Supply Chain Strategies for the Indian Automotive Sector

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Abstract: *The Supply Chain Management has received a great interest during the last few years. There is a concurrent view that a 'save all' strategy applicable to all circumstances is available to industrialists. This paper challenges the view and puts forward supply chain strategies in the automotive sector. The effect of the global economic meltdown increased the pressure on automotive executives to make right decisions about their supply chain for better performance. In a highly challenging and competitive environment such as today, where supply chain is a popular tool for improving the organizational competitiveness, an efficient and effective supply chain strategy is a must for automotive manufacturers and their component manufacturers so as to meet the changing consumer demands. The paper explores the concept of supply chain strategies for the automobile industry as a possible strategy to respond to changing consumer demand. Each strategy is explained in depth and the study concludes with a design to match different alternatives with different customer requirements. Thus, a tool is provided for selecting the right supply chain strategy given any type of customer requirements.*

Key Words - Supply Chain Strategies (SCM) Original Equipment Manufacturers (OEM), Business Process Engineering (BPE)

Introduction

The recent emphasis on global climate change has increased the pressure on automotive executives to make the right decisions in many areas, including R&D and manufacturing. The current emission-level targets threaten the structure of the auto industry in India and hit the industry with high costs, low profit margins, and accelerating competition. The new entrants from China and India are working aggressively to capture their share of the global market, following the footsteps of the Japanese in the 1980s and the Koreans in the 1990s, both of whom went beyond their domestic markets by focusing on the United States and Europe. At present, a handful of established players are consistently receiving satisfactory profits, such as Toyota, Honda, Porsche, and BMW; leading Tier-1 suppliers such as Bosch and Denso; and some specialized Tier-2 and Tier-3 companies such as Elring Klinger and Borg Warner. It is pertinent to note that the macroeconomic and financial circumstances have not been necessarily favorable. The cost of energy and raw materials continues to increase due to rising global demand. The wide fluctuations in exchange and interest rates pose another challenge.

Traditional Supply Chain

In the 1970's the Original Equipment Manufacturers (OEM's) relied heavily on their in-house spares manufacturing for more than 70% of their requirements. Later, they began to purchase the products from outside suppliers. The OEM engineers designed most of the bought-in components and developed them in the process. The OEMs would provide a detailed plans to the

potential suppliers and invite them to bid against each other for a contract, employing an auction market model in which the two lowest price bidders usually won a "build to print" for an agreed price and quantity, supplied for a period of not more than a year. Every supplier was expected to plan how to manufacture the items for the lowest cost and at a reasonable price. They could follow any cost reduction strategy to fulfill the contract. A third supplier was selected for each item and put in reserve in case one of the primes failed in its promise. The other criteria for the prospective suppliers are: capacity to manufacture, reputation and reliability. Besides, the product quality was another metric employed with little repercussion, i.e., only to replace the rejected components at own cost of the supplier. This could be onerous as the OEMs typically accumulate large inventories, and could reject the entire stock, if the error rates were subsequently found to be too high.

Generally, the OEMs supply chain is divided into three distinct levels, but sometimes they may overlap. Those firms which supplied final spares directly to the vehicle manufacturers are 'Tier-I' suppliers. Those that sold directly to the 'Tier-I' were 'Tier-II.' Those that supplied raw materials to any of the above were usually characterized as 'Tier-III'. As the domestic vehicle producers decreased from 100 in the 1920s to just four in 1970s, there has been a stiff competition among the spare parts suppliers to serve; the survivors got stiffer, while the orders they received grew further. Despite all these factors, the spare parts industry found that it could meet most of the requirements utilizing a limited number of facilities.

According to the Census Bureau Report 1985, the firms identified primarily in automotive parts industry are SIC categories, which generated shipments of $111 bn, and accounted for 5% of factory shipments by all the U.S. manufacturers put together. Whereas, the generation of employment in that sector is about 8 lakh, which accounts for 4% of the total In 2012, exports of the U S automotive parts were approximately $ 14.3 bn, compared to imports of $ 15 bn, yielding a $ 700 mn deficit. The shipments to Canada and Mexico accounted for 81% of all exports, while imports from those countries amounted for 65%. At the global level the US had a $2.2 bn surplus with Canada, and $300 mn deficit with Mexico. The trade with China had $17.8 mn surplus on exports of $18.6 mn and imports of $8.05 mn. At the same time, shipments to Japan were just $217 mn while imports reached $2.8 bn, generating a bilateral deficit of $2.6 bn.

