

Strategic of logistics planning optimization model

¹Gaofu Xu, ²Zhao Jiang, ³Liang Wang

1 University of Shanghai for Science and Technology, Shanghai, China

2 University of Shanghai for Science and Technology, Shanghai, China

3 University of Shanghai for Science and Technology, Shanghai, China

Email: xugaofu_2007@126.com

Abstract –With the deepening of the study and practice of modern logistics industry, a series of new problems and challenges are presented in front of scholars and logistics managers. This paper in foreign mature logistics model is built based on theory, from the customer's point of view to establish the theoretical model of logistics, the integrated use of quantitative and qualitative method combining the modified and improved, finally come to this model. This paper not only provides the framework of constructing logistics strategy, but also analyses the framework of each element. On this basis, For how to build up strategic logistics planning optimization model, The author puts forward his own opinions.

Keywords –logistics; supply chain; strategic planning; model

1. Introduction

Logistics supply chain management focus on raw materials, components, products and finished goods logistics to ensure that the company's customers in the right time, the right position to receive the right number of manufactured goods.

Logistics supply chain can describe no manufacturing operation company, such as retail store or a third party logistics provider. It can also describe the major company with manufacturing department a responsible for the products of the company or any other company product distribution to market department. A third possibility is to describe the company has manufacturing plants logistics operation.

2. The framework

In the past 10 years, the company's senior managers have been gradually recognized the importance of logistics strategy for their company. Logistics operation improvement undoubtedly should be attributed to the progress of IT. At the same time; IT has promoted the distribution function of the realization and the use of modeling system. Some companies have recognized the potential of this improvement, from which the company has established a value advantage. Wal-Mart is a frequently mentioned example of success in the mass Sales industry. For quality customer service, It is the result of an impressive market share and reached through a managed process to replenish stocks combined with the realization of innovative logistics operation.

Figure 1 depicts the framework of planning and logistics strategy. Its customer service strategy is to support company logistics supply chain design and operation of the driving force. This will depend on the company's products, market and customer service goals because they reflect the market expectations. Many companies must implement complex customer service strategy in their market segments with different customer service needs and expectations. For example, a manufacturer of consumer goods will be different with traditional retail outlets to meet bulk retail sales, because they require a shorter delivery time and 100% of direct shipment to the shop.

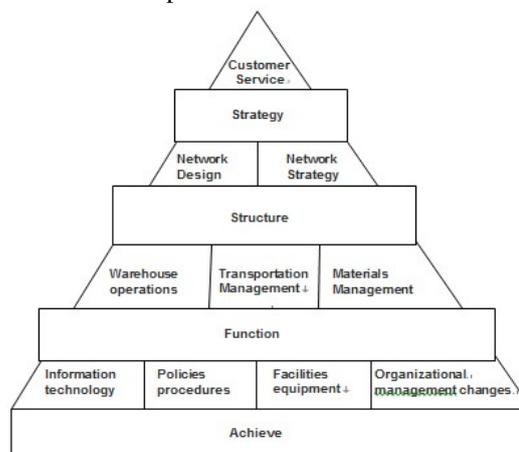


Figure 1, Building elements of logistics strategy

Quality customer service may be driven logistics key objectives of the strategy, but companies must also consider the cost, value-added service, flexibility and

adaptability. Cost has become increasingly important, especially in industries with low marginal revenue. Value-added services are based on the increased costs to provide service to a specific customer, including customer distribution center logistics operations barcode products directly to store trace transport, as well as supplier-managed inventory at the customer's facility. Flexibility is the ability of enterprise customers quickly design and implementation of new services. Adaptability is to adjust its strategy for the long-term ability of enterprises facing new market conditions or technological advances, which require the company to use the development of IT skills to identify market trends and adapt to them.

In the furnished corporate strategic logistics planning, management must challenge themselves to identify a broader range of options. Scenario-based analysis, identify the company's strengths, weaknesses, opportunities and threats, as well as the appropriate resource acquisition and disposal of decision-making, management, advancing along this direction is proven to be effective. Necessary planning process should be institutionalized so that they are repeated on an annual basis or some other cycle.

