

DOI: <https://doi.org/10.24297/ijmit.v15i.8666>

Inventory Management Issues in Indian Steel Industry: A Qualitative Study

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Abstract

Inventory management in Indian steel industry is felt as one of the unexplored area in terms of research practices. This study attempts to understand the major aspects of inventory management of Indian steel industry like major inventory management issues prevalent in steel firms, and impact of these issues, drivers, barriers, and possible measures that may help to resolve these issues. This study is based on an exploratory qualitative study of major Indian steel firms. The narratives reveal six major themes: Inventory management practices; Inventory issues in the steel industry; Major drivers for effective inventory management in Indian steel industry; Major barriers for the implementation of effective inventory management techniques including the implementation of ERP/MRP to manage inventories; Impact of inventory issues; Inventory control techniques to resolve these issues.

Keywords: Inventory Management, Inventory Management Practices, Inventory Issues, Indian Steel Industry

Introduction

Inventory management is one of the most difficult planning and control activities in a manufacturing enterprise. Inventory management poses conflicting functional objectives; e.g. minimize the inventory level to reduce the cost is contradictory to the goal of minimizing the probability of inventory shortage. On one hand, Inventory management deals with retaining and controlling the desirable inventory level, and on the other, it needs to minimize the total inventory cost. Shortage of inventory implies unsatisfied demand and sales shrinkage, whereas excessive inventories may lead to the cost of items storage, taxes and insurance, breakage, spoilage, deterioration and obsolescence, and the opportunity cost of alternative capital investment as well.

The basic need of Indian economy today is rapid industrialization. As important industries like Railway locomotive, Ship Building, Heavy and Light Machine, Construction, etc. depending on the availability of iron and steel, iron and steel industry accelerates industrialization and is, therefore, called the backbone of all industries.

It is expected that India will become the second-largest producer of steel by 2016 [5]. Carrying Inventories for various reasons may cost the steel companies anywhere from 20 to 40% of their revenue a year [1]. From a survey [8] it is revealed that in the Indian Inventory Management context, it is suggested that more than 70% of the companies lacked the unified inventory management system. This problem is further complicated by lack of information about the availability of each product and material for the people who (sales representative, manager, production planner, etc) needs them. These problems result in non-realistic delivery times promised to the end customer, chaotic production planning, stress and disgust of production workers, etc [6]. In addition to these problems, large steel firms (e.g. SAIL, TATA Steel and ESSAR Steel) in India are facing several key challenges such as scarcity of key inputs raw material such as coking coal, iron ore, price squeeze for steel products and complexity caused by customers with diversified products and service requirements, etc.

The body of literature shows an exhaustive amount of research in the area of inventory management. On one hand there are numerous researches related to operations research application, which answers questions such how much inventory to carry and when to order, and on the other side, there are several empirical researches investigating the role of inventory management for firm's performance. In the context of India, very few researches [5, 11, and 12] conducted to discuss issues such as import [11], structural reforms [12], and inventory management trend in Indian automotive industry [5]. However, there is very little or negligible



research conducted to investigate the issues, policies, and identifying best practice in Indian Steel Industry, which was ranked 5th across the world for steel production.

The main purpose of this study is: To identify or explore inventory management practices that are prevalent in majority of steel firms, inventory issues along with their impact and suggested control measures, major drivers and barriers of effective inventory management.

The paper is structured in three parts. The first part looks at the literature on the inventory management practices in steel as well as other Indian industry. The second part explores the major inventory issues collectively as well as component level, drivers for these issues, barriers for these issues, impact of these issues and at the last suggested inventory control techniques captured through in-depth semi-structured interviews. The final part discusses the emerging themes from the narratives in the light of the literature on inventory management in Indian industries and draws conclusions on how predicted suggestions of inventory control techniques may help to resolve these inventory issues.

