improve their reputation. Thus, achieving a balance between minimal inventory and good return on investment is the primary goal of inventory management.

In brief, following statements are true for inventory:

1. Inventory is an unused asset, which lies in stock without participating in value adding process.
2. Inventory may be unused equipment, raw material, finished goods, consumables, spare parts, bought out parts, tools and tackles, gauge and fixtures etc.
3. In our country inventory is always viewed as asset (working capital) though, it is a big liability too.
4. Those inventories are biggest source of waste of materials which are not used in time and become useless for future.

Therefore, inventory is the material held in an idle or incomplete state waiting for future sale, use, or transformation.

In every manufacturing industry, the role inventory management (IM) cannot be ignored or undermined. In the current parlance, the firms are facing many challenges related to adequate maintenance of inventory in their warehouses.[3] The operation managers are facing problems related to reducing inventory carrying costs, availability of stock on hand. Effective inventory management practices (IMP) in steel manufacturing firms will thus provide a systematic and streamlined business operation (Shenvi, 2019). Effective management of inventory will be the major functional area of production and operation manager.[21,22,24] Effective IM is critical to the industry because inventory has a strong relationship between sales and customer service (Dubelaar et al., 2001). All companies are now trying to increase their productivity by reducing the production cost by adopting scientific IM techniques. These techniques help in preparing

a strategy towards bringing continuous improvement in the operational performances of manufacturing units. IMP are used by firms for optimum utilisation of resources and adequate investment in inventory so that funds should not be blocked in the form of stock(Mustafa Tanrikulu et al., 2010). IMP refers to all activities in developing and

managing different levels of inventories and how supplies are made available at low cost (Kotler, 2002).[4] Inventories are considered as ideal resources of having an economic value. Better management of inventory can help to release capital for other productive use (Ghosh and Kumar, 2003). Effective IM helps to foster more sales for the company, which in turn affects the company performance (Mohamad et al., 2016). Mismanagement of inventory provides a direct threat to the company in terms of long-term profitability and business continuity, in which steel manufacturing firms are not an exception. Effective management of inventory throughout the value chain is one of the important elements for large and medium scale industries. The systems will reach at trade-off when supplier requirement matches with company delivery.[5,6,7] When demand does not meet the required inventory due to stock out conditions, it will also be very difficult to survive in the present market condition (Atnafu and Balda, 2018). Inventory control is always associated with different issues for better practices. The problems associated with inventory control are considered a vital concept for organisational development (Ziukov, 2015). For the manufacturing industry, many kinds of research highlight that the industry fails to control the inventory, which resulted into production and opportunity losses (Jefwa and Owuor, 2015). Most of the firms are yet to adopt the inventory control practices in different phases of production, i.e., raw material, work-in-progress (WIP) and finished goods (FIG). Raw materials are the most important ingredients of the inventory concerning production rates for iron and steel plants in India (Singh and Mondal, 2016). It contributes to cost-effective material purchase and storage function. IM has always a positive effect on operational as well as marketing performance in the manufacturing industry. Existing literature also argued that the company and its capital size have a positive effect on IMP. If more concentration is given to IM, then automatically it leads to a firm's performance (Koumanakos, 2008). [8]This paper highlights the role of automating inventory practices and inventory distribution turnover (DT) strategies for proving competitive advantages and operational efficiencies in large steel manufacturing firms.[19,20,21] Automation operational practices are adopted in the areas of IM like radio-frequency identification (RFID), vendor managed inventory (VMI) and electronic data interchange (EDI). Effective management of IMP will able to provide competitive advantages for the manufacturing industry to survive in This study is an attempt to study the effect of IMP on successful contribution towards operational performances of steel manufacturing firms.