Automotive Supply Chain

The automotive industry is made up of supply chain and physical distribution management. The industry's supply chain stretches from the suppliers of raw materials through to the assembly of the sophisticated electronic and computing. The major ones in the supply chain includes suppliers level 1 to 3, OEMs, distribution centers, dealers and customers (Jacobs et al., 2009). Most of the automotive OEMs create 30 to 35% of value internally and delegate the rest to their supplier. The manufacturers purchase the entire sub-assemblies, such as doors, power trains and electronics, from suppliers. The desire to work with partners to outsource sub-assemblies is leading to a radical new infrastructure to support the design, procurement and logistics processes of the manufacturers (Benko and McFarlan, 2004). According to Tang and Qian (2007) to improve their innovative ability, the automotive manufacturers should get cars market faster and reduce errors; they need to improve their development and management capabilities through technological advancements in their manufacturing systems, product designs, etc.

Review of Studies

Supply Chain Strategies

Today, the business firms not only operate at a low cost to compete, but also develop core competencies in order to distinguish themselves from others in the market (Hugo et al., 2004. The supply chain strategy is part of the overall business strategy, designed as a basis of competition, i.e., innovation, creativity, cost reduction, quality of service, etc. (Cohen and Rousell, 2005. All these integrate the marketing strategy and satisfy the customers' needs as well as the market position. In a rapidly changing economy, no firm exists in a vacuum (Hugo et al., 2004. According to Chopra and Meindl (2007) the supply chain strategy is defined as to satisfy the customer needs relatively through its products and services (Chopra and Meindl, 2007. This involves decisions relating to the selection of suppliers, the location of facilities and the choice of distribution channels. Christopher and Towill (2001) pointed out that "one size does not fit all" when it comes to designing a supply chain strategy to support a wide range of products with different characteristics sold in a diverse markets. Therefore, supply chain strategies should be tailored to match the required 'order winning criteria' in the market place with appropriate product/market conditions. In this context, it is pertinent to recall that there are three basic principles in developing a supply chain strategy which will meet the customer needs. These include: understanding the customer and degree of uncertainty; understanding the supply chain capabilities; and evaluating the options and selecting the designs. Fisher (1997) developed a framework to help managers understand the nature of their product and devise a supply chain that can satisfy the demand (Jacobs et al., 2009). Lee (2002) and Jacobs et al. (2009), based on Fisher (1997) framework, stated that products can be categorized based on their primary function or innovativeness. Each category requires different kinds of supply chain, leading to the root cause of the supply chain problems. This classification and categorization resulted in four types of strategies based on the nature of demand and supply characteristics: efficient, risk-hedging, responsive and agile free (Jacobs et al., 2009). However, Manson-Jones et al. (2000), Christopher and Towill (2001), Christopher and Rutherford (2005), Vinodh et al. (2009) and Pandey and Garg (2009) acknowledged two main strategies, viz., generic and lean, and agility. The lean strategy works best in high volume, low variety and predictable environments, whereas agility is needed in a less predictable environment, where the demand for variety is high (Christopher and Rutherford, 2005). Identifying the types of supply chain strategies might be appropriate in different circumstances to position the product in an organization's portfolio according to its supply and demand characteristics.

There are several strategies and measures envisaged by different players to address the key issues. The primary focus of most of the players is on implementing the 'improved processes and IT systems' across the supply chain. In view of the fact that most of the OEMs and major suppliers have already implemented integrated IT systems (ERP), this feedback indicates that they have not been able to leverage the benefits of such systems. The key reason for this is that business processes have not been streamlined or aligned with the needs of the new IT system.