Literature review

Inventory management plays a very strategic and their improvement may lead to better performance [10]. Koumanakos [13] concluded that higher the level of inventories preserved by a firm, the lower its rate of return Greek industries. Wallin et al. [4] emphasized that how should a firm decide which of the four choices i.e. inventory speculation, inventory postponement, inventory consignment, and reverse inventory consignment – is most appropriate to adopt for a govern purchased item in a particular context? They also discussed the drivers for this decision. A limited number of research used country specific context. John et al. [9] examines inventory management practices in flour milling manufacturing firms and their effects on operational performance from industries in Nigeria. Munyao et al [14] examined the role of inventory management practices in the performance of a production department in Mombasa country. An interesting research conducted at IIM Bangalore by Haritha [5] studied the inventory management of Indian automotive industries. They used a sample data of 58 auto firms across 14-year period and concluded that inventory holding have declined differentially across tiers and across different types of inventories. [8] outline the major difficulties influencing the performance of small and medium-sized manufacturing companies in connection with the complexity of their production processes. Tang .et.el [1] studied how to best balance raw material inventory and production demands under capacity constraints which has become the serious subject faced by most large steel companies. He formulated a constrained optimization model to minimize the total cost attributed to raw material inventories. According to SU Wenbo [3] Inventory control is an important part of the iron and steel enterprise's third profit source, which directly affects the enterprise's profit level and core competitiveness. He analyzed the common problems based on the characteristics of iron and steel enterprise inventory in China and the management of "high cost, low profit" uses the measures of agile supply chain inventory control model, to solve the problems of the inventory control. Optimize each enterprise inventory and production logistics equilibrium of the chain, in order to achieve "win-win" of the cost and time, improve the efficiency of the whole steel industry under the environment of supply chain, make it out of the trouble and develop rapidly. [31] In factories one may equivalently find too much raw materials and shortages at the finished part level, or treating capacity as analogous to stock, simultaneously underutilization of resources and congestion. Each of these problems may be looked upon as the result of inappropriate distribution and control. Inventory also has disadvantages. It ties up working capital and space. It can suffer from obsolescence, deterioration and shrinkage. It can lead to administrative complexity and it can mask inefficiencies. However, none of this research investigated the Inventory Management issues in steel industry in India. In addition, most of the empirical research on Inventory Management have focused on average inventories and did not cover the inventory management at component (raw material, WIP and finished goods) level within firms and across the supply chain. Therefore, this research has focused on Inventory Management issues at each level.



Nature of The Indian Steel Sector and Its Impact on Its Inventory Management: A Study

Indian steel industry is a continuous process industry. To maintain the continuity of production supply of raw materials must be uninterrupted. From the interview it is revealed that- "Being process industry, if equipment is down it may lead to stoppage of full plant. Hence the criticality of item is also analyzed." [1] Because raw material inventories can compensate for the unexpected demand fluctuations as well as variability in the replenishment process, large inventories are maintained to ensure the continuity of production. But storing them increases the inventory cost. Therefore, how to best balance raw material inventory and production demands under capacity constraints has become the serious subject faced by most large steel companies. At the industry level import of steel has a greater impact on inventory piling. From the newspapers it is revealed that almost all the steel firms have more often stocks are piled up in their stock keeping units due to bulk of steel imports into India. [22] While shipments from Japan and South Korea are nothing new as steelmakers there take advantage of free trade agreements (FTAs) with India, making their exports duty-free, it is China that is causing concern. Japan and South Korea are largely exporters of automotive-grade steel, which is not produced extensively in India, and they have been exporting even earlier. But China exports hot-rolled coils which compete directly with Tata steel. Any further jump in imports from China is going to be a major concern for steel companies in India. Imports from China rose by almost 70% in the last financial year due to two factors—first, Chinese steel prices are much lower than Indian steel prices; and two, if an Indian importer intends to import steel products from China or any other trouble-FTA country with the end-use of eventual exports, they are also exempted from import duty. This makes lower-priced Chinese steel preferable to steel from Japan, South Korea or even domestic steel. Prices of Chinese flat steel products, which now meet the quality standards of established Indian companies, are usually 15% lower than Indian steel prices, thereby making imports very attractive. [22] The dealer of flat products said the influx of Chinese and Russian steel shipments had eaten into the market share of established Indian companies, with several end-users such as real estate companies now demanding low-cost imported steel. This has put stress on the balance sheets of hundreds of Indian steel companies, dominated by the big three—Steel Authority of India Ltd (SAIL), Tata Steel and JSW Steel.

This is confirmed by the fact that [22] India's domestic steel production for sale in the same period was 90.5 Million tonnes, 3.3% higher than a year ago. The country's consumption in April-March 2015 was at 76.3 Million tonnes, 3.1% higher from a year ago, according to JPC data. This rather large gap is explained by the fact that 1.45 Million tonnes is retained as inventory by steel companies. These [34] Excessive inventories may lead to the cost of items storage, taxes and insurance, breakage, spoilage, deterioration and obsolescence and the opportunity cost of alternative capital investment as well.

