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e-transformation: The Restructuring of the Supply Chain of Mature Business Industries via e-Technology

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ABSTRACT

The intent of this paper is to set the groundwork for the analysis of the impact of e-Technology on the supply chain of mature business industries. The analytical framework will be demonstrated via a critical industry in the USA, the automobile industry. Automobile manufacturing and retailing of such products has been greatly affected by advancement in e-Technology. On-line retailing has been maturing in the USA for the past six years, in particular, in the Business-to-Consumer(B2C) area. Automobile industry has to capitalize on this gain beyond the traditional information sharing. In addition, the major impact of the e-commerce environment will likely be in the Business-to-Business(B2B) area. The B2B area is estimated to account for more than 70% of the total transactional volumes in the years to come. The first part of this research will address the impact e-Technology has in the manufacturing end of the industry. Then the downstream of the Supply Chain will be discussed based on recent developments in the consumer sector in regards to the use of Information Technology in the E-commerce environment and their impacts on the consumer expectation from the automobile industry. Online transactions will be explored. The next part of the research will concentrate on the current and potential developments in the B2B area of the E-commerce world regarding the relationships between manufacturers and suppliers, such as e-supply management and e-postponement. Finally, the overall restructured supply chain of the automobile industry and the corresponding responsibilities of each business organization and relationship to each other will be presented and discussed.

1. Introduction

Depending on the geographical locations, there are many matured industries globally that face the difficult situation of limiting growth. This is especially true in the USA where population growth is very controlled and leveled. With competitive and investor pressure, it becomes imperative for these industries to transform themselves so as to position for the next decades. With pricing and volume growth as limiting factors, these businesses are increasingly focusing on exploring opportunities to re-invent themselves and further streamline their operations in order to provide additional values to investors. Competitively driven global businesses are swiftly capitalizing on the value of forging strong corporate alliances that achieve optimal operational efficiencies and flexible enterprise relationships with suppliers and customers along supply chains. The result is synergetic mutual competitive advantages for the aligned participants in a synchronized supply chain. Competencies and strategies are based in applications of information technology, operational analysis, and collaborative alliances that will reconfigure marketing/logistics channels and optimize process/distribution costs.

Through out the 80s with increasing global competitive pressure, businesses that strived had recognized the value of operational efficiency. Often time corporate strategies were focused on issues such as quality of product and customer service. Internal operating cost was of utmost importance. It led to successful business organizations that not only were with clear vision of the

future direction of their respective industry, but were also streamlined and lean operationally. With relentless pressure by global competitors and consumers during the 90s, such leading organizations recognized the need to further distance themselves from competitions. Operationally, it became obvious that a streamlined business by itself was inadequate to maintain competitive advantage. Leading businesses started to turn their attentions to exploit opportunities to work with their suppliers and customers. Strategic decisions were made not just with a single organization in mind but with the potential impact on suppliers and customers through out the whole supply chain of the industry. In particular, within each supply chain of an industry, there usually would be a dominating level that essentially had the ability to facilitate various changes within the industry. The focus became the synchronization of the respective supply chain with such level as the leading coordinator.

Generally, there are two tool sets that can be deployed to synchronize the supply chain. One tool set being the implementation of Information Technology such as e-commerce. As an example, the implementation of on-line ordering system in the airline industry has reduced transaction cost by up to 80%. Another tool set is for the analysis of operations functions such as inventory management, procurement, and logistics. For example, the recent implementation of the continuous replenishment concept coupled with the inventory aggregation effect has transformed various retailing businesses to the lowest cycle inventory level in history.

The intent of this research effort is to explore collaborative environments where both tools sets can be coupled for optimal value generation. The concepts are illustrated in the automobile industry in the USA. This specific industry most certainly is in a mature state and definitely is in need of a significant restructuring of its supply chain. For example, being in a replacement mode, that is new growth is insignificant, it most definitely is having difficulty in servicing the needs of the consumers based on the current practice of the push strategy in the supply chain. On the manufacturing side of the supply chain, collaboration with tiers of suppliers are in its exploration stage.

2. Upstream Strategies – B2B

From the manufacturing end of the industry, the main issue that the automobile manufacturers, the OEMs of the industry supply chain, face is the efficiency and speed of their processes. Internally the automobile manufacturers have to invest into gaining flexibility within their processes. It will allow the manufacturers to be able to respond to demands from end consumers' requirement and changes of taste as much as possible, raising the satisfaction level(service level) of the sector. The goal is similar to what has made famous companies such as Dell Computer, the concept of a demand-driven supply chain. Obviously the complexity of the automobile industry, which involves the assembly of a few thousands parts as compare of the tens of parts in the computer industry, makes the true practice of the concept very much impossible. But consumers in the automobile industry are not interested in the selection of individual nuts and bolts of their automobile. There are limited numbers of critical components

that differentiate one automobile to another from the consumer point of view, such as the stereo system and roof-racks. An ordinary consumer will not be interested the type of cooling system used in his/her automobile even if given a choice. It is the contention that on a limited basis, the automobile industry would be improving itself by practicing a demand-driven type of supply chain. Production cycle times will have to be reduced and lower batch size will have to be realized resulting in smaller amount of purchase from suppliers with quicker order cycle time. By shortening the cycle times it will lead to the reduction in process inventory overall. But the concept of reducing production cycle time via flexible manufacturing and modularized approach can lead to higher cost as a result. But this additional cost can be recaptured via the added ability to match demand with supply.

