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**“AUTOMOBILE INDUSTRY - A STUDY ON
SUPPLY CHAIN PRACTICES”**

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“Automobile Industry - A Study on Supply Chain Practices”

Prof. Ravindra Dhananjay Chaudhary

Research Scholar, Swami Vivekanand University, Sagar, MP

Abstract – Automotive industry has hundreds of suppliers and thousands of spare parts units. Due to globalization, the automotive supply chain has been undergoing tremendous changes and the industry has been exploring innovative methods to reduce operating cost, lead time and inventory to sustain their growth in the market. With the expansion of sourcing partners, streamlining customer requirements, inventory management, accurate forecasting, better suppliers' relation, coordination and co-operation across supply chain, better visibility and control over the process and reduction of lead time is being achieved by the organizations. The Indian auto industry is small in size, compared to the world markets (\$ 6.73 billion compared to a world market of \$737 billion) but has experienced a growth rate of 20-25% in the past few years. Despite higher raw material costs, higher energy costs and poorer infrastructure in India, multinational OEMs that have entered the Indian market have managed to produce cars that have high local content and are sold at competitive retail prices, largely owing to efficient supply chain. The last few years have seen greater integration of the Indian automobile industry with its global counterparts. Most significant challenge identified by automotive Players in India is 'integrating the entire supply chain' and managing it as a single integrated entity. Managing inbound logistics remains another key concern for OEMs as well as auto component players, driven more by challenges related to reliability of data, lead time and absence of quality logistics players on the upstream side. The present paper attempts to capture the innovative supply chain practices in Indian Automobile Industry, identify key challenges involved in integration and implementation of supply chain, and suggests strategies to overcome the challenges for optimum leverage.

Keywords: Automobile Industry, Logistics, Lean and Agile Supply Chain and Supply Chain.

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INTRODUCTION

The changing business conditions of the 21st century has led to companies facing issues ranging from globalisation, economic uncertainty to new technologies and increasing consumer demands. In the automobile industry, as manufacturers design and build vehicles globally, their supply chains become increasingly complex with challenges that often stand in the way of profitability and higher shareholder value such as long order-to-delivery lead times, unreliable production schedules, excess inventory across the supply chain, lengthy demand planning cycles and lack of visibility of suppliers. 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 organisational competitiveness, an efficient and effective supply chain strategy is a must

for automotive manufacturers and their component manufacturers so as to meet changing consumer demands.

OVERVIEW OF INDIAN AUTOMOBILE INDUSTRY

The Indian automotive components industry's annual turnover (for FY 2003) was US\$ 6.73 billion. When compared to the global automotive components industry of US \$737 billion, the Indian industry dwarfs in size. But, at a compounded growth rate of 20-25 %, the growth in India's auto components exports is much faster than that of the domestic market (10-14%). The auto ancillary industry caters to three broad categories of the market:

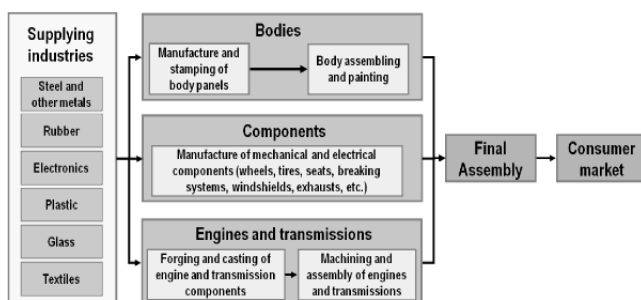
- Original equipment manufacturers (OEM) or vehicle manufacturers, that comprises of 25% total demand

- Replacement market that comprises 65% of the total demand
- Export Market that comprises primarily of international Tier I suppliers and constitutes 10% of total demand

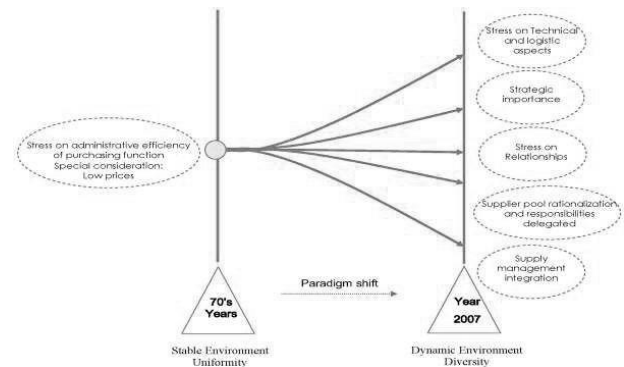
THE AUTO ANCILLARY INDUSTRY CAN BE FURTHER DIVIDED INTO SIX MAIN SEGMENTS

- Engine Parts - Engine assembly, fall into 3 broad categories: core engine parts; fuel delivery system; and others.
- Electrical Parts - The main products in this category include starter motors, generators, spark plugs and distributors.
- Drive Transmission & Steering Parts- Gears, wheels, steering systems, axles and clutches are the important components in this category.
- Suspension & Braking Parts – These include Brakes, Leaf Springs, and Shock Absorbers
- Equipment – This includes headlights, Dashboard Instruments
- Others - Sheet metal components and plastic molded parts are two of the major components in this category.

