

**Integrated Master of Logistics & Transportation
Master Thesis No 2000:10**

**Structuring Logistics Activities
In Multinational
Companies (MNCs)**

---Strategic Perspective---

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The completion of this thesis is by no means an individual work; despite the fact that only one name appears on its cover. I would like to thank a number of people who made this thesis possible, realizing that such a list can never be complete.

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A handwritten signature in black ink, appearing to read 'GAO Yong'.

GAO Yong

Abstract

The internationalization of the world economy has substantially increased the border-crossing activities between companies. Consequently, logistics has become a strategic weapon for the success of many global firms. By minimizing the costs in the value chain or providing customers/consumers with differentiated services, logistics acts as a major source of competitive advantages. In spite of the significance of cost factors, the environmental considerations have become another key element in the development of logistics strategy, and this role will possibly increase in the future.

Nowadays it is crucial for firms to design their logistics structure on the international basis. Design and control of these international structures has become a complex managerial issue. A common solution for many MNCs is to outsource logistics services/knowledge from third party service providers, through which companies could be more focused on their core business.

Multinational companies have never stopped looking for better solutions for logistics. The current trend in the market is to decrease the number of local distribution centers (DCs) while establishing more centralized warehouses on the regional, national or international basis. This trend is closely linked to a concept of regional logistics infrastructure center (RLIC), which is regarded as the logistics solution for the future.

Keywords: logistics strategy, distribution structure, regional logistics infrastructure center (RLIC), third party logistics etc.

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Chapter 1 Introduction

1.1 Background

There is no doubt that globalization of world business has resulted in significant changes in the global marketplace. Multinational companies (MNCs) today must internationalize manufacturing and marketing operations because of the increasing competitive pressure in industrialized markets and increasing accessibility to world markets (Fawcett & Closs, 1993). There is a strong need for MNCs to develop new competitive strategies and re-evaluate their approaches on the global basis.

Things that happened during the last several decades e.g., growth in foreign direct investment (FDI), economic growth, removal of trade barriers, regionalization, deregulation, technical development of information technology (IT) greatly enable the globalization process and provide more opportunities for companies to do business worldwide (Bowersox & Closs, 1996). Many firms' international expansions are achieved either through exports or establishments of foreign manufacturing and/or distribution facilities. The physical structures of many industrial firms are highly related to international elements. Design and control of these international structures has become a complicated managerial issue. (Vos, 1997)

Nowadays, an effective way for MNCs to achieve global success is through deepening their value chain in foreign locations (Choi, 1999). As a consequence, logistics becomes an area of strategic importance and a source for competitive advantage (Bagchi & Virum, 1998), because it is of great value-added potential and best position to provide supply chain optimization in the international transaction process (Cooke, 1999).

However, globalization involves much more than simply importing or exporting products or materials (Bowersox & Calantone, 1998). Globalization has created networks of international transactions

comprising flows of goods, services, people, factor payments, and capital (Choi, 1999). The uncertainty and complexity that are facing MNCs' logistics management are awesome. Logistics practices that are successful in the domestic context might not be successful in the global context. The development of a deeper understanding of structuring logistics activities in the international context is the central theme of this thesis.

1.2 Problem Statement

The emergence of more sophisticated markets overseas means that leading users are no longer concentrated in a few markets (MacCormack et al, 1994). MNCs should pursue different strategies in relation to the characteristics of the markets and products involved (Brush et al, 1999).

Porter (1990) argues that an industry or a firm to be global if some competitive advantages can be obtained by integrating activities on a worldwide basis. These competitive advantages can either be the firm's ability to produce at lower costs (*low cost strategy*) than its competitors or the ability to produce in a unique way compared to its competitors (*differentiation strategy*). From the operational level, the propensity of firms to engage in international production can be explained by the ways through which they achieve competitive advantages such as: deriving from asset ownership (*e.g., tangible assets, patents, technology, skills*), location bound endowments (*e.g., input prices and quality, investment incentives, infrastructure, culture and trade barriers*), and internationalization of cross-border market transactions (*e.g., minimization of transaction costs such as search and negotiation costs, uncertainty about the nature and value of inputs, and the opportunity to capture the economies of interdependent activities*) (Dunning, 1993).

Firms today are increasingly trying to match their resources against internationally dispersed resource conditions when making location decisions (Dunning, 1998 & Choi, 1999). Advances in new

technologies and the expansion of market economies have all augmented the number of attractive locations. The location factors such as the structure of the host economy, the host governmental regulations, and the nature of the local business culture can affect the success and failure of foreign direct investment (FDI) (Dunning, 1997), when the transfer of technology and knowledge management becomes the key issues in international business (Choi, 1999).

Van de Ven (1989) argues that two elements are significant for structuring the international logistics activities e.g., international business environment and logistics structure. The first element needed to be elaborated in this thesis is the explicit focus on multi-nationally operating firms. Several factors distinguish the organization of international industrial activities from that of strictly domestic activities.

Brush et al (1999) argue that factors such as cost factors e.g., wage, material prices, energy prices, interest rates, and transportation tariffs; as well as productivity levels in manufacturing processes differ greatly in different countries. In addition, government policies can deeply influence the operations of MNCs by offering special incentives to stimulate investments (Vos, 1997). Many national markets are protected by quota systems, tariff barriers or other regulations; it is impossible to make a completely free flow of goods (Bowersox & Closs, 1996).

An illustration of a firm's manufacturing & logistics structure is shown in figure 1-1. This thesis emphasizes the objects and activities within the frame.

Structuring Logistics Activities in Multinational Companies (MNCs)

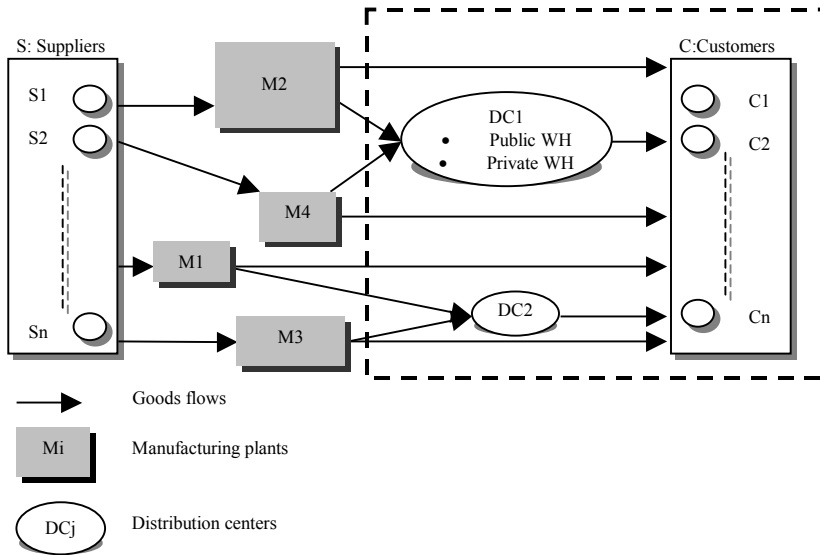


Figure 1-1: Example of a manufacturing and logistics structure
(Source: developed based on Vos, 1997)

Firms' logistics structures are closely related to their manufacturing structures. Vos (1997) argues one key factor in the design of manufacturing & logistics structure is the location of an MNC's plants and distribution facilities. General location theory asserts that a location can be chosen near suppliers, near customers, or somewhere in between, and its criteria emphasize cost-based variables such as scale economies, transportation costs, and factor cost advantages (Schmenner et al, 1982 & Brush et al, 1999). In this respect, a potential strength in manufacturing costs should be traded off with variations in transportation costs of both input materials and finished products. The impact of these variations on the supply and distribution costs is closely related to the exact location of an enlarged manufacturing capacity (Vos, 1997).

Besides the cost based variables, Dicken (1987) argues that the nature of national resource conditions and the corresponding manufacturing processes are crucial considerations in choosing a location. Moreover,

the conditions of the regional logistics infrastructure and a firm's marketing strategies, which aim to serve new customers both in the home country and in foreign countries, could also affect a firm's location choices (Ellis & Williams, 1995).

A trend among MNCs today is to centralize logistics systems, which appears to be positive in improving the efficiency, the productivity and customer service. A typical example of centralized logistics system is the distribution centers (DCs) established on regional, national, or international basis. Simkin & Ferrell (1997) define a distribution center as a large, centralized warehouse that receives goods from factories and suppliers, re-groups them into orders and ships them to customers quickly; it focuses on active movement of goods rather than passive storage. Schipper (2000) argues that distribution centers may provide MNCs with decreased warehouse spaces and associated costs, stock levels, more efficient intercontinental transportations, the possibility of shipping components directly from suppliers to a single logistic center, improved customer service, and reduction of tied-up working capital. However, only limited economies of scale effects are found (Pfohl et al, 1992 & Vos, 1997).

According to Simkin & Ferrell (1997), warehouses consist of private warehouse or public warehouse. Private warehouses are operated by a company for shipping and storing its own products. They are appropriate for firms that require special handling and storage features and want to control the design and operation of the warehouse. Private warehouses are usually leased or purchased when a firm believes that its warehouse needs in given geographic markets are so substantial and so stable that it can make a long-term commitment to fixed facilities.

Public warehouses rent storage space and related physical distribution facilities to other companies and sometimes provide distribution services such as receiving and unloading products, inspecting, re-shipping, filling orders, financing, displaying products and coordinating shipments. They are especially useful to firms with seasonal production or low volume storage needs, companies with

inventories that must be maintained in many locations, firms that are testing or entering new markets and business operations that own private warehouses but occasionally require additional storage space.

1.3 Research Questions

The internationalization of the manufacturing has led to many complex management issues e.g., developments of global logistics strategy, international location decisions, and international distribution. The main research question of this thesis is to

“Analyze how MNCs structure their logistics activities in the global business environment with regard to strategic competitive performance”.

The main research question can be divided into several partial research questions:

- What impacts do the variables: e.g., logistics strategy, supply and distribution structure, location determinants, and regional logistics infrastructure have on the design of MNCs' international logistics structure?
- What strategic considerations, corresponding to the variables presented above, should be involved in the process of structuring logistics activities in MNCs?

1.4 Purposes & Limitations

This paper examines the manufacturing/logistics interaction in international manufacturing. The overall purpose is to determine the impact of a firm's globalization perception and manufacturing/logistics integration on competitive performance.

In relation to this overall purpose, there are two sub-purposes.

- Identify the major impacts of the research variables on the design of international logistics structure.
- Identify the significant strategic considerations of global logistics strategy and evaluate relevant determinants to support MNCs' decision-making in structuring their logistics activities.

The main research question involves many more issues than that are proposed in this thesis. Due to my limited time, I give priority to a certain number of issues, which I think are more appropriate for this research and my educational background. Since this thesis aims to analyze issues regarding the design of international logistics structures from the strategic perspective, other perspectives such as technical aspect etc will not be covered.

1.5 Methodology

1.5.1 Research Design

Yin (1984) argues that research design should be the “blueprint” of a research. It is the logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusions. Starting from this intention, this research is designed with five mini-case studies, namely mini-case of SKF Logistics AB, mini-case of Abba Seafood, mini-case of Göteborgs Kex, mini-case of DFDS Nordisk Transport, and mini-case of EKA Chemicals.

Since this thesis explicitly emphasizes the multinational companies, most of our respondents are chosen from Swedish multinational companies (MNCs). I include MNCs that operate in different industries so as to get a general view of my research problem.

1.5.2 Qualitative Study

In order to reach a deeper understanding of the situation investigated, I have found that qualitative study is more appropriate for this research,

since qualitative study is exploratory, inductive and emphasizes process rather than goal or result (Holme & Solving 1991).

Further, the main research problem of this thesis involves lots of data that cannot be quantified e.g., attitudes, values, and perceptions. Also, the nature of it, *analyzing international logistics activities with regard to strategic performance*, has made the use of quantitative investigation not necessary.

1.5.3 Methods for Collecting Data

1.5.3.1 Primary Data

The main methods used to collect primary data are interview and questionnaire. Taking the form of personal interviews, the interviews involve logistics managers of each Swedish MNC. I recorded all the conversations during the interviews and took a lot of notes at the same time. Eleven questions from our interview guide (*See appendix 1*) are proposed and discussed during the interview; two other questions regarding the location determinants are answered by the respondents after the interview. The answers are sent to me by mail.

1.5.3.2 Secondary Data

The secondary data consists of textbooks, journals, research papers, articles, and company reports. They are collected from the library, target companies and through Internet. The chapter of theoretical framework mostly consists of secondary data. It is applied to the data analysis and conclusions in Chapter 4 & 5.

1.5.4 Validity and Reliability of the Research

The constructed validity and reliability are very high. The research design deeply incorporated the requirements of the research problem. All the respondents are the logistics managers in multinational companies. They are the people who really work with logistics. (*See*

table below) Therefore, their opinions about our questions are of great validity and reliability. Additionally, in order to keep away from one company's specific logistics problems, I have visited eight different multinational companies. In this way, I could be aware of the subjective points from our respondents, and obtain more reliable data.

