

# Approaches to Assess the Impact of Global Trends of International Logistics Companies' Activities

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**Abstract.** Transportation holds an important position in the context of global economy and international business, as its use is necessary to create interconnections and new processes within various economic systems. The following factors are to be taken into account in order to increase demand for transportation services: economic growth, increase in production and sales, rise in profitability, globalization, integration of international markets and emergence of new approaches to logistics itself. There is a need to increase efficiency and competitiveness of transportation services. The parties involved in the process have to solve the problems concerning their technological, technical and commercial interaction. To provide the organizations engaged in transportation with an opportunity to perform their functions in a qualitative manner, there is also a need to form market segments of transportation services. The steady growth of foreign trade between countries, the increasing influence of global economic processes on the activities of firms provide for the logistics companies to seek the ways to cut costs and to build up competitive advantages. The analysis of export and import statistics shows an increase in foreign trade between the European and Asian countries which makes it necessary to draw attention of logistics companies to new, "faster" transport corridors. The Northern Sea Route is now under close scrutiny by many countries, even outside the pool of circumpolar states. The authors developed certain stages of assessment of the impact of global trends on the activities of international logistics companies within the framework of the problem under study.

## 1. Introduction

Current global trends influence the way, the result and the evaluation of the conduct of various business operations carried out by international companies. The processes of globalization and internationalization have a strong impact on modern logistics [1-4]. A new technological development (the Fourth Industrial Revolution) as well as the risk growth and the global interest of states in controlling development and distribution of Arctic resources reinforce these global processes [5-7].

It is hard to overestimate the importance of logistics in the conduct of international business [8-10]. Logistics costs may go up to 25-30% from the final price of exported goods. This is primarily due to customs costs, as well as to more complex and expensive transportation, a large number of intermediaries who run delivery procedures, increased requirements for logistics services, upgrading the skills of carriers, the choice of transport corridors, and so on. Now we can observe a steady increase in the number of participants in the logistics services market. It is necessary for the company entering a new market to meet the global standards. We must also bear in mind the role, importance and



requirements for international logistics, that include not only transportation of goods between enterprises located in different countries, storage of the goods in transit, customs procedures, but also organization of coordinated work of firms involved in delivery chains are significantly increasing.

Every year, requirements for quality indicators of the international logistics activity become tougher. The priority is given to such indicators of logistics activity as speed and timeliness of delivery, reliability, flexibility, complexity and customization of the services provided. Being the shortest route from Asia to Europe, The Northern Sea Route is currently one of the most attractive transport corridors for logistics companies [7,11,12]. As competition in the international logistics market is high, it forces international logistics companies to constantly search for the ways of increasing their competitiveness. Nowadays, there is an increase in the number of large logistics companies due to the concentration of ownership and appearance of various associations (networks, clusters, mergers and acquisitions). It is clear that only major international logistics companies which have representative bodies in numerous countries, supported by wide distribution systems with state-of-the-art technological equipment and software, as well as various logistics associated companies, can effectively operate in the modern global market [13].

The object of the study is performance of international logistics companies. The subject of our research is the impact of processes, phenomena and trends in the global economy on the performance of international logistics companies.

Methods of research. The authors chose the ADL-modeling method to achieve the goals of the study.

## 2. Lines of research

There is an obvious interdependence between the amount of transported goods and the volume of foreign trade. The most significant volumes of foreign trade can be observed in European and Asian countries [14]. The dynamics of export and import is given in Table 1.

**Table 1.** Foreign trade in commodities for the period from 2009 to 2018 (mln, USD) [Compiled according to the International Trade Statistics. <https://www.trademap.org>]

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Europe:										
Export	5185	5905	6996	6829	7173	7112	6066	5996	6594	7293
Import	5165	5885	6953	6645	6762	6751	5724	5765	6366	7027
Asia:										
Export	4350	5657	6808	7364	7550	7673	6852	6494	7221	7984
Import	3997	5214	6403	6911	7131	7111	6202	5895	6719	7521

The financial crisis of 2014 deeply affected the foreign trade in these regions. In comparison to the previous decade, the value of the exports in European and Asian countries reached its peak in 2018.

