

**GLOBALIZATION IMPACT AND STRATEGIC MANAGEMENT OF SUPPLY CHAIN:
THE BMW ROSSLYN AUTOMOBILE INDUSTRY CASE STUDY****^{1,*}Nwaneri Amanze Earlington and ²Chinedum Onyemechi**¹Faculty of Civil Engineering, University of Leeds, United Kingdom²Department of Maritime Management Technology, Federal University of Technology Owerri, Nigeria**Received 10th March 2023; Accepted 14th April 2023; Published online 26th May 2023**

Abstract

Globalization changes the face of engineering over the last decade. This study will review the impact of globalization of the supply chain on the strategic behavior of BMW Rosslyn automobile company and their management of projects. This essay will start to talk about the definition of globalization as well as its challenges in the BMW Rosslyn automobile plant. It will move further to review the supply chain strategies adopted by the BMW Rosslyn automobile industry by first of all identifying the idea of globalization in the automobile supply chain frame work, determining the challenges associated with globalization of the supply chain to an automobile industry, evaluating the several types of supply chain strategies that are present in the automobile industry, demonstrate the circumstances for execution of these strategies as well as create a supply chain strategy that could react to changing customers' needs.

Keywords: Globalization, Supply Chain Management, Automobile Industry.

INTRODUCTION

Increasing customer needs, rising and falling market requirement and also fierce competition (Cheng and Zhang, 2006) has triggered the customers to increase its demand with additional choices. Rutherford and Christopher (2004) stated that this will be a consequence of these days market, recognized by reduced product life-cycle, additional competitive product introductions as well as unpredictability in demand, which are making the life cycle unclear and also hard to predict. Within the automobile companies, the modern day contributing mainly in globalization has generated substantial opportunities, and also at this same time frame, put pressure on the producers to improve quality, enhance styling, improve organization efficiencies and also generate impressive features to their products in order to catch the attention of the customers as well as grow into new markets. Most of these issues means that automobile producers must be flexible and attentive to customer requirement to be able to succeed. The crucial role associated with supply chain management (SCM) in improving the automobile effectiveness cannot possibly be underscore. Regulators and companies as mentioned by (Hugo *et al.*, 2004; IBM, 2009; Guna Sekaran and Ngai, 2004) have in a way or another recognized the actual role of supply chain as a method of obtaining competitive edge against other companies in the automobile industry. The automobile industry has gone through substantial structural modifications in the last ten years. Furthermore, the last twenty years has witnessed SCM practices highly-developed towards more lean procedure methods, so as to improve supply chain performance, i.e. minimizing costs and also eradicating inefficiencies. Principles for example supplier base rationalization; outsourcing; reduction in the number of distribution facilities; reduction of buffers in material; just-in-time; customized and global networks; capacity and time have

resulted to changes in the supply chain efficiency specifically in minimizing costs. As a result of weakness along with confusion within the business environment, lean supply chain is unable to manage the changes in customer requirements. According to Gerth and Sweicky (2008), the features in the traditional downstream supply chain tends not to create conditions that will react to modifications in business environment except for low priced and waste reduction value stream mapping. Hence, lean is just not a common strategy to satisfy the many requirements of the supply chain. To realize a substantial level of flexibility as well as customer's ability to react quickly, combining lean idea along with new technology is necessary for easy design of new streamlined operations on the store ground and beyond. According to Elkins *et al.*, (2004) the Agile supply chain methods enable quick economical reactions to unforeseen and ever-changing product requirement, and also assist in fast declaration of unexpected products customized to meet up with ever-changing customer wishes. Lately, scholar's interest has aimed at lean supply chain strategy in line with the combination of lean along with agile strategies. The lean idea (Mason Jones, 2000; Naylor *et al.*, 1999) has developed into a well known method to better adjustment to alterations in the company environment in order to handle the market as well as customer requirements in a more positive approach while keeping high degree of operational performance.