Once the strategic objective of the enterprise has been articulated, it must identify the structural elements of its strategy that's network design and network strategy. What Network or channel design concern is to jobs and functions to achieve customer service goals, as well as the different participants in the supply chain, how to execute them. It consists of a distributor in the extent to which management decisions such as marketing, sales, delivery and billing functions. Market share and scale is often decided the related cost, but also determines the company has and operation direct distribution channel and Shared with third parties or by a third party operation of the value of the channel. Such decisions should also consider the long-term changes in the market share of the market and the company expected. If the expected growth in market shares, should consider the investment in the direct distribution channels rather than with third-party co-operation to accelerate growth.

What the physical network strategy concern is to only through optimization model to fully evaluate logistics network decisions in an integrated manner. The key part of the decision includes facility location and the design of the task, and the use of these facilities for customer service strategy. The facilities are to center and warehouse in the nation and regional distribution, as well as supplier's factory or distribution center and customer facilities. Customer facilities can be factories, distribution center or shop.

As shown in figure 1, the structural elements of logistics strategic framework must include warehouse operations, transportation management, and materials management structure of decision-making related to the implementation of the strategy elements and to integrate them. Warehouse operations, transportation management and materials management logistics and inventory management in the entire network, linked to decision-making with the system and structure of decision-making. The same time, any strategic planning studies must take

into account the interaction between the strategies and functioning.

The realization of the final level framework is including support and implementation strategy of personnel, business process and IT. The successful implementation of the logistics strategy is crucial to create its integration of order management and order replenishment processes. Implementation might build the most difficult aspects of the logistics strategy, largely due to the rapid changes in IT and global markets, which require continual adaptation.

3. Model

In recent years, it's increasing that's based on the optimization model of supply chain strategy research. The company's senior managers are more adhere to the dynamic changes of their company and industry data to understand more clearly the role of the model in the analysis of the major decisions. In many cases, consultants were invited by ready-made modeling system implementation model. They also help management evaluation and implementation of the strategic direction given by the model. Through modeling system installed within the enterprise, as well as technology transfer to internal planning group, consultants can stay with the company after the end of the initial study analysis of important outstanding issues, or consultants can come back regularly to check and extend the company's strategic supply chain planning.

It is the natural result of the conceptual framework that build optimization models to analyze the company's strategic logistics planning shown in Figure 1. Constructing model aims to strengthen and expand to the company's markets, products, distribution channels and many other factors management judgment. By introducing strategic analysis of the supply chain decision database and model emphasizing on data collection and descriptive modeling activity, it is intelligent strategic planning and management to the precondition of the realization of conditions.

Following this framework, we discuss how to express logistics network model customer service requirements to begin. These requirements, such as the maximum delivery time for different market segments, direct store delivery and single procurement, can be explicitly expressed in the supply chain model of the transport sub-network. Maximum delivery time limit connection distribution center to its service market transportation line allowed maximum distance to score. Direct to the store delivery corresponding to the supplier and the connection between the shop. The transportation cost of these connections they will largely determine whether it is selected in an optimal solution is taken as a positive logistics .Single procurement 0- 1 decision variables to describe these variables to determine whether each customer or market served by a particular distribution center.

Similarly, channel design choices can also use logistics network model to evaluate. Their explicit form depends on the nature of the choice, for example, consider the operation of several warehouses third-party

logistics providers, which provides transportation from the warehouse to the nearby market. We assume that this is the choice of a one-year, and logistics network model depicts a company logistics network one-year snapshot view. Third party warehouse and transportation links will be included into the model of decision-making database.

