

Background note on Supply Chain management In Automotive Industry

Auto SCM India 2006, Chennai

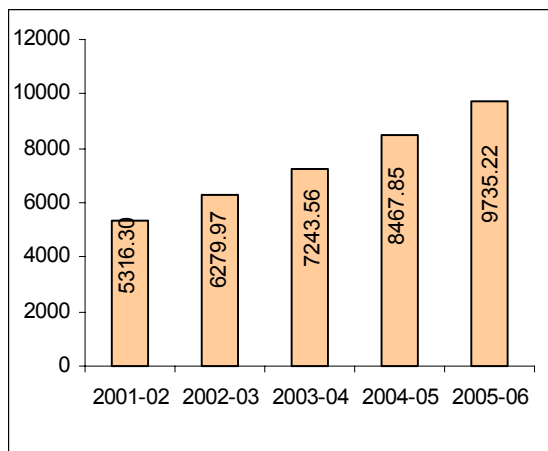
Supply Chain Management in Automobile Industry

Overview of Indian automobile and auto components industry

Indian automobile industry is riding high with overwhelming economic growth rate of 8.4% in 2005-06. The industry has been growing at CAGR of 16.33% from 2001-02 to 2005-06 in terms of production. Booming IT/ITES sector, manufacturing industry (namely textile, pharmaceutical and engineering) and real estate have contributed to this high growth in automobile industry in the country.

This is easy to understand because the per capita disposable income of the people has gone up remarkably. Over the last five years, per capita personal disposable income has gone up by around 8%, which has increased purchasing capacity of the people in the country. Other factors have also contributed to this high growth in Indian automobile sector. These include lowering age of first car users, shorter replacement cycles, rising dual income families, new technology, which is lowering cost of ownership, low car penetration in the country and most importantly growing steel production in the country. In addition, wide variety and easily available financing options are also some of

Chart-1: Automobile Production Trend in India ('000 units)



Source: SLAM

the major reasons for surge in demand for automobiles in India.

Domestic sales have grown at CAGR of 14.27% from 2001-02 to 2005-06. The commercial vehicle segment, in particular, has increased at CAGR of 24.35% during the above-mentioned period; whereas total sales of passenger cars in domestic market have increased at CAGR of 14.02%. In terms of production, commercial vehicles have registered a CAGR of 24.55% from 2001-02 to 2005-06; while passenger vehicles have registered a CAGR of 18.24%. There is a declining trend in mopeds production as well as in sales in the domestic market. During 2001-02, mopeds production and sales have declined at CAGR 2.93% and 5% respectively.

Exports on a roll

The significant development in Indian automobile sector is the outstanding growth of its exports. From 2001-02 to 2005-06, total exports of automobile sector has gone up at CAGR of 44.56%. Exports of motorcycle segment have registered highest annual growth rate of 61.42% during this period. This has clearly indicated that Indian automobile sector is going global.

Chart- 2: Export Trend in Indian Automobiles ('000 units)



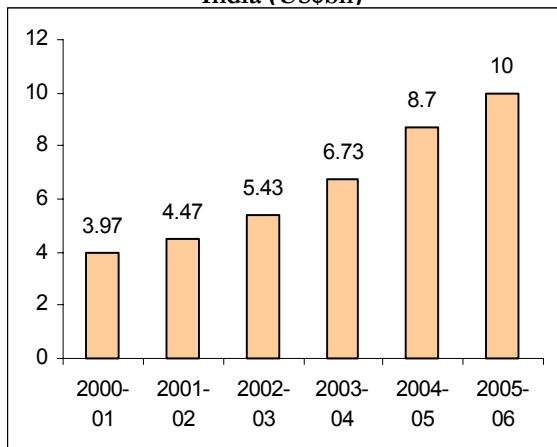
Source: SLAM

There is a considerable rise in demand for Indian three-wheelers in global market, particularly in the African countries. From 2001-02 to 2005-06, exports of three-wheelers have grown at CAGR of 49.33%.

