Supply Chain and Logistics Management Innovations at Maruti Suzuki India Limited

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ABSTRACT

Maruti Suzuki India Limited has been in car manufacturing business for over 30 years and is the largest car manufacturer in India. Maruti Suzuki India Limited has a nationwide dealer sales and service network. The study analyzes various innovations implemented in supply chain and logistics management and the benefits derived by Maruti Suzuki India Limited to gain competitive edge in the Indian Automobile Industry. The study is based on secondary data comprising of literature review. The findings suggest that Maruti Suzuki India Limited has been constantly implementing many innovations in supply chain and logistics management which have given them many positive results in terms of enhancement of operational efficiencies, cost reductions and attaining customer satisfaction. Further study can be conducted on other car manufacturers in the Indian Automobile Industry.

Key words: Just-in-time (JIT), Logistics management, Maruti centre for excellence, Maruti Suzuki India limited, Supply chain management.

INTRODUCTION

“Supply Chain Management” (SCM) and “Logistics” are part of the same solution set, one filling the gaps, and one closing them. Both are involved in integrated activity involving many functions, divisions and organizations and are responsible for multiple flows of information, physical goods and financial instruments. A supply chain is a partnership of organizations which are involved in providing a product or service. Stakeholders of the supply chain act as partners who are linked together through both physical and information flows. Effective integration of suppliers into supply chains is a key factor for manufacturers in achieving the improvements necessary to remain competitive. (Ragatz, Handfield et al., 1997)². For supply chains to be effective, operational information about the production process has to be shared between manufacturer and suppliers. The goal is to create and coordinate the manufacturing process seamlessly across the supply chain in a way the competition cannot easily match (Frohlich, Westbrook, 2001)⁹. The concept of supply chain management is a form of process innovation and use of innovative tools and work designs which form the basis for radical improvement of business process performance (Davenport, 1993)⁸.

Logistics has evolved with the overall responsibility for the movement, storage and handling of both inbound material and outbound products. Logistics innovativeness and logistics service differentiation both positively influence logistics performance (Ralston et al., 2013)⁷.

Maruti Suzuki India Limited (MSIL) is one of the most successful stories in supply chain and logistics management in the Indian automobile market. Over the years it has worked to convert obstacles into opportunities.

MSIL was incorporated on February 24, 1981 with the name Maruti Udyog Limited. The company was formed as a government company, with Suzuki as a minor partner, to make a people’s car for middle class India. Over the years, the company’s product range has widened, ownership has changed hands and the customer has evolved. In October 2, 1982, the company signed the license and joint venture agreement with Suzuki Motor Corporation, Japan. In the year 1983, the company started their productions and launched and rolled out the first Maruti 800 on 14th December, 1983. MSIL India Limited (formerly Maruti Udyog Limited) is India’s largest passenger car company, accounting for over 39 per cent of the domestic car market. The company is a subsidiary of Suzuki Motor Corporation of Japan. The company is engaged in the business of manufacturing, purchase and sale of motor vehicles and automobile spare parts. MSIL have six plants, three located at Gurgaon, Haryana and other three located at Manesar Industrial Town, Haryana.
The figure 1 shows that since 2009-2010, MSIL sold more than one million units annually both for domestic and exports.

**Figure 1 TREND OF MSIL DOMESTIC SALES AND EXPORTS (Number of Units)**


**OBJECTIVE**

To understand the implementations of innovations in supply chain and logistics management at Maruti Suzuki India Limited.

**METHODOLOGY**

The paper is based on secondary data comprising of literature review and print and online reports.

**SIGNIFICANCE OF THE STUDY**

Maruti Suzuki India Limited has been a market leader in the India Automobile Industry. The study attempts to study the changes implemented in their supply chain and logistics management process.

**LITERATURE REVIEW**

The competition in modern business management is no longer between organizations but within supply chains (Lambert, Cooper, 2000)\(^3\). The ultimate success of businesses depends on the ability to integrate the organization’s intricate network of business relationships. The term supply chain management refers to cooperative management of materials and information flows between supply chain partners, to reach goals that cannot be achieved acting individually (Sucky, 2005)\(^4\). The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the turnaround time of inventory movement (Choi, Hong, 2002)\(^10\).

MSIL manufactures over 1.1 million cars per year and offers 18 brands. MSIL boasts of dealer sales network of 1204 in 874 cities and service network of 3013 in 1436 cities.

