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## A STUDY ON INVENTORY MANAGEMENT OF TATA MOTORS

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**ABSTRACT:** Inventory control is associated with planning, procuring, storing and offering the suitable material of proper quality, proper amount at proper vicinity with the intention to co- ordinate and agenda the manufacturing pastime in an integrative manner for a commercial undertaking. Inventory Management truly the technique via way of means of which a company is provided with the products and offerings that it wishes to obtain its goals of buying, storing and motion of materials. The fundamental goal of the have a look at is to figuring out the elements that have an effect on the stock of material, the statistics and reviews of stock control and manage on the age of production enterprise might be analyzed and to create a powerful usage of stock at enterprise, to triumph over the problems via means of giving the viable recommendations.

**KEYWORDS:** Inventory management, stock of materials, stock control.

### INTRODUCTION:

Tata Motors Limited is an Indian multinational automotive manufacturing company, headquartered in Mumbai, Maharashtra which is part of Tata Group. The company produces passenger cars, trucks, vans, coaches, buses, sports cars, construction equipment and military vehicles.

**Formerly:** Tata Engineering and Locomotive Company Ltd. (TELCO)

**Type:** Public

**Industry:** Automotives

**Founded:** 1945

**Founder:** J. R. D. Tata

**Headquarters:** Mumbai, Maharashtra, India

**Area served:** Worldwide

**Products:** Automobiles, Luxury vehicles, Commercial vehicles, automotive parts, Pickup trucks, SUVs

**Number of employees:** 78,906(2021)

- Formerly known as Tata Engineering and Locomotive Company (TELCO), the company was founded in 1945 as a manufacturer of locomotives. The company manufactured its first commercial vehicle in 1954 in collaboration with Daimler-Benz AG, which ended in 1969. Tata Motors entered the passenger vehicle market in 1988 with the launch of the Tata Mobile followed by the Tata Sierra in 1991, becoming the first Indian manufacturer to achieve the capability of developing a competitive indigenous automobile. In 1998, Tata launched the first fully indigenous Indian passenger car, the Indica, and in 2008 launched the Tata Nano, the world's affordable car. Tata Motors acquired the South Korean truck manufacturer Daewoo Commercial Vehicles Company in 2004 and purchased Jaguar Land Rover from Ford in 2008.
- Tata Motors' principal subsidiaries include English premium car maker Jaguar Land Rover (the maker of Jaguar and Land Rover cars) and the South Korean commercial vehicle manufacturer Tata Daewoo. Tata Motors has a bus-manufacturing joint venture with Marcopolo S.A. (Tata Marcopolo), a construction-equipment manufacturing joint venture with Hitachi (Tata Hitachi Construction Machinery), and a joint venture with Fiat Chrysler which manufactures automotive components and Fiat Chrysler and Tata branded vehicles.
- Tata Motors has auto manufacturing and vehicle plants in Jamshedpur, Pantnagar, Lucknow, Sanand, Dharwad, and Pune in India, as well as in Argentina, South Africa, Great Britain, and Thailand. It has research and development centers in Pune, Jamshedpur, Lucknow, and Dharwad, India and South Korea, Great Britain, and Spain. Tata Motors is listed on the BSE (Bombay Stock Exchange), where it is a constituent of the BSE SENSEX index, the National Stock Exchange of India, and the New York Stock Exchange. The company is ranked 265th on the Fortune Global 500 list of the world's biggest corporations as of 2019
- Tata Motors has been presented the Golden Peacock Global award for corporate Social Responsibility (CSR) in the large Business category by the institute of directors in 2007. Tata Motors buys Nissan facility in South Africa. Tata Motors has got a prestigious order from the Delhi Transport Corporation (DTC) for 500 non-ac, CNG-propelled buses. Tata motors Ltd has appointed Mr. P M Telegang as Executive Director (Commercial Vehicles).

## **OBJECTIVE OF THE STUDY**

The study of the Inventory Management is done in TATA MOTORS LTD.