Bmw Rosslyn automobile plant industry**Overview of the project**

The BMW Rosslyn industrial plant is situated in Pretoria, South Africa. It has been the first BMW production line setup outside Germany, with production commencing in 1974. The plant exports more than fifty thousand 3-series cars annually and it has a substantial improvement in local content. The business employs close to two thousand five hundred men and women as well as delivers about two hundred and twenty

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units/day. The supply chain strategy at BMW commence from the customer and stops at the customer. They utilize built-to-order method to provide their customers what they really want. Customers can make their particular demand through the dealers. The details will be conveyed to Germany. The detail will be captured in the main information base. Bill allocation is conducted to find out the cost of production as well as determining the location where the car is going to be produced. All the parts are generally supplied on built-to-stock basis for the design life of the imported car. Parts are generally acquired at the Cape Town international Airport simply by shipment. It will be presented to the BMW Rosslyn plant factory in Pretoria where the assembly normally takes place. As soon as assembled is done, its delivered to the storage warehouse where it can be transferred to the dealer completely ready for collection by the customer. Several producing techniques at Rosslyn industrial plant incorporates production of cars, exportation, high quality specifications and also the utilization of mySAP technology for improving communication. MySAP automobile minimizes the order-to delivery time period, fortifies the supply chain strategies in areas involving demand, organizing as well as tracing and tracking of material deliveries. It increases inventory reliability throughout the plant factory. BMW is actually dedicated to applying environmentally favorable, technological sophisticated ways to improve the quality of paintwork, with regards to physical appearance and performance. The paint shop in Rosslyn plant gives BMW the flexibility to fabricate cars that will satisfy the customers' particular demands. To guarantee the best possible customer full satisfaction, the standard of the cars produced at Rosslyn plant is actually tested by using a method known as Full vehicle Audit. This particular audit measures up the quality of one unit of the car to the customers' specification such as technical specifications and functionality. These audits are carried out during the entire assembly process at particular points. These types of rigorous audit standards are established in Germany by the central quality teams and are the same for every BMW plants. Rosslyn industrial plant is completely incorporated in BMW's global supply system and also has built itself as the quickest developing BMW plant on the globe. It's the sole subsidiary company outside BMW Group within Germany that integrates the car maker, the national sales as well as marketing company directly into a single organization. It is truly at the head of probably the most technologically sophisticated automobile factory in the southern hemisphere (Kaps, 2006).

Globalization

In general, the idea of globalization is described as (Scholte, 2000; Waters, 1995; Friedman, 2000; Mulgan, 1999) a global technique of improving connectivity concerning nations around the world, companies as well as individuals that involves in some sort of exchange, trade, distribution of quantifiable or even non quantifiable elements (Najjar *et al.*, 2000). According to Waters (1995), globalization is defined as a cultural procedure where the limitations of geography on social as well as cultural agreements recede and by which individuals turn out to be more and more informed that they are actually receding. From the financial viewpoint, Friedman (2000) states that globalization symbolizes improving capital flow along with trade of goods and services as well as multiplication of free-market capitalism to just about any region on earth. From the cultural viewpoint, Scholte (2000) asserted that globalization symbolized sharing and exchange of

thoughts, consumers protection and working conditions. From the legal viewpoint, Mulgan (1999) states the globalization represents the guidelines and restrictions involving organizations like the World Trade Organizations.

THE CONCEPT OF GLOBALIZATION IN THE AUTOMOBILE SUPPLY CHAIN FRAMEWORK

There are several improvements and developments within the business circumstances of these modern days. This means that companies are generally struggling with new challenging problems starting from economic uncertainties, globalization up to new technological improvements as well as rise in needs from the customers. Within the automobile industry, while producers design and assemble cars throughout the world, the supply chain grows more and more complicated with numerous issues that usually fill in the clear way of greater shareholder benefits and profit for instance lengthy purchase order to guide delivery periods, undependable manufacturing activities, and surplus stock throughout supply chain, insufficient presence of suppliers and very long demand preparing cycles. However, above these elements which prevent the effective supply chain in making enormous revenue is globalization. Globalization is actually the main obstacle that rates higher. As a result of the impact of globalization, in the future there will probably be a greater pressure on the automobile management to take correct decisions concerning their supply chains for much better efficiency. The near future environment regarding the automobile industry is going to be very tough and competitive and for that reason, an effective and better supply chain strategy is going to be a powerful tool for increasing the organization competitiveness.

In the future, a highly effective and efficient supply chain is a must for automobile producers as well as their component producers in order to generate income and also excellent market placement globally. In this particular active environment, an excellent supply chain is actually an important aspect in encouraging automakers in distinguishing themselves from competition. Actually, most of the automobile businesses are generally strengthening the requirements in order to introduce and also redefine supply chain strategies, design and procedures. In the event the technique could possibly be managed effectively, supply chain is the main force in developing sustainable edge against the competitors in the next competitive market.

