International Journal of Information Technology and Management

Vol. VII, Issue No. X, November-2014, ISSN 2249-4510

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AN INTERNATIONALLY INDEXED PEER REVIEWED & REFEREED JOURNAL

www.ignited.in

International Journal of Information Technology and Management
Vol. VII, Issue No. X, November-2014, ISSN 2249-4510

An Analysis on Recent Trends in Indian Automotive Industry: Significance on Supply Chain Management

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Abstract – The Indian automotive industry, comprising vehicle and component manufacturers, has grown steadily since the economic liberalization of the early 1990's. The arrival of major global auto companies has galvanized the domestic sector into adopting Supply Chain best practices. This has enhanced competitiveness leading to a quantum growth in exports. However, the Indian automotive industry has to operate in an unique environment further posing challenges to the already complex automobile supply chain. Therefore, a need is felt to continually study supply chain practices in this sector from a contemporary, practitioner's viewpoint in order to identify key factors of differentiation which would ultimately provide competitive advantage. This paper seeks to understand the present status, complexities and challenges facing the Indian automobile sector. It examines trends such as visibility and innovation, collaboration and supply networks and evolving leadership roles impacting supply chain effectiveness. Strategies for overcoming challenges are presented as also a framework for further study and analysis.

The automotive companies in the world are facing new and pressing challenges. In future due to globalization, the automotive supply chain should focus on exploring innovative methods to reduce operating costs, lead times and inventory to sustain their growth rate in market. Globalization will foster a substantial industrial reorganization in the automotive industry.

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INTRODUCTION

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. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement. Emergence of new technologies and the ever- increasing intensity of competition are forcing organizations, firms and industries to reexamine how they do business, meet new customer driven challenges, companies are re-thinking, restructuring and re-investing their supply chains in order to survive, succeed, excel and even in some specific cases targeting to spearheading competitiveness. Indian Automotive industry has been facing major challenges due to fierce competition, increasing operational complexity, technology changes, shortened product lifecycle and frequently changing customer needs. Despite high stocks, the performance of the supply chain has failed to meet customer expectations in terms of delivering the exact specification desired within an acceptable timescale. Today Indian automotive industry is completely capable of producing various kinds of vehicles and can be divided into three broad categories: two-wheelers, cars and heavy vehicles. Vast scope exists for Indian automobile and auto component manufacturers to reduce their logistics costs with the implementation of SCM solutions. As India is a developing country, and fascinatingly, there has been an upward trend of realization of supply chain optimization. SCM solution market has been making inroads in India and it is being established widely by many automobile industries in the country, particularly manufacturing ones where inventory carrying cost is very high.

Several automobile manufacturers in India have taken positive actions to manage their logistics cost and get better customer services and measures have been undertaken by Indian companies to develop their supply chain. Auto manufacturers in India and all tiers of the supply chain have immense opportunities to enhance their entire supply chain process with the successful implementation of SCM solution. At present there are 15 manufacturers of passenger cars & multi utility vehicles, 9 manufacturers of commercial vehicles, 16 of 2/3 wheelers and 14 of tractors besides 5 manufacturers of engines. Total

turnover of the Indian automobile industry is expected to grow from USD 34 Billion in 2006 to USD 122 Billion in 2016. The automotive industry is today a key sector of the Indian economy and a major foreign exchange earner for the country. Today, India is the 2nd largest tractor and 5th largest commercial vehicle manufacturer in the world. Hero Honda with 3.9 million motorcycles a year is now the largest motorcycle manufacturer in the world. With the growth of transportation system the automotive industry of India is also growing at rapid speed, occupying a vital place on the 'canvases of Indian economy. By exploring Indian automobile sector, it has been found that uncertainties like demand and lead-time have direct impact on managing inventories and managers are facing great difficulties while controlling these parameters. Customer satisfaction and cost reduction are again the key issues to be handled effectively and efficiently. To improve profitability and efficiency, automotive players are seeking ways to achieve operational excellence, reduce operating cost and enhance customer service through efficient supply chain management. Efficient and effective supply chain management plays a very important role in the auto industry.

The automotive industry is changing its business model with innovative supply chain to reduce cost, create customer buying experience and quality. Mahindra & Mahindra has implemented one of the most efficient supply chain systems in use by Dealers today, though it still stands room for improvement.