However, it must be recognized that [6] Indian Steel Industry in a delicate situation. The mismatch in the growth rates of supply and demand puts downward pressure on prices and makes it a buyer's market. They need to ensure profitability in the face of rising input costs without increasing the prices. Therefore, cost reduction is probably the most important driver for ensuring competitiveness & profitability. This is typically done by reduction in product inventory (unsold stock), substitution of raw material, transportation and other related costs like freight costs etc.

In summary, it can be concluded that for well management of inventories, such type of studies must be done in steel firms in India that have entered a rapidly growing and moving ahead in the midst of challenging situations. The nature of the industry and the fact that the growing challenges affects inventory management of steel firms which are in the crucial phase in practices.

It is evident that the nature of the steel sector and the changing global market conditions create challenges for maintaining optimum inventory management in Indian steel firms, which this study puts under further scrutiny. The present study was designed to explore, document and analyze the factors that influence the major inventory management aspects.



Methodology

Since, to the best of our knowledge, there are no other studies in the context of the Indian steel industry, which attempt to capture the unique dimensions of inventory management aspects like inventory management practices, inventory issues along with their impacts and suggested possible measures, major barriers and drivers, we felt that an exploratory study such as ours was needed. During this study it is felt that most of the information are scattered related to this topic, which is best tried to present collectively here to highlight real issues which are felt as ignored till date. A semi-structured interview protocol was used, which covered the following topics: drivers and barriers for effective inventory management, inventory management problems at each level, executive's prioritization of inventory issues, factors responsible for its existence, strategies used for inventory management. For our empirical analysis, this research uses an exploratory qualitative study of leading steel companies in India. Both primary as well as secondary data are collected. Company reports and personal interviews with senior executive of these firms have been selected for interview. Personal interviews with the senior executives involve frequently asked additional follow-up questions to clarify their feelings and their points of view towards the issues addressed. The clarifications for conflicting or unclear answers were sought either during the interviews or afterwards via informal email exchanges and telephone conversations. Extensive handwritten notes were taken, which were transcribed at the earliest possible time after the interviews. Judgment sampling [38] was used to locate information-rich key respondents. Since this was an exploratory study, the researchers used inductive analysis to identify categories, themes, and patterns that emerge from the data [36]. To draw meaning from the data, a range of tactics was used, such as comparison/contrast, noting of patterns and themes, clustering, use of metaphors, confirmatory tactics, following up surprises, and checking results with respondents [37]. The coding procedures of Grounded Theory [38] were followed which resulted in identification of themes from the narratives that are presented in the section on findings.

Findings of the exploratory study

Six broad themes emerged from the analysis of the interviews which are relevant to the understanding of inventory management in Indian steel industry : Inventory issues in the steel industry ; Major drivers for effective inventory management in Indian steel industry; factors responsible for its existence; Major barriers for the implementation of effective inventory management techniques including the implementation of ERP/MRP to manage inventories ; Impact of inventory issues ;Inventory control techniques to resolve these issues.

Table 1 illustrates the themes, categories and dimensions that emerged from these interviews:

Themes	Categories	Dimension
Inventory management practices	Most prevalent	Operational performance
Inventory issues	Raw material	Investments
	Work-in process	Operations
	Finished goods	Procurement
Drivers	Inventory practices	Automation
	Internal operations	Updation
Barriers	Methods of inventory management practices	Procurement Conflict between different departments
	Management inefficiency	

Inventory Management system Handling & maintaining

Impact of inventory issues	Department	Production
	Company	Supply
	Industry	Storage
		Handling
		Labor
		Transportation
Various inventory management strategies	Current practices	Performance
	Suggested measures	Improvement

Inventory management practices

[9] In the theoretical literature, a vast array of inventory management best practices (for example, just in time, vendor managed inventory, collaborative planning, forecasting and replenishment, automatic replenishment, agile system, and material requirement planning) abound. But experience and empirical evidence has revealed that there is limited knowledge and understanding of these practices. This lack of awareness and limited embrace of these cutting-edge practices in inventory management could account for the rising increase in raw material wastages, longer lead-time, lost sales, product shortages, backorder penalties, increasing production cost, and poor-quality issues currently ravaging the industry. From [9] it is revealed that a positive relationship exists between inventory management practices and operational performance.