Globalization challenges of the supply chain for an automobile industry

A lot of new challenges will likely be confronted by the automobile industry like BMW Rosslyn plant later on. Most of the important challenges which will influence the supply chain extremely are listed below (Ambe *et al.*, 2010);

- The actual variation already in the market demand as well as increasing customer needs is going to be crucial challenges within the automobile industry.
- Long demand cycles and also the insufficient presence of suppliers, resources and manufacturing limitations will result in arrangement delays and temporary modifications in production.

- The organization is going to be facing enormous global financial crisis. This can result in greater pressure on the competitive efficiency regarding automobile industry.
- The current focus on the weather changes is actually raising the pressure on the automobile management to take appropriate decisions in several areas such as R&D and also in production.
- Common macroeconomics and economic conditions will never be beneficial either.
- Incredibly strong variations will probably be there in exchange and also interest rate plus they are challenging and expensive against which to hedge.
- Since the global requirement will certainly increase, therefore the price of energy and raw materials will likely increase constantly.
- Expensive and low priced margins tend to be continuous issues experienced within the automobile sectors globally. Then, only a number of recognized companies are only going to obtain satisfactory revenue.

SUPPLY CHAIN MANAGEMENT

The extremely competitive global company environment as well as raising customer needs (Sahay *et al.*, 2006), have resulted in the improvement and also constant change and development of several related specialties such known as Supply Chain Management (SCM). Supply chain management (SCM) can be explained as the planning and also management of movement of product, value added procedure throughout the organization limitations to satisfy the important requirements of the final customer (Fawcett *et al.*, 2007). Typically, SCM consist of interactions along with handling the flow and out flow of product (Christopher, 2005; Samaranyake, 2005), information and services concerning the producers, manufactures and consumers. According to Sherer (2005) supply chain involves entire activities, functions and also facilities within goods and services coming from the material phase towards the consumer. Klemencic (2005) added that it includes an upstream supplier system along with downstream channel. Currently, several companies have grown to be a part of one or more supply chain. They need to do evenly very well to have greater performance. A standard supply chain may consist of supplier, production, distribution, purchasing and also customer as shown in figure 1 below;

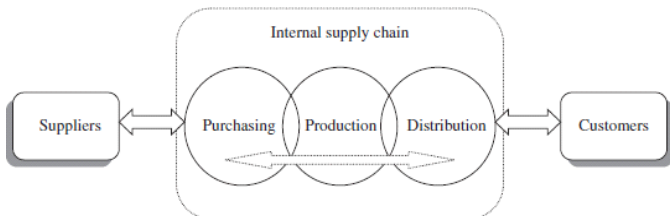


Figure 1. A standard Supply chain process (Christopher, 1992)

Supply chain management for BMW Rosslyn automobile industry

The automobile industry consists of supply management as well as physical circulation management. According to Qian and Tang (2007), the business supply chain extends from the manufacturers connected with raw materials to the assembly of the extremely advanced electronics and also processing systems. Hugo *et al.* (2004) added that the main part of supply

chain incorporate original equipment manufacturers (OEMs), dealers, suppliers (tier 1-3), distribution centers and customers. Furthermore, Dietz (2004) stated that the majority of automobile OEMs generates thirty to thirty five percent of benefits internally and designates the remainder to their own supplier. Producers bought all subassemblies, for example power trains, doors and also electronics from the suppliers. Benko *et al* (2004) added that the will to cooperate with associates in order to use outside agencies for subassemblies is actually resulting in a drastically brand new infrastructure to back up the planning, procurement, as well as strategic techniques of the producers. However, Qian and Tang (2007) realized that to boost their advanced ability, move vehicles to market quickly and minimize mistakes; automobile producers must enhance their improvement as well as administration skills by means of advances in computer aided process planning, computer aided engineering, product data management, computer aided design, computer assisted manufacturing, concurrent engineering, business process engineering ect. The figure 2 below is the overview of the supply chain management of automobile industry;

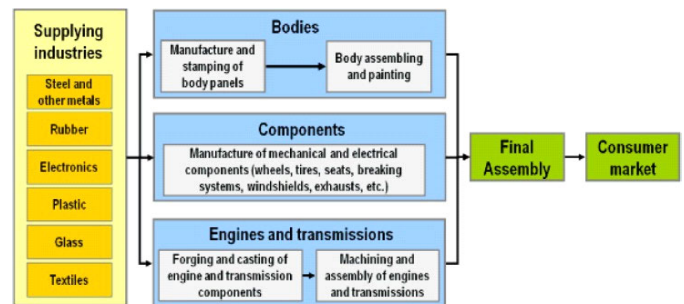


Figure 2. Supply chain management of Automobile industry (Pires *et al.*, 2003)

SUPPLY CHAIN STRATEGIES

Companies these days tend not to just operate at a cheaper cost in order to compete, although they need to build up key skills to differentiate it from challengers and also excel in the industry (Hugo *et al.*, 2004). Supply chain strategy is a component of the entire organization strategy, developed around a well-defined foundation of competition (creativity, low priced, service, high quality) (Cohen and Rousell, 2005). It can be incorporated together with marketing strategy and also customers' requirements, product strategy along with power placement.