Universally, the automotive industry has been accepted as a major driver of growth of a nation's economy and is a significant contributor to the global economy. The automobile has been described as 'both a form and function' based product involving high level of engineering as well as being positioned as a fashion product. The industry has rightly been called as "the industry of industries", since it uses outputs of nearly all manufacturing industries and supports upstream (mining, steel etc) and downstream industries (finance, insurance, after – market etc). Infusion of technology has led to incorporation of electronics (sensors, actuators) replacing mechanical design of assemblies – engine brake system, steering etc, built in test equipment, entertainment and navigation system and advancements in materials and design. India, China and Brazil are major emerging markets with robust domestic demand and adequate local production. Global automotive companies have lowest EBIT margins in comparison to industry leaders (10.4%) but having the highest number of inventory turns and best in class delivery performance (97.3%). The industry is asset, material and labour intensive which calls for involved operational planning and execution at all levels of management. Government interventions have been a major driving force for development of the automobile industry in Brazil, China, South Korea and the United States at the Incubation, Penetration and Sustainability stages.

AUTOMOTIVE INDUSTRY IN INDIA: PRESENT SCENARIO

Although the Indian automotive industry has its genesis in the 40's, it has seen considerable growth in the last two decades mainly due to economic liberalization including 100% FDI in the sector. Global auto and component manufacturing companies are motivated to establish manufacturing and R&D facilities in the country due to availability of large pool of skilled workers, low production costs, faster design and development process and emerging market status These companies outsource most functions regionally retaining control on product development and strategic procurement. The industry comprises various groups – assemblers, multi-national assemblers, Indian component suppliers, multi-national component suppliers, each with specific strengths and weaknesses, with 77% of the production value contributable to the organized sector and the rest in SME sector. Presently, there are more than 30 OEMs offering more than 75 options in all categories of vehicles. India's automotive industry is the world's sixth largest producer of automobiles in terms of volume and value and has grown 14.4% in the last decade. The industry contributes 7% to India's GDP, 7-8% of the total employed population (about 13 million people), 4% of exports, 39% of FDI inflows (USD 5.5 billion between 2009-13) and contributes 17% to total indirect taxes collected.

Overall domestic sales are led by two-wheelers, (77.4% of total sales in 2012-13) followed by passenger vehicles (15.1%) and commercial vehicles (4.45%). In the last five years there has been an overall growth in automobile production (from 10.85 million vehicles in 2007-8 to 20.63 million vehicles in 2012-13). Although 2012-13 has seen almost stagnant sales, exports have increased by 10% in the same period. However, in global terms, even with export earnings of 4 billion USD (including 1.8 billion USD as exports of auto component sector), the automotive sector contributes only 2.37% of world production and is ranked a low 26th in rank in the world auto export market with a share of 0.53%. The quest of Indian automotive industry in striving for global competitiveness is evident from the fact that major automotive manufacturers are the second-largest number of recipients of the Deming award for quality.

Significantly, India has the best-in-class fuel economy rates as well as affordable total cost of ownership. Realising the importance of the auto industry, which has grown in seven 'clusters' and its contribution to economic growth, the Indian government laid out the goals of the industry in two documents – 'Auto Policy 2002' and 'Auto Mission Plan 2006-16. The Government has taken active steps to realize a target of USD 145 billion in output contributing to 10% of the GDP and providing additional employment to 25 million people by 2016. The setting up of manufacturing facilities in India by

large automakers such as Hyundai, Ford, Toyota etc has also ensured rapid establishment and growth of a robust auto ancillary/component sector. Design, development and simulation capabilities have increased substantially and global companies like Bosch, Goetze-Werke and Johnson Control have set up facilities in the country. The multi-tiered auto component industry presently contributes significantly to the overall growth of the automobile Industry and major part of exports go to the Original Equipment Manufacturers (OEMs) and Tier I suppliers and only 30% to global aftermarkets, indicative of the advancements in this sector. Automakers are increasingly looking towards rural markets and the youth segment in India due to enhanced buying capacity of this segment.

TRENDS IN SUPPLY

Differentiated Outsourcing - Outsourcing in the automotive industry will continue. Differences in labor costs and disadvantages in scale and scope are influencing this trend. Outsourcing will create opportunities for both automotive suppliers and supply chain management providers (such as logistics companies and IT firms) to expand their businesses into adjacent areas—for example, preassembly or management and quality control. To benefit from continued outsourcing, supply chain management providers must offer flexible, modular solutions because not every manufacturer will concentrate on the same core capabilities and functions.

Low-Cost-Country Sourcing - The auto industry will continue to source from low-cost countries as manufacturers and suppliers continue to complement their commodities with more complex products and services. The lowest price, however, isn't everything—automakers and suppliers must look at the total cost of sourcing, including logistics, quality of work, and management. This approach is referred to as "best-cost-country" sourcing, and for supply chain management providers represents another opportunity to encourage, enable, manage, and optimize sourcing.

Risk Management - Most manufacturers agree that their supply chain risk has increased in recent years. Natural disasters, terrorism, workforce issues, and level of dependence on partners and suppliers are just some areas that require strong capabilities in risk management. Manufacturers and their suppliers must account for supply chain alternatives in their overall supply chain strategy. Increased transparency based on real-time information allows them to identify risks early on and, ultimately, to manage them. This represents an opportunity for supply chain management providers to expand their value-added services. They have the opportunity to become risk-mitigation agents by ensuring the required transparency and by offering, for example, fall-back solutions or performance guarantees.