Auto components industry is growing at CAGR of 20.3%

Growth of automobile industry has driven India's auto components industry as well. Indian auto components industry has increased at CAGR 20.3% from 2000-01 to 2005-06 in terms of production. During 2005-06, production of automotive components was worth of US\$10 billion from US\$8.7 billion in 2004-05. It is expected to reach US\$18.7 billion by 2009 and US\$40 billion by 2014.

Chart-3: Production of auto components in India (US\$bn)



Source: ACMA India

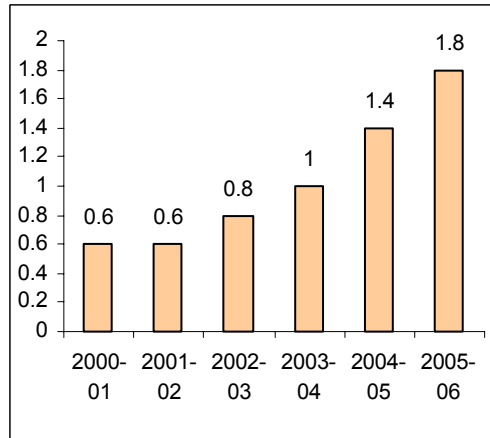
Production of auto components in India comprises engine parts (31%); drive transmission and steering (19%); body chassis (12%); suspension and braking parts (12%); equipments (10%); electrical parts (9%) and others (7%). Growing IT capability for design, development and simulation has also attributed to this high growth in production of auto components in India.

Exports of Indian automotive components growing at CAGR of 24.6%

Exports of auto components from India have registered an outstanding growth rates over the last couple of years. From 2001-02 to

2005-06, exports of auto components have shot up at CAGR of 24.6% (chart 4). Europe accounts for 31% of total exports of auto

Chart-4: Exports of Auto Components (US\$bn)



Source: ACMA India

components, followed by the US at 26%; Asia at 16%; Africa at 10%; Middle East at 10%; Oceania at 1.5% and others at 0.5%.

India is emerging as a major destination for global automobile and auto component MNC's for investments. Major advantages that India has over others include huge population, low penetration, huge skilled human-power, infrastructural development, and low production costs.

India's Competitive Edge

Global automobile manufacturers are consistently streamlining their business process by outsourcing their non-core activities to low-cost countries like India. Global automobile manufacturers are under tremendous pressures to innovate their manufacturing process and at the same time, to reduce costs. In view of the present global competitiveness, they must not only develop new features to strengthen their customer requirements but also follow the environmental and safety standards. In addition, the base price of a car is expected to remain same over the next decade. As a result, companies are forced to source more components from low-cost countries like India.

According to Mckinsey, global outsourcing of automobile and auto components would reach US\$375 billion by 2015 from US\$65 billion in 2002. India has plenty of scope to garner this potential. According to the management consulting firm, India has the potential to notch this opportunity and reach up to US\$25 billion to emerge as major sourcing destinations along with China, Mexico and Thailand. Besides low cost, India's auto components industry has the major advantage of enormous skills in process, product, and capital engineering—its excellent manufacturing history and good education system.

India's process-engineering potential can be utilised for redesigning of manufacturing processes to make them more labour intensive and less capital intensive, which will enable the MNC's to reduce their overall costs substantially. For instance, "de-automating" of the production processes, which are applied in Western countries' factories, can reduce the overall manufacturing cost of some components by up to 20%.

In case of product engineering, India has emerged as a leading destination in the world. India's strength is in its design, which helps in reducing costs. For instance, redesign of the Maruti Alto's steering system has cut down its weight by 15%. India, with its skilled engineers, can design a product very fast, which in turn reduces its development cost and lead times. For example, an Indian supplier took six months to design a steering system for an automaker. It took more than four years to develop similar system with suppliers in the other low-cost countries. Several automobile manufacturers have already set up their auto component facilities in India.

According to ACMA, India's auto component sector is becoming more mature and achieving greater heights. In India, there are 456 auto component companies having ISO 9000 certification, 248 companies having TS 16949 certification, 136 companies having QS-9000, and 129 having ISO 14001 certification.

