

OPTIMIZATION METHODS FOR SUPPLY CHAIN ACTIVITIES

S. BĂLĂŞESCU¹ M. BĂLĂŞESCU¹

Abstract: *This paper approach the theme of supply chain activities for medium and large companies which run many operations and need many facilities. The first goal is to analyse the influence of optimisation methods of supply chain activities on the success rate for a business. The second goal is to compare some logistic strategies applied by companies with the same profile to see which is the most effective. The final goal is to show which is the necessity of strategic optimum for a company and how can be achieved the considering the demand uncertainty.*

Key words: *distribution, logistic chain, distribution strategy, strategic optimization.*

1. Introduction

This paper aims to analyse how a company can be successful and how it can achieve its objectives through various methods of optimization settings for the supply chain activities. Therefore, this paper highlights the importance of the strategic optimum for the company logistics. Choosing an effective strategy will allow optimization of all the company's functional departments, namely: research and development, marketing, operations and distribution.

In this paper we intend to perform a comparative study on the competitive and logistics strategies of various companies with the same profile, to see how each of them aim their own goals and own market segment, taking into account the characteristics of the company and its products and the very varied needs.

Another issue is related to the analysis of how to obtain the optimum strategy. The

most effective and practical way to describe how to obtain an optimal strategy in a company is through examples and case studies.

The last issue is to analyse how to obtain the *strategic optimum*. The most effective and practical way to describe how to obtain a strategic optimum for a company is through examples and case studies. We will try to answer the question "How to obtain the strategic optimum?" For this we need to complete 3 important steps:

- Understanding the customer and supply chain uncertainty.
- Knowledge of supply chain capabilities.
- Strategic combination to obtain the strategic optimum.

2. Strategic optimum necessity

Obtaining strategic optimum is very important in a company's success in the current competitive context. This concerns

¹ *Transilvania* University of Braşov.

an adaptation of all the strategies applied by the company both in its activity as well as along the logistics channel that it uses. The strategic optimum is not a static concept that refers only to a certain stage. It is a dynamic concept, assuming continuous adaptation to changes in the market structure and consumer needs. This is not just a simple adjustment, but continuous adaptation in order to obtain always the optimal strategies that will benefit the company and will position it on the market.

In obtaining the strategic optimum it was noted that logistics strategy is very important and essential determinant because it is the one that bears the responsibility to ensure an appropriate level of responsiveness of the logistic channel in terms of varying levels of uncertainty for the demand [2].

Depending on the level of uncertainty, logistics will adopt the appropriate strategy: to create an efficient supply chain or to create a receptive supply chain. In either case, the common goal of competition and logistics policies is clear, namely: obtaining the strategic optimum. This will lead to an adaptation of policies that will be placed in a common application area called "the strategic optimum".

For strategic optimization there is no "formula" for combining logistics and competitive strategies and for a particular competitive environment there isn't some logistics strategy that would ensure the strategic optimum for the company. This is done taking into account all the parameters that influence the company's activity.

Since there isn't a formula for success, it was necessary to analyse the functional levels to identify those activities and strategies that can lead to performance. Thus it was found that it is necessary to expand the strategic optimization goal

from the lowest level - operation - to a global level.

Expanding strategic goal involves adapting and combining strategies at operational and functional level so much as to obtain the optimal shape which ensure the optimum for the whole activity.

Once reached the strategic optimum, it requires the continuous adaptation of strategies to the changes inside the market, to the changes in consumer needs structure and logistic channel. Permanently adaptation to the market and maintain strategic optimum will lead to a sustainable development and the company success.

3. Competitive logistic strategies

A company's competitive strategy refers to determining customer needs, which must be satisfied through products and services by comparison with population segment targeted by competitors. For example, Wal-Mart aims to provide a greater variety of products at reasonable quality and a low price. Most products sold at Wal-Mart are common household goods (everything from household goods to clothing), and they can be found in any other store. What Wal-Mart guarantees is a low price and availability of products on the shelf. McMaster Carr sells maintenance products, repair and other operations products. McMaster Carr supply has over 400,000 different products shown in the catalogue and on the website of the company. The company competitive strategy is built around ensuring customers convenience (opportunity), availability and promptitude.

Focusing on promptitude, McMaster does not compete based on low prices. We note that Wall Mart's competitive strategy is clearly different from that of McMaster. Offering another example, we can compare the competitive strategy of other 2 companies Dell and Gateway, which sells

eMachines (computers) appealing to different distributors, retailers. Dell is based on a low price offer, but customers have to wait about a week until the products delivery.