Company name	Type	Respondent name	Respondent title
SKF Logistics AB	MNC	Bertil Hastéus	Managing director
EKA Chemicals	MNC	Stefan Bodelind	Logistics manager
Göteborgs Kex	MNC	Bengt Sjöstedt	Logistics manager
DFDS Nordisk Transport	MNC	Hans Wallberg	Branch manager
Abba Seafood	MNC	Lennart Lundqvist	Technique director
New Weave AB	MNC	Ingvar Axelsson	Logistics manager
Saab Automobile AB	MNC	Ingemar Malmberg	Logistics manager
		Per Ljungqvist	Logistics manager
Alfakonsult	NC	Peter Cedergårdh	Logistics consultant
AX-Food	MNC	Anders Agerberg	Logistics manager

Note: MNC refers to multinational companies; NC refers to national companies

Table 1-1: Background of the respondents

In order to decrease the negative effects caused by different languages and misunderstandings, I recorded the conversations of all the interviews. In the meanwhile, I took a lot of notes. The primary data is sorted and presented after at least twice re-listening to the tapes. Thus, I believe that the data presented in the mini-case studies and also appendices is of high validity as well as reliability.

However, errors can never be avoided. Some potential sources of errors could be the language, and changed situations. The fact is that all the interviews were conducted in English. Even though the respondents didn't have too much difficulty in answering the questions in English, there could still be some misunderstandings that I didn't notice or I am not aware of. Further, the interview questions are answered based on the companies' current conditions; it might become irrelevant during my research process.

1.6 General Outline of the Thesis

The main outline of this thesis is shown in figure 1-2. This thesis starts with the first chapter of introduction. This chapter aims to present a general view of the thesis. The research purposes & questions and the main research problem will be discussed. Additionally the research methodology will be presented and the corresponding reliability and validity will be evaluated.

Starting from the main research question, Chapter 2 aims to make a literature review in the corresponding area. The theoretical perspective of strategy, international manufacturing and logistics, and location determinants will be discussed.

Chapter 3 is the presentation of the data I got. The whole chapter is divided into five mini-case studies. Chapter 4 is the application of the theories to the analysis of empirical data. In Chapter 5, I would like to conclude my data analysis and give some recommendations for the future research. In the final chapters e.g., references and appendices, the information sources and some information about interviews will be presented.

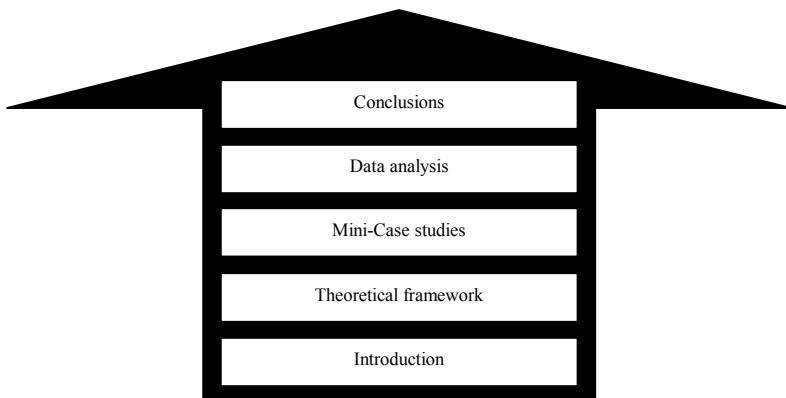


Figure 1-2: The main outline of the thesis

Chapter 2 Theoretical Framework

2.1 The Concept of Strategy

There have been different definitions of strategies among researchers. Grant (1998) proposes that strategies can be basically categorized as corporate strategy, business strategy, and functional strategy. The relations among these three strategies could be shown in the figure below.

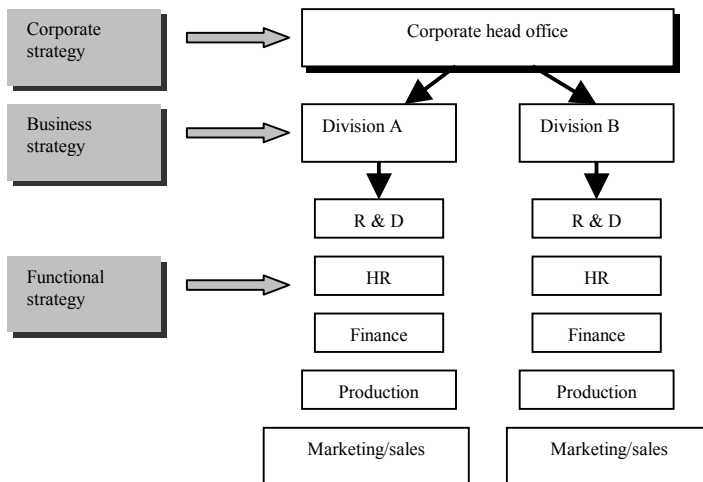


Figure 2-1: Levels of strategy and organization structure
(Source: Grant, 1998, page 20, figure 1.4)

Corporate strategy defines the scope of a firm in terms of the industries and markets in which it competes. Corporate strategy decisions include investment in diversification, vertical integration, acquisitions, and new ventures, the allocation of resources between the different business of a firm, and divestment. Business strategy is concerned with how a firm competes within a particular industry or market. If a firm is to prosper within an industry, it must establish a competitive strategy. Functional strategies are the elaboration and implementation of

business strategies through individual functions such as production, R&D, marketing, human resources, and finance. They are primarily the responsibility of the functional departments.

Grant (1998) argues that corporate strategy is the responsibility of the top management team, supported by corporate strategy staff. Business strategy is formulated and implemented primarily by the individual business. The distinction between corporate and business strategy corresponds to the organization structure of the typical multi-business corporation.

2.2 Competitive Advantage

Competitive advantage refers to the ability of a firm to outperform rivals on the primary performance goal-profitability (Grant, 1998). Porter (1985) argues that there are two major sources of competitive advantage: cost advantage and differentiation advantage.

2.2.1 Cost Advantage

Cost advantages will be gained when firms have the possibility to provide customers with lower cost than their competitors (Porter, 1985). They are determined by series of cost drivers: e.g., economies of scales, economies of learning, process technology, product design, input costs, capacity utilization, and residual efficiency (Grant, 1998).

The relative importance of these cost drivers varies greatly from industry to industry as well as among different activities within the firm. Grant (1998) asserts that the identification of these cost drivers may help practitioners to diagnose a firm's cost position in terms of understanding why a firm's unit costs diverge from those of its competitors and also make recommendations as to how a firm can improve its cost efficiency.

2.2.2 Differentiation Advantage

Differentiation advantage occurs when a firm is able to gain from its differentiation a price premium in the market that exceeds the cost of providing the differentiation (Porter, 1985).

According to Grant (1998), differentiation strategy extends beyond product differentiation to include all aspect of the relationship between a company and its customers. It is concerned with the provision of uniqueness. Ultimately, differentiation is all about a firm's responsiveness to customer requirements. A firm's opportunities for creating uniqueness in its offerings to customers are not located within a particular function or activity, but can arise in virtually everything that the firm does.

Porter (1985) identifies a number of drivers of uniqueness over which the firm exercises control. These include: product feature & product performance; complementary services; intensity of marketing activities; technology embodied in design and manufacture; the quality of purchased inputs; procedures influencing the conduct of each activity; the skill and experience of employees; location; and the degree of vertical integration.

2.3 Multinational Corporation and Global Logistics Strategies

2.3.1 Definition of Global Logistics

Global logistics & distribution have played a critical role in the growth and development of international business and in the globalization of manufacturing (Cooper, 1993). The use of appropriate distribution channels in international markets increases the chances of success dramatically. Wood et al (1995) define global logistics as the design and management of a system that directs and controls the flows of materials into, through and out of the firm across national boundaries

to achieve its corporate objectives at a minimum total cost. The functions of global logistics are shown in the figure below.

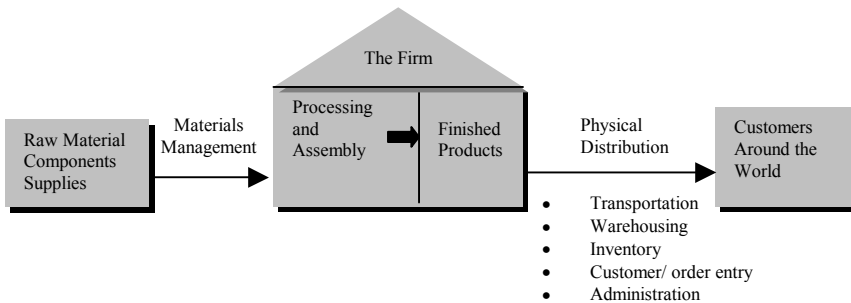


Figure 2-2: Global logistics
(Source: Wood et al, 1995)

Similar to domestic logistics, global logistics encompasses materials management and physical distribution (Wood et al, 1995). Those two processes involve the inbound logistics: inflow of raw materials, parts, and supplies through the firm and outbound logistics: the movement of the firm's finished products to its customers, consisting of transportation, warehousing, inventory, customer service/order entry, and administration (Barbalho et al, 1998).

2.3.2 Global Logistics Strategy

Even though logistics strategy is highly emphasized in MNCs, the concept of logistics strategy and how it relates to all the components of logistics has remained ambiguous and are often confusing for practitioners (Bender, 1990), due to the complexity and uncertainty of the global operations.

Byrne (1991) asserts that effective global logistics strategy enables MNCs to meet the challenge of global competition, because it has great impacts in unifying formerly disparate responsibilities into new patterns of efficiency. Further, it's an alignment that helps companies control high costs of inventory, capital, fuel, and labor. Byrne identifies several effects in this respect.

- *Differentiate MNCs from competitors through improved customer service; gained cost controls through shipment consolidation and*
- *Increased purchasing leverage through company-wide buying;*
- *Reduced paperwork by expediting the order-to-delivery cycle*
- *Eliminating redundant order entry; improved operating performance in manufacturing*
- *Enhanced coordination of activities from sourcing to delivery through universal information access*
- *Strengthened balance sheets by shrinking inventories and accounts payable*
- *Increasing receivables*
- *Streamlining cash flow*

Nowadays, logistics strategy is no longer solely a functional strategy, especially in the global context. It should be deeply integrated into a firm's global business plan. Some new strategic considerations such as environmental issues, and cultural aspects etc, which are resulted by the market changes and the increasing customer expectations, have become the focuses in the global logistics.

2.4 International Manufacturing

2.4.1 Integral Chain of Operations

Industrial firms today do not operate independently, but rather in a chain of organizations, which includes the goods flow from the extraction of raw materials via required manufacturing processes and intermediate transports up to and including the distribution of finished products to customers (Van de Ven & Florusse, 1991). A simplified example of an integral chain of operations is shown in Figure 2-3.

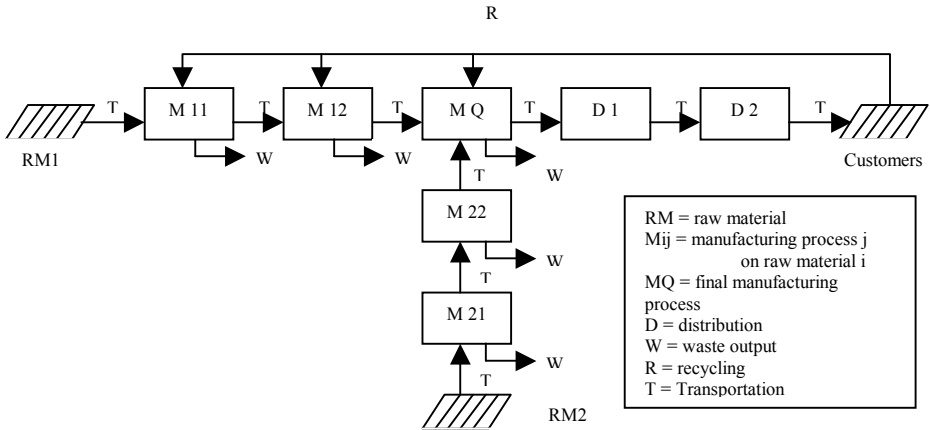


Figure 2-3: Integral chain of operations

(Source: Van de Ven and Florusse, 1991, figure 2)

Note: In reality, this chain can be extremely complex, involving much more manufacturing and/or distribution process.

The manufacturing process involves transformation of raw materials into semi-finished products (M11, M12 & M21, M22) and final manufacturing process (MQ). The finished products may be distributed to customers through channels such as wholesalers & retailers, and distribution centers; finally the manufacturing processes may also output waste in the form of thermic energy, polluting materials or non-polluting materials.

2.4.2 National Resource Conditions

Where national resource conditions exert a dominant influence on a firm's competitive advantage, it must locate where national resource conditions are favorable (Grant, 1998). Basically, national resource conditions include input materials, labor, capital, and energy.

According to Vos (1997), input materials can be basically categorized as raw materials, specific components, standard semi-manufactured products, and auxiliary materials. Since raw materials and specific

components (*usually manufactured by only a limited number of suppliers, e.g., engines*) are only available in certain countries or regions, the locations of those two types of materials affect MNCs' location decisions. The standard semi-manufactured products (*e.g., steel plate*) and auxiliary materials (*e.g., water, certain basic chemicals*) may influence a firm's plant location choice if the purchase prices differ significantly among countries. The MNCs' location choices directly influence the cost that is involved in transporting these materials.