MSIL recognizing the increasing competition from the global OEM (Original Equipment Manufacturers) and increasing customer expectations had shown unparalleled dedication towards R&D (Research and Development) to retain the market superiority. The organization achieved the capability for carrying out full body change and is working on various new projects for new model design and development. Systematic efforts are being put in to enhance the efforts through establishment of world class test and track and proving ground facility, which will help in validating various vehicle systems and models along with full in-house designing, development and evaluation of entire vehicle, extensive training, development of prototype build capability and many advanced engineering projects.

Over years, MSIL has been redefining supply chain strategies and operations and designing their operations to maximize throughput and lower cost. To improve profitability and efficiency, MSIL has been innovating to achieve operational excellence, reduce operating cost and enhance customer service through efficient supply chain and logistics management. MSIL understand that sustainable logistic operations positively affect the supply chain (Grant et al., 2013)\(^1\). Lean supply chain and logistics management are critical success factors and just-in-time (JIT) in supply chain and logistics are powerful strategies (Myerson, 2012)\(^6\).

The company has 246 local suppliers and 20 global ones which function in a seamless manner. The company strictly receives their supplies ordered the previous night in a two hour slot the next day.

Many of Suzuki Motor Corporation’s global vendors set up joint ventures in the northern region. While setting up the plant the government had approved of manufacturing only on condition of localization of
components. Maruti used this by scouting for entrepreneurs and turning them into vendors, facilitating loans, licenses, technical know-how and even location in a phased manner. Of the 246 suppliers, Maruti has joint ventures with 19 of them and hold strategic equity stake to have a say in production and quality issues. Maruti however was not satisfied with the delays in production due to the lag time in supplies. The organization had adopted the Japanese system; Just in Time (JIT) to achieve higher operational efficiencies and reduce inventory carrying cost. MSIL adopted the E-Nagare system of electronic flow which has completely transformed its supplier chain.

From 385 suppliers at one time, Maruti’s local Tier I looks much leaner now at 246. As some of the bad performers were weeded out, smaller suppliers were absorbed in the car major’s Tier II vendor list. Also, Maruti started insisting on ‘full systems supply’ from its Tier I vendors instead of supplying each component separately. Maruti has a total of 800 suppliers including Tier II and Tier III suppliers. Maruti sources 10 percent of its components directly from foreign markets and 10 to 15 per cent of components are imported by its vendors, which MSIL intend to reduce this to half over the next 2 to 3 years to reduce its exposure to the foreign exchange fluctuations. The inventory levels maintained for the imported components is up to three months, which mean a huge capital lock up in the inventory. By localization, the per cent of capital lock up will be reduced in addition to exposure to the foreign exchange fluctuations.

To achieve JIT material supplies, the company has given preference to locally based suppliers. It also wanted a shorter pipeline and effective logistical control, which facilitated relocation of vendors within a 100 km radius of its plants. Over 76 per cent of the company’s 246 suppliers are located within 100 kilometers of radius, who supply 86 per cent of the company’s 246 suppliers are located within 100 kilometers of radius, who supply 86 per cent of the components by value to Maruti. MSIL have strategically located the suppliers of bulky components such as instrument panels, fuel tanks, bumpers, seats, etc. adjacent to the company’s manufacturing facilities in the Suppliers Park. Maruti supports it’s vendors in all possible ways. This includes finding technology partners, giving financial, technical and management support and bringing transparency in its dealings.

Fifty four of the top eighty component suppliers of MSIL India compete against each other in what has been called ‘Quality Circle Competition’, and the top three get a chance to present their cases in Suzuki’s Japan facility alongside other global vendors. The idea behind the Quality Circle Competition was for the teams from different vendors to identify, discuss and resolve any one core business issue that will add value to the overall functioning of the company, thereby increasing overall efficiency.

Simultaneously, the need arose to upgrade Maruti’s supply chain. From Suzuki, Maruti adopted the ‘Maruti Production System’ based on lean manufacturing program, wherein the vendors are called for classroom training and several waste elimination methods are identified and executed jointly. The focus on quality also added further strength to the company’s supply chain.

An initiative called ‘Shikhar’ was introduced along with the suppliers’ quality teams where ‘poor’ vendors were identified and even eliminated. They have a moving monthly average of 500 defective parts in a million and any vendor found supplying more than that benchmark, would not make the grade.

At MSIL, India’s largest carmaker, E-Nagare or ‘electronic flow’ is a religion. Simply put, this electronic flow is actually the sequence of production plans from the vendor to Maruti’s shop floor, which now sits at a two hour cycle from 30 days in the past. E. Nagare has completely transformed the supply chain at Maruti over the last few years. Across Maruti’s twin sprawling plants in Gurgaon and Manesar, multi colored bumpers arrive in mobile trolleys and components line up outside factory sheds directly feeding the ever-hungry, multitasked assembly lines. Within the factory premises, the inventory hold up is just two hours.