On the other hand, customers can go to a "computer retailer" where they are assisted by specialized vendors and can leave the same day with an eMachine computer. The number and variety of products is still limited to the dealer (retailer). In each case the competitive strategy is built according to customer priorities, such as product cost, delivery time, product variety, availability, and last but not least quality.

For McMaster Carr the variety of products and the promptitude are more important than the price. On the other hand, a Wal-Mart client gives more

importance to price. A Dell customer who buys online prioritises the variety of products, their prices, while an eMachine PC client who buys from a distributor, is more interested in price, promptness, purchase assistance.

The competitive strategy of a company is set taking into account the target customers, based on their priorities. To form a competitive strategy are aimed one or more customer segments, and this will produce products and services according to their needs.

In analysing the relationship between the competitive strategy and distribution strategy we start from the logical scheme of the relationship between the firm departments, as shown in Figure 1.

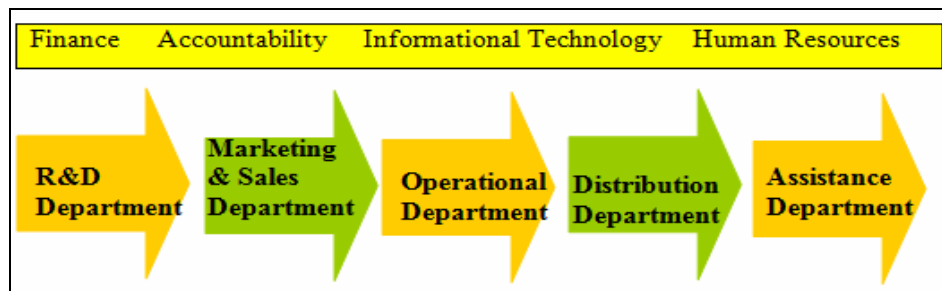


Fig.1. *The logical scheme of the relationship between the firm departments*

In the R&D department are designed and created new products. Marketing and sales department aims to identify customer requirements and priorities for a proper product development. The operational and informational system makes possible the product creation, converting raw materials into finished goods. Distribution department links the product and the customer ensuring that each customer gets the product. Service department ensures the proper functionality of products.

Departments of finance, accounting, information technology and human

resources facilitate smooth functioning of the scheme.

For each department there is a strategy. R&D department strategy determines the portfolio of new products that the company is trying to develop. Marketing and sales department strategy involves market segmentation strategy, product placement, price and promotion strategy.

Distribution strategy involves the selection of raw materials suppliers, goods transport to and from the company, product manufacturing and product distribution to the customer.

Rarely, there is a complete vertically integrated company and it is important to recognize that the distribution strategy defines the role of each integrated part in the distribution process.

For example, distribution strategy at Cisco assumes that most of the manufacturing and assembly process to be performed by a company from outside. In this case, the company's distribution strategy identifies not only the correct performance of the process but the place of each department whose tasks are related to the exterior.

The logistic strategy includes the generalized specifying of the distribution structure and those of what is traditionally called "supply strategy", "operational strategy" and "logistics strategy". For example, Dell has decided to sell products directly and Gateway through distributors, while Cisco has contracted manufacturing companies. These decisions define the structure of logistics strategy.

Logistics strategy also contains decisions on the inventory, transport, information facilitation and data course. For example, Amazon decisions to build warehouses to store some products and continue to use distributors to other products are parts of the company's distribution strategy. Also, Toyota strategy to have production facilities on each major market is part of the company's distribution strategy.

Distribution strategy emphasizes closed relations between functional strategies within the company. Each function is crucial if the company need is to satisfy the customers in a profitable manner. The various functional strategies cannot be formulated in isolation. They must be interconnected and appropriate for a company to be successful. For example, the success of the Seven-Eleven Japan [3] is based on the excellent relationship between functional strategies of the company. Marketing department at Seven-

Eleven has ensured the possibility of easy access to shops and the availability of a large variety of products and services. Department of Research and Development of Seven Eleven constantly create new products and services using an excellent information infrastructure.

The distribution and operation department of Seven-Eleven has focused on a wide variety and density of stores to be very cooperative. The result is a virtuous cycle where the supply chain infrastructure is exploited to provide new products and services to increase demand. This demand lead to improved operations, increased availability in stores, increased accountability and refined methods of supply and information structures.