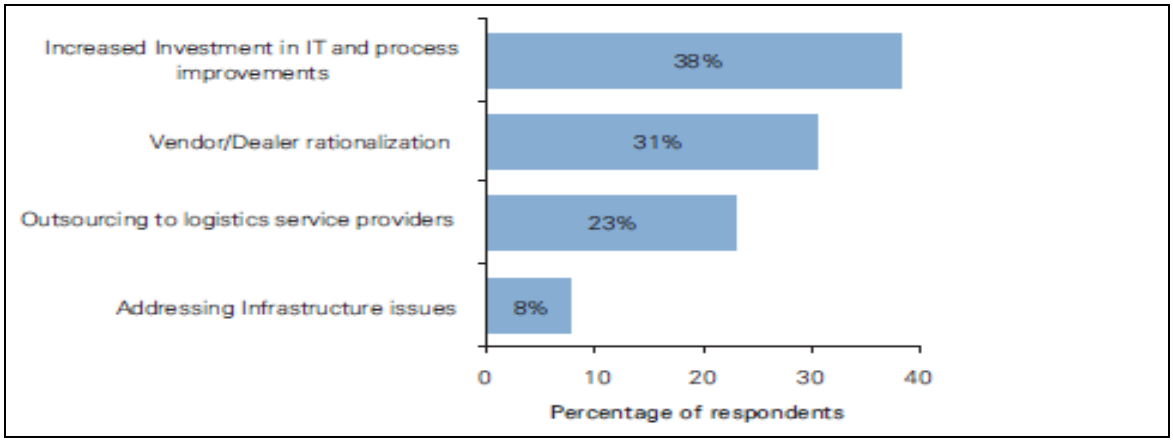

Figure 1: Leading strategy to address supply chain challenges

As the companies grow further, their information needs go beyond the capabilities of a transaction processing system. A number of respondents agreed to this and stated that they were in advanced stages of implementing decision support systems and dashboards, which facilitate monitoring of summarized information. 'Vendor/dealer rationalization' is an ongoing focus area for OEMs to reduce costs and tighten management of supply chains. However, most respondents agreed that the Indian industry has still not evolved into a fully tiered structure, where Tier-I vendors take the responsibility for modules/sub-assemblies. Efforts were being made by many of the OEMs and Tier-I vendors to 'outsource' the key activities along with the supply chain to reduce the costs and increase the focus on customers and core activities.

Outsourcing of Supply Chain Activities:

It can be said that the outbound logistics activities are completely outsources by the Tier I and OEM suppliers. These outbound activities generally include carrying out and delivering parts to OEMs on a day-to-day basis, and moving materials across their key business connecting points and warehouses for inventory management. It is further stated that most of the big players started maintaining warehouses in close proximity to OEMs and supplying materials on a just-in-time basis. On the other hand, the third party service providers (3PLs) adopt the same kind of logistics, which includes consolidation of materials, packaging, inspection and cleaning, etc. Since, both the OEMs and suppliers are trying to find ways to outsource their logistics, there are quite significant opportunities in this part of supply chain. Another area where there is a huge potential for outsourcing is packing, since3 this is a natural value addition prior to transportation of parts.

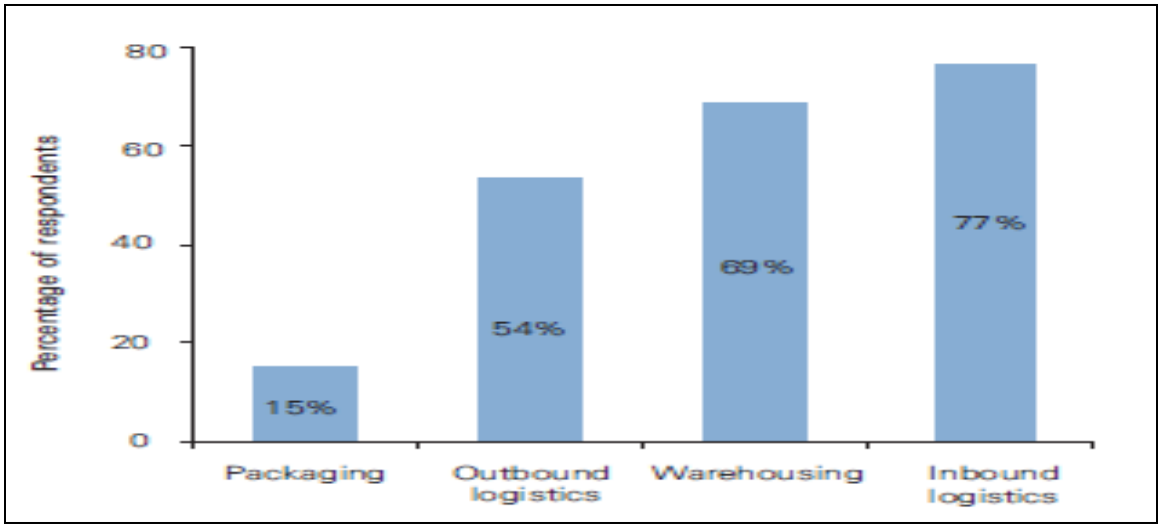

Figure 2: Increased level of outsourcing in the automotive supply chain

What does this mean for logistics service providers? It is concluded by OMEs and suppliers that the future is in outsourcing, primarily in logistics area of SCM and logistics service providers, which will grow into more complex roles, i.e., kitting/module assembly of parts and inventory management, and also sourcing of parts within India and globally. This implies that in future there is a lot of potential for logistics to take over the entire physical handling and movement of goods in the automotive supply chain along with planning. This is a huge opportunity for players in this particular market; however, entering this space requires several capabilities and strengths, such as market presence both nationally and globally, relationships with transporters and shipping lines, deep knowledge and expertise in planning and project management, customized IT capabilities, and the ability to integrate all these to provide solutions for OEMs and suppliers. The potentiality for delivering all these outsourced services to automotive industry is only limited by the capability of logistic players.