According to Hugo *et al* (2004), within a rapidly changing worldwide economic system, absolutely no company exists in a vacuum. Meindl and Chopra (2004) suggested that a supply chain strategy is actually defined, in accordance with its challengers', collection of customer requirements that attempt to meet through its services and products. This requires making decisions associated with selecting suppliers, area of the facilities and also the selection of circulation channels. According to Christopher *et al.*, (2006), now it's significantly recognized that "one size will not suit all" in terms of developing a supply chain strategy to compliment numerous products with various qualities distributed in variety of markets. Hence, Christopher (2005) suggested that supply chain strategies must be designed to complement the requirements available in the marketplace using suitable product or market conditions. Generally, there are three

fundamental concepts in creating a supply chain strategy that can satisfy the preference of the customer requirements (Fawcett *et al.*, 2007; Meindl and Chopra, 2010; Taylor, 2004; Hines, 2006). They are

Knowing the customer as well as level of uncertainty.

Learning the supply chain abilities.

Analyzing the options and deciding on the design.

However, Fisher (1997) created a structure to assist managers recognize the nature of their own products and invented the supply chain which can best meet that requirement. Lee (2002) and Jacobs *et al.*, (2009) suggests that according to Fisher (1997) structure, the products could be classified as primarily functional. All the categories need unique different varieties of supply chain resulting to the main reason of the supply chain issues. These categories and classifications generated four kinds of strategies in line with the characteristics associated with demand and supply. The strategies consist of according to (Holmstrom and kaipia, 2007; Jacobs *et al.*, 2009) are:

Agile supply chain Lean supply chain,

Responsive supply chain, Risk-hedging supply chain.

On the other hand, Christopher and Towill, 2001; Hull, 2005; Hallgren and Olhager, 2009; Pandey and Gary 2009; Manson-Jones *et al.*, 2000; Simons and Zokaei, 2005; Christopher, 2005; and Vinodl *et al.*, 2009, recognized the two major supply chain strategies. These types of strategies are called generic or leagile supply chain strategies including agility and lean. Lean is most effective in high volume, low variety and also foreseeable environments while agility is required in less foreseeable environment in which the need for wide variety is definitely high. Discovering these kinds of supply chain strategies may be suitable in various situations to put the product in a business portfolio in accordance with their own supply and demand features.

SUPPLY CHAIN STRATEGIES FOR BMW ROSSLYN AUTOMOBILE INDUSTRY

Lean supply chain strategy: The lean supply chain utilizes constant enhancement initiatives that concentrate on eradicating waste or maybe non-value measures across the chain (Wee and Wu, 2009). The idea is backed by efforts to accomplish internal producing efficiencies and also creating a time reduction, which allow the economic production manufacture small volumes and improve cost reduction, earnings and producing flexibility to some extent (Rahminia *et al.*, 2009). The limited setup times offers internal flexibility, although a lean supply chain might lack external reactivity to customer needs, which could demand flexibility in product design, organizing and arranging, circulation in addition to production. Since the exchange rate rises in the market, the lean supply change strategy has developed into “several market competition”, which will be the production of any quantity, perhaps just one unit, together with the capability to meet several market sections (Kollberg *et al.*, 2009). Automobile companies must observe that combining with the additional variety and reactivity contact, they have to stay flexible to potential changes. Customer demands are generally

consistently changing and also product life cycles tend to be shorter, hence, together with lean, supply chain should react to the market.

Agile supply chain strategy: Rahminia *et al.* (2009) states that the effective use of agility to the technique of supply chain has been presented in order to transfer and utilize the winning technique of agility to that regarding supply chain. Furthermore, Christopher and Towill (2000) added that agility in the actual framework of SCM concentrates on reactivity. Lee (2002) proclaimed that in these days of complicated and difficult supply chain, agility is very important in worldwide competitiveness. However, Swierczek and Kisperka-manson (2009) reported that the actual drivers at the rear of necessity for agility in supply chain resembles to the ones that drove the creation of agile producing idea and also originated from the rate of change and issues in the company environment. Agility in the supply chain, in line with Sharifi and Ismail (2006), is actually the capability of the supply chain as a whole and its associates to quickly adjust the system and its procedures to continuously changing demands of the customers. Moreover, in the automobile business, products could be sold at reduced amount using a higher-level of wide variety, allowing the techniques of “mass customization” being chased. One of several traditional example of this kind of strategy would be the delay of colour of paint of vehicles at the customer stage. Instead of keeping numerous premixed colours, retailers started to stock paint in a neutral colour, and customize with the ultimate colour depending on a particular customer requests.