For MNCs, the purchase price of input materials is often an important criterion in supplier selection. The best choice of suppliers does not have to be the closest one. MNCs cannot ignore the potential price benefits of distant suppliers, even though there could be some risks and uncertainties (Farmer & Ploos van Amstel, 1991). For instance: timeliness of material delivery; enlarged inventories, poor quality of input materials and waste on obsolescent inventories. Furthermore, quality and lead-time criteria should also be considered in the selection. The freedom in supplier choice may in some countries be restricted by local content rules, requiring a minimum expenditure on material purchases within the country where a plant is located.

Manufacturing process is a process to transform input materials into finished products by using the required quantities of the production factors labor, capital, and energy. Van de Ven (1989) categorizes labor as technological labor, control labor, direct operators and indirect operators. Employees in the technological labor category may be involved in such departments as product development, process technology, quality control, and maintenance. The control labor category encompasses employees responsible for the planning and control of a firm's operations. Their activities are of a more tactical and strategic nature, requiring a large amount of information from both internal and external sources. The activities of direct operators are related to the transformation of input materials into finished products. Finally, indirect operators perform activities of a more supportive nature, such as cleaning, security, manufacturing process data

recording, and the maintenance of information flows with suppliers and customers.

Capital consists of fixed capital and working capital. Fixed capital refers to the sum of the economic values of land, buildings, and machinery and other types of physical equipment required in the manufacturing process (Vos, 1997). Working capital defines the difference between a firm's current assets and its current liabilities (Gitman 1985), which emphasize the physical component of a firm's current assets, in other words its inventories e.g., input materials, work-in-progress and finished products.

Energy mainly consists of thermal energy and electrical energy. Thermal energy can be generated by means of fossil fuels or by means of solar heat. Electrical energy can be generated by means of the fossil fuels mentioned above, but also by alternative means like waterpower, solar power, and nuclear power. In addition the combined generation of heat and power is becoming increasingly important in energy intensive industries. (Van de Ven, 1989)

2.5 International Distribution

2.5.1 Main Activities in the Distribution Process

International distribution includes various activities involved in the flow of goods from plants to customers located in different countries (Wood et al, 1995). These activities are categorized as: transportation, handling-in, handling-out, storage, and reconditioning (Ploos van Amstel, 1985 & Vos, 1997).

According to Vos (1997), transportation involves the flow of finished products from manufacturing plants, possibly through one or more distribution centers to customers. In this context, the choice of an appropriate mode of transportation is particularly important in the design of a firm's international manufacturing and logistics structure. Handling-in and handling out functions concern the flow of goods to

and from storage facilities respectively. Both functions can be divided into physical and administrative components. An information flow is necessary to control physical flows; administrative activities are required to provide this information.

The storage function is required in the time period between handling in and handling-out activities. Important input requirements are floor spaces, racks, and pallets. Storage also involves working capital since money is tied up in inventories. The reconditioning function deals with restoring and /or altering the package of product.

International goods flows involve several elements of risk, such as the risk of obsolete, un-salable products and the risk of price erosion. The latter risk concerns decreasing sales prices during the total lead-time from the start of manufacturing to the delivery of finished products.

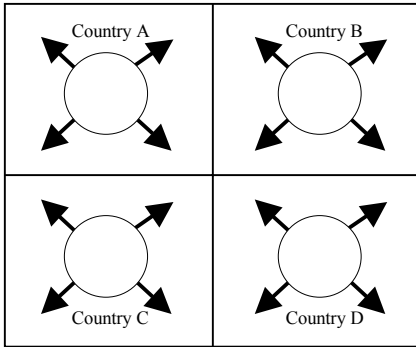
2.5.2 Basic Types of International Distribution Structure

A firm's international distribution structure should be designed to guarantee the efficient organization of finished product flows (Vos, 1997). Van Goor et al (1992) argues that an appropriate design of a multinational's distribution structure requires a detailed analysis of the consequences on cost, quality, and lead-time criteria. In this type of design problems, trade-offs are almost inevitable. Product characteristics play an important role in these trade-offs.

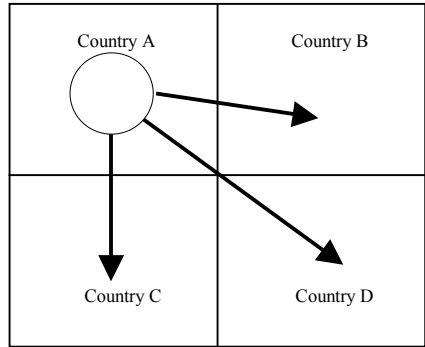
Ellis & Williams (1995) propose that concentrating production on key locations within the region will inevitably place demands on the logistics function. For MNCs, logistics is no longer merely a support function to production facilities, but an important element of their cost reduction strategies and part of the means by which the customer service can be improved (Choi, 2000). In their book, Ellis & Williams (1995) present three types of international distribution structures that can be used by MNCs (*See Figure 2-4*).

Structuring Logistics Activities in Multinational Companies (MNCs)

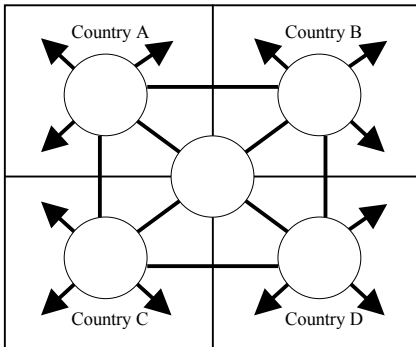
(i) Logistics functions organized on a country-by-country basis



(ii) Development of a pan-regional logistics function for regional exporter



(iii) Development of a pan-regional logistics function for a coordinated international regional strategy





Key:  = Distribution Centers
 = Goods Flows

Figure 2-4: Changing pattern of distribution for international regions
 (Source: Ellis & Williams, 1995 page 291 Figure 7.7)

For firms operating as regional exporters, there is the opportunity to concentrate their distribution facilities on a single location to serve the whole region. As a consequence, a single distribution site replaces individual national distribution centers, and enables the organization to move from (i) to (ii) as illustrated in Figure 2-4. Alternatively, for companies operating a coordinated international regional strategy, a

more complex pattern of distribution may emerge, as shown in figure 2-4 (iii).

Likewise, Van Goor et al (1992) presented another four types of international structures (*see figure below*), which reflect the importance of the variables location and capacity.

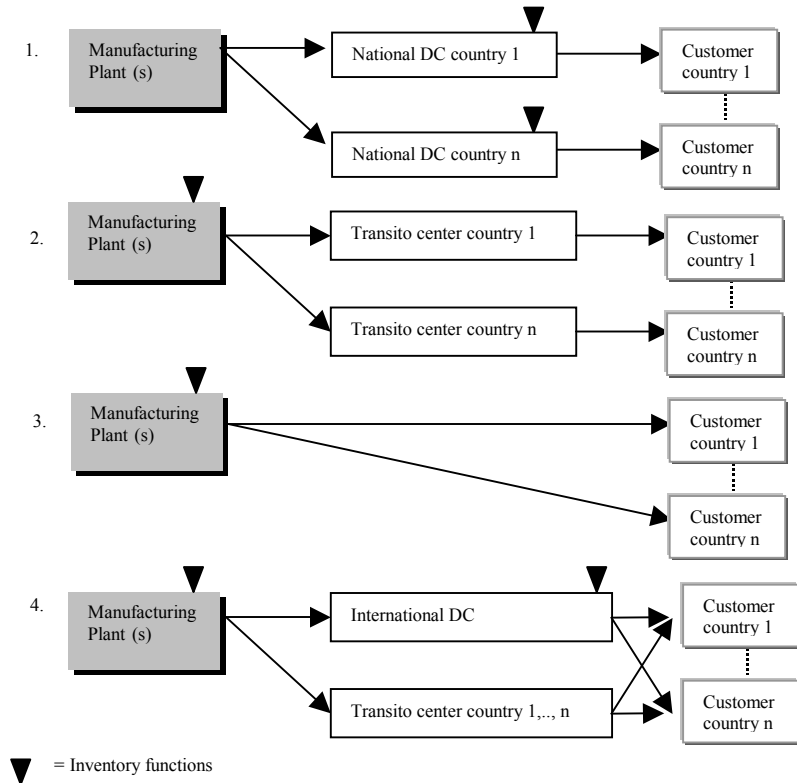


Figure 2-5: Four basic types of international distribution structures
(Source: adapted from Van Goor et al, 1992, Figure 4.6)

In alternative 1, finished products are shipped from plants to various national distribution centers (NDCs), from which local customers are supplied.

In alternative 2, finished product inventories are centralized in manufacturing plants. Subsequently, transito centers in various countries should be frequently supplied with products in order to guarantee service levels demanded by local customers.

In alternative 3, finished products are shipped directly from plants to customers in various countries. This structure often results in expensive shipments in order to realize the required customer service levels.

In alternative 4, an international distribution center (IDC) is introduced which supplies customer in various countries. A firm might have several IDCs, depending on, among other things, the geographical scope of its markets. Transito centers can still be used to serve certain customers.¹

2.6 Economies of Scales

2.6.1 Economies of Scale In Manufacturing

Economies of scale can be used to determine the annual capacity and number of manufacturing plants and distribution centers. Wagner (1981) argues that large industrial firms may have more opportunities to achieve lower costs per unit of output, because they possess three principle sources of cost advantage: e.g., learning and experience effects, economies of scale at the firm level and economies of scale at the plant level.

According to Wagner (1981), learning and experience effects in large-sized firms result in a cost advantage over their smaller competitors; because they have great impacts in improving co-operational efficiencies between managers and operators and enabling them to move faster down the experience curve. However, it is still possible for small firms to adopt strategies that enable them to compete. Several causes contribute to the economies of scales at the firm level: economies in overhead functions; economies due to bulk handling;

economies in inventories and work in progress through risk spreading; marketing economies; and financial economies. Notably, it is doubtful whether all of these economies can be realized in practice. Economies of scale at the plant level will result when there is an increase in a plant's annual output in physical units.

In practice, researchers have paid pretty much attention to the economies of scale caused by an increasing manufacturing capacity. Pratten (1988) argues that increased manufacturing capacity offers more opportunities for specialization of both labor force and capital equipment and the use of more efficient and effective manufacturing methods. In the meanwhile, economies of massed resources may be obtained.

Variations in the annual plant capacity affect a firm's operating costs (Vos, 1997). Maintenance costs are usually supposed to be proportionally related to a plant's capital investments (Pratten, 1988). In addition, the total direct labor requirements in many process industries do not increase proportionally with the annual plant capacity, which leads to lower direct labor costs per unit of output.

Determining the optimum capacity of manufacturing plants is of great complexity. Vos (1997) argues that a number of factors favor the construction of large-scale plants but there are also opposite forces limiting the possibilities to maximize scale effects. Particularly, the trade-off between scale effects in manufacturing and the associate effects on supply and distribution costs is an important issue in design problems of MNCs. The trade-off between economies of scale in manufacturing and distribution costs would provide a good first approximation for plant capacity and plant number decisions (Scherer et al, 1975).

2.6.2 Economies of Scale In Distribution

The effect of the centralized distribution system on transportation and inventory costs had already been the subject of detailed investigation in

previous studies. A common view on centralized distribution structure is its impact in reducing inventory costs (Schipper, 2000). Many European firms have started centralized distribution centers in Western Europe. However, only limited scale effects were found by previous studies (Vos, 1997).

Pfohl et al (1992) argue that an increase in the annual capacity did not result in a substantial reduction of handling and storage costs per unit of output. One explanation of these modest scale effects was that the number of employees required for handling activities is more or less proportionally related to a DC's annual capacity. One weakness of Pfohl et al's studies is that they didn't incorporate the factor of inventory cost.

Available empirical results were mainly concerned with the effect of centralization on inventory costs. In strategic planning, Das (1978) assert that the number of distribution centers as well as their locations and annual capacities should be determined jointly, with the aim of minimizing the total distribution costs subjects to maintaining a desirable service level.

2.7 Location Determinants

An MNC's choice of its manufacturing & distribution location affects its cost competitiveness since countries may differ with respect to the availability and the price of production factors (Vos, 1997). Brush et al (1999) propose three groups of plant location determinants² (*See table below*): proximity to other network nodes, access to factors of production, and national and regional characteristics. Based on my former discussions, I believe that those determinants can be also applied in the design of logistics activities.

Variable group	Factors	Determinant of location
Network nodes	Proximity of downstream nodes	Proximity to important markets
	Proximity of upstream nodes	Proximity to key customers Proximity to key suppliers Proximity to other facilities
Access to factors of production	Access to raw materials and energy	Access to raw materials Access to energy
	Access to capital and local technology	Access to capital Access to local technology
	Access to skilled labor	Access to skilled labor
National and regional characteristics	Government policies	Access to protected markets Tax conditions Regional trade barriers Government subsidies Exchange rate risk
	Societal characteristics	Language, culture, politics Advanced infrastructure
	Regulation	Labor practices and regulation Environment regulation

Table 2-1 Groups, factors, and determinants of plant location
(Source: Brush et al, 1999, page 4)

2.7.1 Proximity to Other Network Nodes

This group of determinants is most closely linked to a manufacturing perspective that recognizes relationships between a plant and other nodes in its network.