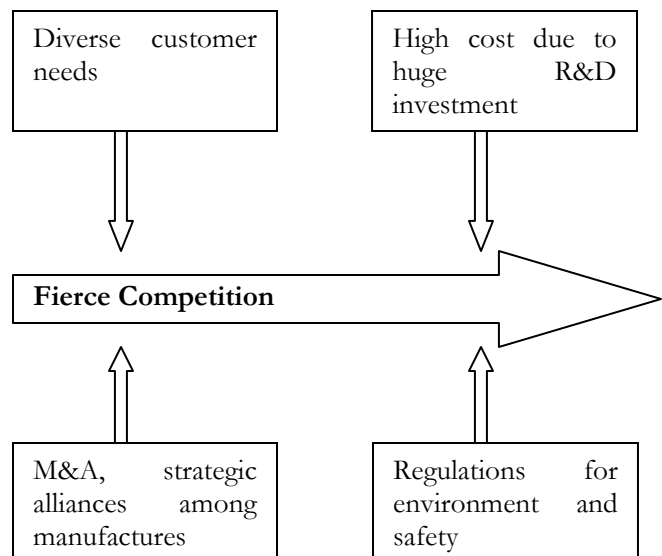
Given the potential of India's automobile sector, multinationals can take the full advantage of its huge resources. India with its large young population and abundant skilled labour force can become a major player in the automobile sector across the world.

Role of SCM in Automotive Industry

According to the Council of Logistics Management Supply Chain Management, "the process of planning, implementing and controlling efficient and cost effective flow of materials, in-process inventory, finished goods and related information from point-of-order to point-of-consumption, for the purpose of conforming to customer requirements as efficiently as possible".

The automobile industry has undergone significant structural and other changes in the last decade or so. In view of the present globalisation, implementation of lean production and the development of modularisation have changed the relationships between automobile assemblers (OEMs) and their suppliers, especially those in the first tier. Stiff competition among manufacturers will result in more mergers or acquisitions. The challenges automobile manufacturers and suppliers face include improving quality, meeting cost reduction targets and developing time to market.

Global Automobile Market Scenario



All this is driving the organisations towards greater product differentiation using cutting-edge R&D, innovative sales and marketing approaches, and increasing focus on boosting efficiencies in manufacturing and supply chain. Hence, in the age of e-business and global outsourcing, supply chain management (SCM) plays a crucial role in many of these areas.

SCM is a best-in-class, high-performance solution which can be utilised by the world's leading automobile manufacturer, logistics and distribution companies, and retailers to blend the demand chain with the supply chain. SCM helps in demand forecasting; taking an order; giving an accurate promise date; sourcing and manufacturing the right goods; position inventory properly; pick, pack, and efficient transshipment; most importantly, SCM makes a world of difference to the manufacturers by maintaining a minimal finished goods inventory.

Supply chain management flow is divided into:

- a) Product flow
- b) Information flow
- c) Finance flow

The product flow is nothing but movement of goods from supplier to customers and also in case of any customer returns or service requirements. The information flow covers updating the status of the delivery as well as sharing information between suppliers and manufacturers. The finance flow encompasses credit terms, payment schedules and consignment and title ownership arrangements.

Supply chain management has two types of software—planning application and execution applications. While planning application is utilised to determine the best way to fill the order, execution software determines the physical status of goods, the management of materials and financial information of all parties involved.

Rapid surge in global sourcing of auto components has also become a challenge for manufacturers and suppliers although sourcing has reduced the cost of production substantially. Auto component manufacturers and all tiers of the supply chain have immense opportunities to enhance their entire supply chain process with the successful implementation of SCM solution.

Benefits of SCM and IT

Quicker response – improved professional service

- Timely product supplies
- Accurate pricing/discounts
- Reduction in billing errors – cleaner SOA
- Simplified and faster payments process
- Reduction in administration costs for customers/vendors
- Online information (purchases, sales, inventory, financials)
- Elimination of reconciliation of accounts/error processing
- Reduction in accounting cycle times
- Less duplication of job – utilisation of human-power in value adding roles
- Reduction in paper flow, data processing, printing, mailing
- Better warehousing and transportation management
- Timely and correct asset capitalisation
- Credit management (customers)
- Better plant maintenance
- Easy access to data /information