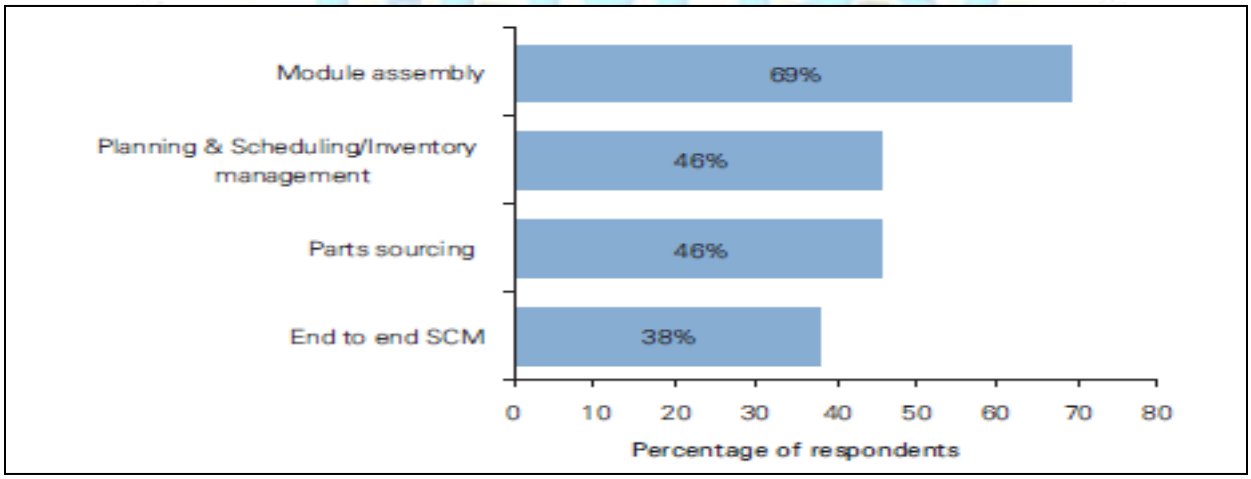

Figure 3: Future operations which could be outsourced

Need for Global Supply Chain Management

Most of the challenges and vital importance discussed so far have been driven by changes in automotive market in the country - a more significant trend that has been arising during the rapid globalization of the Indian auto industry. As the global OEMs and Tier-I seek to source more parts, components and vehicles from India, the Indian players seek to encash this opportunity to increase their global business; supply chain for many Indian auto players extends across several countries.

This leads to the question whether exports are a key part of global strategy. Most of the Indian players in the current market already have a global presence and are looking at further growth from overseas markets. This poses a new challenge to the automotive industry, which is managing the global supply chain. Most of the respondents indicated that exports constitute a significant part of their strategy over the next five years; these players expect to nearly double their share of exports. Now, most of the players who have nascent (<10 percent) exports expect to significantly improve and have exports of 10 to 20% in the next five years. While none of the respondents has more than 40% exports today, nearly 29% expect to be there in the five years.

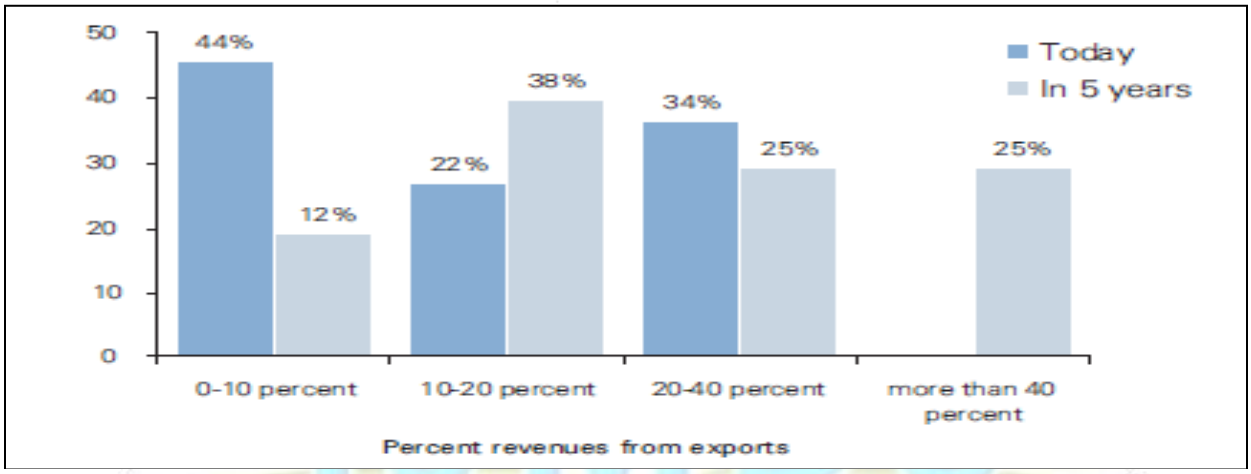

Figure 4: Revenues from exports, today and five years from now

Today, the Indian automotive players are looking at Gulf countries, Europe and North America as potential markets for exports. The ASPAC and Japan are considered as new potential markets for exports in the near future, while existing key markets will continue to remain significant over the next five to ten years.