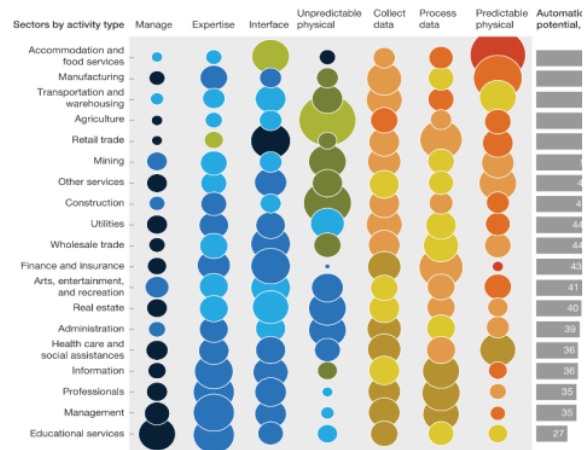


Fig.1 Use of automation practices according to sector-wise statistics-global statistics (see online version for colours)

Manufacturing firms are adopting RFID practices, materials requirements planning practices, VMI practices, inventory bar-coding practices as different types of automation practices for reducing cost, and increasing the efficiencies of operational units. It will emphasise the manufacturing firms to adopt automation in the operation and management functions (Bhaskar Singh, 2020). Operational performance Operational performance/efficiency is the alignment of all manufacturing units within an organisation to ensure all are working in synchronisation for achieving core business goals. It deals with assessing individual efficiency, reducing individual unit cost, planning for production cum process, and increasing individual unit output (Gill et al., 2014).[9] The study of Maksoud et al. (2008) concludes that role of operational efficiencies was highly positive on the future performance of the Indian manufacturing industry. OE in an organisation needs to measure both the input and the output side of IM in an organisation. In the case of the manufacturing industry, OP helps to reduced waste and maximise value creation. The output will give productivity, competitive advantages, and a profitable position. OE has a strong positive impact on future performance in Indian manufacturing firms (Gill et al., 2014). In a manufacturing firm, role of raw materials management also play a crucial part in the operation as well as the production process. The study conducted in Nigerian manufacturing sectors, reveals that practices of IM take into account raw materials management and it has a direct impact on operational performances of manufacturing units (Akindipe, 2014).

2. Methodology

As per the current definition, large-scale manufacturing firms are with a turnover of more than ₹2,500 million

Indian rupees (Ministry of Micro, Small & Medium Enterprises, 2023). The present study based on large-scale steel manufacturing firms which comprise of RSP (SAIL, 2022) – large-scale manufacturing firm with a turnover of ₹58,042.91 million FY22, Jindal Steel – large-scale manufacturing firm with a turnover of ₹77,246.00 million in FY22 (JSPL, 2023), Rashmi-Group (2022) – large-scale manufacturing firm with turnover of ₹86,000 million FY19, MESCO Steel (2019) – large-scale manufacturing firm with turnover of ₹81,402 million FY19, and MSP Steels – large-scale manufacturing firm with turnover of ₹16,698 million FY19 (Macintosh,2019). The population size of the present study comprising five steel manufacturing units viz., RSP (SAIL), Jindal Steel, Rashmi Group, MESCO Steel, and MSP Steels were 4,600 employees [10] These manufacturing firms' selection is based on geographical proximity concerning easy inaccessibility. The targeted respondents are the key officials of steel manufacturing firms, i.e., production manager, store cum warehouse manager, operation manager, quality control manager, sales manager, distribution and marketing manager, senior officers of production and operation department.

3. Importance of Stocking Inventory

Generally, every trading organization/ business organization/manufacturing unit/industry must stock inventory for smooth and efficient running of its operations. However, in environments where an organization suffers from poor cash flow or lacks strong control over (i) electronic information transfer among all departments and all significant suppliers, [11](ii) lead times, and (iii) quality of materials received, inventory plays important roles. Even to fulfill demand at once the stocking of inventory is essential otherwise customer may move to others for purchasing till the production is carried out. Some of the more important reasons for obtaining and holding inventory are:

- Predictability
- Fluctuations in demand
- Unreliability of supply
- Price protection
- Quantity discounts
- Lower ordering costs
- Avoiding stock outs (shortages)
- Improve customer service
- Maintaining goodwill in business
- Reduce costs

In addition to above the stocking of inventory provides the following advantages:

- It helps in smooth and efficient running of business.
- It provides adequate service to the customers

- It reduces the possibility of duplicating of orders.
- It improves the cash-flow by timely shipment of customer order.
- It helps in minimizing the loss due to deterioration, obsolescence, damages etc.
- It helps in maintaining economy by observing some of the fluctuations during demand and supply.
- It acts as buffer stock when raw materials are received late and when shops rejection are too many.