OVERVIEW OF SUPPLY CHAIN MANAGEMENT IN AUTO-INDUSTRY



Trends in Auto-Supply Chain - Paradigm Shift in Supply Management in Recent Years



Source: Eva Ponce-Cueto, A Conceptual Model for Integrating Strategic Supply Management into the Supply Chain

Trends in Demand	Trends in Supply
Uneven Growth The demand for cars is growing, stemming in large part from China, India, and Eastern Europe. Established automotive markets in the United States, Western Europe, and Japan, however, are flat to declining. This uneven growth raises implications for the supply chain. For one, OEMs and their tier-1 suppliers must establish a local presence to benefit from these new growth opportunities in emerging economies. They must also tap into the local supply base to take advantage of cost levels and to fulfill local content requirements.	Differentiated Outsourcing 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.
Fragmentation A combination of customer demand for personalization—the right product for their specific use at the right time—and manufacturers conquering new customer segments is causing automakers to grow their product offerings. The environmental or “green” movement is encouraging fragmentation even further, by shifting demand away from large and/or high-consumption vehicles to smaller and/or more fuel-efficient cars.	Low-Cost-Country Sourcing The auto industry will continue to source from low-cost countries. 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.
Accelerated Volatility In the past, forecasting new product demand was easy. Today, new cars that initially sell well may lose ground very soon. Today, a higher degree of flexibility and responsiveness must be built in up front so that suppliers can react quickly when overall product volumes are not in line with plan, or when the mix within the product differs from original forecasts.	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.
Aftermarket The aftermarket business is often a somewhat neglected area, even though it generates the largest share of OEM and dealer profits. Tracking the crucial information such as: Which product is selling, and at which price? through which channels is product being sold? what are the products' replenishment cycles? which kinds of customers are buying which kinds of products?—and the like Would help optimize aftermarket business gains.	Transparency and Accountability 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.

CHALLENGES

- Fluctuating market demand and rising customer requirements is a key challenge in the automotive industry.
- Lengthy demand planning cycles and lack of visibility to supplier, material, and production constraints cause scheduling delays and short-term production changes.

- The industry is faced with global financial crisis. This has led to increased pressure on the automotive competitive performance.
- Recent emphasis on global climate change is increasing pressure on automotive executives to make the right decisions in many areas, including R&D and manufacturing.
- High costs, low profit margins are constant challenges faced world auto-industry. Only a handful of established players are consistently delivering 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 BorgWarner.
- General macroeconomic and financial circumstances are not favorable, either.
- The cost of energy and raw materials continues to increase due to rising global demand.
- Strong fluctuations in exchange and interest rates pose another challenge and are difficult and costly against which to hedge.

In this dynamic business environment, a superior supply chain is one critical element to helping automakers differentiate themselves from the competition. In fact, many of trends in the auto industry are reinforcing the need to innovate and redefine supply chain strategies, layouts, and operations.

INNOVATIONS IN AUTO-SUPPLY CHAIN TO TAKE ON THE CHALLENGES

- **OUTSOURCING FROM LOW-PRICE, HIGH QUALITY SUPPLIERS**

Domestic car makers are benefiting from new possibilities in outsourcing from low-price, high quality suppliers. In the case of Mahindra and Mahindra, one of India's leading producers of commercial vehicles and tractors, For rear axles, the centre bracket was bought in as a casting and machined in-house, but the tubes and shafts were bought in from local suppliers in fully finished form. This permitted unit production costs to be much lower than would have otherwise been possible, and allowed the Mahindra's Scorpio to be sold at an ex- dealer price (including air-conditioning and power steering) of 5.5 lakh rupees, which was around 60% of the price anticipated by industry observers. And the sales of the Scorpio have transformed the financial fortunes of Mahindra and Mahindra during the five years since its launch.

- **SYNCHRONIZE OPTION CONTENT WITH PARTS**

A critical challenge in supply chain management in the automotive industry is the synchronization of sales and marketing requirements and forecasts with parts flowing in from suppliers. This challenge is tackled by demand management on the front end of the supply chain to be seamlessly linked to material requirements on the back end of the supply chain.

LINK THE SUPPLY CHAIN TO NEW PRODUCT PROGRAMS TO MANAGE

TOTAL ENTERPRISE COST— so as to manage total enterprise costs across product that is on research and development, operations and sales and marketing.

- **MANAGE CAPACITIES AND MATERIALS ACROSS THE GLOBAL NETWORK**

Automotive companies need a global view of demand in a common format to make decisions on capacity management, sourcing and profitable allocation of vehicle and option content.