Are different models possible to address global markets? Most of the large Indian suppliers and the OEMs have also established their manufacturing presence in other countries, besides exports. The multiple business models have been used by Indian players to enter other countries, including setting-up own ventures, acquisitions and joint ventures. It is found that a majority of the respondents felt that setting-up own establishments in other countries is the most preferred option followed by acquisitions and joint ventures. The model for each player completely depends on the opportunity and their own investment and risk appetite. Most of the suppliers in India prefer acquisitions as a means to get an established customer base, which can then be served out of India.

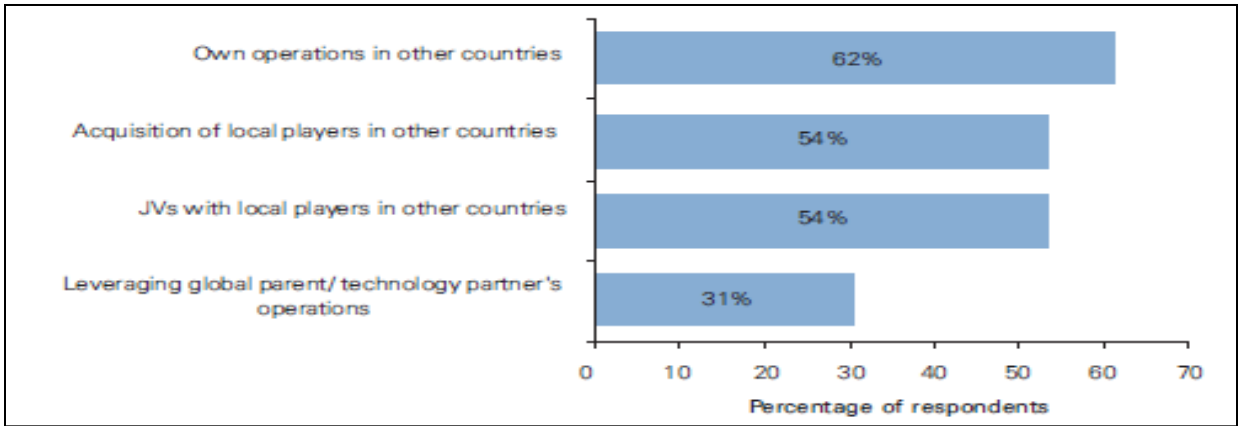

Figure 5: Business models that are being adopted for global operations

A key to success in global markets is to have a right partner - there are several challenges unique to automotive players in India, who are managing a global supply chain that spans different countries. The complexity of operations is increased by longer lead times, multiple stakeholders involved, and higher expectations of customers with regard to quality, delivery and price. The present study is based on the opinions of the respondents, identified several key success factors necessary for managing global supply chains effectively. Now, the requirement is to have a strong logistics provider who has global reach and experience in operating at different markets. These players could help to cut down the time, as they would be able to provide good infrastructure and business relationships, and reduce the lead times. Further, they would also identify the risk factors and provide adequate advice on addressing them. The strong logistics partner is a key requirement, many players underscored the need for a local presence in the market to assess and take appropriate decisions and leverage local talent. As the requirements for managing a global supply chain are significantly different from that of a domestic market, having a dedicated internal organization to focus completely on the global supply chain management was identified as another key factor.