Transparency and Accountability - Business operations are becoming more complex and global. Supply chains are turning into complex supply networks. As a consequence, auto manufacturers and suppliers need transparency and accountability across the entire supply network. For example, near-real-time information flow based on a sensor-driven supply chain across the extended enterprise is in high demand. Information should, ideally, flow in two directions to help ensure better and faster interactions within enterprises and among OEMs, suppliers, and supply chain management providers. At the same time, there is a focus on security across these complex information networks, led by the need to manage risks. The supply network has become very complex globally and is optimized to the penny. Because of this, automakers and suppliers cannot afford to go after breakdowns in the supply chain. Providers must deliver performance and output in a transparent manner—they are now held accountable much more stringently than in the past, and are at risk when it comes to paying high penalties in case of nonperformance.

IMPACT OF GLOBALISATION ON SUPPLY CHAINS

The automotive industry is one of the most global industries amongst all the industries in the world. The automotive industries are always at the forefront of establishing the global infrastructure. They will be faced by many challenges at global level. In order to earn huge profits and to successfully build and expand their existing infrastructure at the global level they will have to make an efficient and smart supply chain keeping future market in mind. In the globalised markets other industries will also try to earn a good status and profits at global level and so automotive industries will get high competitions from other industries also. Also as the companies will try to join the global markets and for that they will globalize their existing infrastructure. They will be faced by operational issues in the form of quality and delivery reliability. These two operational issues will be the top challenges for entire automotive companies. With the existing supply chains the companies are not getting those benefits and profits which

they have anticipated from their global supply chains. In future the globalization will increase. According to the market research data it was estimated that only one third of the automotive companies supply chains have improved their overall performances as result of globalization and their profits were also improved accordingly. In contrast near about 70% of the top supply chains have reported that because of globalization the overall performance of the

companies has been improved. In addition to it now they are trying to make important factors such as delivery reliability and quality issues under their control and they expect that they can completely get hold on these issues in years to come. In future the top concern for the automotive companies will be more advanced business issues like regulatory and legal challenges of the international supply networks and the cultural and organizational level obstacles which will result because of increasingly virtual relationships. To achieve a global status the focus of automotive supply chain should be on integrating their global chains. This will include integrating the product life cycle management and enterprise resource planning for its partners. Also apart from it they should use tools such as collaboration, sharing of knowledge and social networking because they will help them to remove distance gaps and will make people networks across the extended value chains .To support integration a smarter supply chain should establish common terminology and process.

The supply chain should be such that they should not run each facility separately instead they should manage the resources globally by matching the demands with manufacturing capacity and sourcing around the world. These supply chains should use intelligent business analytics to track and synchronies demands and supply trends, evaluates complex scenario and acts based on the most likely outcomes. This insight along with the supply chain flexibility allows the smarter supply chains to adjust sourcing and production planning to optimize the operations globally.

MAJOR ISSUES IN AUTOMOBILE SUPPLY CHAINS

Supply Chains have been aptly defined as a ". . . network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer" and is therefore the sum total of efforts in integrating a network of firms and coordination as regards information, material and financial flows. Interestingly, the top two supply chain goals have shifted, from reducing operating costs and overall inventory levels, to concerns of how to improve customer service and speed of product delivery to markets.

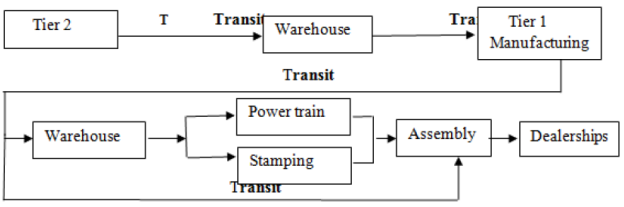

Figure 1 schematically depicts a typical automotive supply chain which comprises of a network of smaller supply chains each with its own separate characteristics.

The complexity of the automotive supply chain may be gauged from the fact that a typical vehicle comprises approximately 20,000 components with about 1000 sub-assemblies or modules. The automotive supply chain includes multitude of Tier 1, 2 and Tier 3 suppliers or manufacturers with many assembly operations and a number of dealerships. Customer demand for varied specific configurations and features add to the high level of response needed from automobile supply chains. The order lead time required by a customer is averaged at 4-6 weeks in the automobile industry and there is a definite correlation between implementation of Supply Chain Management (SCM) practices and quality and conformance of design. Toyota's Production System enshrining lean thinking has long since been an industry benchmark.