In the next section we try to answer the following question: "Given a competitive strategy, what need a distribution company to do particularly better?"

4. The achievement of strategic optimum

The success or failure of a company is closely related to the following:

1. A competitive strategy and all functional strategies must combine and form a coordinated overall strategy. Each functional strategy must support other functional strategies and help a company to achieve the goal of competitive strategy.
2. The different functions within a company should optimally structure the processes and resources
3. The whole construction of the distribution chain and the role of each step must be matched in order to support the distribution strategy.

A company can fail either because the wrong strategy or because the type of supply chain, or when the processes and resources do not provide the ability to support the desired strategic combination.

Consider, for example, a situation that promotes a company's ability to provide a

wide range of products in a short time, while aims and the shortest possible transport cost. In this situation, it is likely that the distribution slows the orders. To make transport savings more substantial, it has to group multiple orders in the same shipment or to use transport means not expensive but slow. This action is in conflict with the initial goal proposed by the marketing department, namely to ensure variety and a shorter waiting time.

Similarly, we propose to consider a scenario where a seller decides to offer a high level of variety bringing a small amount of products, but selecting distribution companies based on lower costs, not their responsiveness. In this case, the seller is likely to have dissatisfied clients due to reduced availability of products.

To develop a strategic combination we return to the example of Dell Computers [5]. Competitive strategy of Dell is to provide a wide variety of products at a reasonable price. Customers can choose from thousands of possible configurations of a computer. In terms of supply chain strategy, a PC manufacturer has a number of options. On the one hand, a company may have an effective distribution strategy shifting its focus to the possibility of producing cheap PCs by limiting the variety and exploiting economies. On the other hand, a company may have a flexible and receptive distribution chain that provides a wide range of products. In the second case, the cost will be higher than in the first case.

What makes a company to need the strategic combination of distribution strategies and competitive strategies? An explicit or implicit competitive strategy will specify one or more customer segments that the company aims. To implement a proper strategy, a company must ensure that its distribution

possibilities can reach all targeted customer segments.

In order to obtain the strategic optimum, the logistics needs to ensure that the responsiveness of the distribution channel corresponds to the involved uncertainty of the demand. The aim to obtain the strategic optimum is to achieve a high level of responsiveness in the event of high demand uncertainty and a high level of efficiency in case of low uncertainty.

Example: Dell competitive strategy aim those customers for whom is very important the PC personalization and delivery within a few days. Given the wide variety of PCs, the high degree of innovation, fast delivery and customers' request, Dell face a high uncertainty. In this situation it has the ability to create either an efficient logistic chain, or a responsive one.

An *efficient supply chain* would use slow and inexpensive models for transport and economies of scale in production. If Dell would have made this choice of an effective channel, it would encountered difficulties in bearing demand with a high level of customization and ensure fast delivery [7].

Building a *responsive logistics channel* allows a better understanding of customer needs. Consequently, receptive distribution channel strategy is best suited to meet the needs of Dell target customers.

Example: a pasta manufacturer - Barilla. Pasta is a product with a relatively stable demand thus having a low level of demand uncertainty. Provision is also almost predictable. But in this case Barilla could plan a responsive distribution when the pasta comes in smaller amounts by customer order and is sent in a very fast way of transport as FedEx. This choice would make pasta, obviously very expensive, leading to loss of customers. Consequently in this case is more optimal

the design of an effective distribution channel focused on reducing costs.

"Strategic Optimum Area" makes that the involved uncertainty growth entails the increasing responsiveness of the logistic channel.

For a high level of performance, companies should transfer both competitive strategy (taking into account

the uncertainty) and supply chain strategy (taking into account the receptivity) to the Strategic Optimum Area [4]. "Strategic Optimum Area" makes that the involved uncertainty growth entails the increasing responsiveness of the logistic channel. This relationship is shown in Figure 2.