Inventory issues in the steel industry

Inventory management is very necessary because [8] inventories are considered to be assets. However, in reality, inventories negatively influence company performance as they absorb financial resources that could be used for more important business activities. overcapacity, overinvestment in inventories [12] and overproduction leads to Inventory management problems like finite storage time for some inventories, procurement and storage issues etc. [3] In the unceasing circulation process of procurement, production, sales process, reasonable inventory makes it possible that each link is relatively independent economic activity, and also adjust the change caused by the mismatch between the variety of demand and supply and quantity. On the contrary, the unreasonable inventory will cause many problems, such as steel product backlog, serious supply chain “bullwhip effect” phenomenon, seriously affecting the overall development of industry. According to one of the respondent view major inventory problems are:

- Being a large variety of Stores requirement, inventory management is quite complex.
- Considering the lead time of supplier, inventory for regular items is maintained from 15 days stock to 30 days stock.
- In case some supplier defaults, urgencies can be met with sister unit stocks.
- MOUs are being entered into to reduce the procurement and inventory cost.
- Rate contracts are being done to reduce the inventory.
- Being process industry, if equipment is down it may lead to stoppage of full plant. Hence the criticality of item is also analyzed.”



Inventory issues at component level

Raw material: [1] raw material inventories account for the largest part of the inventories in the iron and steel industry, minimizing them in a quantitative manner is of vital economic significance. Thus, improving the management level of raw material inventory is clearly of extreme importance. The steel industry is also highly material intensive [2]. Generally, 1 tons of steel output requires handling and transportation of around 4 tons of bulk raw materials [3]. According to one of the respondent: “-Raw Materials are being procured centrally for all the units. Multiple sources of vendors are being engaged to ensure uninterrupted supply.”

Iron and steel enterprises are mostly owned inventory, easy to cause inventory amplification between the subordinate enterprises forming “bullwhip effect”. High level of inventories may be unavoidable in steel companies due to a continuous production system because it may be either too costly to switch off the equipment and restart, or it may be that it is not technically feasible. Steel mills have to hold large inventory of raw material for uninterrupted production and operations [12]. In addition, IM problem in steel industry is also characterized by large production demands, high inventory costs, no stock out, limited inventory capacities, and finite storage time for some kinds, etc [1]. Overinvestment in raw materials and then its improper utilization results in the form of [12] costs on the interest, maintenance, spoilage, etc., also influence inventory stock. Uncertainties in supply of raw materials which influence inventory holding. Therefore, how to best balance raw material inventory and production demands under capacity constraints in the iron and steel industry is a challenging task. Taylor and Bolander (1997) [28] state regarding continuous process industries; “the perennial question of ‘how much inventories do we really need?’ remains largely unanswered.” *Work-in-process (WIP):* steel industry fails to reduce work-in-process inventories. It results in carrying cost, handling cost, labour charges, obsolescence and damage [2]. Major issues at this level involves [2] overproduction, Internal Movement of Material (which means moving a product between different processes of manufacturing that do not add any value), Inappropriate processing (which denotes excessively elaborate and luxurious equipment is extravagant if simpler machinery would work as well), Unnecessary motion (that shows unusual resources are consumed when workers have to bend, walk or reach distances in order to do their jobs. Workplace ergonomics assessment must be conducted in order to create more proficient environment) and Defects (which means quarantining and inspecting inventory that takes time and overheads money). *Finished goods (FG):* Companies has to build and maintain adequate stock of each variety to meet the customer demands [8]. Difficulty of inventory management increases with the product portfolio complexity. India’s domestic steel production for sale was 90.5 mt, 3.3% higher than a year ago. The country’s consumption in April-March 2015 was at 76.3 mt, 3.1% higher from a year ago, according to JPC data. This rather large gap is explained by the fact that 1.45 million tonnes is retained as inventory by steel companies [27]. This above information supports the fact that generally gap between production and sale is noticed in Indian steel firms which results in unsold finished goods inventory piled up in the stock yards. Various factors are responsible for this gap. These are overcapacity, overinvestment, import of good quality foreign steel goods and stiff competition among domestic steel players. Gap between production and consumption of steel shows that still a large mass of inventories is piled up in the stock keeping units of Indian steel mills.[3] And in the storage process, individual work delayed and violated and steel products are piled in a mass, to find that the time to look for the stock goods is too long so that the enterprise cannot realize the inventory control methods of first-in first-out (FIFO), and waste a lot of manpower, material resources, and financial resources. Several factors such as low demand, import of good quality steel at low prices and management inefficiency etc, are responsible for this [5]. Failure to reduce finished goods inventories, increased product variety, intensified competition and poor transportation networks are causing the failure in FG reduction [7].