Trends in the auto industry which impacts the supply chain are depicted in Table 1. Fisher profoundly enunciated that a supply chain must be tailored based on specific requirements of the product being manufactured. This is specially so for the complex automotive industry wherein, an automaker has to contend with managing a network comprising several supply chains. It is imperative that Indian auto industry align supply chain practices to business strategies for maximizing competitive advantage in an emerging market. Macro-economic cycles of growth, contraction and recovery, creates tremendous strain on the effectiveness of established supply chain especially in the automotive sector due to its widespread linkages with other industries.

Demand-Side Trends	Supply-Side Trends
Uneven Growth	Differentiated Outsourcing
Fragmentation	Low-Cost-Country Sourcing
Accelerated Volatility	Risk Management
Importance of After market	Transparency / Accountability

Table 1. Trends Impacting SCM

Indian industry spends a high 14% of its GDP on logistics, compared to 10-11% in Europe and 9% in USA and nearly 22% of aggregate sales (equal to about USD billion) is tied up in inventories in the supply chains. The cost of logistics remains high due to various factors including lack of large specialized, integrated logistics firms (third party logistics - 3PL) using effective technologies and also inadequacy of infrastructure. This indicates that there is ample scope for Indian automotive companies to streamline their supply chain process and become more competitive. Major competition between automakers in India is at the level of assemblers rather than between entire supply chains including first tier component suppliers.

The top five global supply chain challenges are – visibility, cost containment, risk management, increasing customer demands and globalization. It is interesting to note that automotive supply chains, globally, lag behind other supply chains (such as

retail, pharmaceutical etc) in these five parameters clearly indicating the need for and scope of considerable improvements to make them more effective and responsive. The surge in demand in the last decade has put sudden pressure on the existing Indian auto and auto component manufacturers, with hardly any integration, to quickly adopt global standards and practices and introduce or vitalize supply chain processes thus posing challenges in technological preparation and transition management almost dynamically without impacting the brand image.

Supply chains in the automotive sector have to contend with peculiarities in the Indian context which are distinctly different from those in developed countries. Preference for small cars and two wheelers, lack of visibility at the customer end especially in rural markets, packaging complexities due to language and cultural diversity, quality challenges due to resource shortcomings, large number of fragmented suppliers which impede effective collaborations, complex tariffs and duties, lack of infrastructure (off highway transit is difficult) and a multilevel distribution system impacting price of products are some of the significant supply chain challenges. The biggest challenge being integration of end-to-end supply chain followed by managing in-bound logistics, product and part proliferation. The auto component industry , a major contributor to export and growth, is beset with frequent changes in costs of raw materials, customer demand for product quality, timely deliveries and sourcing of raw materials. Multinational companies entering India face unique challengescultural diversities, pricing-income disparities and sourcing. Hyundai, for example adjusted well to Indian environment by tailoring the Santro with reduced engine output (for higher fuel efficiency) and competitive pricing of spare parts etc. Only 50% of the workforce is considered to be of high quality with a high attrition rate averaging 40%. Skill development is being undertaken by some major Tier-1 auto-component manufacturers and a good example is that of Bosch Ltd which has the Bosch Vocational Center (BVC) to impart training on quality, safety, problem solving techniques etc. A survey has revealed that the main strategies for overcoming SCM challenges in Indian auto industry are - increasing investment in Information Technology and process improvements (38%), vendor/dealer consolidation (31%) and improving internal infrastructure (8%). Outsourcing to logistics service providers by Original Equipment Manufacturers (OEM) is bound to increase in the future in domains of module assembly, planning, scheduling and Inventory Management.

CONCLUSION

Indian automobile and auto components industry is on a roll and there is a massive scope for improvement and augmentation of supply chain in this sector. India has become a most sought after destination for foreign companies to establish their facilities and form alliances with domestic companies. The Indian economy is now gaining momentum in the world of free trade and liberal movements of goods and services between countries. Low cost of manufacturing and conducive government support have been the major drivers for foreign companies investing in India. Therefore efficiency in supply chain will be critical for India's automobile success.

The Indian industry is yet to match the supply chain standards of developed countries and tremendous potential exists for national level integration of supply chains. Some future trends in the auto industry have been highlighted in the paper which necessitates significant changes in supply chain practices in automotive supply chains. There is also a need for external support to the industry by way of supportive Government regulations and policies and development of infrastructure. The industry needs to focus on development of green technologies such as hybrid vehicles, low emission and fuel efficiency to meet futuristic, stringent norms, cost control throughout the automotive value chain (such as frugal engineering in the development of Tata Nano), enhance investments and efforts in R&D specially in auto component manufacturing sector and build up scale to enhance export.

In future the landscape of automotive industry will be exposed to a set of critical challenges. There will be more complexities due to increased globalization due to which there will be many new challenges will emerge in the automotive industries and hence they will have to overcome these complexities and find new ways to create profits if they want to prosper.

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