

# An Investigation on Supply Chain Performance: A Study of Indian Automotive Industry

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## ABSTRACT

*In manufacturing industries or the supply chain, very few attempts have been made in the past to measure service quality or to test the linkages between service quality with supplier's satisfaction and loyalty. Thus, to fill the existing void in the literature, an attempt has been made to conceptualize a model proposing linkages of service quality with supplier's satisfaction and loyalty in the supply chain of automotive industry. The research design for this paper includes a combination of literature review and a survey of 220 and 170 practitioners from four and two automobile manufacturing companies located in Northern India and Western India, respectively. Structural Equation Modeling Techniques (SEM) has been used to examine the relationships among the variables and to test the goodness fit of the proposed model. Set of propositions related to model was empirically tested at supplier-manufacturer dyad and with an optimum fit of model, found that the data fits the model.*

## 1. Introduction

The economic growth of a nation largely depends on three sectors, namely agriculture, manufacturing and the service sectors. In the Indian context, higher dependency and correlation has been found between the manufacturing and the service sectors. As it has been very rightly observed by Gupta and Singh (2012) that "It is very easy to calculate the loss due to poor sale but it is very difficult to calculate the loss due to poor service quality". One of the manufacturing sectors that is on the verge of a revolution and is predicted to become the global hub is the Indian automobile industry. This has happened as all the leading automobile manufacturers of the world have set manufacturing facilities to serve the local market and expand their reach globally. In order to accomplish their targets and to have better competitive advantage the Indian automobile companies have taken lead in adopting supply chain management practices. The reason behind this as sighted by Christopher (1992), is that supply chains compete and not the companies. Also, it has been widely accepted and observed that increase in satisfaction of each member of supply chain can be brought about by only putting aside the traditional arms length relationship and developing closer partnership type arrangements. In developing such type of relationship, service quality has been recognized as an important tool. Also the relation of service quality with improved supply chain performance has been well accepted (Chow et al., 1994; Kearney, 1994; Mentzer et al., 1999, 2001; Pery and Sohal, 1999; Stanley and Wisner, 2002). In the context of supply chain, it is also evident that service quality not only has impact on suppliers, distributors, customers and employees but it also affects the overall business and growth of the organization.

However, despite this universal recognition of the importance of service quality in supply chains, according to Nix (2001), this area has been little researched. Therefore, this paper attempts to address the need for more empirical based research into the experience of service quality between

the business to business customers (manufacturer-supplier dyad) specifically in the context of Indian automobile industry.

## 2. Supply Chain Management : An Overview

Many organizations today are forced to increase their global market share in order to survive and sustain growth objectives. At the same time, these same organizations must defend their domestic market share from international competitors.

The challenge is how to expand the global logistic and distribution network, in order to ship products to customers who demand them in a dynamic and rapidly changing set of channels. Strategic positioning of inventories is essential, so that the products are available when the customer wants them (Handfield, et al. 2002, p. 38).

**Domenica (2002, p. 8)** also claims that supply chain should actually be efficient and effective. In this case, efficient means to minimize resource use to accomplish specific outcomes; and effective, in terms of designing distribution channels.

Efficiency is measured by delivery performance, product quality, backorders and inventory level, whereas effectiveness is measured by service quality and the service needs.

Long-term competitiveness therefore depends on how well the company meets customer preferences in terms of service, cost, quality, and flexibility, by designing the supply chain, which will be more effective and efficient than the competitors'.

Optimisation of this equilibrium is a constant challenge for the companies which are part of the supply chain network, shown in Figure 1.

To be able to optimise this equilibrium, many strategic decisions must be taken and many activities coordinated. This requires careful management and design of the supply chain. The design of supply chains represents a distinct means by which companies innovate, differentiate, and create value (Longitudes 04, 2004, p. 8). The challenge of supply chain

design and management is in the capability to design and assemble assets, organizations, skills, and competences. It

encompasses the team, partners, products, and processes.

