

Global logistics in automotive industry: case study of South Korea

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Abstract— this paper considers the peculiarities of the development of transport infrastructure of the Republic of Korea, the formation of priority logistic directions for the development of transport communications, the development of the system of land, sea and air communications, as well as the modern logistic and transport policy of the Republic of Korea, the main trends of its development.

Keywords—*global logistics; automotive industry; South Korea; case study*

I. INTRODUCTION

The emergence of the term "global logistics" reflects a developing trend in the world economy, which is characterized by the movement of entrepreneurial activity from its specialization in individual countries and regions to a multi-organized world market economy.

The main tasks of global logistics are the 1) formation, 2) management and 3) optimization of material flows at the level of macro-regional economic structures [1].

In the field of logistics management of automotive industry, the main driving forces behind its modern globalization are:

- Continued growth of the world economy;
- Search for new growth reserves by entering new sales markets, cheap sources of raw materials and labor resources outside the national borders of their countries;
- The creation of a large number of companies with a wide international division of labor and modern information and computer technologies, which form the basis of integration in global logistics systems, as well as the emergence of international logistics intermediaries (freight forwarding companies, companies managing expert operations, foreign trade companies) with a developed global infrastructure;
- Implementation of deregulation procedures to remove trade, customs, transport and financial barriers to the development of trade and economic relations. This facilitates the movement of capital, goods and information across national borders [2].

At the same time, there are many barriers to the development of global logistics due to various reasons, including the difference in political systems, the

unequal economic and social level of development of countries. Such barriers exist, for example, between the different global regions (Asia and Europe; Europe and America, etc.).

There are also financial barriers associated with tax, customs, trade policies of states, restrictions on the import of capital [3].

II. GLOBAL LOGISTICS

A. Main definitions

International logistics is the strategic management of the international supply chain, understood as the unification of the logistics activities of firms - links in the supply chain, namely: operational, financial, marketing functions and control of the material flow of goods, money and information across borders and over the borders of various states. The object of the study of international logistics is international supply chains, the links of which are represented by enterprises of different countries [4]. The subject of international logistics is international supply chain management. International supply chain management is the design, planning, execution, control and monitoring of activities in the international supply chain in order to create net value, building a competitive infrastructure, using the levers of international logistics, synchronizing supply with demand and measuring the results of the functioning of the international supply chain as a whole [5].

The main driving forces of globalization in logistics are:

- the economic growth;
- prospects for the development of global markets;
- regionalization;
- global competition;
- expansion of technologies;
- deregulation of transport and development of logistics infrastructure [6].

The main factors leading to the globalization of logistics are:

- 1) economic - the concentration and centralization of capital, the growth of TNCs (transnational corporation) and FIGs (financial and industrial group), international cooperation and division of labor,

international marketing, e-commerce, international logistics;

2) political - state borders are gradually becoming more transparent, provide more and more opportunities for freedom of movement of people, goods, capital;

3) international - the dynamics of globalization is associated with the dates of major international events that stimulate the process of globalization;

4) technical - the development of modern means of transport, information systems and technologies, communications and telecommunications, flexible automated production;

5) public - the weakening of the role of traditions, social ties and customs contributes to the mobility of people geographically, spiritually and emotionally;

6) liberalization and deregulation - the liberalization of customs, trade, tax laws in many countries, deregulation of transport have intensified the trend towards the internationalization of economic activity [7].

B. Strategies of global logistic companies

Companies implement international logistics strategies in three ways: the use of specialized enterprises, centralized stocks and the deferral method. International logistics is the planning, organization, control and management of the movement of flows (material, financial, informational and others accompanying them) that cross national borders, the points of their origin to the final consumer in space and time. Logistics becomes international when the supply chain crosses national boundaries. The differences in the application of logistics at the national and international levels are based on the differences in the organization of the corresponding logistics systems. The use of logistics at the national level is limited, first of all, by the borders of the state, which are not crossed by the formed logistics chains. The logistics systems here operate in accordance with national legislation.

The main tasks of international logistics can be identified:

1) optimization of the pricing process for purchased, produced and supplied goods and services;

2) ensuring the optimal level of quality of products and services;

3) determination of the level of need for a given product or service in a specific internal and (or) external market;

4) deciding on the method of delivery (with the help of an intermediary or independently; what kind of transport; with or without intermediate storage, etc.);

5) determination of the optimal level of logistics service;

6) determination of the size of the safety stock;

7) selection of the most advanced technologies for the production of products and services;

8) organization of work of foreign branches of the company;

9) analysis of the international competitive environment and obtaining competitive advantages.