Leagile supply chain strategy: The automotive market is presently witnessing quick improvement in the amount of models as well as model versions that exist around the global market. The market is currently instructed to provide for the rising levels of product variety. An essential concern in this particular industry will be the dependability of the production as well as the delivery procedures. An undependable production and delivery procedure perpetuates the stock push process as dealers trade from stock instead of placing automobiles on order and risk making the customers upset (Krishnamurthy and Yauch, 2007). Every customer order should turn into a batch-size-of one, achieving specific customer demands with regards to standards and delivery day. Thus, an essential alternation in a way of thinking is necessary to move towards build-to-order, recommending remarkable increase in flexibility and reactivity across the supply chain associates.

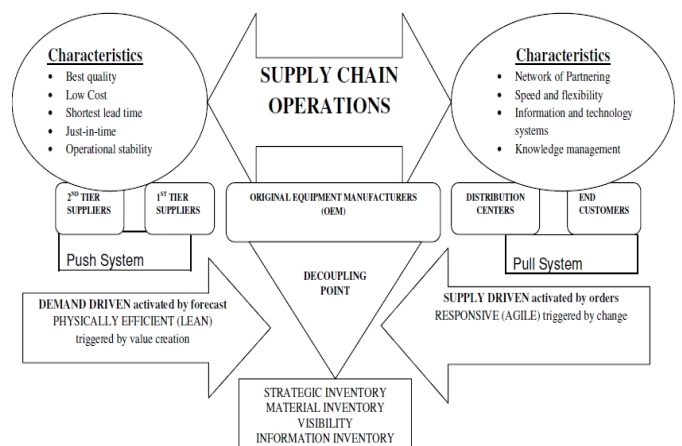


Figure 3. Leagile supply chain in the automobile industry.

Leagile supply chain is designed in order to infuse competitiveness within an establishment in an economical manner (Krishnamurthy and Yauch, 2007). Leagility is actually the mixture of lean and agile models within a complete supply chain strategy by placing the decoupling point in order to match the necessity of addressing an unstable demand downstream, and offering level schedule upstream through the decoupling point as shown in figure 3 below (Vinodl *et al.*, 2010; Hull, 2005; Rahminia and Moghadaian, 2010). The decoupling point is the boundary whereby the transition from the built-to-forecast function to built-to-order function occurs. Therefore, making use of a leagile supply chain helps to ensure that an establishment will certainly reduce cost, preserve consistency while as well be flexible and attentive to customer requirements. This can bring about competitive edge through innovation, services, cost and also quality as demonstrated in figure 4 below.

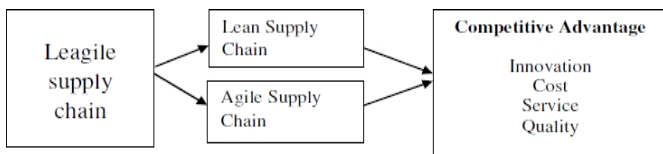


Figure 4. Attaining competitive edge through leagile supply chain (Christopher, 2005)

Agile supply chain is really a profitable strategy for the progress of the company while lean supply chain is really a pre-requirement with regards to the creation of an agile supply chain, thus leagile supply chain is definitely a strategy for competitive edge.

Impact of globalization of the supply chain on business approaches in the BMW Rosslyn plant industry

The automobile companies are usually at the leading position of setting up the global commercial infrastructure. The automobile industry is going to be confronted by several issues at the global stage. So as to generate enormous revenue and also to effectively build and increase their current facilities at the worldwide level, they will certainly need to generate an effective and sensible supply chain strategy, maintaining potential market in mind. Within the globalize market, some other companies will likely seek to generate an excellent reputation and revenue and for that reason, automobile companies are likely to get high competitions from several other companies. BMW Rosslyn plant has completely incorporated techniques and network globally. It utilizes service management method as an ingredient of a wider strategy to boost the supply chain lifecycles. This system is actually induced by difficulties in the technology inserted in vehicles and following the need for techniques to compliment servicing. It utilizes a portal in order to combine information along with techniques featuring its suppliers. This can lead to faster information system regarding communication. Furthermore, it employs sophisticated engineering programs like mySAP, built-to order, just in time manufacturing that happens to be features of lean manufacturing as well as innovations. Regardless of the productive supply chain techniques, technology driving the process must be seamless and as quickly as possible for survival during these unstable periods. Table A on the next page displays the list of characteristics of lean and agile associated with BMW Rosslyn automobile plant.