The intention selected or refuse that 0-1 decision variables can be expressed in the logistics network model, 0-1 variable control of a third party warehouse throughput model optimization variables take 1 of each warehouse throughput. The amount will allow the maximum take a contract or the actual maximum, and if the variable is selected to be 0, the throughput will be forced to 0. In the latter case, the third party warehouse logistics flow will also be forced to 0, where throughput must be 0. Model is also the cost of including the intention of the details, such as warehousing and transportation costs, both may have the fixed and variable costs with quantity discounts in general, logistics network model may involve the operation of the facility and its features 0-1 decision-making and other decisions. These may include some cases, as follows:

- (1) At existing facilities, which should start or expand?
- (2) At existing facilities, which should be closed?
- (3) At which the new facility should start with how much throughput capacity?
- (4) Each facility, what is the task (for example, processing and / or storage which Kinds of products)?
- (5) At each facility, what equipment is required in order to support its mission (for example, logistics Sorting equipment, transportation equipment, refrigerated storage area)?
- (6) Each customer or market which or what some of the facilities will serve?
- (7) Each facility by which suppliers to add?

The model may include additional logical constraints based on the 0-1 decision variables, they reflect the company's the logistics strategic flexibility and risk management judgment. For example, in order to cope with possible high demand, you can couple with constraints forcing all started in each geographical region the total handling capacity of the facility is 25% higher than expected demand, or add constraints limit any start of facilities and the nearest start facilities the distance between no more than 50 kilometers in order to avoid accidents facility failure risk.

What has been discussed above decision concern is the structure of the logistics network. In order to assess the strategy, we need to add reflect function of the network management involved in the operation, process, resources, transportation logistics and cost decision-making variable. And we have them contact with the description of the structure chosen decision variables and constraints.

Framework in Figure 1, the management of logistics network functions are divided into three categories: warehouse operations, transportation management and material management. All three types are included in the consolidated modeling. A distribution center warehouse operations through the facilities of the sub-model

description, including the product logistics processes to describe the flow through the facility, the conversion formula and resources.

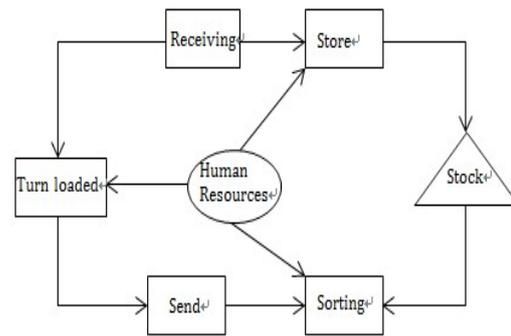


Figure 2, Process logistics distribution center

Figure 2 shows an example, it depicts the receipt, turn loaded, storage, sorting and sending operation. Five kinds of operation for human resource consumption also in the picture are described. Optimization model determines the distribution center is maintained at its optimal operating level needed to thousands of hours of labor measured the amount of human resources; these resources are allocated in warehousing operations and its cost. Finally, Figure 2 depicts the inventory holding costs associated with each product line, it is the function of the facility product throughput.

Network link is like before between the structure of decision-making and functional management before. Structural levels or design level, we have a 0 or 1 decision variables, positive throughput equal to 1 to allow optional facilities equal to 0 limit throughputs to 0. Therefore, if the facility has not been selected as part of optimal logistics network, the process of the facilities at the conversion formula and resources will remain at zero level of operation.

Transport management in the logistics network model through the following three transport sub-model to express:

- (1) connected suppliers and supply chain facilities internal transport sub-model
- (2) transport between facilities connected facilities and facilities sub-model
- (3) to connect external transport facilities and customer and market sub-model

Logistics network model can also include the transportation mode selection option. This choice can choose between the truck or rail transportation connecting the company's distribution center and its market, and can also choose between full load and lack of full load transport, the latter of which will result in higher unit costs. The optimization model mode choice decision-making must be careful, because it can easily lead to a complex mixed integer scale type.

Finally, the material management function and across the entire supply chain operation related. This may include decisions on transport between the permitted facility or each product line consists of a number of facilities to carrier. Integrated supply chain management of data management and modeling system development is

the common responsibility of materials management and information technology functions.

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Vitae



Gaofu Xu, was born in 1990. He obtained a Bachelor degree in Software Engineering in Software department from East China University of Technology.

He now is a student in University of Shanghai for Science and Technology, Shanghai, China. His research interest includes supply chain, and Logistics Management.

Zhao Jiang and Liang Wang are also the graduate students in the School of Management from University of Shanghai for Science and Technology