

Planning Lucrative Supply Chain for an Automobile Industry

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Abstract—As you know, in the present scenario of immense competition each and every automotive company is beholding to improve their every segment of their supply chain to improve their sales and to increase the profit margin. This paper basically deals with the guidelines to improve and plan a supply chain for an automobile industry to stand as healthy competitor in the upcoming challenging world. Thus day by day we are planning for the best to come out of the supply chains. Our motive is to design such a supply chain that would be profitable to the industry. We need to plan a beneficial network of supply chain.

Keywords: Supply Chain, Supply Chain Management, Supply Chain Decision,

1. INTRODUCTION

A supply chain is a network which consists of all parties involved directly or indirectly, fulfilling a customer's request. The supply chain not only includes the manufacturers and suppliers, but also the transporters, warehouses, retailers, and customers themselves. Well-planned and well-designed supply chain will result in the progress of industry. A recent study of supply chain activities indicated that as much as 80% of total supply chain costs are determined by the network in place and not by the decisions the supply chain team makes on a daily basis within that network. The cause can be attributed to structure, which significantly determines the types of decisions and degrees of freedom that are available to supply chain decision makers. As a result, many companies have literally staggered into difficulties associated with warehouses, distribution centers and sources of supply (manufacturing, supplier locations, etc.) due to lack of worthy design.

2. FOREMOST CONCERNS IN AUTOMOBILE INDUSTRIES SUPPLY CHAIN

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” [1] 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 [2].

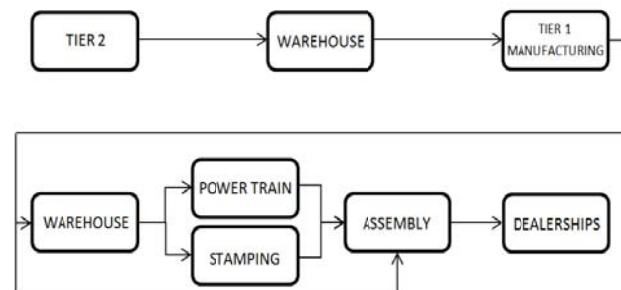


Fig. 1

Fig. 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 [3]. 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 [4] and there is a definite correlation between implementation of Supply Chain Management (SCM) practices and quality and conformance of design [5].

Toyota's Production System enshrining lean thinking has long since been an industry benchmark [6] [7].

3. POINTS TO LOOK OVER FOR A BETTER SUPPLY CHAIN

Keeping the below stated policies at the forefront of consideration can create opportunities to ease pressures on margin and the bottom line.

- **Network structure, which determines 75%- 80% of total supply chain costs, offers the biggest opportunity to reduce those expenditures:** That's because when manufacturing and distribution assets are in place, and major transportation contracts are negotiated, actions to improve operations and efficiencies in the supply chain are limited. The time to discover the biggest supply chain improvement opportunities is during assessment or reassessment of the infrastructure in place; e.g. manufacturing capability, raw material sourcing, major transportation lanes, distribution facilities and delivery to customers.
- **Optimize supply chain infrastructure to realize maximal cost savings:** A company's existing supply chain infrastructure is a primary cause of daily disruptions and short-term challenges. Those companies that experience the smoothest and most profitable operations are the ones who routinely re-evaluate both operations and infrastructure. Those who reevaluate as a matter of procedure tend to become supply chain and profitability leaders. A recurring evaluation of infrastructure should be considered a necessity.
- **Understand the changes that can be impacted:** Change is inevitable, and the response to it will determine a company's profitability. First assure that the processes and tools are in place to recognize the changes occurring in the supply chain. Then identify and analyze potential courses of actions and communicate the execution plan.
- **Consider technological analysis to make the supply chain decisions:** Spreadsheet analysis can evaluate a potential change in a business plan or supply/demand balance and perhaps project the impact of a given course of action. However when decisions involve multiple products made across multiple manufacturing sites, shipping and distribution point issues while serving thousands of customers, companies need sophisticated tools to effectively consider all the options to assure maximization of every supply chain infrastructure.
- **Modern infrastructure planning requires a collaborative effort:** Good supply chain operations happen because the people in charge of different aspects (sales, manufacturing, logistics, procurement and finance) are effectively communicating by:
 - a. Providing the critical data necessary to make the best overall decisions.
 - b. Understanding how each critical decision impacts them.
 - c. Informing each department of every decision and the steps they need to implement.
- **The planning process needs to include many different scenarios to ensure a robust solution:** Even with collaboration across all of the stakeholders, the supply chain infrastructure design process depends on forecasts of the future that will not all prove to be accurate; e.g. customer demand, competitors' actions, cost of raw materials and transportation. Those who recognize the uncertainty of the data that drives their business planning can use supply chain tools to explore different possible futures and evaluate a course of action. That way they can confidently make decisions that will perform well across a wide range of possible futures and position themselves for a positive return.
- **Consider hybrid solutions to ensure low-cost, high level customer service:** Simplified assumptions are quite common during evaluation and analysis of complex supply chain operations. These may cause managers to overlook opportunities that are combinations or hybrids. For example, instead of sourcing 100% of a raw material from a low-cost country, perhaps optimal customer service at lower costs can be achieved by sourcing 80% to the low-cost provider and 20% to a higher cost and more reliable alternate supplier. Another example is demand variation by day of the week, which may warrant different operations on different days. Hybrid solutions are frequently solutions for optimal mix of customer service and cost, however they are often difficult to identify and evaluate.
- **Models and analysis mean nothing without implementation:** A good supply chain infrastructure planning process begins with solid analysis and evaluation of various scenarios to identify an optimal course of action. However, it is not complete without implementation planning, which must address the cultural and organizational issues that too often prevent companies from achieving the gains that have been projected. If there is resistance within the organization to change, it may be necessary to stage the implementation in increments to gain credibility before tackling the more strategic approach.
- **Optimized supply chains minimize inefficiencies:** A good supply chain infrastructure planning process goes beyond elimination of waste to analysis of benefits and tradeoffs among the different drivers of sustainability in the supply chain. This by definition means that you are creating a greener and more sustainable operation. One example is analysis of tradeoffs between profit and other sustainability measures (for example CO₂ emissions). Using tools to analyze the total impact of different courses