Benefits to Shareholders

- Accurate and transparent information
- Good controls over receivables
- Better inventory management
- Improved reporting of accounts
- Audit trail
- Branding

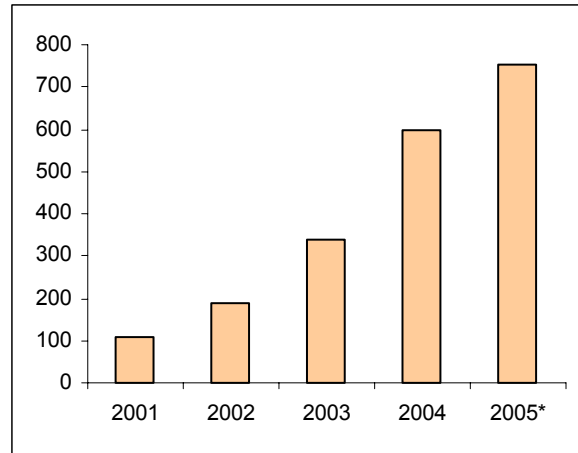
Potential and Market Size of SCM in India

SCM solution market has been making inroads in India and it is being accepted widely by many industry sectors in the country, particularly manufacturing and retail where inventory carrying cost is very high. According to CMIE, over Rs100,000 crore of industry sector is tied up due to high inventories. In India, logistics cost is very high as compared to other developed countries. It forms around 14% of the country's total GDP. Transportation accounts for 35%; inventory for 25%; losses for 14%, packaging for 11%; handling and warehousing for 9%; and others for 6%. Several automobile manufacturers in India have taken proactive measures to control their logistics cost and improve customer services. Several measures were undertaken by Indian companies to improve their supply chain.

In India, some of the automobile manufacturing companies have adopted e-sourcing, which helped them to reorganise the purchasing process and supported the aggregated buying across business units with the help of Internet-based tools or B2C Internet portals. With the use of Internet, more global suppliers have participated compared to the traditional strategic sourcing process. The process reduces time spent on negotiating, accelerates information gathering and speeds up communication channels among buyers and sellers. The companies have implemented this e-sourcing for procurement of high-value commodities. For instance, Tata Motors has saved Rs22 crore on transactions worth Rs362 crore in 2004.

Kirloskar Group saved Rs7 crore with reverse auction.

Chart-5: SCM Market Size in India (Rs cr)



**2005 Cygnus Estimates*

Source: IDC, Cygnus Research

Hence, the essence of SCM solution lies in coordinating the flow of information and goods between the customers and the network of suppliers, manufacturers and distributors. Interestingly, there has been a growing trend of realisation of supply chain optimisation in India; there is no dearth of SCM solutions in the country. Around 70% of Indian software houses have expertise in SCM. Currently, manufacturing and automotive sectors have been the leaders in implementing SCM solutions in the country.

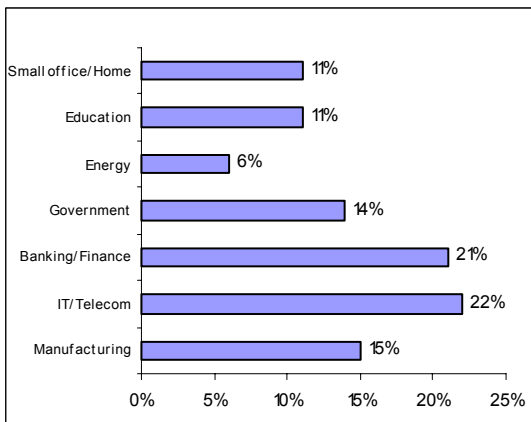
IT spending by the manufacturing sector in India, which accounts for 10% of the domestic IT market, is growing between 30 to 40% per annum. The main reasons for this surge in spending on IT by manufacturing industry are: a) Indian manufacturing companies which are Tier 1 or Tier 2 suppliers to OEMs in India or abroad, to reduce time-to-market and product life cycles, put pressure on manufacturers to integrate with OEMs of both India and other MNCs, Tier I suppliers, sub-contractors and distributors during product development and process manufacturing; b) The manufacturing sector wants to improve operational efficiency

and capital productivity by reducing fixed and variable costs; c) dwindling product lifecycle, rapid customisation of products and most importantly growing globalisation led to a spurt in IT spending (chart 6) by the manufacturing sector in India.