MSIL used to give one month schedule of their material requirement, which lead to the suppliers producing more and the inventory levels at MSIL started to go up. In view to reduce inventory levels, MSIL lowered its material quota from a month to 15 days and the inventory levels inside the plant fell by an impressive 70 per cent. MSIL initiated the same process with the tier one suppliers to implement a similar system with their own suppliers to make the supply chain lean at all levels.

Today, Maruti vendors are reaping the benefits of efficiencies unleashed by the original equipment manufacturer (OEM). The vendors have been supplying to Maruti on a just-in-time basis and directly on line, which means the part is approved and Maruti does not have to inspect them at all making it a 100 per cent fool proof process.

E-Nagare has increased clarity on an hourly basis resulting in better capacity utilization at the vendor’s end. At Maruti, while inventories have come down drastically, any inefficiency in the system is now glaringly visible. As for the suppliers, any reduction in
cost by Maruti brings down their overheads substantially.

Maruti has halved man hours spent on each car in five years. Maruti manages this through a host of initiatives that involve workers and up to Tier II vendors, as much as the management. For instance, by debottlenecking its production lines year after year, it has reduced the number of hours every worker spends in producing a vehicle by half of what it was five years ago. Mechanization and optimal utilization of manpower has raised service bay productivity of its dealer service centers by 20 per cent, saving them a few hundred crore in setting up new service bays.

MSIL have taken many initiatives on time and cost reduction to improve their productivity. In the press shop, earlier they used to take two hours to change the molds used for stamping the doors of their models, which now takes just five minutes by simply getting the dies close to the line. MSIL have made their Gurgaon plant linear, wherein the vehicles enter from one end and goes out from the other end in a straight line. To cope up with the more efficient production systems and constant price reduction drives, MSIL had also introduced the “one component one gram” drive which would reduce the weight of each Maruti car by 2.5 kg. MSIL embraced RFID technology which offered a solution for tracking pallets and managing manufactured inventory and rejects. The technology efficiently tracks pallets and also keeps track of rejected panels.

On the inventory front, they assist the dealers in inventory management by reducing the inventories, which means lesser working capital financing cost for the dealers. MSIL analyzes the market, and everyday inventory, inquiry, orders and sales, and the dealers are informed of vintage stocks, which are 3 to 4 months old, which is hard currency stuck in old stock which needs to be mobilized immediately.

Manufacturing efficiency begins at the vendor end. Lean delivery is about vendor efficiency. Vendors are pushed for timely delivery (including transportation and packaging) and appropriate quality and cost. For vendor efficiency, Maruti has a separate organization called Maruti Centre for Excellence (MACE) to give vendors advice.

MACE was formed in April, 2004 by MSIL in collaboration with 21 of its suppliers, with a corpus fund of Rs.150 million. The activities of MACE include providing training, support and consultancy to the suppliers (Tier-1 & Tier-2) and its sales network to help them achieve world class standards in quality, cost, and service and technology orientation.

MACE uses a collaborative approach to help suppliers and dealers know the world’s best practices and to assimilate these practices in their day to day operations. The various training programs conducted by MACE for the capacity building of suppliers and dealers also include training on health, safety and environment management systems. The entire approach adopted by MACE aims at building a total quality culture at suppliers and dealers.

The Just-in-Time (JIT) and e-nagare inventory management systems, introduced in 2003, have helped in reducing inventory levels to less than a day. In 2010-11, the organization started encouraging its suppliers to supply material during the night shift, which helped in reducing traffic congestion and pollution in and around their plant in Gurgaon city. A milk run system was also started in 2010-11 for 30 suppliers based in Faridabad. The logistics for these companies is managed by one logistic supplier. This initiative helped in reducing the number of trips per day to MSIL by 30 per cent from these suppliers and improvement in the truck fill rate by over 25 per cent.

For MSIL, Logistics has played an important role in keeping overall supply chain costs as low as possible, particularly in reducing inventory. MSIL constantly innovate to achieve logistics improvements, including studying new routes and trade options.

MSIL has outsourced the management of spare parts and components in terms of warehouse management and transportation. The outsourced logistics service partner gets an access to the e-nagare system of MSIL, through which MSIL can download the production schedule and coordinate with suppliers for the components and the quantity. Logistic service providers (LSPs) actually operate as Tier I suppliers to MSIL and maintain an inventory of 3 days in the warehouse and 2 days of in-transit inventory. The spare parts are directly dispatched to the dealers after receiving the indents through the MSIL system.