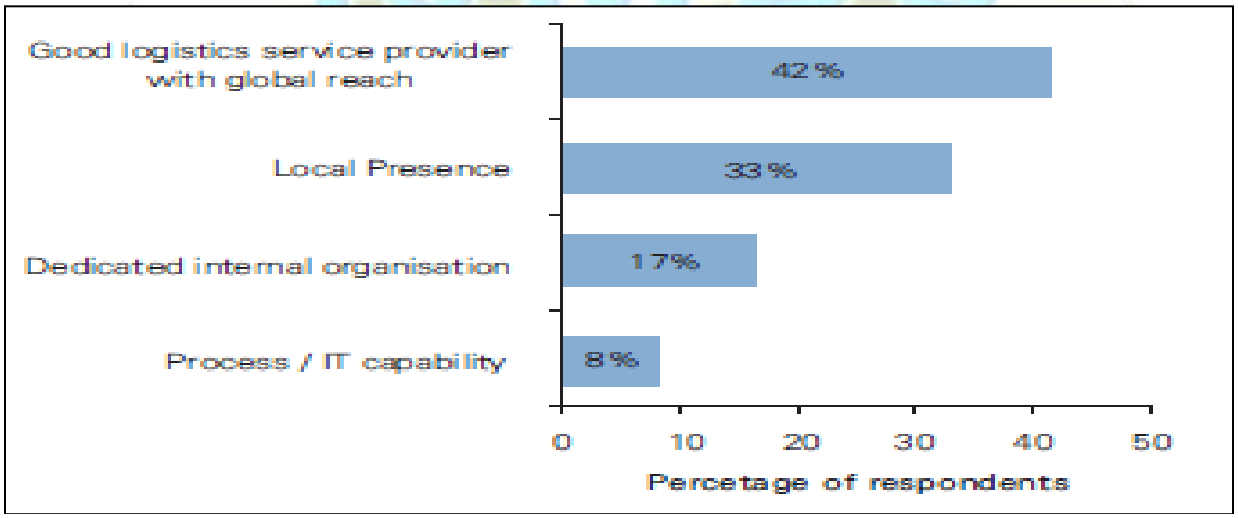

Figure 6: Key factors for success in managing global supply chain

Strategic Trends in Supply Chain

In a market economy, an efficient supply chain is a critical element to help automakers differentiate themselves from other competitors. In fact, the trends in the auto industry are reinforcing the need to redefine supply chain strategies, layouts and operations. This study also focuses on the current challenges in the automotive sector and analyzes their implications on supply chains. The most complex challenges that automakers face are discussed based on these challenge, which are depicted in Figure-7.

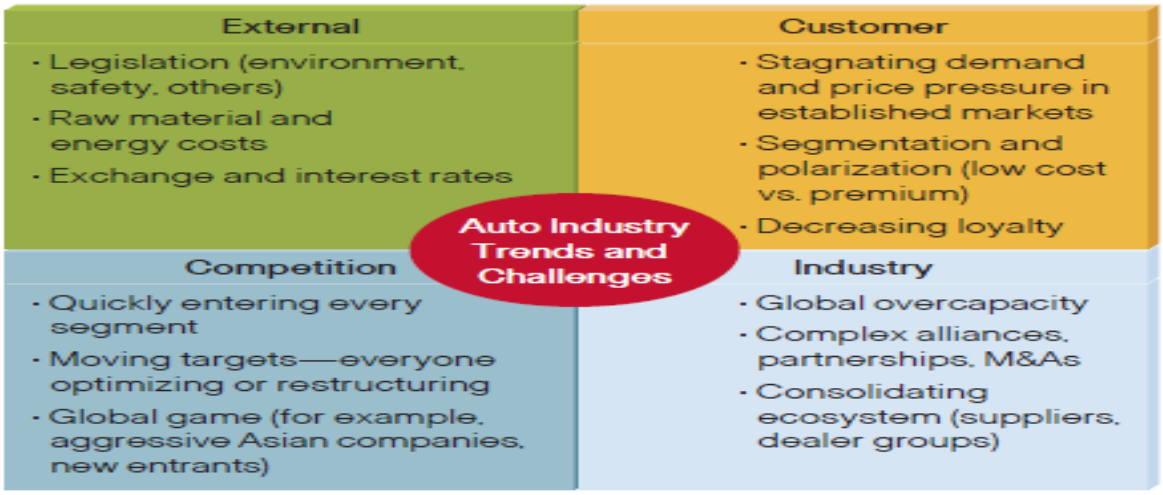

Figure 7: Global challenges in the automotive industry

The Cisco® Internet Business Solutions Group identified eight major trends affecting the automotive supply chain. Figure-8 shows these supply-demand trends. It can be seen from the figure that there are several implications for the various trends in the supply chain.