There is a huge scope for Indian automobile and auto component manufacturers to reduce their logistics costs with the implementation of SCM solutions. Proliferation of Internet, in particular has made the business easier and cheaper for manufacturers to coordinate their business activities with their suppliers.

Indian IT Industry is growing rapidly and in 2005-06, IT service (excluding ITES) industry witnessed an excellent growth rate around 30%, out of which software export accounted

Chart-6: Sector-wise usage of IT in India



Source: Cygnus Research

for over 75.5% and the domestic market constituted the remaining 24.5%. Implementation of supply chain solution would streamline their business process. The manufacturers would be able to deliver their products faster to their suppliers and reduce the inventory carrying costs.

Challenges in Supply Chain Management

In view of the diverse business activities, today's supply chain process is very critical for success in current business scenario. Today, the supply chain managers are facing various external challenges driven by customer

requirements and intense competition. The major challenges are:

- Network Planning – This is one of the most important issues for SCM. Determination of production requirements and inventory levels at the vendor's facility for each product and development of transportation flows between these facilities to the warehouses in a best possible way to reduce total production, inventory and transportation costs with fulfilment of service level requirements.
- Supply chain integration and strategic partnering – In SCM, information sharing and operational planning are crucial for successfully integrated supply chain. But the challenges are – what type of information would be shared, and how this information will be used, what level of integration is required and what partnership can be implemented?
- IT and Decision Support System– This is another important challenge for SCM. Today, SCM is driven by the scope and opportunities appearing due to abundance of data and the savings which can be achieved through efficient analysis of these data. What data should be transferred with its significance and most importantly, what infrastructure is required internally and between its partners is very important.
- Training – It is important for every company, which is implementing SCM. Companies must leverage extensive training to their employees, who are going to use the system. Understanding the market, risk, and spend analysis and applying strategic sourcing methodologies are important.

Best Practices / Case Study

Success story of Mahindra and Mahindra

Mahindra and Mahindra (M&M), is one of the largest private sector companies in India, under the flagship of Mahindra Group.

M&M Farm equipment unit is one of the major two operating divisions of M&M, producing around 100,000 tractors per annum. In 2005-06, the company sold total 85,029 units, achieving a growth rate of 30% against the previous year. Mahindra's farm equipment division plays an important role in the country's mechanisation of agriculture, which directly impacts lives of around 6m farmers in the country. The division is the third largest producer of tractors in the world. The company exports tractors to the US, African countries, and several countries of South-East Asia.

The company has faced stiff competition after the country's economic reform in 1990s. The company was facing a major challenge in its supply chain of products across the country as well as overseas market. The company has set up its assembly/manufacturing facilities at multiple locations, which has increased the complexity of the entire supply and operations. Hence, the company needed an integrated solution, which could link all plants to optimise total costs, operational efficiency, and respond quickly to customer requirements.

The company, therefore, implemented SCM solution in the year 2000 to streamline its business process.

For M&M, cost reduction was very important. In view of global competitiveness, the company has to develop new products and varieties in existing products to compete with world-class offerings. The company has to spend more money on raw materials but cannot increase the prices due to high competition. Thus, SCM was the only solution to keep its margin healthy – minimising costs by reducing the cost of

production, logistics, working capital (inventory), and the cost of lost sales. Thus, SCM solution has enabled a pull-based replenishment, which helped in optimising the logistics and manufacturing operations to improve margin and minimised costs by enabling quick customer requirements.

Successful implementation of SCM has helped M&M by reducing its inventory by more than 50% and the company expects to maintain similar inventory level. Replenishment lead times, which cover planning and execution lead times, were around 52 days, before the SCM project began. Now, the replenishment time has been reduced to 19 days.