- Control investment in inventories and keep it at an optimum level.
- To know about the techniques which are they are adopting for inventory control.
- To find out the criteria for judging the inventory system.
- To minimize inefficient inventory and reduce inventory carrying cost.
- Maintain sufficient stocks of raw materials in periods of short supply.
- Maintain sufficient finished goods inventory for smooth sales operation, and efficient customer service.
- To ensure continues supply of inventories to the production.
- To avoid over store and underneath stocking
- To facilitate data for short and long term planning and control of inventory.

## **LITERATURE REVIEW**

### 1) Spare parts inventory control

- J. Roberto, M. A. Mesquita  
Published 2011  
Engineering

Spare parts inventory are needed for maintenance and repair of final products, vehicles, industrial machines and equipments, frequently requiring high investments and significantly affecting customer satisfaction. Inventory management is complex due to the large number of different items and low demands. This article presents a literature review on single location spare parts inventory control, embracing both demand forecasting techniques and inventory control decisions on the different life cycle stages. Overall, the literature review identified the following research opportunities on inventory management: criteria to decide to stock or not an item, how much to order in the first and the last batch, demand forecasting and inventory control models integration and case studies on real applications.

### 2) Inventory management in automobile industry

- R. Ramamoorthy  
Published 2018

Inventory management has emerged as most of the important tools to improve operational Efficiency over the last 30-40 years across the globe. The automobile industry uplifts it for profit it solves unemployment problem, it shows new technologies through this save time money and manpower. Inventory is individual of the major and most significant resources a developed commerce possesses, and the earnings of stock is one of the major source of proceeds production for a company The aim of inventory administration is to hold inventory at the lowest potential charge, given the objectives to guarantee continual provisions for continuing Operations. While creation decisions on inventory management has to find a compromise between different cost components. Such as the costs of supplying inventory inventory–holding costs and costs resulting from insufficient inventories.

- 3) Evaluation and Selection of Inventory Policies by MCDM-Matrix Method-A case Study for Passenger Vehicle for Automotive Industry in India
  - Amit Gupta, PC Tewari, RK Garg
  - International Journal of Research in Business Management 1 (2), 1-10, 2013
  - The inventory employs huge amount of annual revenue of any organization. The evaluation and selection of inventory policies one of the vital activities of business processes. As purchasing is quite critical for the manufacturer, seeking the right policy is absolutely significant for the company. Thus the inventory policy selection process has received considerable attention in the business management literature due to the key role of inventory policy performance on cost, quality and service in achieving the objectives. The selection of one of the best alternative from a set of potential alternatives depends upon the selection criteria. We have proposed a framework for selection of inventory policy using Matrix method based on selection criteria for Passenger vehicle manufacture automotive industry.
  
- 4) Productivity and quality improvement through value stream mapping: a case study of Indian automotive industry
  - Jaiprakash Bhamu, JV Shailendra Kumar, Kuldip Singh Sangwan
  - International Journal of Productivity and Quality Management 10 (3), 288-306, 2012
  - Value stream mapping (VSM) is one of the most important lean manufacturing tools to identify and reduce all type of wastes in a systematic way. This paper demonstrates the effect of VSM implementation on cost of poor quality, in-process rejections, percentage value addition, lead time, work in process inventory, distance travelled by components and percentage scrap through a case study of VSM implementation in an Indian automotive industry. The results of the study show that the productivity and quality of a company can be improved by implementation of VSM.
  
- 5) Remanufacturing for the automotive aftermarket-strategic factors: literature review and future research needs
  - Ramesh Subramoniam, Donald Huisingh, Ratna Babu Chinnam
  - Journal of Cleaner Production 17 (13), 1163-1174, 2009
  - While the concepts of remanufacturing and reverse logistics are gaining popularity in practice, the available literature and theory on strategic decision making in these areas are limited. This paper is designed to address this gap, in particular, for the automotive industry aftermarket. In doing so, the authors reviewed literature pertaining to: customer demand(s), product design and development, cost-benefit analysis of remain, core (i.e., used product) supply management, remain competencies and skills, product life cycle strategies, remain and reverse logistics network design, relationships among key stakeholders, environmental considerations, regulations, and impact of emerging economies. The literature findings along with our experience in working with automotive remain products were used as inputs to guide the formulation of seven major propositions for the strategic factors in decision making within remain. The propositions were then tested through a case study. The case study reconfirmed many of the factors like product life cycle, regulations, etc. from the literature review and also identified new factors like OE customer requirements. Our results provide a foundation for further research for companies that deal with Original Equipment (OE) Sales, Original Equipment Service (OES), as well as Independent Aftermarket (IAM) business in the automotive industry.
  