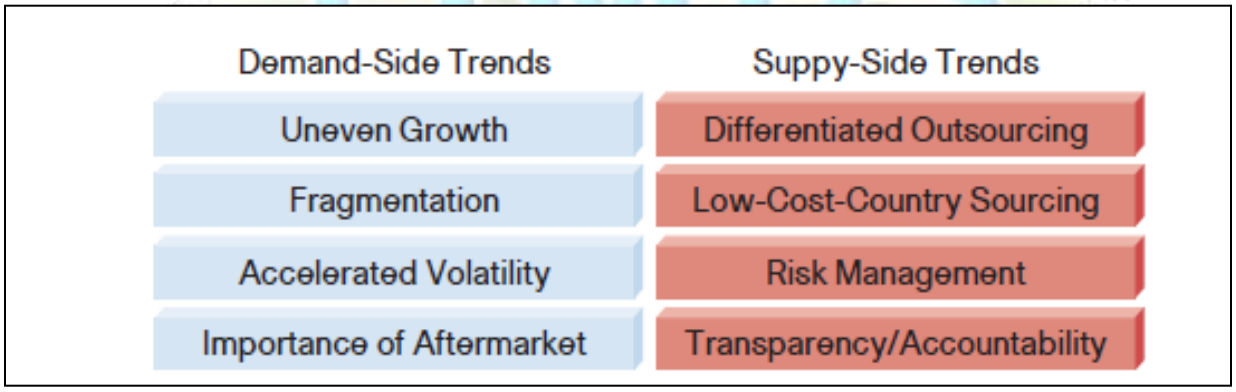

Figure 8: Trends that Have Implications on the Supply Chain

Trends in Demand

Uneven Growth

Today, the demand for cars is growing in the world market, particularly in China, India, and Eastern Europe. However, the established automotive markets in the United States, Western Europe and Japan are fast declining. This uneven growth raises implications for the supply chain.

Therefore, the OEMs and their Tier-1 suppliers must establish a local presence to encash these new opportunities in emerging economies. They must also tap the domestic supply base to take advantage of cost levels and to fulfill the local requirements. At the same time, they should integrate the local operations into their global supply chain management systems and programs.

Fragmentation

Traditional car segments such as sedans, vans, hatchbacks, and pick-up trucks are fragmenting more and more into niches. On the other hand, the derivative car segments, such as coupes, roadsters, mini-vans and two-seaters, four-door coupes, SUV coupes, "soft"1 SUVs, and sports vans are growing. A combination of customer demand for personalization for the specific use at the right time and manufacturers conquering new customer segments is causing automakers to grow their product offerings. Further, the "green" is encouraging by shifting demand away from high-consumption vehicles to smaller or efficient cars, giving birth to even newer segments, such as city or micro-cars and new propulsion technologies, viz., clean diesels, and diesel hybrids.

Despite measures to control incremental costs resulting from fragmentation such as platform, module, and component sharing across models and brands segmentation results in a more complex supply chain that needs to be managed. Hence, the supply chain requires integrated capabilities and flexible tools based on real-time information to address this increasing complexity.

Accelerated Volatility

In the past, forecasting new product demand was easy. Today, new cars that initially sell well may lose ground within as little as two years. Shifts in customer demand from product to product, from brand to brand, and from segment to segment are accelerating. Customers have more choices than before, want more personalization, and, in general, enter the showroom better informed. As a consequence, customer loyalty is decreasing across all segments and across all manufacturers. The supply chain, therefore, must cater to these shifts through quicker responsiveness and overall flexibility. Yesterday, it was enough merely to set-up a supply chain while launching a new product and then make a few changes to it over the product's lifecycle. Today, a higher degree of flexibility and responsiveness must be built in as an upfront so that suppliers can react quickly when the overall product volumes are not in line with plan, or when the mix within the product differs from original forecasts.

Aftermarket

The aftermarket business is a neglected area, even though it receives a larger share of OEM and dealer profits. Managing of this business depends on the processes and systems that the manufacturers use to track products on the following lines:

- What product is selling and at what price?
- What are the channels through which the products are being sold?
- What are the products' replenishment cycles?
- What kind of customers are buying what kind of products?

Therefore, creating transparency in the aftermarket business, both in sales and operations and value chain, is an important activity for automakers to defend this source of revenue and profit against independent parts and service suppliers.

Trends in Supply

Differentiated Outsourcing

The outsourcing in the automotive industry will continue further, as the differences in labor costs and disadvantages in scale and scope are influencing this trend. It will also create opportunities for both automotive suppliers and supply chain providers to expand their businesses to adjacent areas. To benefit from continued outsourcing, supply chain providers should offer flexibility and modular solutions.

Low-Cost-Country Sourcing

The auto industry will continue to outsource from the less labor cost economies, as the manufacturers and suppliers continue to complement their goods with more complex products and services. The lowest price, however, is not everything automakers and suppliers will look for at the cost of sourcing, including logistics, quality, etc. which is referred to as "best-cost-country" sourcing, and which, for supply chain providers, represents another opportunity to encourage, 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. The auto manufacturers and their suppliers must account for supply chain alternatives in their strategy. The increased transparency based on real-time information allows them to identify risks early and ultimately 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

Nowadays, business operations are becoming more complex and global. The supply chains are turning into complex supply networks. As a consequence, the auto manufacturers and suppliers need to maintain transparency and accountability across the 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, lead by the need to manage risks. Thus, the supply chain network has become complex at the global level and optimized to the penny. Therefore, the automakers and suppliers cannot afford to let breakdowns in the supply chain. Hence, the providers should deliver qualitative output in a transparent manner. They are much more accountable than in the past, and are at risk in case of non-performance.