Major drivers of the inventory management in Indian steel industry

Being a core sector, the steel industry reflects the overall growth of an economy in the long term. The demand for steel is also derived from other sectors such as automobiles, consumer durables and infrastructure. The Indian steel sector enjoys advantages of domestic availability of raw materials and inexpensive labor. Iron ore



is also available in abundant quantities, providing a major cost advantage to the domestic steel industry. Four major drivers for effective inventory management in Indian steel industry are found out ABC Analysis, JIT, application of inventory management system and management decisions.

ABC (always better control) Analysis in SAIL:

According to respondent's view, "In ABC analysis, 'A' category items like Raw Material and major consumable item stocks are monitored on day to day basis. Procurement for B category-regular items is done keeping buffer for around 3 months". Traditionally ABC classification is used for grouping the items for inventory control. But it has been generally recognized that the traditional ABC analysis may not be able to provide a good classification of inventory items in practice as pointed out by Partovi, F. Y., and Anandarajan, M. (2002). JIT implementation may help a great deal in inventory reduction in the Indian steel industry. For this [2] proper training of the employees as well as the top management involvement is the important factors for the successful implementation of JIT. Presence of accurate data including the accurate and reliable forecast of demand is a key for JIT to operate smoothly. From the mathematic model presented, [19]it is concluded that JIT can eliminate the storage, capital, insurance, ordering, and transportation costs. However, it depends on certain conditions. Application of inventory management system involves automation of inventory management in an organization completely. Leading steel firms have full automation in their inventory management. Automation enhances accuracy and accessibility of inventory data. automation involves [3] the use of the EDI between upstream supply chain partners, the implementation of CRM, the methods of B2C direct sales to shorten the information lead time, effectively improve the level of inventory control, reducing inventory pressure. In view of iron and steel enterprises use the agile supply chain model, its advantage is that it can quickly reconstruct and adjust, according to the formation and dissolution of the dynamic alliance, to seize the market opportunities quickly. But majority of small as well as medium steel enterprises lacks in automation of inventory management system that results in [3] Lack of scientific and reasonable prediction program, part of the enterprise inventory demand forecasting are still in the experience management phase. So, once the fluctuated message transmits between competing enterprises, price of steel and steel sales demand forecasting will be not accurate, resulting in firms to sell or hoarding steel, procurement costs and sales costs increasing, along with the increase of inventory.

Factors responsible for its existence

[23] The main problem the steelmakers are facing is a huge surge in imports with supply from China, Korea and Japan and growing threat from Russia and Ukraine. Imports during FY 2014-15 surged in excess of 10 million tonnes as against 5.7 million tonne the year before, i.e sharply up by about 80%. Moreover, imports are being dumped at extremely low prices, below the cost of production of many plants in India. A sluggish market demand in India on the back of weak infrastructure investment and manufacturing activities has resulted in excess inventory in the system. Imports have displaced domestically-produced steel through dumping at very low prices. Inventory problems of too great or too small quantities on hand can cause business failures. [32] growing demand for product variety, higher customer service levels, and greater demand uncertainty may be forcing higher inventory holdings. These conflicting pressures leave it unclear whether inventory holdings should be expected to exhibit much net change over time [24] Because of the costs involved in idling manufacturing capacity, backordering or stock outs of the part are not acceptable. Thus, if inventory of this part falls to precariously low levels, the manufacturer may expedite shipments or take other actions to increase it. On the other hand, space and capital constraints limit the inventory the manufacturer is willing to hold. When inventory grows too large, the manufacturer may take actions to reduce it. The manufacturer's challenge is to minimize the space and capital costs associated with holding inventory and the operational costs involved in adjusting supply. [25] India's leading steelmakers expanded capacities by 50% over the last two years, but when anticipated demand failed to materialize, the steel produced found itself languishing as unsold inventory. [35] Unlike capital investment, inventory investment generates a



negative real rate of return (due to depreciation and storage costs, for example), making it strictly dominated by capital investment in terms of prospective yields