2.7.2 Access to Factors of Production

According to Brush et al (1999), factor costs as location determinants are included within both manufacturing strategy and international business perspectives. Since the variation in factor quality and cost is possibly to be greater in the international context than in the domestic context, thus these determinants are possibly to be more important to MNCs than domestic companies.

Consequently, the opportunity to locate near critical factors of production are crucial for all plants, the plant that is part of an integrated network of plants is more likely to be able to specialize in that part of the value chain that uses critical factors intensively. It can

thereby create a competitive advantage for the whole network to have access to factors of production as an important location determinant.

2.7.3 National or Regional Characteristics

This group of determinants is most closely linked to the international business literature and is more possibly to be crucial for MNCs than for domestic companies.

2.8 Research Model

Based on former discussions, a research model is developed as it is shown in the figure below.

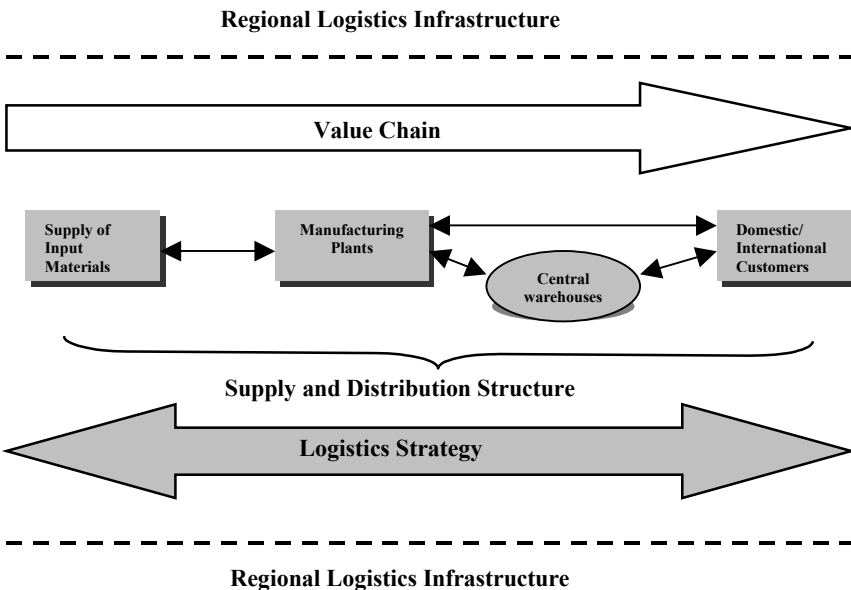


Figure 2-6: Research model
(Source: own model)

This model illustrates a firm's goods flow from the supply of materials via the required manufacturing processes to the distribution to

customers. Regional logistics infrastructure is included to emphasize that the firm participates in national/international transactions. Materials can be delivered by foreign suppliers (*international or global sourcing*), manufacturing might take place in various countries and finished products can be exported through direct delivery and central warehouses.

The focus in this research model is on MNCs' international logistics activities. In this context, three variables are identified as: logistics strategy, supply and distribution structure and regional logistics infrastructure. All these variables have a considerable impact on a MNC's performance.

Notes

¹ The discussions about this model basically follow the text present in the book (Vos, 1997), PP. 23-24; small changes are made to the text.

² The discussions about the three groups of location determinants under the table 2-1 basically follow the discussions presented in their article (Brush et al, 1999) on page 4; small changes are made to the text.

Chapter 3 Mini-Case Studies

3.1 Mini-Case of SKF Logistics AB

3.1.1 Company Background¹

SKF was founded in 1907 in Göteborg, Sweden. It manufactures its products at some 80-production sites in 22 countries, and it has been the leading technical innovator in the bearings field for some 90 years. In recent years, the service business is also becoming an increasingly important part of the SKF group's operations.

Currently, SKF is continuously strengthening its position in the technical service and maintenance know-how business. A deep understanding of its customers processes together with a leading position in the sophisticated technologies in its field means that SKF can help customers lower their costs, increase productivity and improve uptime at their industrial facilities.

SKF is always able to remain close to its customers, thanks to the network made up of its own sales companies in some 50 countries plus more than 7000 independent distributors and dealers worldwide. This network combined with the accumulated knowledge and expertise of its employees, enables the SKF group to supply the right products and services to its customers, no matter where they are.

The SKF trademark stands for quality in the global bearing market and the fact is that most of the inventions in the rolling bearing industry bear the hallmark of SKF's engineering skills and ingenuity. In 1990, SKF acquired Chicago Rawhide (CR), an oil seals company in the USA, and became a leading supplier for electrometric seals to the North American market. CR has expanded its activities in recent years into Asia and Europe. In Europe, SKF also has a bearing seals company in Italy.

3.1.2 Logistics Strategy in SKF Logistics AB

The logistics strategy in SKF is a very focused area. Instead of outsourcing from the outside specialists SKF has created a very strong organization with specialists to do logistics internally. SKF Logistics AB sells logistic services to companies both inside and outside SKF. The company tries to concentrate on the companies that produce and sell industrial goods.

In SKF Logistics AB, the concept of logistics is defined as the process that links the production and customers. Within the company border logistics more concerns the movements of the goods instead of planning, and it can be divided into outgoing logistics (*product distribution*) and internal logistics (*material flow*).

Since the company provides logistics service both internally and externally, it has to be competitive. The ways to be competitive are through high automatization, the outsourcing, and operating the warehouse handling in a right way. From the company's point of view, those factors are closely related to the efficiency and productivity.

Concerning the competitive advantage, logistics is definitely a competitive weapon for SKF Logistics AB. The logistics manager Bertil Hastéus further stated that:

“...Logistics has been a measure of competition and it will be the prerequisite for every business. In the meanwhile, it will benefit the transportation system. The suppliers will have very hard competition on timing, price, and reliability of the product. This competition will be tougher and tougher...”

Regarding the logistics in the international context, and if a company is operating in many countries, an efficient network independent of country borders is of importance, following Mr. Hastéus.

Further, Mr. Hastéus specially mentioned the effects of the e-commerce on the logistics strategy:

“The appearance of e-commerce has created quick and convenient contact between the potential customers and the suppliers. One major effect of e-commerce is that orders may come from any corner of the world; in that case companies will have problems to reach the customers.”

Within SKF Logistics AB the belief is that the company has the capability to cover all the corners of the world. With the air, sea and the land to deliver it everywhere, the company has the shortest delivery times.

Also environmental issues are of some importance in SKF Logistics AB and its logistics strategy planning. Mr. Hastéus asserts that environmental issues must be balanced with SKF's competitive situations:

“For instance, we put up requirements for our suppliers; requiring them to use the latest technique in order to reduce the problems. However, there are no policies existing in our company that we should always adopt the environmentally friendly solutions. In my view, it is balance of efficiency, cost and environmental judgments. The current solution we have is to take account of environment issues in our contracts of transportation. From the customers' point of view, to be honest, they pay very little attention to those issues.”

3.1.3 Current Supply and Distribution Structure of SKF Logistics AB

In SKF Logistics AB the supply chain concept is just another word for logistics. It's exact the same as flow planning in SKF and Mr. Hastéus stated that:

“Supply chain is everything; we have decided that, now we call it logistics”.

Customers are supplied either directly from the group's factories, OEM customers or via the central warehouses, i.e. one in Singapore for Asia, several in the USA for north America, and one in Belgium for Europe and the rest of the world. Every factory delivers its finished product into international warehouses that are carefully designed and categorized within SKF. Mr. Hastéus stated that:

Structuring Logistics Activities in Multinational Companies (MNCs)

“We have a number of warehouses, which are both factory based and region based. Outside Europe, in USA and North American, Latin American and Asian countries, we have also local warehouses, because they are appropriate to the local infrastructure, transportation customs and shipping regulations etc. For instance, we have local warehouses in Malaysia and Thailand. From Singapore, it is possible to reach Malaysia in four hours. However, we cannot make it, because the administration needs two days. Also, Malaysia and Singapore are not close friends, regulations are very tough.”

SKF Logistics AB is the beginner of the firms to start to build up their own distribution networks. Its network has been running for 8 years. Within SKF, eighty-factory systems are connected with one unique computer system (*an overall order system standardized all over its factories*). Several factories within SKF still have their own transportation network but still use the network of SKF Logistics AB at the same time. Regarding the scheduled transportation network, no matter whether surface based (*including land & water transportation*) or air based, SKF Logistics AB is cost efficient.

A project of constructing regional distribution center started in SKF in 1992; it was put into full operation in 1996. Factory warehouses are responsible for the assortments; while the distribution center has full services for the European market. This distribution center may cover Europe market in two days. Mr. Hastéus further stated that:

“Construction of regional distribution center (RDC) is the prerequisite to closing the warehouse. In our total deliveries, 70% are direct delivery from factory to customers, 30% goes from the distribution center.”

SKF Logistics AB uses third parties for logistics expertise and services e.g., use of contractors. Schenker helped it with knowledge to put up the network. In selecting the contractors, the company is very strict. Just as Mr. Hastéus said:

“We are not tied up to any companies. We always select the best player in each market. For us, if they fail twice they are out.”

SKF Logistics AB doesn't plan to make big changes in its current distribution structure. However, the company is improving all the time.

One thing SKF Logistics AB is doing now is to subcontract its hubs. The company tries to integrate the hub operations with its warehouse operations. It is sort of third party logistics, while management still belongs to SKF Logistics AB. For Mr. Hastéus himself, he believes very strongly in outsourcing itself.

“We are very positive at outsourcing, we should use specialists. However, we have to take care of the things, which is not easy with outsourcing such as the administration and management etc. We have realized that we had made a third party logistics long before it has become an organization. Now it is an business unit of ours.”

3.1.4 Regional Logistics Infrastructure

SKF Logistics AB is not very dissatisfied with the current Regional logistics infrastructure. The company is deeply aware of the possibilities and advantages & disadvantages of different transportation modes. One problem for the company’s distribution network is the small percentage of the use of rail transportation. Mr. Hastéus stated that:

“To be honest, it is just a matter a time. ... If there is an alternative to rail, of course I am going to use it. However, it has disadvantages. Truck is door-to-door transport, while by rail transport you could only reach a few doors. In addition, to make quick efficient goods flow, you must have the right tools such as wagon and container.”

The concept of regional logistics infrastructure center (RLIC) is not a common idea in SKF Logistics AB. However, as a general concept, what the company has been doing, for instance the replacement of the local warehouses with the consolidated distribution centers could be linked to this concept. In the meanwhile, the company also offers vendor management if the distribution center wants.

3.1.5 Location Determinants

The results of location determinants scaled by Mr. Hastéus are shown in the table below.

Structuring Logistics Activities in Multinational Companies (MNCs)

Scales

“0”	Not at all
“1”	Very little extent
“2”	Little extent
“3”	Some extent
“4”	Large extent
“5”	Very large extent

Location determinants	Manufacturing plants	Distribution centers
1. Proximity to important markets	4	5
2. Proximity to key customers	4	3
3. Proximity to key suppliers	2	2
4. Proximity to other facilities	1	1
5. Access to raw materials	2	0
6. Access to energy	2	0
7. Access to capital	0	0
8. Access to local technology	1	0
9. Access to skilled labor	3	4
10. Access to protected markets	4	3
11. Tax conditions	3	2
12. Regional trade barriers	3	1
13. Government subsidies	2	2
14. Exchange rate risk	1	0
15. Language, culture, politics	2	2
16. Advanced infrastructure	4	Missed value!
17. Labor practices and regulation	3	3
18. Environment regulation	2	1

Note: “missed value” in this table refers to the determinants that didn’t receive any value from the respondents; it could be because that the respondents have difficulty in scaling them or they might think that the determinant are irrelevant to their business.

Table 3-1: Results of location determinants in SKF Logistics AB

3.2 Mini-Case of Abba Seafood

3.2.1 Company Background²

Initially, the business began in 1838 in Bergen, Norway when the Brothers Ameln began trading in fish. In 1850, the head office moved to Sweden and by 1928, the business was concentrated in Bohuslän on the Swedish west coast after the construction of the first cannery in Kungshamn. In 1941, the fishing industry in Glyngöre, Denmark, began production of herrings and sardines. Today, Glyngöre is one of

the most famous brands in Denmark and is an official supplier to the Danish crown.

Nowadays, Abba Seafood is the leading manufacturer and marketer of chilled and preserved fish and shellfish products in the Nordic region. It has its roots in Norway, Sweden and Denmark. The division's products consist of primarily fish roe in tubes and jars, pickled herring, anchovies and fish balls. By preserving and improving upon tradition, Abba Seafood has acquired thorough expertise in primary products, processing and refining of seafood. This knowledge, along with a modern and attractive range of seafood products, has made its strong brand a leader and driving force on the Nordic market and has given it a stable position internationally. Abba Seafood has been a member company of the Norwegian Orkla Group since 1995.

The goal of Abba Seafood is to satisfy the shifting needs of its customers and consumers more effectively than its competitors. The work at Abba Seafood shall be characterized by high professional competence, responsibility and the will to change. Security and growth are created through profitability. Consequently, Abba Seafood shall invest in the refinement of its existing products and the development of new ones. It shall focus its activities on the Nordic countries and increase its strength in selected export markets with competitive product groups. Abba Seafood shall be an exciting, vital and energetic company. A company that people will want to do business with and work for long term.