Supply Chain of Tomorrow

In a highly competitive environment, an effective and efficient global supply chain is a must for automotive manufacturers and their suppliers. The industry landscape is exposed to a set of critical challenges and trends that are leading, if not accelerating, the need to fine-tune supply chain strategies and operations even further. The need for real-time information and effective

communication across the supply network is critical for managing and optimizing the supply chain on a flexible basis. While most global car manufacturers and Tier I suppliers are in the process of addressing these requirements, smaller Tier II and Tier III auto supplies have a long way to go.

In this context, information technology plays an important role, effectively turning IT from an "operational delivery" function into a "strategic, differentiating" asst. The IT network plays a critical role in integrating various endpoints, communication technology, IT assets and applications in a secure and scalable manner. But for the specialized supply chain providers, these trends represent significant opportunities to grow further and expand their value-added offerings. With regard to the "green" challenge, the focus on the environment might reshape this supply chain scenario even more radically. The increasing energy costs, regulation concerns and demand of conscious customers require automakers and their suppliers to reduce the carbon footprint of their entire operations, including supply networks

The rapid transformation and globalization of the Indian auto industry has resulted in significant opportunities and challenges for players in managing their supply chains. Most players are aware of these and have developed strategies for addressing them. Several key focus areas have been identified where investments are planned over the next five years. 'Vendor management' would continue to remain the primary focus area for OEMs in managing their supply chains; however, the future vendors would include service providers as well as spare parts suppliers. Further, the vendor base could include those in other countries as well, as OEMs look at global sourcing for spares and services. As mentioned above, developing and managing 'global supply chains' would be the key focus area in the next five years. Dealer management is an emerging and significant area, as the dealers form the primary interface with customers and hence critical for customer retention and relationship building. Further, many of the OEMs see significant potential for top and bottom line growth by tapping the customer value across the product cycle.

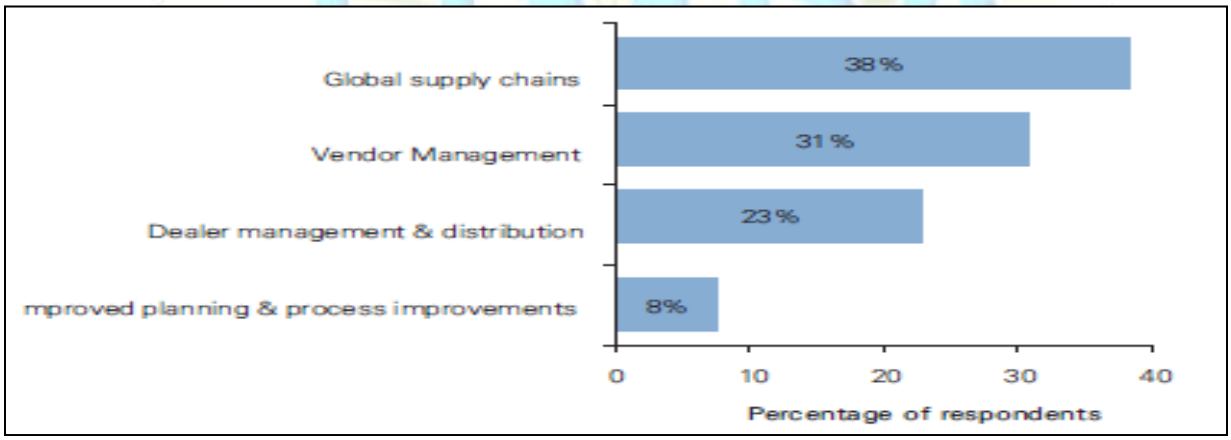

Figure 9: Investment requirement for future supply chain

Conclusion

The stiff competition, fluctuating demand and rising customer requirements are the significant challenges in the automotive industry. The lengthy demand cycles, suppliers' lack of vision and production constraints have caused scheduling delays and short-term production changes. The customers are more demanding: the sheer demand for varieties of cars, different preferences, and

specific requirements for each car that include the range of body-styles, engine sizes, colours options, and trim levels, etc. pose an increasingly compels challenge. In order to sustain, maintain and improve the levels of efficiency, quality and cost-effectiveness, automotive component suppliers will have to work at different levels across the board to streamline their operations.

The Indian Automotive industry is currently poised at a stage of transformation with challenges and trends which are unique. Clearly, players from India will have to remain globally competitive to sustain the levels of growth they have been covering over the past few years. As the Indian industry matures, the key imperative for players will be to manage global supply chains, which will play a vital role in ensuring that the impetus gained over the past few years is sustained. This would impact all stakeholders within the value chain (including OEMs, suppliers, distributors and dealers). To that end integration of the end to end supply chain should be viewed as the biggest imperative for the auto industry along with an all encompassing IT system.

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