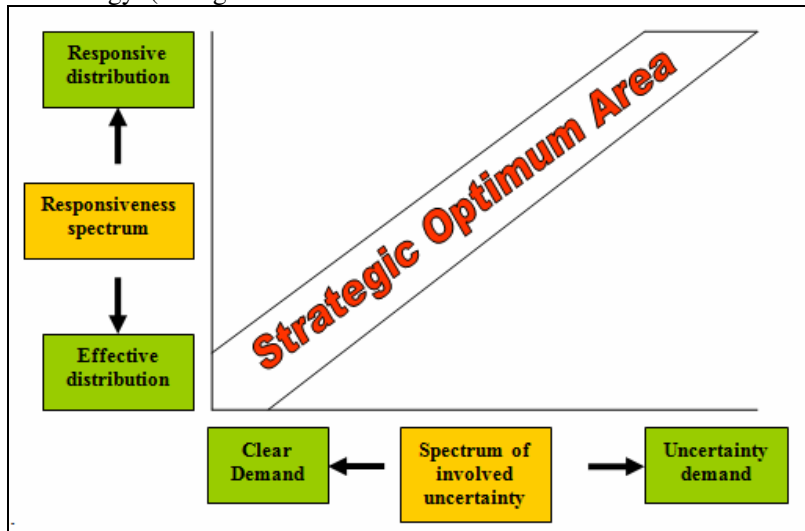


Fig.2. *The relationship inside the Strategic Optimum Area*

The first step in the strategic optimization consists in designing functional roles of the various levels of the supply chain so as to ensure an adequate level of responsiveness. It is important to understand that the desired levels of responsiveness, required beyond the logistics channel can be achieved by allocating a different and effective receptivity for each level as illustrated in the following examples.

Ikea - Swedish furniture retailer [1] - sells furniture and owns large warehouses / stores in a large number of countries. *Ikea's* target segment is represented by those customers who want stylish furniture at a reasonable price. The company has limited variety of styles reducing the size of each

deposit and the variety of models. So, it decreased the involved uncertainty faced by the distribution channel. *Ikea* record the full range of styles on inventory and serves customers from warehouses. This way, it use inventory to absorb all the uncertainty facing across the entire supply chain.

Using inventory also allows that replenishment orders by manufacturers to be more stable and predictable. This goes to a very low level of uncertainty and the company is focused on streamlining business following relocation of production to low cost countries. In the distribution channel ensures responsiveness, absorbing uncertainty in the stores and suppliers while being efficient.

In contrast, another way of obtaining responsiveness could involve the retailer to keep a brief on customer preferences. In this case, the retailer does not participate significantly to the maintenance of the logistical channel responsiveness and most of the uncertainty is transferred to the manufacturer. For the supply chain to be responsive, the manufacturer must be flexible and have low reaction times. Here we can give the example of a furniture factory located in Tennessee. Each week the company produces thousands of sofas and chairs delivered in other countries. British retailers allow customers to select from a very wide variety of styles and promise a relatively quick delivery. This requires a high level of uncertainty distribution. However, retailers are not very concerned of inventory, because the involved uncertainty is transferred over England INC. In these circumstances it may be more efficient since most of the uncertainty distribution is absorbed by England INC by the flexible manufacturing process. To solve the uncertainty they keep more inventories of raw materials, allowing their suppliers to focus on efficiency. If raw material inventory decreases the providers must become more responsive.

So the logistic channel can obtain a level of responsiveness by adjusting the roles of each level of functionality. Make a functional level more responsive means to allow others' levels become more effective. The best combination of roles depends on the efficiency and flexibility available within each functional level.

5. Conclusions

The final step in obtaining the strategic optimum is to bring in a common point the distribution responsiveness and supply and demand default uncertainty. Distribution

planning and other functional strategies within the firm must also sustain the level of responsiveness required [8].

When the firm serves a market segment that can achieve the optimum strategic state by defining the strategic position, but when serving multiple market segments, the situation is complicated and the optimum strategic is difficult to obtain strategy requiring a more complex strategy.

The adaptation of competitive and logistics strategies should be considered when there are changes in consumer behaviour. These changes are caused by changes made in the structure of markets and globalization. Increasingly, consumers have the desire for personalized products. Competition and varied offer made possible to meet individual customer needs. So, competition is focused on providing variety of products at a reasonable price. As firms grew products variety offered, logistics had to support a much larger range of products, adapting to new trends.

Another big change is the increase of supply opportunities, globally. Manufacturers have to be more receptive than in the past, to provide a variety of products so that choice becomes an advantage, decrease response time and to control prices, being able to face the competition. As the competitive landscape changes, the company is forced to change competitive strategy and logistic strategy to achieve strategic optimum and remain competitive in the market.

To obtain strategic optimum, a firm must build a logistic channel to best meet the needs of different consumer segments. To maintain the optimum, logistics strategy should be adjusted accordingly to the changes specific to each stage of the product life cycle.

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