- **OPTIMIZE PRICES, CHANNEL INVENTORIES AND THE ORDER-TO-DELIVERY PROCESS**

The automotive industry is one in which customers expect more content for less money, and regulators expect more safety, lower emissions and higher fuel economy.

- **EXTENDED SUPPLY CHAIN AND SUSTAINABLE RAW MATERIALS**

As automobiles incorporate more advanced technologies, the material content of vehicles becomes more varied. Ford has a long history of seeking to use sustainable materials in its products and source from suppliers that demonstrate sustainable business practices, including respect for human rights and the environment.

Logistics management aim at strategic coordination of traditional corporate cost centers such as purchasing, manufacturing, transportation, and warehousing so as to recognize functional synergies within the firm to better fulfill customer requirements.

A stronger buyer-supplier relationship will enhance performance throughout the chain. Exploitation of the supply chain by the power partner may lead to dissention and under performance, thus hurting the power holder. Likewise, a judicious use of power may serve to benefit the power holder.

SUPPLY CHAIN INTEGRATION: The supply chain integration strategy to corporate competitiveness is increasingly becoming relevant. It is critical to realize, however, that those firms which seek to lead the race to integrate the supply chain must become exhaustively conscious of their own power and effectively manage this power to support their integration strategy.

POTENTIAL BENEFITS OF INTEGRATED BUYER-SUPPLIER RELATIONSHIPS

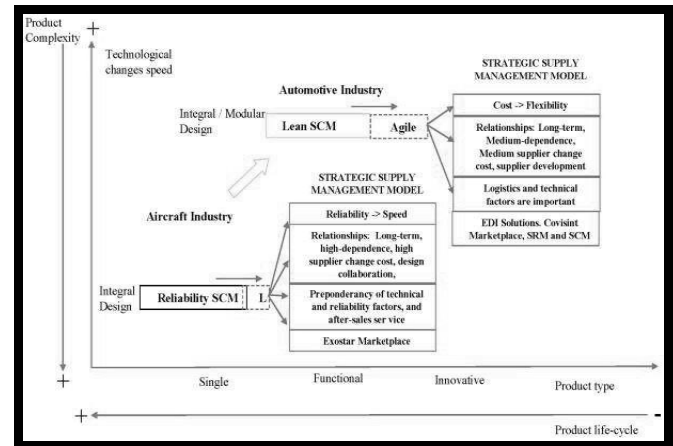
Reduced Uncertainty for Buyers in:	Cost Savings from:
• materials costs	• economies of scale in
• quality	- ordering
• timing and lead times	- production
• availability and responsiveness	- transportation
• decreased administration costs	• decreased switching costs
• market	• integration of processes, technologies
• understanding of customer need	• improved asset utilization
• product/materials specifications	
Reduced Uncertainty for Both in:	Enhanced Responsiveness from:
• convergent expectations and goals	• joint product and process development
• reduced effects from externalities	• faster time to market
• reduced opportunism	• improved cycle times
• increased communication	
• shared risk and reward	

• Leagile Supply Chain

—Leagile supply chain is coined by combining the concepts of lean and agile supply chain-

—Lean means series of activities or solutions to eliminate waste, reduce non-value added (NVA) operations and improve the value added, while agility seeks to adapt to the changing requirements of customers in time, and make organisations and facilities to become more flexible and responsive to customer's needs. Leagility is —a system in which the advantages of leanness and agility are combined by positioning the decoupling point so as to best suit the need for responding to a volatile demand downstream yet providing level schedule upstream from the decoupling.

The Framework Of Leagile Supply Chain Is Depicted In The Following Picture:



Source: Eva Ponce-Cueto, a Conceptual Model for Integrating Strategic Supply Management

CASE STUDY- FORD

Ford's suppliers are critical allies in helping the Company to achieve success in the marketplace and meet sustainability goals. They promote long-term relationships with suppliers and seek alignment with them on sustainability-related issues such as greenhouse gas emissions management and human rights. Within Ford's Purchasing organization, the Supply Chain Sustainability Department develops and implements strategy for engaging with suppliers on sustainability issues. The group also helps build capability within the Purchasing function to address sustainability issues through routine business processes. Since 2005, Ford has been taking steps to rationalize and streamline its supply base through a strategic supplier strategy called the Aligned Business Framework (ABF). The strategy is designed to create a sustainable business model to increase mutual profitability, improve quality and drive innovation. What it means in practice is that they are working more closely and collaboratively with a smaller number of global strategic suppliers. Ford has approved a total of 102 ABF suppliers, 12 of which are owned by minorities or women.

THE 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 increasing requirement 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 keeping costs under control. In regard to the —green challenge, the focus on the environment might reshape this supply chain scenario even more radically. Rising energy costs, regulation concerns,

and the demands of conscientious customers require automakers and their suppliers to reduce the carbon footprint of their entire operations—including supply networks.

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