

Improving Performance Through Logistics Strategies

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ABSTRACT

A fundamental challenge that Mexican companies are facing today to become global competitors is that of devising and implementing strategies to reduce transportation, inventory and warehousing operating costs, and improve on-time delivery. This paper describes the efforts of a Mexican company to achieve this goal while overcoming the country's unfavorable transportation infrastructure and environment.

Keywords: Supply chain improvement, On-time delivery, Logistics strategies

INTRODUCTION

A fundamental challenge that international companies are facing today to become global competitors is that of devising and implementing strategies to reduce transportation, inventory and warehousing operating costs, and improve on-time delivery.

This is particularly difficult for Mexican companies that have to face a fierce competition, and also, a deficient transportation infrastructure. According to the World Competitiveness Yearbook 2006, México is at the 64th place in transportation infrastructure. For this reason, the Mexican Government is currently undertaking an ambitious program to improve it (Plan Nacional de Desarrollo...). In addition to this, there is a lack of coordination of the different participants in the distribution of goods of Mexican supply chains. In particular, government agencies and transportation service providers. Finally, Mexican companies, with the exception of very few, are still considering the logistics function at the operating level, without enough expertise at the tactical and strategic levels.

This paper describes the efforts of Parker Hannifin de México, S.A. to achieve this goal while overcoming the country's unfavourable transportation infrastructure and environment. The report is structured in four sections. The next section offers a brief review of bibliographic references that treat problems of similar nature to the one at hand. Then, the general scheme used to obtain a solution is described. The third section describes the manner in which the company of interest attacked the problem and reached a solution. Finally, the last section gives various conclusions and recommendations.

REVIEW OF RELEVANT LITERATURE

The problem of reducing distribution costs has been treated exhaustively in the academic literature. Most of the work done applies management science models to redesign the distribution network in such a way that costs are optimized, Burns, et al., 1985, Blumenfeld, et al., 1985, Lapierre, et al., 2004, Lin, J., et al., 2006, Liu, et al., 2003, and Archetti, et al., 2008 are some examples of this approach. Chopra, 2003 gives an excellent overview of the factors that are important in the design of a distribution network.

Another approach to distribution cost reduction follows the principles and concepts of Quality Management programs. In particular, the application of the lean approach seems to be of great potential. This approach was

originally proposed by Shingo, 1989 and Monden, 1993 among others to improve manufacturing performance in Toyota. It then evolve to involve the supply chain with the works of Womack, et al., 1996, Jones, et al., 1997, Hines, et al., 1997 and Hill, et al., 2000 . The main concern is the identification and elimination of waste throughout the supply chain. The seven types of waste defined by Toyota were extended to a chain environment. This approach has been further refined by Sutherland, et al., 2007, RWD 2004, Sutherland, 2006, and Dirnberger, 2003. These authors focus the application of the lean approach in the areas of truck and railroad transportation.

DESCRIPTION OF METHODOLOGY

The methodology utilized for attacking the problem of improving the performance of the distribution system is a general scheme recommended that considers the supply chain as a whole. This consists of five stages (see Figure No. 1). The first stage has the goal of tying relevant aspects of the marketing strategy of the firm to the improvement problem. Here, the main aspects to identify are those concerning with the product mix and growth expected, and the relevant competitive factors and their required levels, Hill, 2000. This information is of importance because the supply chain characteristics depend upon the specific factors that must be met to compete, Fisher, 1997.