The theory of international logistics is based on the following basic principles:

1) regulation and simplification of customs and technological procedures when crossing borders by material flows, since one of the barriers in the logistics chain is border crossings;

2) unification of rules, tariffs, parameters and standards regarding technology and technical means of transportation;

3) recognition by states of the priority of international relations, proclaiming the principles of logistics, while maintaining the economic sovereignty of countries;

4) emphasis on quality indicators of transportation, such as timely delivery of goods while ensuring their safety;

5) creation of new objects of the global logistics infrastructure;

6) the direction of large investments in the development of transport and information infrastructure related to the management of streaming processes;

7) creation of a single information logistics space that would perform a number of tasks, such as: creation and management of databases; search for contractors; informing about the location of the dispatched goods and the estimated and planned delivery time to the points of destination; provision of regulatory documents for the logistics system;

8) the orientation of the management strategy in the partner countries towards the so-called spatially distributed production international, multinational structures, etc.

The main participants in the international logistics process are the exporter's supplier; exporter of goods and (or) services; an intermediary company (for example, a carrier of goods); importer of goods and (or) services; the final consumer of goods and (or) services. In this case, the final consumer and importer can be one person, the exporter and the exporter's supplier can also be one and the same person, but intermediaries can additionally participate at any stage of the supply chain: from the point of origin of goods and (or) services to the final consumer [8].

III. LOGISTICS IN KOREAN AUTOMOTIVE INDUSTRY

The development of macro logistics is largely influenced by regional characteristics of reproduction. Considering the regional aspects of the formation of logistics systems for South Korea is especially relevant. The unique combination of socio-economic and natural-climatic factors in each region determines a special ratio of supply and demand for products,

pricing policy, the specifics of the activities of logistics intermediaries and other regional features. Regional transport communications, operational transport enterprises, as well as the presence of logistics intermediaries, the state of the infrastructure and the production and technical base of regional distribution systems have a great influence on the synthesis of logistics structures.

A. Trends in automotive industry in South Korea

The Republic of Korea has earned a reputation in the world as one of the fastest growing economies. Using its favorable geographical position in the Asia-Pacific region, it has the opportunity to become the central link of the international logistics system in the 21st century. In light of the geographic and infrastructural opportunities available, as well as the potential of the regional economy, it is very important for Korea to make every effort to become a regional center in East Asia in a short time. Despite the rapid pace of production growth that has put Korea in 13th in the ranking of highly developed economies, logistics costs have always been onerous for South Korean businesses. The relative costs of logistics in Korea are significantly higher than in advanced competing countries. Logistics in the republic, accounting for 12.8% of the gross domestic product, loses in comparison with the United States (10.1%) and Japan (9.59%) [8]. The burden of logistics costs is growing as the volume of domestic and foreign freight continues to rise. The total volume of internal and external traffic increased from 486.6 million tons in 1997 to 570.5 million tons in 2001 and stood at 724.3 million tons in 2006, 896.1 million tons in 2011 and is projected to be 1.265.5 million tons by 2021 [9].

The automobile industry is an industry which needs very developed technology and developed infrastructure, which is quite necessary for the good manufacturing process. Actually, company needs 20,000 to 30,000 parts to manufacture a car. So, it's quite difficult to make an automobile product, and mass production in the automobile industry is very difficult. Because of this reason people need many skills and ability, also technology when a country does export of the automobile products successfully.

Nowadays automobile industry in Korea is quite important (table 1, figure 1). In August 2020, South Korea earned \$3,890,000,000 only in automobile industry. It is 10% of the total industrial income. Through the graph you can check that the Korean automobile industry has the second largest volume in domestic market following the semiconductor industry.

TABLE I. EXPORT INDUSTRIES IN SOUTH KOREA, 2020

INDUSTRY FIELD	EXPORT VOLUME, \$	RATIO, %
SEMICONDUCTOR	8 200 000 000	20.68
AUTOMOBILE (INCLUDING COMPONENTS)	3 890 000 000	9.81
COMPUTER	1 310 000 000	3.30
PETROCHEMISTRY	2 760 000 000	6.96
BIO HEALTH	1 070 000 000	2.70
PETROLEUM GOODS	2 000 000 000	5.04
HOME APPLIENCES	600 000 000	1.51
VESSELS	1 240 000 000	3.13
SECONDARY BATTERY	630 000 000	1.59
STEEL	2 040 000 000	5.14
DISPLAY PRODUCT	1 570 000 000	3.96
WIRELESS COMMUNICATION	840 000 000	2.12
FIBER	800 000 000	2.02
OTHERS	13 996 000 000	35.29
TOTAL	39 656 000 000	100

