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APPROACH FOR STUDYING OF THE STRATEGIC STRUCTURING OF LOGISTICS ACTIVITIES IN MULTINATIONAL COMPANIES

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Обоснованно роль материально-технического обеспечения в достижении успеха транснациональных компаний. Обоснованы пределы расходов в обеспечении конкурентоспособности логистических структур. Обнаружены тенденции на рынке логистических услуг.

Ключевые слова: дистрибутивная структура, логистическая стратегия, региональный центр логистической инфраструктуры.

The internationalization of the world economy has substantially increased the border-crossing activities between companies. Logistics has become a strategic weapon for the success of many global firms. By minimizing the costs in the value chain or providing customers with differentiated services, logistics acts as a major source of competitive advantages. Nowadays it is crucial for firms to design their logistics structure on the international basis. The current trend in the market is to decrease the number of local distribution centers 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.

Key words: logistics strategy, distribution structure, regional logistics infrastructure center, third party logistics

Problem Statement. The 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. There is a strong need for MNCs to develop new competitive strategies and re-evaluate their approaches on the global basis.

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.

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

Globalization involves much more than simply importing or exporting products or materials. Globalization has created networks of international transactions comprising flows of goods, services, people, factor payments, and capital. The uncertainty and complexity facing MNCs' logistics management are awesome. Logistics practices that are successful in the domestic context might not be successful in the global one. The development of a deeper understanding of structuring logistics activities in the international context is the central theme of this article.

The emergence of more sophisticated markets overseas means that leading users are no longer concentrated in a few markets. MNCs should pursue different strategies in relation to the characteristics of the markets and products involved. Porter [16] 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) [11].

Firms today are increasingly trying to match their resources against internationally dispersed resource conditions when making location decisions [5]. 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 [10], when the transfer of technology and knowledge management becomes the key issues in international business [5].

Van de Ven [22] 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 those of strictly domestic ones.

Brush et al [3] argue that factors such as cost factors e.g., wages, 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 [24]. Many national markets are protected by quota systems, tariff barriers or other regulations; it is impossible to make a completely free flow of goods [2].

Firms' logistics structures are closely related to their manufacturing structures. Vos [24] argues one key factor in the design of manufacturing and logistics structure. It 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 [5, 9]. 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 [24]. Besides the cost based variables, Dicken [8] proves the nature of national resource conditions and the corresponding manufacturing processes to be of crucial considerations in choosing a location. Moreover, the conditions of the regional logistics infrastructure and firm's marketing strategies, which aim to serve new customers both in the home country and in foreign countries, could also affect firm's location choices [12].

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 a centralized logistics system is the distribution centers (DCs) established on regional, national, or international basis. Simkin [20] defines 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 the active movement of goods rather than on passive storage. Schipper [18] doubts 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 [14].

Warehouses consist of private warehouse or public warehouses [20]. 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.

Paper objective. 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 objective of the paper is to present the research approach of 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 is the impact of 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 exposition of structuring logistics activities in MNCs?

I. Multinational Corporation and Global Logistics Strategies. Global logistics and distribution have played a crucial role in the growth and development of the international business and in the globalization of manufacturing [6]. The use of appropriate distribution channels in international markets increases the chances of success dramatically. Wood et al [26] 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.

Similar to domestic logistics, global logistics encompasses materials management and physical distribution [26]. 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 [1].

Byrne [4] 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 [4].

- Differentiate MNCs from competitors through improved customer service; gained cost controls through shipment consolidation;
- 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.

II. International Manufacturing. 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 [21].

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

The firm must be located where national resource conditions are favorable and where national resource conditions have a dominant influence on a firm's competitive advantage [13]. Basically, national resource conditions include input materials, labor, capital, and energy.

III. International Distribution. International distribution includes various activities involved in the flow of goods from plants to customers located in different countries [26]. These activities are categorized as: transportation, handling-in, handling-out, storage, and reconditioning [15].