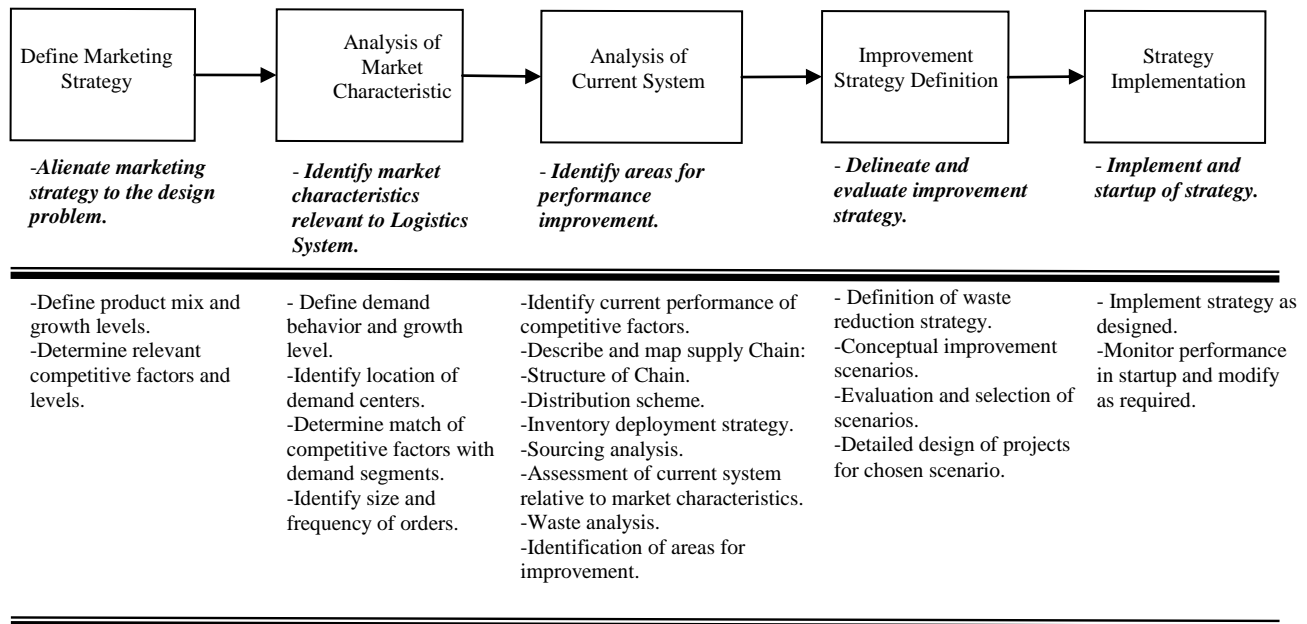


Figure No. 1. Proposed Methodology for Supply Chain Improvement

The second stage deals with the identification of several market characteristics that will determine the structure of the chain. The size, location and density of the market are fundamental inputs in the determination of the chain structure, the distribution scheme, and the inventory deployment strategy. This inputs are required for each market segment-competitive factor pair identified. The size and frequency of the orders are then needed to fine tune the transportation and inventory parameters.

The third phase of the methodology has the purpose of identifying areas for performance improvement. This phase includes an exhaustive analysis of the current supply chain; its structure, distribution scheme, inventory deployment and sourcing strategies. This is assessed with respect to market characteristics and the current performance of the competitive factors. Once this is done, it is recommended to develop a detailed waste analysis, which could be carried out with the help of mapping tools, Hines, et al., 1997. Finally, it follows the step of identifying areas for improvement.

ANALYSIS OF MARKET CHARACTERISTICS

The market for the Mexican Divisions products include other Parker companies as well as other OEM’s. The location of the main customers is in the Northeastern part of the USA as is shown in Figure No.2.

The above Figure illustrates the clients for those Divisions included in Parker Industrial which at the start of the study were handled independently from the transportation point of view. The frequency of the shipments to all of them is daily, and the size of the orders does not insure an FTL shipment.

ANALYSIS OF CURRENT SYSTEM

For our case study, the analysis will focus mainly in the transportation strategy followed by the company of interest. Considering that this has a very intense commercial activity with USA firms, it is expected that its transportation activity is related with importing and exporting through Mexican Northern border entry ports. In our case, all this activity is realized through Laredo.

Both inbound and outbound distribution activities follow the same general scheme. For inbound transportation, all the suppliers ship parts and materials independently to Laredo. Here, these shipments are consolidated and sent to Apodaca. Most of Parker’s suppliers are located at the northeastern of USA. As illustrated in Figure No 3. Outbound distribution is consolidated at the shipyards of the company in Apodaca, sent to Laredo, where this is separated into orders to be sent to each customer.

Total annual importing cost is of the order of 90 million USdls., of which 99% is transported by truck. Overall daily transportation requirements for the company total 32 pallets equivalent to an average truck utilization factor of 70%.

Total annual exporting cost for fiscal year 2007 was 38 million USdls with 89% of the products transported by truck. Daily transportation activity is of the order of 13 pallets, which represent a truck utilization factor of 55%. Truck transportation represents about 90% of total importing and exporting costs. Importing volume is 62% higher than exporting volume, and USA freight is 78% of importing cost. Truck capacity is 22 pallets properly distributed to use total volume. However, this aspect was very deficient because items of different forms and weight were palletized in different manner.