3.2.2 Logistics Strategy In Abba Seafood

Abba Seafood specially works with the distribution issues, in which area it is deeper than a lot of its colleagues and competitors. Abba Seafood began to notice the importance of distribution ten or twelve years ago, impressed by the new movements in USA, the ideas from Wal-Mart. Regarding the importance of logistics, Mr. Lundquist stated that:

Structuring Logistics Activities in Multinational Companies (MNCs)

“...Actually if you make a map to look at the chain of operations, you will see that we are actually dealing with the transportation instead of food. We have so many chains and we are more a transportation company than a food company. From our strategic perspective, we must try to decrease the chain parts.”

Abba Seafood established a joint venture to minimize the different activities and extra costs with its main customer ICA. The cooperation follows the principle of efficient customer response (ECR).

Logistics is definitely an important tool for Abba Seafood to compete in the fast changing global marketplace. Mr. Lundquist stated that:

“Logistics is more than a strategic tool. Our transportation cost is much lower than people believe. We are trying to prove to the customers that they get very good service.”

There are sort of competitions between customers and suppliers regarding who should own the distribution chains in the market. In Sweden, Abba seafood has the control over the chain. While in Norway, it is the opposite; the customers come to the suppliers to collect the goods.

The goal of Abba Seafood is to have its total distribution in the way of an ECR model, through which the company can balance its demands also for transportation service. Mr. Lundquist stated that:

“This philosophy intends to not wait for the orders but go to the customers and say that we will take care of your stocks. It applies to our internal customers and the suppliers the same way. We try to optimize the distribution chain and also the production part.”

Environmental issues are of great importance in Abba Seafood’s strategy. Just as Mr. Lundquist stated that:

“We live on what we get out of the sea, nature is very important for us.”

Every one in the Abba Seafood is educated in the environmental issues. The company is also successful in getting its marketing people

interested, which is the most important part. The company has rewritten its environment policy, and it will be licensed with the ISO 14001 soon.

3.2.3 Current Supply and Distribution Structure of Abba Seafood

The company's supply chain structure is rather simple. Nearly all the materials are procured on a yearly basis, because of the highly restricted market. The raw materials are normally stored at least for one year.

Abba Seafood has no more than half of its sales in Sweden; the other part is outside Sweden, both within Scandinavia and outside Scandinavia. In Sweden, the company has one central warehouse from which the finished goods are distributed. Eighty or ninety percent of its distribution is concentrated on three customers: ICA, KF and Ax-Food.

To the Scandinavia markets outside Sweden, Abba Seafood has sister companies in Finland, Norway and Denmark; who have their own warehouses. Abba seafood delivers its goods to those warehouses. For the market outside Scandinavia, the products will be distributed from an export warehouse in Denmark. The manufacturing plants of Abba Seafood are located just 60 kilometers from that central warehouse. Normally the products will go through the central warehouse to the other countries, while some go directly from the factory.

Abba Seafood's logistics activities are similar to third party logistics in many ways. The company outsources some kinds of transportation but no warehouses. It has a partner company that takes care of its distribution. In Sweden the company has one contractor for transporting cold foods.

The main transportation mode that Abba Seafood uses for finished goods is trucks. For the in goods (*raw materials*) that company purchases, the company use water transportations. There are no train

connections to the company's factory. The improvements that Abba Seafood is intending to make are highly based on the customer requirements. Mr. Lundquist stated that:

“It is more and more concentrated pattern of distribution. The number of local distribution centers will probably decrease. It is easy for us to transport to fewer DCs.”

Currently, the company is trying to build up a website, through which suppliers might be able to log in the company's computer system to see what the company is planning to produce. Suppliers might see the company's demands, and the security level depends on the products. The main obstacle now is that the connections are not good enough.

3.2.4 Regional Logistics Infrastructure

The main improvements of infrastructure that Abba seafood wants is the development of the railway. The company tries to work out its environmental problems with better infrastructure.

The company's current distribution structure is closely related to the concept of regional logistics infrastructure center (RLIC) and it is very positive to this concept. Mr. Lundquist's stated that:

“Regional logistics infrastructure center (RLIC) will be both competitive and environmentally friendly, and it will be a trend in the market sooner or later.”

3.2.5 Location Determinants

The results of the location determinants scaled by Mr. Lundquist are shown in the table below.

Scales	
“0”	Not at all
“1”	Very little extent
“2”	Little extent
“3”	Some extent
“4”	Large extent
“5”	Very large extent

Location determinants	Manufacturing plants	Distribution centers
1. Proximity to important markets	1	2
2. Proximity to key customers	1	3
3. Proximity to key suppliers	4	1
4. Proximity to other facilities	3	2
5. Access to raw materials	5	0
6. Access to energy	1	1
7. Access to capital	2	3
8. Access to local technology	2	2
9. Access to skilled labor	5	4
10. Access to protected markets	3	4
11. Tax conditions	1	0
12. Regional trade barriers	3	3
13. Government subsidies	0	0
14. Exchange rate risk	3	0
15. Language, culture, politics	4	3
16. Advanced infrastructure	1	4
17. Labor practices and regulation	3	3
18. Environment regulation	3	1

Table 3-2: Results of location determinants in Abba Seafood

3.3 Mini-Case of Göteborgs Kex

3.3.1 Company Background³

Göteborgs Kex is the leading manufacturer of cookies/biscuits in Scandinavia. The company is located in Kungälv, 20 km north of Göteborg, and employs approximately 600 people. Göteborgs Kex is part of the Norwegian Orkla group of businesses, which is the largest supplier of brand goods for the food and convenience stores in Sweden and Norway.

In Sweden, Göteborgs Kex has a market share of slightly more than 50 percent and has a turnover of approximately 500 million SEK each year. Included in Göteborgs Kex's supply of 50 or so products you can find an assortment of famous brands such as Ballerina, Singoalla, Guld Marie, Brago, Hushållswafers, Kung Oscar pepparkakor, Smörgåsrån, Digestive, Baddare and Variant.

3.3.2 Logistics Strategy in Göteborgs Kex

Logistics is not a focused area in Göteborgs Kex and it is quite new for them. Logistics is discussed at different levels within the company. The main target of Göteborgs Kex is to reduce the logistics costs, in which way the company may provide consumers with decreased prices so as to become more competitive in the market. Notably, the logistics strategy in Göteborgs Kex is strongly affected by the customers. Mr. Sjöstedt stated:

“We have big powerful customers. They dictated how to distribute. We are forced to negotiate with our conditions. ... The delivery performance is even more important than the price discussions. One possible way is to reduce the extra costs in the value chain.”

Logistics is certainly a competitive weapon for Göteborgs Kex. Nowadays, the company’s customers are increasingly paying more and more attention to logistics. Delivery performance has become the most important thing for Göteborgs Kex. From the company point of view, it has been fulfilling its delivery target quite well so far.

In order to decrease the overhead costs, Göteborgs Kex has closed down their Norway plant and loads all the products in Göteborg. The reason for this is closely relates to the fixed cost, and it benefits the management. The company has to enlarge its manufacturing capacity in Göteborg and hire one hundred new persons for the productions.

Even though Göteborgs Kex doesn’t have too many environmental problems, environmental considerations are already in its logistics planning. Mr. Sjöstedt stated:

“We have good relations with the community and also have low noise levels. We have also done the ISO 14001, which will be good for the competition and also good for the customers.

Actually, it is not hard for Göteborgs Kex to adapt to the requirements of the customers regarding the environmental issues; it is just an extension of its quality system.

3.3.3 Current Supply and Distribution Structure of Göteborgs Kex

The supply structure of Göteborgs Kex is simple. The company doesn't have any specific requirements such as just in time (JIT) for its suppliers. It cannot dictate its suppliers. The raw materials the company needs are flour, fat, sugar, chocolate, and outer packaging materials. All the raw materials come bulk. Most raw materials are from Sweden; some package materials are from both Sweden and other countries in Europe. The company has two big stocks for raw materials.

The company's market covers Sweden, Norway, Finland and other markets outside Scandinavia. Nordic region is the dominant part in its market coverage. The company has its own sales in Norway and Finland. There has been big change in the distribution structure, Mr. Sjöstedt stated:

“Five or six years ago, we delivered all our goods to different DCs. As the biggest customer for us, ICA has created many hubs around Göteborg; we send all our goods down to the hubs and deliver them every second week. Nowadays, ICA has closed down some of the distribution centers. They changed their internal pattern for Sweden, we deliver to one, and they deliver to six. In this way, they forced us to have safety stocks. When I started here ten years ago, we had no products in the warehouses.”

In Norway, the company has the same pattern with the distribution centers as in Sweden. Finished products are delivered to a warehouse that the company still owns outside Oslo. From where the company delivers the products to the distribution centers, and then the customers deliver the products themselves.

Göteborgs Kex uses a lot of third party transportation for its finished goods. Mr. Sjöstedt stated that:

“We don't have any transportation of our own at all. Since transportation is not our core business, therefore we buy it, so we can focus on producing biscuits.”

Göteborgs Kex doesn't outsource any third party warehouse services, because it is very expensive in Norway and Sweden. Also, the warehouse management in Göteborgs Kex is very cheap, running very well, it is very hard for a third party to get involved. The company has seasonal changes upon its warehouse spaces, for instance it will increase its warehouse from now on (*November, 2000*) till the Easter holidays the next year.

For the domestic markets e.g., Finland and Norway and international market e.g., USA, ICE Land, and Denmark, the products are handled in different ways. In Nordic market, the production is based on the forecast; with forecast the company produces the stocks that are put in the warehouse and delivers them from the stocks. The export products are handled in an ordinary way. The company orders transportation e.g., ship, lorries for different products. Everything is produced in Göteborg; the company has sales agencies in export markets. For instance, for USA market, the company delivers the product to its agency's warehouse in USA For Danish market, the company delivers directly to the warehouses of Supermarkets.

3.3.4 Regional Logistics Infrastructure

Concerning the Regional logistics infrastructure, Göteborgs Kex currently has some difficulty with the bridge close to the factory, which is not strong enough to support heavy trucks. The company's trucks have to go through the town, which is noisy and dangerous for the passengers. From the company's point of view, in the Northern part of Sweden there is still a lot of work to do with infrastructure.

Regarding the concept of the regional logistics infrastructure center, Mr. Sjöstedt stated:

"I can't say that I have heard the concept of regional logistics infrastructure center, while it might be useful in the future."

3.3.5 Location Determinants

The results of the location determinants scaled by Mr. Sjöstedt are shown in the table below.

Scales	
“0”	Not at all
“1”	Very little extent
“2”	Little extent
“3”	Some extent
“4”	Large extent
“5”	Very large extent

Location determinants	Manufacturing plants	Distribution centers
1. Proximity to important markets	2	4
2. Proximity to key customers	4	4
3. Proximity to key suppliers	3	2
4. Proximity to other facilities	3	2
5. Access to raw materials	4	3
6. Access to energy	2	2
7. Access to capital	2	2
8. Access to local technology	2	3
9. Access to skilled labor	4	4
10. Access to protected markets	0	1
11. Tax conditions	1	3
12. Regional trade barriers	2	4
13. Government subsidies	2	3
14. Exchange rate risk	2	3
15. Language, culture, politics	2	3
16. Advanced infrastructure	Missed value!	4
17. Labor practices and regulation	Missed value!	3
18. Environment regulation	Missed value!	4

Note: “missed value” in this table refers to the determinant that didn’t receive any value from the respondents; it could be because the respondents have difficulty in scaling it or they might think that the determinant is irrelevant to their business.

Table 3-3: Results of location determinants in Göteborgs Kex

3.4 Mini-Case of DFDS Nordisk Transport

3.4.1 Company Background⁴

DFDS Nordisk Transport is one of leading transport groups in Northern Europe. Its activities include international transport and

forwarding by road, rail, air and sea. National distribution of consignments of every size in its home markets and a fully developed logistics service.

DFDS Nordisk Transport was established with the aim to ease the transition from a conventional quay/quay shipping operation to that of a door/door concept, which characterizes the European market today. The mission of the company is to provide transport and logistics services that enhance our customers' competitiveness wherever they do business, all over the world.

Early in 1977 DFDS Transport had obtained a leading position on the door/door market between Denmark and England based on own to Ro/Ro ships. In the same year it was decided to expand the market to also include the other Nordic countries and the Continent. Since 1977 DFDS Transport has built up an international transport and logistics organization in Northern Europe through organic growth and partly through company acquisitions.

Nowadays, DFDS Nordisk Transport provides total transport and logistics coverage within Europe. This is based on wholly owned subsidiaries in its home markets and carefully selected partners in a continent-wide network. Intercontinental forwarding by air and sea is organized in cooperation with its own companies in the USA, Hong Kong and South-East Asia.

3.4.2 Logistics Strategy in DFDS Nordisk Transport

The current company DFDS Nordisk Transport has been merged twice during the past two years in order to achieve a full service concept. The reason behind this is, as Mr. Wallberg stated:

“We must have a well developed organization to handle it, we must have as many players as possible to reduce the costs, through which we will have the possibility for instance, to cross country borders and provide third party logistics to the customers etc, and it is also the demand from the customers and suppliers.”