- 6) A literature review on the impact of RFID technologies on supply chain management
  - Aysegul Sarac, Nabil Absi, Stéphane Dauzère-Pérès
  - International journal of production economics 128 (1), 77-95, 2010
  - RFID technologies may improve the potential benefits of supply chain management through reduction of inventory losses, increase of the efficiency and speed of processes and improvement of information accuracy. Various RFID systems can be obtained by combining different tags, readers, frequencies and levels of tagging, etc. The cost and potential profit of each system change in a wide range. In this paper, a state-of-the-art on RFID technology deployments in supply chains is given to analyze the impact on the supply chain performance. Potential benefits, particularly against inventory inaccuracy problems, the bullwhip effect and replenishment policies, are briefly surveyed. Various works addressing analytic modeling, simulations, case studies and experiments as well as ROI analyses are reviewed. Finally, conclusions and future research perspectives are presented.
  
- 7) Multi-criteria ranking of inventory ordering policies using fuzzy Based-Distance Based Approach for Indian automotive industry
  - Amit Gupta, RK Garg, PC Tewari
  - i-Manager's Journal on Management 8 (1), 41, 2013
  - In current scenario of globalization, the organizations are facing the difficulty of proper selection of manufacturing processes, purchasing strategies, process and product design, equipment, machineries and tools to meet the tough challenges of global competition. With the emphasis on quality improvement concepts and wide use of enterprise systems, the managers try to go beyond the conventional boundaries of money and material and also try to explore the vast new universe of possibilities. Proper evaluation and selection of inventory policies is very crucial for the progress and development of any industry. In this paper, we proposed a framework for ranking of inventory policies based on expert opinion elicitation and fuzzy-based Distance Based Approach (DBA) methodology. The conventional method is not self-reliant to integrate the uncertainty of the real problem. The ranking criteria e.g. Unit Cost, Holding Cost, Purchasing Cost, Shortage Cost, Demand, Reorder Level, Lead Time and Review

Period which are most relevant to selection of inventory policy have been selected after exhaustive study of available literature. Based on the expert opinion in concurrence with selection criterion, inventory policies are evaluated and ranked using DBA technique.

- 8) Research paper on Inventory management system
  - Punam Khobragade, Roshni Selokar, Rina Maraskolhe, Prof.Manjusha Talmale
  - Published 2018
  - Inventory Management System is software which is helpful for the businesses operate hardware stores, where storeowner keeps the records of sales and purchase. Mismanaged inventory means disappointed customers, too much cash tied up in warehouses and slower sales. This project eliminates the paper work, human faults, manual delay and speed up process. Inventory Management System will have the ability to track sales and available inventory, tells a storeowner when it's time to reorder and how much to purchase. Inventory Management System is a windows application developed for Windows operating systems which focused in the area of Inventory control and generates the various required reports.

## CONCEPTS OF INVENTORY:

### INVENTORY:

- Inventory can be broadly defined as the stock of goods, commodities or other economic resources that are stored or reserved at any given period for future production or for meeting future demands.

### Classification of Inventories:

- **Direct inventories:** It includes those items which plays a direct role in the manufacturing and become an integral part of finished goods. The direct inventories are as follows:
  1. Raw materials inventories.
  2. Work in process inventories.
  3. Finished goods inventories.
- **Indirect inventories:** Indirect inventories include those items which are necessary for manufacturing but do not became component of finished goods production, such as lubricants, oil, grease, stationeries, maintenance materials etc.

### RESEARCH METHODOLOGY:

The data has been gathered through interaction and discussions with the executives working in the division. Some important information has been gathered through couple of unstructured interviews of executive. Annual reports and other magazines published by the company are used for collecting the required information.

### DATA COLLECTION METHOD:

Both primary data and secondary data were collected for doing research.