The company has established a strong web component for its 400 plus dealers to collect sales information and 800 suppliers to submit SCM planning information and material requirement planning (MRP) schedules. The company started with dealer stock of 12,000 tractors and company stock of 7,000 units. But the change in business model and implementation of pull-based replenishment enables the company to minimise its dealer stock to 6,000 and company stock to 3,500. With the fuller implementation of SCM, the company expects to reduce its dealer inventory further to 4,000 tractors and company stock from 3,500 to 2,000 by maintaining healthy customer delivery response. Information flows from the company to its supplier in terms of MRP-derived schedules.

Ashok Leyland- Success story

Ashok Leyland, one of the largest private companies in the country, had sales over Rs6,000 crore in 2005-06. Ashok Leyland is a part of Hinduja Group. It is also one of the largest automobile and auto component companies in India.

The company offers a world-class range of trucks, buses, special application vehicles and engines, crossing millions more than 40 countries in the world. During 2005-06, the company produced total 65,085 vehicles out of which it has exported 4,879 units. In the

domestic market, the company has sold total 56,776 units.

The company was facing the huge task of integrating its entire supply chain and at the same time it had to reduce its costs, inventory, and improve customer satisfaction. Rising raw material cost was a serious concern for the company. There had been a steep rise in steel prices and copper prices.

Therefore, Ashok Leyland decided to streamline its supply chain process and the company started its SCM project 'Oscars' to optimise its supply chain and rationalise its sources.

The project 'Oscars Inbound' included supplier partnership, vendor base rationalisation, tiering of suppliers and cluster information, inventory optimisation through JIT and LCL, total cost management, logistics initiatives, e-sourcing and global sourcing. The gains from 'Oscars Inbound' are given below:

- Supplier partnership covers engineering and technical support, global market leader, global availability of spares, testing capabilities, improved field performance, system supplier, JIT supplies and world-class technology.
- Partnership gains include vendor consolidation under Tier-I, continuous technological upgradation of products without in-house investment, shorter development lead time, value engineering and cost reduction, improved field performance, inventory efficiency through JIT supplies and human-power rationalisation.

○ Vendor base rationalisation

Status	00-01	01-02	02-03	03-04	04-05
Vendor Base	1017	950	738	612	400
ISO/QS certified	245	281	364	382	400
Self certified vendors	210	240	260	290	350
JIT % of PO Value	69	72	74	77	82
LCL % of PO Value	5	5	6	7	9
MRP % of PO Value	26	23	20	16	9

Gains from source reduction includes pricing on volumes, improvement in quality and reliability, vendor improvement programme for continuous improvement, tiering for ease of fitment- system buying and reduction in paper work

- Vendor tierisation included economies of scale, system buying, rationalization of supplier base, while cluster formation included 5S adherence-mistake proofing, process improvements leading to self certification
- Inventory level has reduced from 23 days to 18 days.
- Total cost management included various cost management initiatives such as daily management, process control, design, technology and

- capacity. Total savings was 3% on total operating cost.
- Logistics initiative included transporter-based rationalisation, Kanban pull from satellite warehouses, enhancement of truck-turn around, load, space and route optimisation benefiting entire logistics process, which has benefited the company by saving over Rs1.25 crore per annum
 - Stores outsourcing covered activities outsourced to 4PL service providers and the service are— receipt accounting/documentation, binning and debinning, issue accounting, perpetual inventory and reverse logistics for pallets. All these services have saved 42 man days.
 - E-sourcing included global benchmarking, gain through bidding, identification of cost-competitive sources, introducing best sourcing practices, increasing efficiency and minimising costs, improving bottom-line of the value chain. All these activities have saved 11.5% of total material cost

Conclusion

Indian automobile and auto components industry is on a roll and there is an immense scope for management for enhancing the supply chain of the sector. India has become a favourable destination for foreign companies to establish their facilities and form alliances with domestic companies. Low cost of manufacturing and conducive government support have been the major drivers for foreign companies investing in India. India's large young population, higher GDP growth, and most importantly per capita passenger car penetration is low at 8.5 car per thousand population, which creates great opportunity for industry players to offer an affordable four-wheeler alternative to the two-wheeler customers. According to Planning Commission of India, Indian automobile industry is expected to grow at CAGR of 15% over the next five years. The Indian economy is now gaining momentum in the world of free trade and liberal movements of goods and services between countries. Therefore, efficiency in supply will be critical for India's automobile success.