Table A. list of lean and agile characteristics of BMW Rosslyn plant (Kaps, 2006)

Features of BMW	Lean characteristics	Agile characteristics
Just-in-time manufacturing	✓	
Total quality management	✓	
Reengineering	✓	
Build-to-order	✓	✓
Benchmarking	✓	
Market sensitivity	✓	✓
Differentiation	✓	✓
Flexibility	✓	✓
Competency	✓	
Adaptability	✓	✓
Collaborative relationships	✓	✓
Information systems and integration	✓	✓

BMW Rosslyn is definitely flexible to customer requirements, offering the choice to enable them to prescribe any type of cars they desire at the suitable price available. Cars are designed-to-customers requests instead of by mass production. For instance, different strategies are being used during painting together with selections of the car functions with regards to ease and comfort, thus flexible production. They actually do not maintain inventory considering that the strategy is concentrated on built-to-order, therefore cars are produced in series since the order are positioned by making the demand planning throughout the teams of the supply chain. This means that the implementation of the structure of leagile supply chain is quite possible in order to respond to adjustments in the market. Usually, the automobile industry uses mass production concentrating on cost reduction strategy. However, because of the adjustments in the business environment, globalization and so on, there were some sort of change from this practice. BMW Rosslyn along with the automobile industry generally has experienced the effects of global economic crisis causing a noticeable reduction in sales and also exportation around the world. In addressing this kind of problem, BMW Rosslyn has aimed at cost reduction strategies using suppliers and minimizing production plants as some sort of measures to ease the problem. Obviously, cost containment is really an issue which is an established fact in the automobile agendas. As observed by IBM (2009) study, presently there are 5 main challenges experiencing by automobile companies during these unstable periods. This consists of visibility, cost containment, risk, customer requirement and globalization. Furthermore, the increasing energy cost as well as the raw materials and rates of interest also contribute to the challenges associated with automobile companies to a greater extent. In this particular unstable business environment, along with lean manufacturing, automobile producers must be agile and reactive in responding to changes. An excellent supply chain is essential to assist automobile companies modernize and distinguish themselves. For this reason, there is certainly the necessity to redefine and also redesign the automobile supply chain strategies, operations, layouts in order to have the ability to react to ever-changing market requirements. It must be acknowledged that the automobile industry have specific agile features and also the execution of a leagile supply chain is critical regarding the survival of the automobile industry in this unstable periods and many years to come.

Conclusion

The features of automobile industry are going to be subjected to some important issues in the future. There may be much more difficulties as a result of increased globalization which means that several new issues will certainly arise in the automobile companies and thus, they must subdue these kinds

of difficulties in order to find new strategies to generate revenue if they wish to be successful. In future years, the earth is going to be very competitive, thus the necessity of an effective global supply chain strategy will end up a requirement for automobile industries. This can be achieved by the optimizing their current supply chains as well as facilities and creating an effective and far better supply chains and techniques that will realize them excellent market placement and also reputation, possibly in a very globalize markets. In addition, this study recommends a structure for leagile supply chain for BMW Rosslyn automobile company. Using this structure, it would likely guarantee cost reduction and as well react to customer requirements. The market is facing global financial crisis. It has resulted in increased demand on automobile competitive overall performance. Therefore, leagile supply chain will be the strategy of the century which could relieve the automobile business from the present issues. At the moment, automobile organizations around the world are involved in a global industry transition. Roughly almost everything concerning their companies is actually changing i.e. their services and products, wherever and exactly how they are marketed. Automobile supply chains have reached the middle of the chain. With regards to automobile organization, coming out from this complicated time of transformation is good and it depends on the way they adjust to an effective better supply chains. The search in order to go global makes automobile organizations in the industry to think, plan, operate as well as invest in the near future with regards to opportunities and also markets around the world. The actual fact continues to be that there must be an integration of strategic objectives so that companies can react to customer changing demands and opportunities. Hence, globalization should not neglect innovation, technology, culture and also the environment.

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