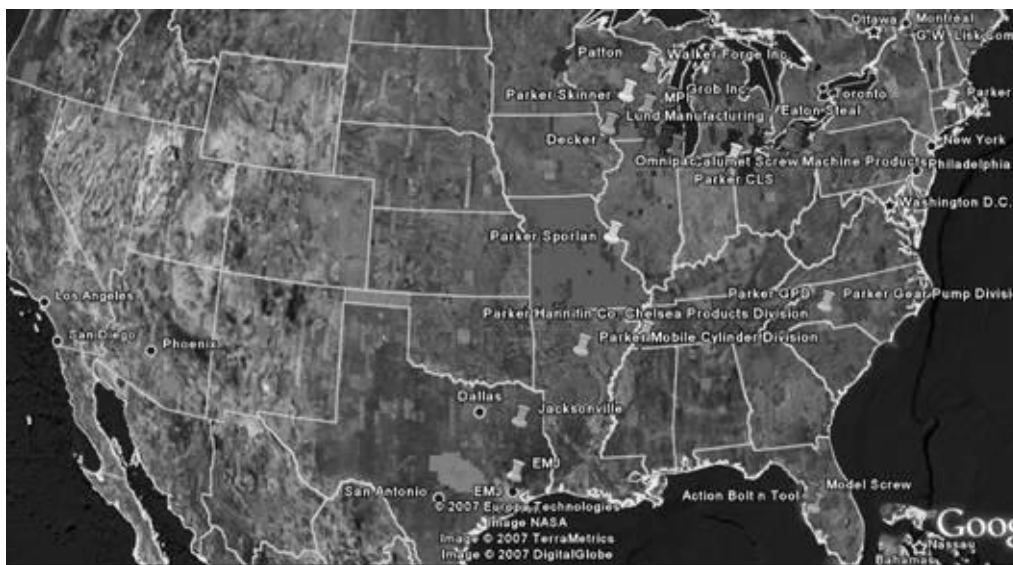


Figure No. 3. USA suppliers location

It is also of interest to note that each Division has its own organizational units responsible for purchasing and selling. Both units work independently at each Division and among Divisions, having as a result that there is not economies of scale due to sharing transportation resources in USA.

From the previous summary of the distribution system of the company, the following types of waste were identified; Low trailer capacity utilization and a lack of synergy in inbound and outbound transportation.

For the reduction of the first waste, it was decided to evaluate the use of standard containers and a metallic structure that would allow the a better use of volume. The second waste required the design and evaluation of consolidating schemes and the definition of a corporate function with the responsibility of defining company wide transportation requirements.

DETAILED DEFINITION OF IMPROVEMENT STRATEGY

From the previous step, the main areas for further improvement center around the increment of trailer capacity utilization and a better coordination of inbound and outbound transportation.

Trailer Capacity Utilization Improvement

This concept considers two aspects; The utilization of the trailer volume at each trip and insuring this at both ways, from the company to the customers and from the suppliers to Parker. In order to achieve higher utilization factors, it was decided to design standard containers, as illustrated in Figure No. 4, and a metallic structure that would permit to use the height of the trailer.

After considering the restrictions on volume and weight, it was determined that it was possible to use up to 66 containers per trailer, improving the utilization factor per trip three times.

Coordination Of Transportation

The lack of coordination between Divisions in the transportation of goods to the market and from the suppliers was due to the fact that each of them worked separately. To remove this barrier, it was defined a new organizational position at the corporate level that would insure economies of scale by centralizing this responsibility.

At the same time and to facilitate it, a study to analyze the location of a consolidation point before reaching Laredo was undertaken. The company suggested to evaluate the alternatives of having the consolidation at one of two warehouses already in operation located in New Haven, IN and Olive Branch, MS.



Figure No. 4. Example of standard container

As a first stage of the consolidation strategy, it was decided to study its feasibility with the suppliers only. For each alternative, there was a study to determine which suppliers would participate in the consolidation process in a milk run or with a direct shipment, or if it would be more convenient to continue without change.



Figure No. 5. Description of location of crossdocking facility and milk routes

After an exhaustive analysis, it was concluded that 40 suppliers could be included in one of eight milk routes and their shipments be consolidated in Olive Branch, Mississippi as illustrated in Figure No. 5. The analysis for the second stage which will include the transportation to the customers is under way, and it is expected to finish during the second semester of this year.



Figure No. 6. Best carriers for suppliers located at each state

Dynamic Selection Of Best Carriers

Finally, another area for improving that was identified is concerned with carrier selection. Instead of having a set of fixed transportation providers, Parker decided to follow an approach in which these were selected dynamically after some predefined period of time. Figure No. 6 shows an example with the carriers currently chosen.

IMPLEMENTATION OF STRATEGY

The implementation of the strategy has been very successful to date. The first two initiatives implemented were those of the standard containers and the selection of the best carrier. The initial implementation of selecting the best carrier per state resulted in a 15% decrease in the transportation cost in USA. The introduction of the standard containers and the structure has resulted in the reduction of 53% in the number of trucks required for inbound and outbound transportation.

The strategy of consolidating shipments from the suppliers was carried out once the organizational changes at the corporate level regarding the responsibility for the transportation management function were implemented. To date, the number of shipments from the suppliers to the company has decreased 73% due to this reason.

The previous operational achievements have impacted overall transportation cost by 48%. At the moment, this effort of improvement to diminish transportation cost is still in process, and the possibility of re-designing the outbound distribution is in progress.

CONCLUSIONS

Several conclusions can be made regarding the experience gathered with this project. The identification of important areas for improvement in the transportation operations of the company's chain is just another piece of evidence that, at least Mexican firms are at the infant stages of applying operational and strategic improvement strategies. Operationally, there seems to be a lot of room to apply waste elimination methodologies, and strategically, with the exception of very few, none are aware of the potential benefits that can be achieved.

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