MSIL is increasing its infrastructure for outbound vehicles and for spare parts distribution. The company is moving towards ‘hub-and-spoke’ distribution models for vehicle and spare parts through regional vehicle and parts distribution centers (VDCs and PDCs). MSIL integrated the supply chain to meet customer requirements and fulfill demand in the market. MSIL’s purpose of building hubs is to reduce lead times for spare part and vehicle deliveries from days to hours.

MSIL use road transport for 90 per cent of their dispatches of vehicles. MSIL use rail transport only for A-star, which according to them is the most efficient.
One train can carry 240 vehicles in two levels in specially designed containers. For some domestic supplies of some of their models, MSIL even use sea transport through their yard at Mundra port to send to Kerala, Goa or Cochin as sea transport is cost effective, time is predictable and damages are minimal.

Approximately 80 per cent of imported material arrives through the congested Jawahar Lal Nehru Port Trust (JNPT) in Mumbai and the rest, including steel coils imported from Japan and South Korea, arrive via Kandla and Mundra in Gujarat. MSIL is exploring the port of Pipavav on the Gujarat coast, which could eventually tie up with the proposed Maruti Suzuki plant in the state.

Earlier the steel coils used to arrive in trucks from the port, and the trucks always returned empty and containers carrying cars by rail to Mundra for export were also returning empty. MSIL strategized the logistics that the containers carrying cars would bring back coils to the plant, which was a successful strategic change and saved transport cost.

Another important innovation was implemented when MSIL convinced Suzuki in Japan and its shipping lines to dock at Indian ports once a week instead of monthly. MSIL also suggested Suzuki, Japan that the vessel, to proceed to the Indian port and proceed to Pakistan after offloading the Indian shipment, which was accepted by Suzuki, Japan and MSIL saved on four days of voyage time.

Maruti focuses on two areas: inventory and delivery to dealer, as reducing working capital is very important because it reduces the dealer’s costs, for which proper and timely delivery is essential. The vehicles leave the plant for delivery to the dealers only on receipt of the payment. Earlier the delivery time was 6 weeks, which has been reduced to 4 weeks, which means reduction in the cost of the finance paid in advance for the inventory in transit by 2 weeks.

MSIL’s 80-plus vehicle carriers operate a combined fleet of around 9,000 trucks or trailers. MSIL has deployed the trako Visual Cargo solution in outbound logistics trucks that transport new cars from the factory to MSIL dealers across India. The solution provides transport companies associated with MSIL better visibility into the transport logistics to streamline business operations, improve efficiencies and safety, control costs and meet delivery timelines.

The trako Visual Cargo is software, as a service solution, that provides on-demand visibility from loading to delivery location of cargo vehicles using Global Positioning System (GPS) devices. It is a single, common platform for supply chain stake holders, which include consigners, consignees, transporters and vehicle owners, to track and manage the movement of goods in transit to enhance operational efficiency and improve customer service.

As part of the implementation, a consignment tracking module was configured for use by MSIL and a fleet management module for use by MSIL’s transport vendors. The consignment module, ‘Visual Cargo,’ has advanced dashboard and report features that allow logistics managers to easily monitor, track and manage operations.

India is a growing market and as a leading carmaker, Maruti anticipates growth in times to come. Amidst high growth, it was crucial to ensure delight to the customers in more than one way. Efficient fleet management gained importance as the volumes go up. Effective use of contemporary technology to induce efficiencies into the operations has a direct impact on customer satisfaction. With the implementation of this solution in logistics, MSIL is witnessing productivity improvement and operational efficiency. The solution provides to its fleet logistics team and transport vendors with useful information for the purpose of control of its logistics process.

CONCLUSION

The Indian Automobile Industry has been very competitive and will further get more competitive. Continuous innovations in supply chain and logistics management will contribute positively to the overall efficiency of the entire value chain and will offer many benefits to all the partners in the value chain.

MSIL has been responsive to the dynamic market and has been innovating their supply chain and logistics management process. The changes implemented have benefited all the partners in terms of lean operations, integration of partners in the value chain, lowering of cost, inventory reduction, lesser transit time of finished vehicles and spare parts to their dealers, and fulfillment of ever changing customer expectations. The future will present further challenges, MSIL will be required to be flexible and responsive towards their supply chain and logistics management process and consistently introduce innovations in order to further improve operational efficiency, quality and cost effectiveness.

The study has been restricted to only Maruti Suzuki India limited and it is recommended that further study may be conducted on other players in the Indian market.
Automobile Industry to understand the innovations in their respective supply chain and logistics management process and the benefits which have been derived.

REFERENCES