The practice of the postponement concept is critical in addressing the Total Cost of Production and Fulfillment. It will lead to the improved management of demand and supply controls. Finished product inventory is a major component of the cost structure in this industry. Major re-design of the products from a manufacturing point of view will have to be undertaken. But this practice has already been validated by the HP production of ink-jet printers as example. This is an area whereby the complexity of an automobile will provide an advantage since there are more opportunities for gains.

The implementation of the demand-driven concept can be greatly enhanced by soliciting the collaboration of the major suppliers. Leading edge practices such as Collaboration, Planning, Forecasting, Replenishment (CPFR) will have to be installed in order to advance the cause. In addition, at times, with the suppliers being in other countries, it will make the synchronization that much more difficult. It is necessary for the OEMs of the automobile industry to re-examine and differentiate the suppliers so as to be able to keep certain type of suppliers to be closer in proximity in order to maintain short order cycles and others to continue to strive for low cost and efficiency and remain offshore The issue of offshoring regarding suppliers and other major concepts will be examined in more details.

The utilization of e-hubs, as made popular by organizations such as Cisco, does show tremendous upside opportunities in the automobile industry. But as demonstrated by the joint efforts of GM, Ford, and Chrysler, via the electronic marketplace COVISINT, e-hubs are at times difficult to implement due to the necessary change in operational processes both for the OEMs and the suppliers. But with an estimated volume of one half of a trillion dollars, it would be a matter of time for the procedures to be re-designed to fit the e-marketplace environment.

A recent trend in supply management involving the use of the reverse-auction concept is certainly providing short term gains for the OEMs of anywhere from 15-20% immediate reduction in procurement cost due to the practice. But unfortunately the basic premise of reverse-auction is very much running against the fundamental principle of supply chain management of collaboration in between vertical partners. The potential instability of the supplier base can lead the automobile industry back to the era of the 70s where short term cost was the major objective of most of the American OEMs which basically destroyed the quality notion of their products. A return to that era is totally unacceptable and need to be avoided.

Most of the above-mentioned concepts can add significant values to the strategic directions of the OEMs of the automobile industry. But at times they do create internal conflicts. The trade-offs involved in order to optimize the total value will be presented in more detail.

3. Downstream Strategies – B2C

On the consumer side of the supply chain for the automobile industry, it has provided plentiful of opportunities for strategic re-positioning. Due to various factors, it is amazing that consumers have been willing to accept the common practice of the industry while often times purchase an automobile with less than perfect characteristics. Compromises at times have to be made in terms of color and other important features. This is at the expense of both the consumer and the industry. Consumers will have to settle for less than desirable characteristics on their automobile while the industry has to sacrifice in terms of revenue via discounts and rebates. The main culprit is the perennial mismatch between consumers' desires and the OEMs forecasted desires. So the Build-to-order(BTO) concept, as made popular by Dell, is of significant value to the automobile industry. Even though as mentioned above the difficulty involved with the implementation of this concept, the automobile industry can engage in a hybrid type of environment in the form of a virtual BTO system. This will be discussed in more detail at the presentation.

Conventionally wisdom dictates that in the e-commerce world, buyers would generally be benefited more than sellers. Usually it is due to the availability of information and access. So it is to the advantage to the automobile industry to establish the practice of standard-pricing. This will most definitely reduce the anxiety and eliminate the undesirable chore of shopping around and negotiation of price for the consumer. In particular, the OEMs, such as Toyota and Ford, realize the necessity of establishing the leading edge practice of relationship management. Current disasters such as the capturing of wrongful consumer data need to be minimized. For example, when a consumer, who desired to purchase a white car, ended up purchasing a blue car because it was in the dealer's lot for a long time and the dealer was eager to be rid of such a car and thereby offered substantial discount. In the database of the OEMs, this consumer wanted a blue car. Also, the automobile industry often times will not know that a specific consumer is in the process of buying a new car until the consumer walks into a dealership, which by that time becomes too late for some OEMs. The OEMs need to intervene with the decision process of the consumer at a much earlier intersection. The concept and tools for Customer Relationship Management would be of major value to the automobile industry for such deficiency.

With the advancement of e-marketplace, the relationships between consumers and OEMs of the automobile industry will be re-defined. It will also re-shape and diminish the role of dealerships in the automobile supply chain. Precedence of such change can be found in the airline industry. It may be of a lesser impact to the automobile industry due to regulations and complexity of the transactions. It is the authors' opinion that financing and servicing will become the main thrust of the purpose of dealership and consumers will make all the purchasing decision and arrangement with the OEMs directly.

4. Conclusion

There is no doubt in the authors' opinion that the automobile industry in the USA, being a matured industry, will need to be transformed in order to stay competitive. The automobile industry has always been a business leader in the world for decades, with innovation such as the assembly process. In order to re-capture some of its former glories and re-establish itself as innovative, the automobile industry will have to transform aggressively via the use of e-Technology in both dealing with the upstream suppliers for collaborative efficiency sake and downstream with consumers for excellent services.

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