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.

A firm's international distribution structure should be designed to guarantee the efficient organization of finished product flows [24]. Van Goor et al [23] considers an appropriate design of a multinational distribution structure to require 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 [12] suppose 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 a part of the means by which the customer service can be improved [5]. Ellis & Williams [12] present three types of international distribution structures that can be used by MNCs:

- a) Logistics functions organized on a country-by-country basis;
- b) Development of a pan-regional logistics function for regional exporter;
- c) Development of a pan-regional logistics function for a coordinated international regional strategy.

For firms operating as regional exporters, there is an 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 makes it possible for the organization to move from (a) to (b). Alternatively, for companies operating on a coordinated international regional strategy, a more complex pattern of distribution may emerge (c).

Likewise, Van Goor et al [23] presented another four types of international structures, reflecting the importance of the variables location and capacity.

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, transit 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 customers in various countries. A firm might have several dependent IDCs. Among other things is the geographical scope of its markets. Transits centers can still be used to serve certain customers.

IV. Economies of Scales. Economies of scale can be used to determine the annual capacity and number

of manufacturing plants and distribution centers. Wagner [25] shows 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.

Determining the optimum capacity of manufacturing plants is of great complexity. Vos [24] thinks 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 [17].

Pfohl et al [14] believe 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'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 [7] asserts 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 cost subjects to maintaining a desirable service level.

V. Location Determinants. An MNC's choice of its manufacturing and distribution location affects its cost competitiveness since countries may differ with respect to the availability and the price of production factors [24]. Brush et al [3] propose three groups of plant location determinants: proximity to other network nodes, access to factors of production, and national and regional characteristics. Based on former discussions, those determinants can be also applied in the design of logistics activities.

Table 1

Groups, factors, and determinants of plant location

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 capital and local technology	Access to energy Access to capital
	Access to skilled labor	Access to local technology
		Access to skilled labor
National and regional characteristics	Government policies	Access to protected markets
		Tax conditions
		Regional trade barriers
		Government subsidies
		Exchange rate risk
	Social characteristics Regulation	Language, culture, politics
		Advanced infrastructure Labor practices and regulation Environment regulation

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

According to Brush [3] 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, these determinants are possibly to be more important to MNCs than domestic companies.

The group of national or regional characteristics is more possibly to be crucial for MNCs than for domestic companies.

VI. Research Methodology. Research design is the logical sequence connecting the empirical data to the initial research questions of the study and, ultimately, to its conclusions.

Since this research explicitly emphasizes the multinational companies, most of respondents must be chosen from MNCs. It will be good if MNCs operate in different industries to get a general view of the research problem.

In order to reach a deeper understanding of the situation investigated, the qualitative study is more appropriate for this research, since qualitative study is exploratory, inductive it emphasizes process rather than goal or result.

Further, the main research problem involves lots of data that cannot be quantified e.g., attitudes, values,

and perceptions. The nature of study, analyzing international logistics activities with regard to strategic performance, makes the use of quantitative investigation not necessary.

The main methods used to collect primary data are interview and questionnaire. The personal interviews have to involve logistics managers of MNCs. The interview questions are divided in two sections. First, eleven questions are discussed during the interview. Two other questions regarding the location determinants are answered by the respondents after the interview.

VII. 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.

VIII. Section II: Location Determinants

- A. To what degree did the following factors influence your plant location decision?
- 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

Conclusion. This paper examines the research approach of 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. The first is to identify the major impacts of the research variables on the design of

international logistics structure. The second is to identify the significant strategic considerations of global logistics strategy and evaluate relevant determinants to support MNCs' decision-making in structuring of their logistics activities.

The main research question involves many more issues than the ones proposed in this article. The priority is given to a certain number of issues, which are more appropriate for this research. Since this paper aims at analyzing issues regarding the design of the international logistics structures from the strategic perspective, other perspectives such as technical aspect, etc are not covered.

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