### PRIMARY DATA:

The information collected under primary data is mainly based on TATA MOTORS analysis. A structured questionnaire is used to collect primary data.

### SECONDARY DATA:

The secondary data was obtained through the dealers, sales record, and internet also from various books.

### FACTORS INFLUENCING INVENTORY

There are some factors which influence inventory management system. This factors are identified based on literature review.

1. **Minimum stock level:** Minimum stock is that level of stock which should not be allowed to decrease.
2. **Re-order level:** Re-order is the amount of stock that a company holds so that when the stock falls, the stock must be reordered
3. **Lead time:** Lead time is the time elapse between the date of placing the inventory order and the date of delivery. The need for knowing the exact lead time helps the seller to keep certain inventories to serve clients while waiting for the supplier delivery.

4. **Maximum stock level:** Maximum stock is amount of inventory which should not be exceeded.

### INVENTORY CONTROL TECHNIQUES

Determination and maintenance of optimum inventory level, helps to maximize owner's wealth. Inventory management problems can be handled by some techniques, which are:

- ABC analysis
- KANBAN system
- Just In Time (JIT)
- Safety Stock

#### ➤ **ABC ANALYSIS:**

It is very effective and useful tool for classifying, monitoring and control of inventories. The firm should not keep same degree of control on all the items of inventory. It is also known as **Selective Inventory Control**. According to this technique the task of inventory management is proper classification of all inventory items into three categories namely A, B, and C category. The ideal categorization of inventory items is shown in table as follows:

CATEGORY	NO. OF ITEMS (%)	ITEMS VALUE (%)
A	15	70
B	30	20
C	55	10
<b>TOTAL</b>	<b>100</b>	<b>100</b>

In Tata Motors we can classify inventory according to ABC classification. ABC has two methods for classification:

- Values of per item
- Value with consumption

#### 'A' ITEMS

Small in number, but consume large amount of resources

Must have:

- Tight control
- Rigid estimate of requirements
- Strict and closer watch
- Low safety stocks

Managed by top management

#### 'B' ITEM

Intermediate. Must have:

- Moderate control
- Purchase based on rigid requirements
- Reasonably strict watch and control
- Moderate safety stocks
- Managed by middle level management.

**'C' ITEMS**

Larger in number, but consume lesser amount of resources. Must have:

- Ordinary control measures
- Purchased based on usage estimates
- High safety stocks.

➤ **KANBAN System:**

KANBAN process is a tool to control inventory. It is a process which demands lot of discipline and sincerity.

**WHAT IS KANBAN?**

Kan – “Sign”

Ban – “Board”

So, Sign Board

“A signaling device that gives authorization and instruction for the production or withdraw of item in a pull system”

- The Kanban system can be used easily within a factory, but it can also be applied to purchasing inventory from external suppliers. The kanban system creates extraordinary visibility to both suppliers and buyers. One of its main goals is to limit the buildup of excess inventory at any point of production line. Limits on the number of items waiting at supply points are established and then reduced as inefficiencies are identified and removed. Whenever a limit of inventory is exceeded, it points to an inefficiency that needs to be addressed.
- As containers of parts of materials are emptied, cards appear, color-coded in order of priority, allowing the production and delivery of more before a hold-up or shortage develops. A two-card system is often used. T-kanban transportation cards authorize the movement of containers to the next workstation on the production line, while p-kanban production cards authorize the workstation to produce a fixed amount of products and order parts of materials once they have been sold or used.

**Advantages of KANBAN**

- ✓ Less inventory
- ✓ No line stoppage because of KANBAN material
- ✓ Information flow is fast from buyer to supplier
- ✓ Minimizes waste and overproduction

Tata motors ltd. Uses KANBAN system for inventory control. KANBAN process is a tool to control inventory.

➤ **JUST IN TIME (JIT):**

According to JIT system, all components and other inventory items arrive as when required (that is just before the start of an operation). Item are picked up by the worker and fed directly in to the production process.