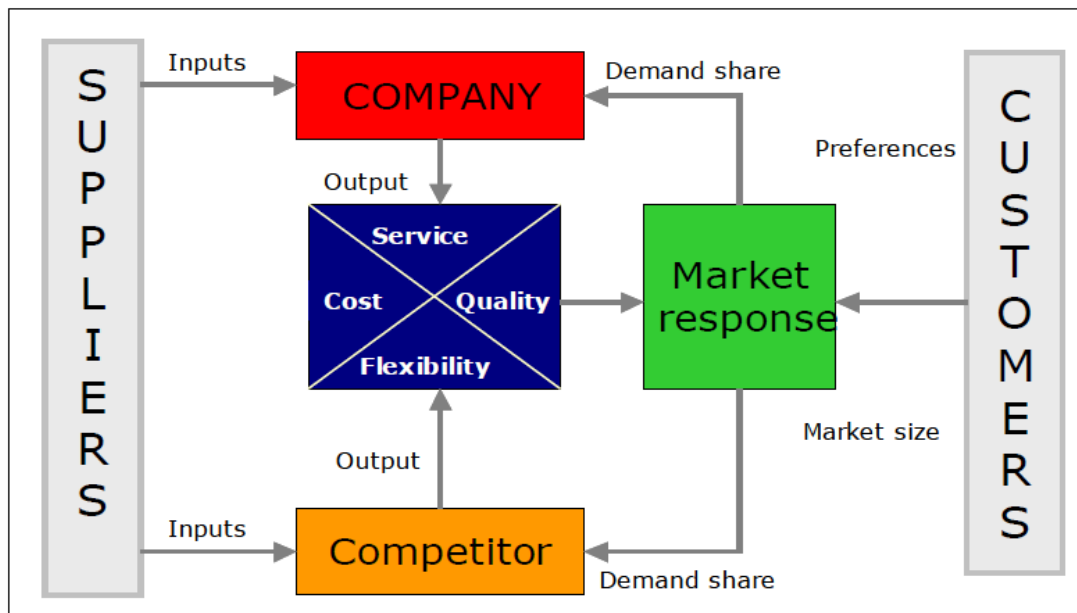


Figure 1: Competitive Framework in the Supply Chain.

To understand the term of supply chain management in depth, first the term of supply chain will be explained, than management and the role of management as a base for complete definition of supply chain management.

According to Mentzer, et al. (2001, p. 5) the definition of "supply chain" is more consolidated as definition of supply chain management. In his study, he tried to make a common definition of a supply chain, based on a comprehensive research

study conducted by several co-authors. They came up with the following definition: "A supply chain is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer".

#### Main Human Resources issues facing the Supply Chain Management:

- Job Attraction & Retention
- Education and Training
- Moving with technology; and
- Succession and career planning.

### 3. 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 (after Japan) 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.

The above scenario indicates that the Indian automotive industry has potential for substantial growth. This makes it imperative for the industry to attain competitive advantage through adoption of global supply chain best practices.

#### 4. Methodology

The primary method used to develop this paper is the case study approach. Since, the purpose of the paper is to understand successful strategies in emerging markets; the literature review was descriptive of existing practices in various industry segments across India. To isolate successful strategies and provide a description of these strategies, case study methods can be used (Huberman and Miles, 2002).

##### Sample Selection-

Companies from two different industry segments were samples for this paper case studies. PepsiCo India and Tata Motors were the companies selected as the principal samples to represent the consumer product goods industry and the automotive industry respectively. The Pepsi Bottling Group (PBG) and General Motors (GM) were the companies selected as affiliate companies, respectively.

**Sample selection for the Consumer Product Goods Industry** - The consumer product goods industry requires high volume supply chains irrespective of region or market. Due to the presence of such supply chains in developed (Western) markets, the selection of such a segment would serve as an excellent platform to compare and contrast the differences between developed and emerging markets. In addition, it would also serve to realize what strategies are transferable or not between established and developing markets. Based on A.C. Nielson's list of billion dollar brands, several consumer product goods and their respective manufacturers were reviewed.

**Sample Selection for the Automotive Industry** - The automotive industry is one of the high technology dependent industries that attain significant growth in an emerging market. The rapid increase in passenger cars and consumer spending on vehicles are a characteristic of emerging markets.