of action can optimize decision making to meet the overall objectives.

4. USE OF SUPPLY CHAIN DESIGN TECHNOLOGY TO DEAL WITH AUTOMOTIVE INDUSTRY FORTHCOMING CHALLENGES

Controlling the inbound transportation network and evaluating alternate network designs can reduce costs, improve service times and minimize asset usage. Here are a few examples of how automotive manufacturers and suppliers have leveraged supply chain design technology to create efficient inbound supply chains.

- **Facility selection:** Sourcing decisions are some of the most vital ones automotive manufacturers face. This challenge is often referred to as the “off-shore vs. near-shore” or “low-cost vs. local” question. By using modeling technology, companies can make supplier and manufacturing location decisions that are optimized across the entire supplychain, identifying the tradeoffs across all the different cost elements.
- **Transportation route optimization** can be done alone or in conjunction with either supply chain optimization or simulation. Using advanced algorithms, transportation routes are defined to minimize the cost of inbound shipments, while considering realistic cost and constraint structures. This helps answer the questions, “What’s going to happen to our transportation routes when the network design is changed?” or “Could there be a more efficient way to get our product from the supplier to production?”
- **Product flow-path optimization:** The process of moving products from supply through production and eventually distribution presents myriad choices. The collective set of these choices make up a product’s flow-path through the supply chain. Modeling all the alternative flow options and using smart algorithms to determine the best choices takes the guess work out of these decisions and provides a useful reference in boardroom discussions.
- **Consolidation center selection and analysis:** For a company with multiple suppliers making different products in a relatively small area, a consolidation center (CC) may be used to combine smaller shipments for fewer larger shipments and reduced transport costs. Flow path optimization can identify which products/suppliers should go to a CC, and network optimization can recommend where and how many CCs may be needed.

5. CONCLUSION

For an automobile company to survive in the present global cutthroat environment, organizations need to show an increased awareness to customer’s needs and also a checkout towards the overall profit. Hence, there is a focus on a customer-centric business models and integration of the profitable methods for a supply chain to benefit the industry. It is useful to ponder around the problems occurring in supply

chain of a automotive industry as a whole. This paper assembles such weak points and suggestions on how to solve them. The Automotive industry is currently poised at a stage of transformation with challenges and trends which are unique. Integrating all the plans and strategies for designing a lucrative supply chain will take the industry to cloud nine and will definitely result in success.

Currently, automotive companies are embroiled in a worldwide industry transition. In this changeover we need to concentrate on the profit of an industry which can be done by getting over through the supply chain problems. Thus, a better planning of a lucrative supply chain would be helpful.

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