Source: OECD, 2020 [10]

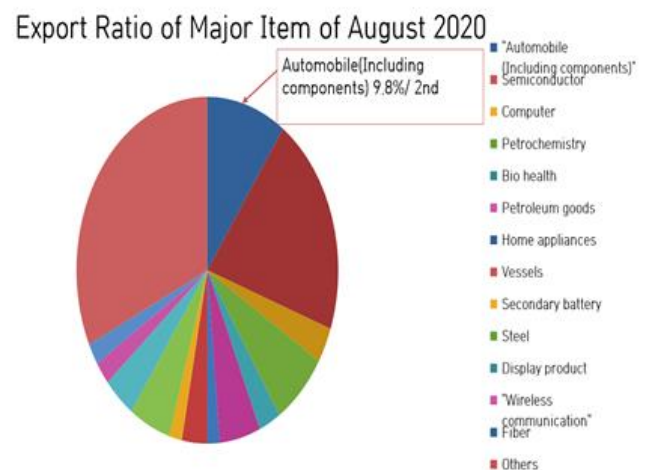


Figure 1. Export ratio in South Korea, 2020

Source: www.investkorea.org [11]

B. Future global trajectories of logistics in South Korea

In recent years, all over the world, logistics has become an integral part of the business strategy. Logistics is used in different ways at different

enterprises, and this depends on innovative capabilities and priorities. Along with the processes of transportation, cargo handling and warehousing, the value chain includes other activities that should not be underestimated, especially if the company focuses on the international market. Consider the main trends in the development of international logistics [12].

Economic globalization has created fierce competition among businesses for locations and locations, and the terms of trade continue to undergo new and rapid changes. The merger of enterprises and the intensive development of information and communication systems only reinforce these processes. The ability to calculate development trends decreases. All this together leads to shorter planning times and requires faster decision-making and response. The division of labor in the economy, considering various distribution systems, is again built on communications (for example, regional networks, cooperative relations, etc.) and on logistics. Therefore, it is very important to understand where the logistics are leading.

As follows from article, the main logistic trends can be characterized as follows:

1) change of production system: from production for a warehouse (Make-to-Stock) to production to order (Make-to-Order). For plant managers working around the world, the main challenge is to master the production of a product in accordance with the individual requirements of customers;

2) change in the distribution of goods. At this level, the traditional salesperson structure is reconciled with direct sales through the logistics enterprise. The manufacturer needs a logistics management. At the same time, adherence to delivery times is valued more than shortening these terms;

3) merger and consolidation of trade and suppliers. Logistics plays an important role in realizing potential synergies in procurement, sourcing, goods receipt, distribution or e-logistics;

4) quantitative trends, namely, a decrease in the number of suppliers in the supply. Three quarters of international businesses intend to reduce their supplier base in the next five years. When selling, as before, shortening delivery times remains relevant;

5) the impact of e-business on logistics. Business processes within the framework of the B2C concept involve the automation of more intensive deliveries, since customers' expectations for reduced delivery times are higher than with conventional ordering methods. The emergence of more costly delivery logistics and the implementation of after-sales services. Modification of processes within the enterprise by expanding electronic trading platforms. The integration of new entrants into the supply chain will lead to the creation of a so-called transparent pipeline;

6) changing the role of logistics in the international market. Third-level providers (3PLs) are market leaders in terms of presence and process capability. Local logisticians, as a rule, work in their own country, for example, American ones concentrate their efforts on the North American continent. In the past years, the growth rate of European logistics providers in the American and Korean markets was 10% per year. In the future, considering the development of B2C, this figure will be exceeded [13];

7) conquest of the logistics market by providers of the fourth level (4PL). He is a supply chain manager who manages his own technologies, resources and capacities, as well as other logistics enterprises with which he has entered into cooperative relationships to offer his client a complete set of supply chain solutions. Thus, a logistics provider of the 4th level as a network integrator manages all organizational and information processes in the supply chain or makes it possible to use outsourcing based on the application of the Best Practice method for individual processes in order to increase the performance of the entire network. Tier 4 providers, when creating their own value, take on some parts of the supply chain and manage the entire business with the involvement of other logistics enterprises. They develop unified solutions for managing complex networks or individual processes within a network.

CONCLUSION

The development of Korean international logistics, the setting of logistics tasks and the effectiveness of their solution directly depend on the trends of the world market. The world economy is developing along the path of progressive globalization and growth of production costs with fierce competition between manufacturers. At the same time, there are obvious tendencies of product individualization (manufacturers are guided by consumer requests), a reduction in the so-called product life cycle, as well as an increase in consumer demands.

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