4. Inventory Modeling

We need a lot of things to survive in our daily lives. All of us are aware of our current demands, but frequently, we are unsure of our future needs. [12] The items we use every day are either bought from retail stores or occasionally from wholesale warehouses. Inventory is the collection of items created to satisfy immediate and future needs. In other terms, "Inventory is defined as a stock of things held on hand by a corporation to use in meeting consumers' present-day and near-term demand. It is seen as an economy of a firm's idle resource. Inventory is crucial to a business from both a financial and an operational standpoint. First off, any business must make a significant financial investment in its inventory. However, from an operational standpoint, inventories increase operational flexibility. Production is streamlined in manufacturing organisations [13] by maintaining adequate supplies. By maintaining adequate inventory, wholesalers and retailers may provide good customer service and improve their reputation. Thus, achieving a balance between minimal inventory and good return on investment is the primary goal of inventory management.

The purpose of all inventory models is to minimize inventory costs. As a result of the inventory model, a designer of air-condition machine decided to redesign its old model machine [14] to enhance its working efficiency and reduce inventory costs in meeting a global market for it air-condition machines. The purpose of modeling inventory situations is to derive an operating doctrine which follows four steps mentioned below:

- Inventory situation should be carefully examined and characteristics should be listed with assumptions concerning the situation.
- The total annual relevant cost equation should be developed in narrative.
- The total annual cost equation should be transformed from narrative into the shorthand logic of mathematics.
- The cost equation should be optimized and the optimum solution is obtained under given

assumption and restriction for how much to order quantity and when to reorder (cycle length).

After the completion of the above process, the objective is to find the values of decision variables that optimize the cost function. In searching optimal solution for the objective function so modeled a feasible solution [15] (The set of values of decision variables that satisfies all the constraints) is determined using mathematical tools/computer software and thereafter the optimal value (the best possible objective function value) for decision variables is searched within feasible solutions.

5. Overview of Inflation

In the current business environment, inflation is frequently defined as the general level of prices rising. It is the state of the economy's equilibrium. [16,17,18] However, this does not necessarily imply that all prices are rising. It is anticipated in the traditional inventory that all expenditures related to the inventory system will remain constant throughout time. Since the majority of decision-makers believe that inflation has no impact on inventory policy, most inventory models created a few decades ago did not take inflation and time value of money into account as system characteristics. But over the past several decades, the monetary position in practically all countries has changed somewhat as a result of widespread inflation. Inflation is now a constant component of the inventory system. Only because it might have an effect on the current value of the future inventory cost does inflation enter the picture. Thus, it is illogical to overlook the consequences of inflation because it has a significant impact on the inventory system and production management.

5.1 Types of Inflation

The important types of inflation are given below':

- Creeping, Walking, Running and Galloping inflation
- Open and Suppressed inflation
- Peacetime, Wartime and Post-War inflation
- Demand-Pull and Cost-Push inflation
- Comprehensive and Sporadic inflation
- Currency inflation and Credit inflation

5.2 Causes of Inflation

The primary cause of inflation is excessive total spending which results in an excess of demand over the available supply of goods and services. The main causing factors are:

- Factors causing an increase in demand
- Factors causing a decrease in supply or production