Major barriers in the Indian steel industry

"According to one of the respondents view major barrier to solve inventory management problems are, "The volatile market, transport infrastructure, commitment to excellence by suppliers. A suitable vendor base with commitment to serve is a must to keep minimum level of inventory". "[5] Emerging economies are also plagued with delays due to customs clearances, lack of proper road and rail infrastructure, and inadequate enforcement of contractual agreements, and so on, which can create major obstacles to adoption of global best practices to manage emerging market supply chains. From the findings it is found out that management inefficiency, lack of unified inventory management system, old methods of inventory management practices and other factors like bulk purchasing, transportation costs, infinite storage time etc., are the major barriers for the implementation of effective inventory management techniques. From the interview with sushil kumar roongta by Indore management journal it was found out that when he was posted as a director marketing, [15] 'there was huge inventory piled up in their plants and the MD of one of the plants said that unless Mr. Roongta helps us, we may have to shut down the production unit as coils were piled up above the danger zone and could topple". After analyzing the situation, he found out that [15]" having large numbers of stock yards, their marketing people would give release to the plants and allow them to produce without back up orders and stock them up in the stockyards and then make efforts to sell. And when customers know that I have an inventory pile up which I cannot sell, then, obviously they would bargain hard with me. So, the first thing he did was to say sorry, no release would be given, unless it has backup orders. So whatever effort they make to sell out of inventories, its better make it at the beginning to book orders. I asked the plants to cooperate and not dispatch without orders. You can blame me if I am not giving orders, but without backup orders, not a single ton of finished goods should be dispatched. That changed the situation - the marketing people started to put efforts in right time and inventory buildup was eliminated." This is an example of both management inefficiency and also good management decisions taken after properly analyzing the situation. [20] An invest analyst say that "inventory management is an indicator of management competency." It's easy to have too much inventory and not enough of the right inventory. In contrast, it takes some skill and sophistication to do a good job of inventory management. A survey conducted by [8] in the Indian Inventory management context suggested that more than 70% of the companies lacked the unified Inventory management system. This problem is further complicated by lack of information about the availability of each product and material for the people who (sales representative, manager, production planner etc) needs them. These problems result in non-realistic delivery times promised to the end customer, chaotic production planning, stress and disgust of production workers etc [6]. In addition to these problems, large steel firms (e.g. SAIL, TATA Steel and ESSAR Steel) in India are facing several key challenges such as scarcity of key inputs raw material such as coking coal, iron ore, price squeeze for steel products and complexity caused by customers with diversified products and service requirements etc. old methods of inventory management practices

Impact of inventory issues

[27] However, volatility of demand may limit the application of the lean principle. Therefore, to improve production system performance, inventories may be required to buffer against volatile customer demand. Also, high level of inventories may be unavoidable in companies having a continuous production system because it may be either too costly to switch off the equipment and restart, or it may be that it is not technically feasible Piling up of inventories (raw materials, work-in-process and finished goods) in yards in majority of Indian steel firms which involves leading steel firms to small and medium sized steel units in the country including Mini Blast Furnace, Sponge Iron Units, Induction Furnace Units and Rolling Mills results in [34] . Excessive inventories may lead to the cost of items storage, taxes and insurance, breakage, spoilage, deterioration and obsolescence and the opportunity cost of alternative capital investment as well. Sometimes it involves finite storage time for some kinds. From the respondent's view steel industry is a continuous



process industry, 'if equipment is down it may lead to stoppage of full plant. Hence the criticality of item is also analyzed'. [35] with regard to resource allocation, inventory investment is highly "inefficient". However, despite this inefficiency, inventory stocks are large; inventory investment is procyclical and accounts for the bulk of fluctuations in GDP. No area is unaffected with these prevalent inventory issues that we have explored in this study. Inventory issues affect production, operation, distribution, finance, procurement, selling purchasing, labor, investments etc.

Inventory control techniques to resolve these issues

[3] The steel industry enterprises should improve the understanding of inventory and inventory management through the theoretical training, cost accounting and other varieties of ways. Some excerpts:

- "Trustworthy vendor base with limited number of vendors, reviewed based on performance for each category of item will reduce the quantum of inventory to be maintained as the risk is minimized.
- Proper Planning, scheduled maintenance can help in proper planning of procurement and ultimately inventory".