#### Benefits of JIT:

- Uniform workstation loads
- Small lot sizes
- Closer supplier ties
- Maintenance of high quality
- Quick and economic steps
- Continuous improvement
- Flexible facilities and multi skilled workforce

#### ➤ SAFETY STOCK:

Safety stock implies extra inventories that can be drawn down when actual lead time and usage rate are greater than expected. It means Prediction of average daily usage and lead time is difficult. Raw materials may vary from day to day or from week to week, it is in case of lead time also. Lead may be delayed, if the usage increases then the company faces problem of stock out. To avoid stock out firm may require maintaining safety stock.

#### FORMULA:

**Re- order point = Lead time (in days) \*Average usage+ Safety stock**

#### IMPORTANT CONCEPT OF EOQ IN INVENTORY MANAGEMENT

EOQ (Economic Order Quantity) refers to that level of inventory at which the total cost of inventory is minimum. EOQ is also known as Economic Lot Size (ELS).

Economic order quantity is the one for which the aggregate of the costs of ordering the inventory and the costs of carrying the inventory is at minimum. Or it can be said that EOQ is essentially an accounting formula that determines the point at which the combination of order costs and inventory carrying costs are the least.

**Assumptions of EOQ model:**

The following assumptions are implied in the calculation of EOQ:

- Demand for the product is constant and uniform throughout the period.
- Ordering costs are constant.
- Price per unit of product is constant
- Lead time (time from ordering to receipt) is constant.
- All demands for the product will be satisfied (no back orders are allowed).
- Inventory holding cost is based on average inventory.

**Limitations of EOQ:**

A part from the above applications it has its own limitations that are mainly due to restrictive nature of assumptions on which it is based.

- **Constant Usage:** This may not be possible to predict, if usage varies unpredictably, as it often does, no formula will work well.
- **Faculty basic information:** Ordering and carrying costs is the base for EOQ calculations. It assumes that ordering cost is constant per order is fixed, but actually varies from commodity. Carrying cost also can vary with the company opportunity cost of capital.
- **Costly Calculations:** In many cases, cost estimation, cost of possession and acquisitions and calculating EOQ exceeds the savings made by buying that quantity.

**USES OF EOQ:**

- EOQ is useful to decide how many inventories should be added when inventory is replenished.
- It is useful in deciding lot sizes, which will reduce both ordering and carrying costs.
- By using EOQ the optimum inventory level can be maintained, which will reduce the investment in inventories.

**INVENTORY TURNOVER:**

**Inventory Turnover Ratio:  $\text{Net Sales} / \text{Average Inventory}$**

(For the year ended 2015-2016)

- Net Sales = 9015.47 Crores
- Average Inventory = 251 crores

**Inventory turnover ratio:  $= 9015.47/251$**   
 **$= 35$**

**Days of holding inventory:  $= 365/35$**   
 **$= 10.42$**

**CONCLUSION:**

Inventory control means the availability of right materials, of right quantities coordinated with lead time. Each and every component of inventory is important and managing the inventories to keep in an optimum level is a must. It might seem axiomatic that inventory control is efficient as long as inventory level is going down. But the fact is that if inventories are minimized with guaranteeing adequate operations, inventories have mismanaged rather than controlled efficiently. Thus the two basic objects of inventory control appear to be conflicting in nature. Inventories should increase or decrease in amount or time as related to sales requirement and production schedules.



**REFERENCES:**

- 1) L. Ling, Supply chain management: concepts, techniques and practices enhancing the value through collaboration. NJ: World Scientific, 2007. 372 p.
- 2) M. Leseure, Key Concepts in Operations Management, 2010.
- 3) D. Plinere, L. Aleksejeva, "Agent system application as a tool for inventory management improvement," in 8th Int. Conf. on Soft Computing, Computing with Words and Perceptions in System Analysis, Decision and Control, 3–4 Sep., 2015. Antalya, Turkey, pp. 157–166.
- 4) Golhar, D.Y. stamm, C.L. and smith, W.P. (1990), "JIT implementation in manufacturing firms", Production and inventory. Management Journal, vol. 81 No. 2, pp. 44-8.
- 5) [www.tatamotors.com](http://www.tatamotors.com)
- 6) [www.investopedia.com](http://www.investopedia.com)