6. Conclusion

The impact of IMP on manufacturing firms' performance among five selected steel manufacturing units. As per the review and analysis, it can be observed few papers indicate the importance of distribution turn over the practice of IM, but this study confirms that DT has a greater effect on the CS of manufacturing firms. DT (IM practice) has a positive impact on the business and providing different benefits such as lower down the cost, increasing customer satisfaction, growth in sales volume. Inventory optimisation techniques are of placing the product at the right location or place and deliver at the right time leads to more operational efficiencies of business processes. IAP have a significant positive effect on operational efficiencies. The main outcome of this study is observed that inventory accuracy is the major area of concern for effective control. The result of this study strongly argued that RFID, VMI, and MRP are highly rated automation practices used in manufacturing firms. It has a high impact on the operational efficiencies of manufacturing firms. IAP is contributing a 49.1% impact on operational efficiencies. It indicated automation practices in the firms provide the exact status of overstocked or out of stock, real-time stock count, and forecast the inventory need. Most of the firms are using automation practices for majorly addressing three issues like, reduce error, guarantees the accuracy and boost efficiencies. Inventory control is needed in a firm in place of manual process for avoiding human error, quick IM solutions, which can streamline the business operation. Lots of new automated IM techniques are adopted like multi-warehousing, bar-coding, 3PLs, drop shipping, predictive analysis, etc. towards improving operational efficiencies and productivity of the firms. From this research paper, it is evident that for large-scale manufacturing firms, IM is a big challenge. To decide the appropriate level of inventory in an organisation and accordingly decide the course of action is a difficult task for the management and IM practitioners. To do the proper management of inventory, the stock details must be maintained systematically and can be easily be accessed at the time of requirement. These functions are a bit difficult if inventory record-keeping was done manually, so every firm must use ICT based or computer-based systems. The study contributes to the existing body of knowledge by helping IM practitioners in the manufacturing industry. As this study covers PSU's steel manufacturing firms as well as private firms, employees are not much concerned about the skill or a techniques-based IM practice. The management must thrive to bring or introduce technological up-gradation in the manufacturing units, avoiding experimentation each

time. It was observed that knowledge of IAP may fill the gap between concepts and practices, which is beneficial for manufacturing units. inventory model for non-instantaneous deteriorating items with constant demand rate and permissible delay period in payment is proposed and developed under assumption that items are transported from RW to retail shop under continuous release pattern. The objective of the model is to maximize the total profit of the inventory system per unit of time. A fuzzy model corresponding to the above mentioned crisp model is developed that is suitable for situation where the parameter's values are fluctuating around a crisp value. It is observed that profit function depends on selling price, purchase cost, demand and holding cost in RW. Eight subcases of four different cases are discussed and a comparative table is made. It is observed that in some cases the crisp model provides the optimal solution while in some cases fuzzy model is appropriate to provide optimal solution. The decision maker has to decide between the choices of crisp or fuzzy model depending upon situation to optimize the profit of the inventory system. The proposed model can be used in inventory control of certain non- instantaneous deteriorating items.

7. Future Scope

The deterministic demand pattern, such as a constant and time-varying demand rate, is the main emphasis of the work that is being presented. More demand patterns, such as probabilistic demand, price-dependent demand, selling price-dependent demand, power demand pattern, etc., can be taken into account in the future. Backlogging rate is regarded as constant and exponentially time dependent for partial backlogging. Additionally, the inverse waiting-time partial backlog and the shortage dependent partial backlog ratio may be included in the future work. Fuzzy models are solved using the signed distance approach, which takes into account triangular fuzzy parameters. Future research can use trapezoidal fuzzy parameters. The model can be solved using other techniques such the centroid method, function primary method, and graded means integration representation approach.

The inventory models that are described here can also be expanded to include multiple degrading items and other combinations of a genuine company environment. When dealing with probabilistic demand patterns, one potential future project could be to investigate these issues by breaking down consumer demand into many discrete situations. For instance, low consumer demand, high customer demand, and most likely customer demand may all be taken into account. Multi-stage mixed-integer

stochastic programming approaches can be used to resolve the consumer demand uncertainty. The creation of effective computer algorithms for situations of this nature may be the primary focus of a superior future endeavour.

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