From the findings these are some suggested inventory control techniques like JIT, ABC Analysis, ERP/MRP along with it also involves some supply chain strategies like inventory consignment, reverse inventory consignment and inventory postponement. [3] Through the information interaction platform, suppliers timely forecast demand, stocking up in advance, to shorten the supply cycle, In order to ensure the smooth implementation of JIT inventory management method in iron and steel enterprises. [3] In view of the inventory problems existing in the iron and steel enterprise mentioned above, implementing enterprise resource planning requires enterprises to introducing information technology talents, making business standardization in technology and product price reasonable, and the overall system design has the characteristics of flexibility and rapid implementation.'

Discussions

The initial question that guided our research was: what are the prominent inventory issues that majority of Indian steel firms from leading to medium as well as small enterprises are facing? Along with this other aspect that involves factors, drivers, barriers, its impact and suggested methods are considered. From these six themes emerged: Inventory issues in the steel industry; Major drivers for effective inventory management in Indian steel industry; factors responsible for its existence; Major barriers for the implementation of effective inventory management techniques including the implementation of ERP/MRP to manage inventories; Impact of inventory issues; Inventory control techniques to resolve these issues. Basically [34] the problem of managing inventories is an optimization problem between overstocking and under stocking cost. It's easy to have too much inventory and not enough of the right inventory. In contrast, it takes some skill and sophistication to do a good job of inventory management. [33] In reality it is found that there exist procurement lags between orders and deliveries and the length of these lags will depend on the source of supply and their availability. Uncertainty in the market for raw material and the demand for the final product is another factor influencing the speed of adjustment. [29] Reducing inventory levels is not a good business solution if it means the customer runs out of parts. We sought to understand inventory issues at their component level. [3] Enlarge the inventory management knowledge, and based on a scientific and reasonable inventory management, reflect the deficiency of internal inventory management, so as to set up a correct and comprehensive concept of inventory. [28] It has two fundamental flaws that detract from its effectiveness. The first and most fatal flaw is that inventory is a post-performance metric. In other words, companies only recognize that there is a problem once they have the inventory on hand. By then, it is often too late to remedy the situation. The second flaw is a function of today's modern supply chain, which is outsourced and extends to multiple companies. Companies are delaying when they take inventory, so the numbers are artificially low. While there are fewer inventories on the books, there is not necessarily less inventory risk. Six themes emerged from the narratives: : Inventory issues in the steel industry ; Major drivers for effective inventory management



in Indian steel industry; Major barriers for the implementation of effective inventory management techniques including the implementation of ERP/MRP to manage inventories ; Impact of inventory issues ;Inventory control techniques to resolve these issues. [3] It is To realize more accurate, more timely and comprehensive information communication between the enterprise upper and grassroots, according to the reasonable information flow, to determine the organization setup, canceling middle-level organization which is blocking information flow, strengthening the functions of information collection and processing control layer and decision-making layer. Without primary data study of inventory management in Indian steel industry is incomplete. Considering the nature of the problem and challenges that exist in managing inventory at component level in steel industry, this research is of prime important to provide an empirical evidence of barriers, drivers and best practices of managing inventory in Indian steel industries.

Conclusions

In conclusion, the themes that emerged from the qualitative analysis highlighted the pervasive factors that impact the inventory management of Indian steel industry. This research is an endeavor to fill the research gap by conducting a qualitative study on Inventory Management and their driving factors in the context of Indian steel industries. This study also contributes to provide necessary measures to solve these such as over investment in inventories, overproduction, mismanagement and higher inventory levels, etc. Identifying the factors responsible for inventory issues and driving force to resolve them for the growth of steel industry is a prime concern in this paper. Several techniques such as the relevance of inventory control techniques such as JIT, ABC analysis, Inventory Speculation, Inventory postponement, inventory consignment and reverse inventory consignment (supply chain strategies). There are a number of interesting managerial implications. Managers can understand the factors influencing the inventory management of Indian steel industries, Secondly, best practices of inventory management could be replicated from one industry which is doing better to the other company. A benchmarking study could be done and learning could be encouraged across the sector and the type of inventories. The identified dimensions could serve as a platform for further research on inventory related issues, its impact, drivers and barriers, prioritization to solve them by management, etc, which will serve as a guide for organizations to address the current as well as suggested inventory management practices that involves developing and implementing policies for better inventory management in the organization. This, in turn, would go a long way in enabling steel enterprises to perform better at managing inventory level, and ultimately contribute to the growth of the economy and positively impact societyaswhole.

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