Additionally, it is a rather large investment to operate under a full service concept. This could be the key reason for the mergers that happened in the company.

In order to compete in the global context, DFDS Nordisk Transport has formed many partnerships with companies worldwide. The company's main competitors are ASG & Danzas. The company's partners in the other regions mostly solely work with the company; if they don't, DFDS Nordisk Transport will find out other solutions.

The most important change for the company during the past several years is the development of the computer system, and the new possibility provided by the use of Internet. For the company, computerized systems as well as Internet are mostly used for information exchanging. DFDS Nordisk Transport is currently in the process of developing its Internet connections, through which the customers may have the possibilities for booking etc. Mr. Wallberg explained:

“The possibility is there to order services through Internet, it is something that we have to prepare. We are connected to the customers and then we have daily contacts with our agencies. Logistics is becoming more and more important for the customers.”

The environmental considerations are necessary, especially in recent years. The demands come both from the customers and government. The customers expect the company to satisfy the environmental standards such as ISO 9002 and ISO 14001. From the company's point of view, Mr. Wallberg stated:

“...If you play as a big company, you cannot ignore those environmental issues.”

3.4.3 Current Distribution Structure of DFDS Nordisk Transport

A typical feature of the DFDS Nordisk Transport's current distribution structure is that it doesn't own any trucks. The company differentiates

its service in different markets, for instance, for UK market the company doesn't let trucks go over to UK, they use the truck to take the trailers to the harbor, and then let Ferry Company take care of the trailers. There will be a certain company in UK collecting the trailers. Mr. Wallberg further stated:

“The trailers are very flexible in the transportation process. It is possible to make round trips, which aim to avoid empty flows. The truck drivers may go to competitors to get loaded. They normally have their own connections.”

DFDS Nordisk Transport has made special agreements with the customers. It keeps stocks for the customers. The delivery performance is all about delivery time and the quality. During the delivery process, most of the goods are not fully loaded, through which the company can get more payments.

3.4.4 Regional Logistics Infrastructure

The company holds a positive view upon the Regional logistics infrastructure in Sweden; even though there are still a lot of things need to be developed. Mr. Wallberg stated:

“The infrastructure is getting better and better. We are satisfied with the developments of infrastructure underway. The forwarding market is very hot, is much hotter than we believe.”

Regarding the concept of regional logistics infrastructure center (RLIC), Mr. Wallberg stated:

“I think that a centralized distribution center connected with road, railway, logistics facilitates, and computer systems etc will be much more efficient than the current distribution centers and it will be environmental friendly as well.”

3.4.5 Location Determinants

The results of the location determinants scaled by Mr. Wallberg are shown in the table below.

Structuring Logistics Activities in Multinational Companies (MNCs)

Scales	
“0”	Not at all
“1”	Very little extent
“2”	Little extent
“3”	Some extent
“4”	Large extent
“5”	Very large extent

Location determinants		Manufacturing plants	Distribution centers
1.	Proximity to important markets	No value!	4
2.	Proximity to key customers		4
3.	Proximity to key suppliers		5
4.	Proximity to other facilities		5
5.	Access to raw materials		0
6.	Access to energy		0
7.	Access to capital		0
8.	Access to local technology		4
9.	Access to skilled labor		5
10.	Access to protected markets		2
11.	Tax conditions		2
12.	Regional trade barriers		2
13.	Government subsidies		1
14.	Exchange rate risk		1
15.	Language, culture, politics		4
16.	Advanced infrastructure		4
17.	Labor practices and regulation		2
18.	Environment regulation		1

Note: “No value” in this table is because Mr. Wallberg is working in DFDS Nordisk Transport, a forwarding company, there is nothing concerning manufacturing plant locations; therefore the first question is not relevant for him.

Table 3-4: Results of location determinants in DFDS Nordisk Transport

3.5 Mini-Case of EKA Chemicals

3.5.1 Company Background⁵

EKA Chemicals is a leading company in pulp and paper chemistry. It is the largest of the eight business units within the Chemicals group. It manufactures and markets chemicals, systems and plants, primarily for the pulp and paper industry. Certain industrial and specialty chemicals are sold to other areas of activity.

In bleaching chemicals, the company is the world's largest manufacturer of sodium chlorate and one of the five largest manufacturers of hydrogen peroxide. EKA Chemicals is also one of the world's leading manufacturers of specialty chemicals for the wet section of papermaking.

EKA Chemicals' headquarter and main process plants are located in Bohus, just North of Göteborg, Sweden. The company with 2,800 employees in 20 countries forms a Business Unit in AKZO Nobel.

3.5.2 Logistics Strategy In EKA Chemicals

EKA Chemicals' logistics function is highly outsourcing based. Mr. Bodelind stated:

“For us, logistics is not our main business, thus it is up to the experts to solve it. For our company, we need to bring experts and this process will probably continue.”

He further explained:

“Now we have an interface to the customers, our logistics strategy should be customer related.”

Environmental considerations are of some importance in the company's logistics strategy. Mr. Bodelind stated:

“We will have an environmental strategy. For instance, how should we choose the mode of transportation?”

The company has created a new vision and strategies. There will be new logistics strategies for logistics, which will certainly focus on a lot of environmental issues. Mr. Bodelind further argued that:

“How should a company evaluate different transport modes in relation to cost, pollution etc would always affect its environmental considerations.”

Logistics is absolutely a weapon of competition for EKA Chemicals. The company has established a system with backup terminals, through which it solves its logistics problems. The company combines it with many customers that it supplies. Now EKA Chemicals is trying to integrate purchasing and logistics into sale or business. The reason behind this, Mr. Bodelind explained:

“In this way we get probably better understanding about business and get the most efficient logistics system. For our customers, logistics is our part of the offer. We have to adapt to the customers and infrastructure.”

3.5.3 Current Supply and Distribution Structure of EKA Chemicals

EKA Chemicals' supply chain structure is very simple. The company has rather few products and simple customer base, which is not daily customers but have at least one-year contracts with the company. As I mentioned in the former section, EKA Chemicals uses mainly third party logistics. The company sold its last truck two years ago. The only thing that the company does is that train wagons are leased by EKA Chemicals. Except this, all its transportation is third party transportation.

Although the company doesn't have too many problems with its local transport, there are more problems in the international transport. The major problems are the cooperation with the subcontractors and different regulations exist in different counties. Mr. Bodelind stated that:

“That is something that we don't have control over, now we are trying to write those things in the contract with subcontractors, they are only allowed to block the goods that we don't pay.”

The transport modes that EKA Chemicals uses are ship, train and truck. Truck is still dominant, especially within the country borders. The strength of EKA Chemicals is that the factory is very close to the harbor. The company owns some sea-based terminals, in which the containers are stored. Terminals are located with regards to the

customer base, infrastructure and cost considerations. EKA Chemicals doesn't have too much air transportations. Concerning the logistics performance, Mr. Bodelind asserted:

“Time is the key factor for us. It is important in two ways; customers want to minimize their stocks, which means that, we more focus on time keeping, if we said we are going to be there by noon, then we have to reach there by noon. On the contrary, too fast is not good either, if we are too early the customer may not have enough space for the goods.”

There has been a change of organizational structure from functional oriented (*vertical structure*) to process oriented (*flat structure*). Regarding this structure, Mr. Bodelind stated that:

“I am now responsible for the whole function instead of a lot of people. I have the possibility and accountability to initiate and to get the logistics function working.”

3.5.4 Regional Logistics Infrastructure

The potential improvements in infrastructure that EKA Chemicals wants are the development of railway. Mr. Bodelind explained:

“We have to cross the town (Göteborg) through which our trucks can go to the harbor. Because of the quality and cost reasons, the Swedish customers are mostly served with direct deliveries. In addition, we have use a lot of combined transport. We will try to increase the shipping value and the use of trains, if possible, maybe we could have a weekly train or a daily train to Germany.”

The company is using some regional centers, which could be linked to the concept of a regional logistics infrastructure center (RLIC). Those centers contain human resource, logistics facilities. It is a center that has the responsibility for that region. Regarding the concept of RLIC, Mr. Bodelind believes that:

“Regional logistics infrastructure centers might be positive in increasing efficiency and their number will increase in the following years.”

3.5.5 Location Determinants

The results of the location determinants scaled by Mr. Bodelind are shown in the table below.

Scales	
“0”	Not at all
“1”	Very little extent
“2”	Little extent
“3”	Some extent
“4”	Large extent
“5”	Very large extent

Location determinants	Manufacturing plants	Distribution centers
1. Proximity to important markets	4	5
2. Proximity to key customers	3	5
3. Proximity to key suppliers	3	2
4. Proximity to other facilities	2	3
5. Access to raw materials	4	2
6. Access to energy	5	2
7. Access to capital	3	2
8. Access to local technology	2	3
9. Access to skilled labor	3	3
10. Access to protected markets	3	3
11. Tax conditions	3	2
12. Regional trade barriers	2	3
13. Government subsidies	3	2
14. Exchange rate risk	3	2
15. Language, culture, politics	2	3
16. Advanced infrastructure	3	4
17. Labor practices and regulation	3	3
18. Environment regulation	3	4

Table 3-5: Results of location determinants in EKA Chemicals

Notes

¹ The information in this part is taken from the company's annual report (1999) and/or Internet homepage, since it is the basic facts about the company; small changes are made to the text.

² *ibid*

³ *ibid*

⁴ *ibid*

⁵ *ibid*

Chapter 4 Data Analysis

In this chapter, the research variables will be analyzed in relation to the data presented in Chapter 3. The analysis emphasizes discussing the similarities and differences existing in different industries regarding the logistics perspective.

4.1 Logistics Strategy

4.1.1 Logistics for Competitive Advantages

All my respondents agree that logistics is an effective way to achieve competitive advantages and this role will possibly continue in the fast changing global marketplace. Logistics has a great contribution to minimizing the costs all through the value chain. However, the applications of logistics in companies' operations vary greatly dependent on different industries, competitive conditions, customer pattern, product characteristics and economic situations.

The automotive industry is one of the leading industries that realize and highlight the importance of logistics. In automotive companies such as in Saab Automobile AB¹, logistics is not just a way of competition, but also an effective and necessary method to achieve good performance of production. As one key part of the manufacturing process, logistics is highly integrated in the manufacturing processes of companies; in this way companies might perform just in time (JIT) production. The raw materials, semi-finished products, and spare parts are all transported on JIT basis, so are the finished products. In the manufacturing plants of Saab Automobile AB, a truck comes to transport finished cars to other terminals every thirty minutes. The whole supply and distribution chain is running all the time. The reason behind this could be traced to the product characteristics and cost considerations for warehouse and inventory.

Companies may use logistics to achieve cost advantages, differentiation advantages or both. Even though recent studies put a lot

of emphasis on the factors e.g., customer relations, product characteristics when developing a logistics strategy, in the interviews that I did at multinational companies, I realized that cost consideration is still significant in this respect. It still dominates or affects companies' strategies to a very large extent. And it is closely related to the companies' competitive advantages.

All through the value chains of different companies, no matter whether inbound logistics (*material flow*) or outbound logistics (*distribution of finished goods*), cost consideration is always one of the key factors. The reason for Göteborgs Kex to close the factory in Finland and Norway is because they realized that the investment capital and overhead costs in those countries maximize the costs for enlarging the manufacturing capacity in Sweden and the distribution from Sweden to those countries. Likewise, DFDS Nordisk Transport choosing to merge is to avoid the big investment in building up another organization.

SKF owns a unique logistics system (*its order system standardized all over its subsidiaries worldwide*), in the meanwhile, the system is cost efficient. Different from other companies that I visited, SKF owns its own network and scheduling system, and it uses a lot of third party logistics as well. The inbound and outbound logistics are balanced in a flat organizational structure, which has positive effects on efficiency and decision-making.

The other companies that I visited e.g., Göteborgs Kex and EKA Chemicals use mostly third party logistics, because of the management, cost and quality reasons. Outsourced logistics function eases the management; companies may focus on their core business. Furthermore, third party logistics service providers are the experts with well-designed networks, good infrastructure e.g., logistics facilities, computer systems. Asking an outside expert to take care of the companies' logistics functions could be cost efficient and quality assured.

Transport companies are the third party service providers for many manufacturing companies. Their logistics strategies differ from that of manufacturing companies. Providing customers with the logistics services in relation to low cost and high differentiation are highlighted in their logistics strategies. The company of DFDS Nordisk Transport has been merged twice during the past two years. The merger has enlarged the geographical coverage of the company; at the same time it may offer more services to the customers. The company has become stronger in the competition than before.

4.1.2 Environmental Issues

Although environmental issues have become one of the hottest topics during the past decades, the attention that has been paid to those issues doesn't seem to be enough. Nowadays, environmental issues are incorporated into many companies' logistics strategic developments. From the companies' point of view, it is not possible for them to ignore their financial performance while pursuing solely environment strategies. The environmental issues will always be the balance of the costs, efficiency and environmental judgments. The companies with better economic situation and financial performance have the better possibility to achieve good environmental performance. Notably, companies' environmentally friendly solutions are always limited by the insufficient infrastructure.

For large companies such as SKF, it has special requirements to its suppliers and dealers regarding the environmental issues. These will have some positive effects in protecting the environment. EKA Chemicals has difficulty in using rail transportation, which is more environmentally friendly comparing with the company's current transportation mode of road. Because of the insufficient railway infrastructure, it is too expensive and inconvenient for the company.