Tata Motors was selected as a representative of this segment because of the impact that it has made in the Indian and international passenger car industry within the last few years. While Tata Motors is not the leading automotive company in India in terms of market share, it is the most

talked about company since the launch of its innovative line of passenger cars such as the Indica and the recent S2500 Nano in addition to the \$5000 truck, the Acer. The impact of such low priced vehicles in an emerging market like India is unfathomable at this point because of the sheer size of the market it could potentially capture. For this reason, the Tata Nano's supply chain was specifically focused on for the case study. In addition, the support of Tata Motor's parent company, the Tata group which is a conglomerate of successfully established companies spanning from Tea to Steel also makes it an interesting company to understand its strategic advantages in India.

GM the largest automaker in the world is also the biggest player in an emerging market like China. However, it is yet to make as much of an impact in India even though it had indirectly been involved in operations of Indian brands such as the Maruti-Suzuki. For this purpose GM was selected as the affiliate company of the automotive industry even though it is a competitor to Tata Motors. How the data was collected and analyzed once all the sample companies were selected.

##### Data Collection and Analysis -

Data for this paper is descriptive and qualitative information on strategic approaches and practices of the sample companies and their affiliates. Data was mostly gathered from interviews with people associated with the selected companies. Additional information was also obtained through the form of analyst and annual reports as well as literature and internet resources suggested by the interviewees.

Literature and internet resources were used to a lesser extent compared to the data directly obtained from the interviews.

The next two sections, describe in greater detail the interviewee selection process and the interview protocol used to collect the data. The last section in this study describes how the analyses of the cases were done.

**Interviewee Selection** - The interviewees were employed or previously employed at the selected companies and affiliates. They belonged to supply, manufacturing and production, global strategy, or distribution and marketing divisions within the firms.

These operations divisions were selected because of their relevance to providing data specific to supply chain strategies. Marketing is also significant because of its ability to influence supply chain divisions and since both companies are predominantly marketing driven companies as opposed to sales driven companies. The personnel were from positions ranging from non-C level upper management to assistant managers. Management positions were selected to understand the strategic decisions made in the company at macro as well as micro levels. This is based on the assumption that most management decisions at the macro level are made by the upper management where as the micro level decisions are mostly directed from the middle through lower management officials within a multinational.

##### Data Analysis -

The data collected were analyzed in two distinct approaches; individual case analysis and cross-case analysis.

The first approach isolated strategies based on individual case data and identified the strategies that yielded successful results. It also identified those strategies that were responsible for the challenges facing the companies currently.

This approach also compares and contrasts the strategies of the affiliate companies with their respective sample companies and may include details of trends within the industry.

In the second approach data from both the cases were used to compare and contrast the selected industry segments. In addition this section also compares the sample companies with other companies from their respective industry segments based on the findings in the literature review. The purpose of this analysis is to isolate interchangeable and non-interchangeable strategies in supply chains across regions and industries. In particular, the differences between the supply chain practices of the companies in India and the U.S. are evaluated to understand how strategies in emerging markets may or may not be different from developed markets based on industry segment.

## 5. Conclusion

India's business process outsourcing industry is renowned over the globe. However, the country has also been making forays into the manufacturing sector and it is working hard to change its reputation as a low-quality manufacturing

center. With a very large number of skilled, English-speaking engineers graduating each year, India is looking to differentiate itself from China by focusing on skill-intensive design and manufacturing outsourcing. Furthermore, it has abundant natural resources. Several multinational corporations are therefore currently looking at India as a high-potential sourcing opportunity.

India is also a highly attractive demand market. With a 300 million strong middle-class, a young population and increasing urbanization, it ranks among the ten largest retail markets in the world.

However, these opportunities can seem insurmountable due to the many challenges and inherent risks of doing business in India. First, the fragmented supplier base, and the lack of quality management and transparency at the supplier's end can make it hard to procure raw materials, spare parts or finished goods from India profitably and without running the risk to harm your brand image. Secondly, the creaking transportation infrastructure, capacity constraints in seaports and frequent power outages intensify even more the challenges of sourcing profitably from India or getting your goods to the Indian market. Third, the absence of organized retailing makes it hard for manufacturers to get their product to the Indian consumer. Restrictive government regulations and a very complex taxation system represent a fourth hindrance to setting up effective distribution and retail networks.

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