Nearly all our respondents assert that the customers pay very little attention to the environmental issues except for in the mini-case of

DFDS Nordisk Transport. Cost consideration is still the main factor when customers choose the mode of transportation.

4.2 Supply and Distribution Structure

4.2.1 Third Party Logistics

All the companies that I visited use some sort of third party logistics. A common reason for the companies is to be set free from the complicated logistics work, while focusing more on their core business. Outsourced logistics functions in some way could provide companies with better logistics service in a cost efficient way. Since the third parties solely focus on logistics, they might be able to achieve better delivery security and time keeping. In the company of EKA Chemicals and Göteborgs Kex, third party logistics providers work very well and play very important roles in the companies' operations.

Additionally, third party logistics service providers can act as logistics expertise for manufacturing companies, they might provide companies with specific logistics knowledge or technique regarding building up distribution networks, scheduling, and inventory control etc. In the mini-case of SKF Logistics AB, Schenker helped SKF to build up its own distribution network. Abba Seafood formed a partnership with a transportation company to take care of its logistics function.

As a general solution for companies' logistics obstacles, third party logistics has and will face more and more challenges. From the management perspective, the involvement of an outside organization with different information flow, organization culture & structure, management philosophy and decision making style, the integration between these two organizations is a great challenge. Poor integration results in bad collaboration between partners. From the operation level, it will lead to low efficiency and poor productivity of employees.

For instance, in the case of EKA Chemicals, the company's goods were blocked on the way, because subcontractors didn't receive the

payment from the contractor. EKA Chemicals later on specially made agreements with contractors and subcontractors regarding this issue. In the case of SKF Logistics AB, in order to keep the delivery performance of third party service providers, SKF only gives its third party partners two chances to fail during the operations. Otherwise, the partnership will be terminated. Obviously, third party logistics is positive for outsourcing companies' performance only in the case where there is a good integration/collaboration between the companies and third party service providers.

4.2.2 Key factors in the Design of Distribution Structure

The physical structure of the distribution network of the manufacturing companies that I visited are designed basically following the models that I presented in the theoretical framework. The companies have their own adjustments in relation to their specific conditions e.g., plant location, and economic situation.

Two factors are highlighted in their current distribution structures e.g., cost and efficiency. Cost considerations affect the location and quantity of warehouses, inventory level, and the use of third party logistics. For instance, in the case of Göteborgs Kex, the company closed down its factories in Norway and Finland to reduce the overhead costs. And it doesn't outsource warehouse services, which are much more expensive than its own warehouses. The low use of railway transportation in all those companies is mainly because of the high costs associated with it.

Smooth flow of goods within the company's distribution network is a crucial element for the distribution efficiency. This is strongly affected by the logistics infrastructure. Another element is the speed of information flow both internally and externally. It closely related to the advanced information system and internal administration.

For most of the companies that I visited, time keeping is becoming more and more important. Time keeping requires that the goods flow to their destination in a just in time (JIT) manner, through which

companies may decrease their warehouse spaces, and save the costs for storages. The goods should be delivered neither early nor late. When it is early deliveries, customers might not have space for storing the goods, late deliveries might delay customers' production or operation. Time keeping also concerns the material flow within the companies' border, and the distribution of finished goods to consumers. In both production and distribution, Saab Automobile AB² strongly requires the JIT transportation. It has no warehouses for raw materials and semi-finished products that are used in the production as well as the finished cars. The incoming materials will be directly put into production, and the finished cars will be delivered right away after they came out of the production lines. Company of Göteborgs Kex is currently in the process of adopting this philosophy in both its production and distribution.

4.3 Regional Logistics Infrastructure

4.3.1 Future Development of Regional Logistics Infrastructure

In general, the logistics managers that I interviewed are not dissatisfied with the regional logistics infrastructure in Sweden, even though they proposed some problems and some developments they wanted. A common opinion among those managers is that regional logistics infrastructure is one of the elements that determines the cost and efficiency of the companies' logistics activities, which concern distance, waiting time, and road conditions.

Another important issue is the environmental concern of the Regional logistics infrastructure. This discussion involves noise level, pollution and accidents. For the company of Göteborgs Kex, one possible development is the reconstruction of the bridge near the factory, which cannot support the heavy trucks and lorries. This development will have positive impacts in avoiding accidents and decrease the noise level in the town (*the factory is located in a small town*).

Nearly all the logistics managers asserted that the development of another alternative, railway transportation, should be one of the most important considerations in the future development of regional logistics infrastructure. Railway transportation is very environmentally friendly; and it has its advantages that other modes of transportation don't have. However, current railway system is not flexible and convenient for most of the companies to use. Railway transportation has problems in providing customers with always door-to-door transportation, because there are not enough connections. The development of railway system is costly and time consuming.

4.4 Location Determinants

4.4.1 Location of Manufacturing Plants

The relevant importance of different location determinants for MNCs varies in different industries and companies. It incorporates the manufacturing characteristics of different industries, and it is closely related to a company's specific factors of production.

The key location determinants differ considerably within the four manufacturing companies that I have visited (*See tables presented in the section of location determinants in the mini-case studies*). One reason for this is the different industries and product characteristics. The regulations of the sea fishing are very strict, for the manufacturing companies like Abba Seafood that rely on the sea; procuring raw materials is the key process that determines its production. That is why the company pays so much attention to the raw materials and suppliers. While, in this respect, the situation of SKF is much better, it doesn't have strict requirements for its raw materials, but some other factors.

The production in EKA Chemicals consumes a lot of energy e.g., water, electricity, thus the company chooses a place that has cheaper and convenient access to the energy. Likely, the reason for companies e.g., Abba Seafood, Göteborgs Kex choosing the determinant of *access*

to *skilled labor* as one important determinant is because of their specific production requirements.

Additionally, a company's financial performance and its mission also affect a company's location decisions. If a company intends to cover a certain geographic area, the determinants of *proximity to the key customers and markets* are of great importance. However, companies will never make their location decisions without evaluating their current financial situations. If a location decision requires companies to input too much capital, they might not be used, especially for the small companies.

4.4.2 Location of Distribution Centers

When it comes to the location determinants of distribution centers, the key determinants are almost the same for different manufacturing companies. This might be because that the purposes and design methods of each distribution center as well as the main activities and actors involved are quite similar among multinational companies, although there are some differences in the mode of transportation, packaging, and material handling etc.

The determinants that are highlighted by the respondents are *proximity to important markets, proximity to key customers, access to skilled labor and advanced infrastructure*. The reasons for this could be traced to the design of the distribution centers. One intention of MNCs to establish distribution centers is to serve several geographic markets, improve the distribution efficiency to those areas. High distribution efficiency and cost efficiency are possible if the distribution centers are located close to the companies' key customers and important markets.

However, the operations of distribution centers involve many different actors e.g., third party logistics service providers, basic logistics facilities and infrastructures. From the human resource perspective, the operations of distribution centers should be supported by knowledgeable employees. For instance, a distribution center needs

employees who have the capability to take care of the material handlings and product assortments etc. Also, employees who are able to control the information system, make volume planning, schedule the transport etc. The operation of a distribution center is rather large and complicated process, it also needs sophisticated administration. It will be tough and cost inefficient for a distribution center to locate at a place where those labor sources hardly exist. In addition, the collaborations between distribution center and third party logistics service providers also require that *access to skilled labor* should be noticed in locating distribution centers.

Further, distribution centers should be located at or at least close to the advanced infrastructures. This is mainly based on cost considerations, productivity and efficiency. Obviously, efficient goods flow should be supported by well-developed logistics infrastructure. In summary, the location decision of a distribution center should be the combination of cost, proximity to key customers and markets, access to skilled labor and advanced infrastructure. The cost evaluations of different modes of combinations are likely to be the final element that determines the final location of a distribution center in many MNCs.

Notes

¹ The information regarding the Saab Automobile AB is in appendix 2. Due to the lack of information concerning several research variables, e.g., logistics strategy, location determinants, I didn't present this part of information in the Mini case studies in chapter 3. I put it in the appendices instead.

² Ibid

Chapter 5 Conclusions

5.1 Introduction

The purpose of this thesis is to determine the impact of a firm's globalization perception and manufacturing/logistics integration on competitive performance. The whole task is performed by identifying and analyzing four key research variables: logistics strategy, supply and distribution structure, Regional logistics infrastructure, and location determinants. The evaluations and discussions are presented in the following sections.

5.2 Logistics Strategy

The way that companies achieve competitive advantages is shifting from product-based concept to service-based concept. In 1980's and early 90's, companies tended to achieve competitive advantage more through product-based concept e.g., decreasing the product costs including material cost, capital, direct labor, indirect labor, energy and management cost etc; producing the products with differentiated design, functions etc that competitors didn't have or couldn't easily imitate.

Nowadays, there is an increased number of companies to achieve competitive advantages through service-based concept. More and more attentions are paid to decrease the cost of logistics services to the customers/consumers, while increasing the quality of the services e.g., timeliness, flexibility, fast response, and high availability. In the manufacturing industry, the focus is now on improving the performance of logistics all through the value chain, which is regarded as the key part in this service-based concept. This shift has significantly increased the importance of firms' logistics strategy. Companies have to adjust their strategic development in relation to the new situations.

Many empirical studies have been done to explore the impacts of logistics in reducing the costs in value chain. Some researchers assert that logistics is positive in providing company with cost advantages as well as differentiation advantages. Logistics strategy appears to be a combination of two major competitive strategies: low cost strategy and differentiation strategy. However, this combination excludes some parts of manufacturing perspective for instance product differentiations for competitive advantages.

Even though many companies have noticed the importance of logistics strategy, it is still difficult for them to benchmark logistics strategy with other types of strategies e.g., corporate strategy, business strategy and functional strategy. The main argument focuses on in which level e.g., corporate, business or functional level a company should perceive logistics strategy. Traditionally, logistics strategy is defined as functional strategy that enables a firm's production strategy (*see figure 2-1*). Based on the information I got, I believe that logistics strategy is no longer solely a functional strategy, it should be considered at the level of business or even corporate level for some companies such as forwarding companies.

Logistics strategy penetrates almost all the processes in the value chain. From the inbound logistics to outbound logistics, logistics strategy is the guideline for a company's logistics activities and it has strong interdependency with the actors and activities involved, in particular when a company's value chain extends into international context. Effective logistics systems have great impacts in reducing the costs caused by international distribution.

From business point of view, logistics strategy now concerns how a firm should compete within a certain industry or market. The empirical studies of this thesis has actually identified and proved that logistics strategy is a competitive weapon for MNCs. The success and implementation of a firm's logistics strategy requires the supports from several individual business functions such as production, R&D, marketing, human resources and finance.

The global logistics strategy appears when a firm expands its activities from domestic context into international context. The difficulty and complexity of the international good flows and transactions have made global logistics strategy one of the key factors that determine a global firm's success. Effective implemented global integrated logistics strategy differentiates MNCs from their competitors through improved customer service for instance in the mini-case of SKF Logistics AB; In addition, it may help MNCs to achieve better performance in documentation, coordination of the logistics activities, control of cost etc. Therefore, the global perspective in the development of logistics strategy has to be highlighted.

5.3 Supply and Distribution Structure

The global manufacturing has increased the complexity of firms' supply and distribution structure. Firms today hardly operate independently rather in an integral chain of operation, which involves different actors such as suppliers, forwarders, consumers/customers etc. Companies are mostly involved in more than one supply chain; the optimization of those supply chains is of great importance in the design of supply and distribution structure. For MNCs, the optimization is closely related to firms' manufacturing plant location decisions. Two factors should be highlighted in the optimization process e.g., cost considerations and efficiency. Other factors e.g., national resource conditions such as access to raw materials, energy, and skilled labor; labor cost etc, investment capital and governmental regulations are also crucial for the optimization process.

Even though the actual physical structures of the distribution network of MNCs differ greatly in relation to the number of warehouses, involvement of transporters and mode of transportations, the design principles behind them are basically the same. That is the finished goods could either be delivered directly to the global/domestic customers from the factories if it is possible with regards to the factors of costs and timeliness etc or through one or a number of centralized warehouses to the global/domestic customers. See figure below.

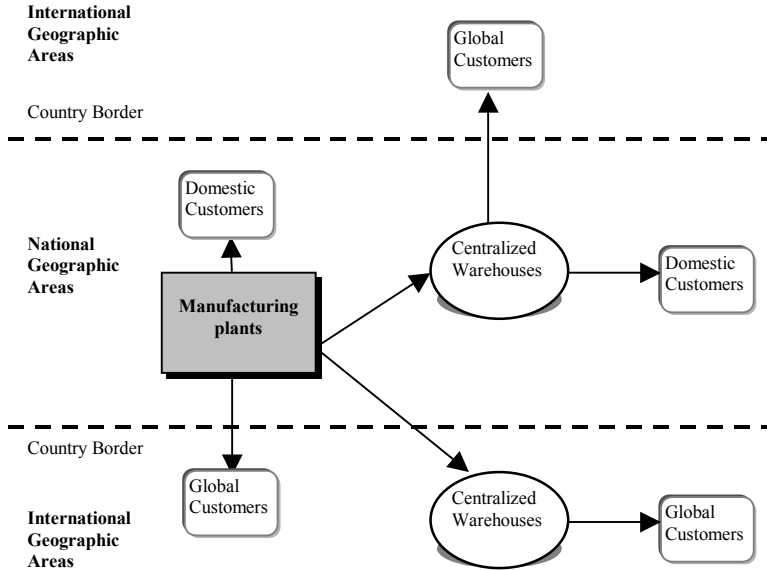


Figure 5-1: Model of an MNC's distribution structure
(Sources: own model)

This figure is an integration of the distribution models presented by Ellis & Williams (1995) and Van Goor et al (1992) (See chapter 2, page 19-22). The distribution structure of SKF Logistics AB is very complicated; it basically covers all the types of distribution structures that presented in these two models.

Regarding the national based logistics functions (*Alternative 1* in Van Goor et al's model and *type i* in Ellis & Williams' model), SKF has such national based warehouses in Malaysia and Thailand. For markets in other Asian countries, USA and European market, the customers are supplied either directly from the groups factories OEM customer-or via the central warehouses, i.e. one in Singapore for Asia and several in USA for North America, and one in Belgium for Europe and rest of the world.

The distribution structure of Göteborgs Kex, EKA Chemicals and Abba seafood is basically an integration of *Alternative 3 & Alternative 4* in Van Goor et al's model and *Type (ii) & Type (iii)* in Ellis & Williams' model. Certain countries in Europe such as Denmark, Norway, and Finland etc are served directly from the factories if it is possible for the companies; otherwise, it will go through centralized warehouses. For the overseas markets such as USA etc are normally served through several centralized international warehouses. This structure could be shown in my model: figure 5-1 as well.

In the discussions with the logistics managers from SKF Logistics AB, Göteborgs Kex and Abba Seafood, I got the impression that there is a strong tendency among MNCs to decrease the number of local distribution centers while establishing more developed and regional, national or international based warehouses, which are able to perform more logistics functions, have more transport connections and of high efficiency and productivity.

In summary, the international distribution structure should be designed based on a firm's manufacturing structure. The cost and efficiency should be highlighted in the whole process. Empirical studies have identified many different types of distribution structures that could be adopted by MNCs. The selection or combination among the different types of structures for MNCs is a balance of cost, efficiency with regard to plant locations, product characteristics, main actors and activities involved and regulations.

5.4 Location Determinants and Regional Logistics Infrastructure

MNCs today must customize their products as late as possible in the supply chain so as to react quickly to market demands. They have to shift their capital investment as well as production and distribution sites to where labor is cheaper or more skilled, according to specific demands at the time.

The location determinants of manufacturing plants vary greatly in MNCs. Companies have different emphasis in each variable group (*see table 2-1, Chapter 2: section of location determinants*) dependent on companies' specific conditions, factors of productions, and different regional and national characteristics. The objective is to achieve best economies of scale, high flexibility of production, optimization of the cross border transport and administration costs, balancing with the considerations of the dynamics of supply capabilities, import barriers and /or export incentive, the behavior of competitors, and the companies' own experiences.

MNCs' plant location decisions integrate considerations of the financial measures such as investment capital, profitability, cost conditions and location advantages including the attractiveness of an investment area in terms of local physical and human resources, host government support for inward investment, costs for employing local factors of production, fit between local strategic assets and the MNC's global pool of resources.

Although the location decisions are affected by the dynamic comparative advantages of different countries, it is important to highlight the impact on the final choice of location of the strategic advantage of individual firms and of the structures of industries, which are constantly in a state of flux. Additionally, the final cost evaluations seem to have dominant roles in the location decisions. As I mentioned in the former chapters, the reason for Göteborgs Kex to change its plant locations is highly based on the cost reasons.

The globalization and the resultant drives to capture economies of scale and scope have complicated the operations of distribution centers. The locations of logistics distribution centers are based on each company's unique needs and the best way for it to provide time- and value-added services, but the key location determinants that identified in this thesis are rather similar among MNCs.

Particularly, the role of regional logistics infrastructure is highlighted by all the MNCs. Infrastructure affects the development of national/regional based distribution centers, especially when companies are operating in a global context. The physical structures and conditions of the logistics infrastructure differ greatly among countries. For Swedish MNCs, it is important to be aware of the differences of logistics infrastructure exist between Europe and other places such as in Asian countries, and American etc when making logistics decisions. Advanced infrastructure may facilitate a firm's production and distribution activities and it may have positive impacts on the cost and efficiency.

5.5 New Insights

The new insights that I have found in my research are:

Logistics strategy is absolutely a weapon of competition for MNCs. It might act as two sources of competitive advantage: cost advantages and differentiation advantages. Environmental considerations are of great importance in today's global firms' logistics strategy, while it is strongly limited by the insufficient logistics infrastructure. There is a strong need for MNCs to further develop this issue.

The use of third party logistics service providers is a very important component in a lot of companies' distribution structures and it could also be an important part in many companies' logistics strategies. Companies can either outsource the logistics services or the knowledge. In most of the companies that I visited, the delivery performance of the third party is good, even though there had been some problems as well. We cannot ignore the difficult parts associated with the outsource itself. For instance, the conflicts caused by different organizational culture and structure, problems exist in communication and administration etc.

The physical structure of distribution networks varies greatly between companies. However, certain similarities could be found regarding the key actors involved, and the main principles used in the designing process. Most importantly, the developments of the current distribution structure in those companies have basically the same direction. That is to establish centralized warehouses on a regional, national or international basis, while decreasing the number of different kinds of local distribution centers (DC).

5.6 Recommendations for Future Research

There are many interesting topics related to the operations and strategies of MNCs that are beyond the scope of this study. A potentially relevant research topic in this field is the development of regional logistics infrastructure center (RLIC).

The concept of RLIC is closely related to MNCs' logistics strategy. It aims to increase the efficiency and productivity while decreasing the costs and environmental problems. It might become the future trend in the market. It would be interesting to deeply investigate this concept in relation to the strategy and international logistics activities.

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Chapter 7 Appendices

7.1 Appendix 1, Interview Guide

7.1.1 Section I: Design International Logistics Activities

- 1) How do you look at the strategies for logistics and distribution that your company has today?
- 2) Do you see logistics activities as a weapon of competition? In what ways?
- 3) How do you describe your current distribution structure? Can you explain how it functions and what improvements you are intending to make? Why are the improvements necessary?
- 4) How do you describe your current supply chain structure? Can you explain how it functions and what improvements you are intending to make? Why are the improvements necessary?
- 5) Can you basically describe your process of developing logistics & distribution strategy? Please indicate the factors involved such as market and customer characteristics, product characteristics, environmental characteristics, product characteristics etc.
- 6) What is your view upon third-party services for warehousing or transportation? E.g., strengths, weaknesses, specific benefits/problems for you. In what aspects do you use them?
- 7) What's your opinion about the character of the Regional logistics infrastructure in terms of air, railroad, telecommunications, motorways and water? Strengths and weaknesses?

- 8) How do you describe the necessary improvements of the existing Regional logistics infrastructure with regard to the efficiency of the supply chains and the distribution chains of today? Are the government officials working close to you in these matters?

- 9) How do you treat the environmental issues e.g., air pollution with regard to the existing logistic structure? Do you think these issues will become more important in the next five years?

- 10) Have you heard of “Regional Logistic Infrastructure Center”? What does this concept mean to you and how would you interpret it?

- 11) Do you think that “Regional logistic infrastructure center” including different logistic companies and services would increase the coordination and efficiency of your company’s logistic activities and functions? Advantage & disadvantage, such as economies of scale, efficiency, inventory cost etc.

7.1.2 Section II: Location Determinants

A. To what degree did the following factors influence your plant location decision? (For each factor choose a number from zero to five, using the scales listed in the table below)

Scales	
“0”	Not at all
“1”	Very little extent
“2”	Little extent
“3”	Some extent
“4”	Large extent
“5”	Very large extent

1.	Close to important markets	0	1	2	3	4	5
2.	Close to key customers	0	1	2	3	4	5
3.	Close to key suppliers	0	1	2	3	4	5
4.	Close to other facilities	0	1	2	3	4	5
5.	Access to raw materials	0	1	2	3	4	5

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6.	Access to energy	0	1	2	3	4	5
7.	Access to capital	0	1	2	3	4	5
8.	Access to local technology	0	1	2	3	4	5
9.	Access to skilled labor	0	1	2	3	4	5
10.	Access to protected markets	0	1	2	3	4	5
11.	Tax conditions	0	1	2	3	4	5
12.	Regional trade barriers	0	1	2	3	4	5
13.	Government subsidies	0	1	2	3	4	5
14.	Exchange rate risk	0	1	2	3	4	5
15.	Language, culture, politics	0	1	2	3	4	5
16.	Advanced infrastructure	0	1	2	3	4	5
17.	Labor practices and regulation	0	1	2	3	4	5
18.	Environment regulation	0	1	2	3	4	5

B. To what degree did those factors list above influence your distribution location decision e.g., regional logistics center, international logistics center? (For each factor choose a number from zero to five, using the scales listed in the table below)

Scales

- “0” Not at all
- “1” Very little extent
- “2” Little extent
- “3” Some extent
- “4” Large extent
- “5” Very large extent

1.	Close to important markets	0	1	2	3	4	5
2.	Close to key customers	0	1	2	3	4	5
3.	Close to key suppliers	0	1	2	3	4	5
4.	Close to other facilities	0	1	2	3	4	5
5.	Access to raw materials	0	1	2	3	4	5
6.	Access to energy	0	1	2	3	4	5
7.	Access to capital	0	1	2	3	4	5
8.	Access to local technology	0	1	2	3	4	5
9.	Access to skilled labor	0	1	2	3	4	5
10.	Access to protected markets	0	1	2	3	4	5
11.	Tax conditions	0	1	2	3	4	5
12.	Regional trade barriers	0	1	2	3	4	5
13.	Government subsidies	0	1	2	3	4	5
14.	Exchange rate risk	0	1	2	3	4	5
15.	Language, culture, politics	0	1	2	3	4	5
16.	Advanced infrastructure	0	1	2	3	4	5
17.	Labor practices and regulation	0	1	2	3	4	5
18.	Environment regulation	0	1	2	3	4	5

7.2 Appendix 2, Interview Data from Saab Automobile AB

7.2.1 Company in Brief

The manufacturing plant of Saab Automobile AB is located at Trollhättan, Sweden. Saab Automobile AB is active in many countries worldwide. The most important markets are: USA, United Kingdom, Sweden, Germany, Italy, Australia, France, Netherlands and Norway.

The company has experienced turbulent financial crisis during the past several years. Nowadays, Saab Automobile AB is fully owned by Saab Cars USA Inc. The overall manufacturing and financial performance start to become better since last year.

7.2.2 Logistics Strategy in Saab Automobile AB

The key distribution objective of Saab Automobile AB is to achieve high performance on reliability, flexibility, lead-time, and efficiency. The company is trying to operate with low tied up capital and efficient distribution in the whole supply chain, without compromising on the customer satisfaction targets and without losing sales opportunities. Mr. Ljungqvist stated that:

“... If a car gets older than thirty minutes here, that means we are failing. They should be taken away immediately. Reliability and efficiency are two of our key objectives. ...”

7.2.3 Current Supply & Distribution Structure of Saab Automobile AB

The manufacturing structure is closely integrated with its logistics structure in Saab Automobile AB. The company has daily departure (scheduled traffic) from the factory in Trollhättan down to Göteborg. For the dealers in Sweden, England and Argentina, the company has shuttle services. Mr. Ljungqvist stated that:

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“The target is to have all the cars produced today and be at sea tomorrow morning. So we have a deadline at 23:30 and the ship leaves at three in the morning. By noon of Thursday, all the cars should be on the way to different dealers. We normally have the cars loaded and distributed directly to the dealers. For an example, in Italia the cars go directly from Argentina to each dealer in Milan. We have specified the lead-time to those areas.”

The main transportation modes for Saab Automobile AB are water and road. Saab Automobile AB uses scheduled transportation of vessels; it informs the shipping company the capacity it needs every morning, so the shipping company can properly arrange other cargos. Saab Automobile AB has railway transportation as well, while it counts for a very small percentage and the delivery performance is poor. Mr. Ljungqvist stated:

“The capacity of the vessels are used both ways all the time. To the different markets, we use different shipping companies.”

Saab Automobile AB always uses transportation companies, and it has quite strong requirements to the third party logistics service providers. For instance, the transporters must fulfill just in time (JIT) requirement. Just as Mr. Ljungqvist explained:

“If we had ten or fifteen cars, ...we require them (transporters) when we have the cars.”

7.2.4 Regional Logistics Infrastructure

From the company’s point of view, there are not too many problems with the current infrastructure. The major development that the company wants is to develop the railway transportation system. Mr. Malmberg further stated that:

“... It is a matter of time... the biggest problem for us is when our trucks drive through the city of Göteborg.... It would be nice if there were better road conditions in Göteborg.”

The current infrastructure affects the development of new logistics solutions as well as the environmental performance of the companies. In this respect, Mr. Malmberg stated:

“... There are many barriers in regional logistics infrastructure to creating new logistics solution. ... But if we want to be more environmentally friendly, there will be more barriers. ...”