**Table 2.** Foreign trade of transportation services for the period from 2009 to 2018 (mln, USD)  
[Compiled according to the International Trade Statistics. <https://www.trademap.org>]

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Europe:										
Export	326	364	402	414	431	489	432	423	471	512
Import	287	327	361	368	387	419	364	360	394	432
Asia:										
Export	205	265	282	297	294	324	303	281	301	317
Import	319	388	461	486	489	480	439	414	456	487

Data show the same decline in the exports and imports of services in 2014-2016. We may consider such a decline as a consequence of the global economic processes. In 2018, Germany, France and the Netherlands (in Europe), and Singapore, China and Japan (in Asia) took the leading positions in the export of transportation services. Almost the same countries are the leaders in the sphere of transportation services import (Germany, France and Great Britain in Europe, and China, Singapore and Japan in Asia).

Maritime transport can be considered as the cheapest mode of transportation. Thus, the region of the Russian Arctic (namely the Northern Sea Route) is getting more preferable for Europe – Asia sea cargo transportation [7, 8].

To remain competitive, all the logistics companies involved in the international cargo transportation are to take the impact of the global economy into account. The companies need to understand the influence of global logistics environment if they wish to compete successfully in the global market. Management of every enterprise is to develop its own global logistics in order to expand the company and operate internationally without assuming either an insolvent advisory fee or an operational deficit. It is essential for any global logistics advisor to justify his/her fees by demonstrating the amount of money that a company saves in each operation. Therefore, cost savings should become a substantial part of every transaction.

In recent years some new prerequisites for the development of global logistics have appeared. We consider the following as the main ones:

- the understanding of market mechanisms and global logistics as a strategic competitive advantage of transnational corporations and other business organizations;
- the existence of opportunities for integration of international logistic counterparts, development of new organizational (structural) well – balanced relationships;
- the access to technological resources (in the field of flexible production in particular), information technologies, various software and telecommunication systems.

Transformation of global logistics systems nowadays is caused by the increasing complexity of market relations and fierce competition. This fact can be supported by the following:

- there is an increase in speed, intensity and complexity of material and information flows (in export and import operations in particular); the financial relations between logistics agents are becoming more complicated;
- there is a reduction in the number of participants of global logistics chains and channels; the complexity of organizational and economic relations is growing, whereas their amount is decreasing;
- reduction (or disappearance) of resources in production and in global distribution chains causes the lack of logistics networks reliability.

Thus, solvency of global logistics systems tends to decline. It is necessary to intensify the process of integration both within the global logistics system and with a dynamic external environment in order to pursue the system's solvency and achieve strategic business goals.

The sources the authors of the paper refer to [7, 15] propose the following: - to analyze business solvency of a company in order to assess its reliability; - to analyze company's costs in order to find financial opportunities for their reduction. We should also propose to analyze logistics expenses of a company as their reduction directly influences the overall revenue of an organization. The growth of the overall revenue determines the increase of freely circulating finance, which in turn indicates the company's business solvency.

To evaluate the work of the company engaged in logistics, it is proposed to use the groups of indicators reflected in the table 3 [15].

**Table 3.** Classification of indicators for evaluating activities of a logistics company

The first group		indicators of a warehouse activity
1. Labour intensity indicators:	1.1 Overall warehouse turnover	
	1.2 Specific warehouse turnover	
	1.3 Unevenness of a warehouse loading index (factor)	
	1.4 Storage indicator	
2. Indicators characterizing the intensity of circulating goods through the warehouse		
3. Stock turnover rate		
The second group		indicators characterizing efficiency of using warehouse space
1. Warehouse capacity		
2. Warehouse storage area		
3. Storage capacity utilization ratio		
4. Storage density		
The third group		indicators characterizing the level of safety of goods and financial indicators of the warehouse activity
1. Quantity of goods that warehouse workers fail to keep undamaged		
2. Warehouse expenses		
3. Cost of goods storage		

4. Productivity of warehouse workers
5. Output per warehouse worker
6. Inventory turnover ratio
7. The ratio of dead stock (illiquid assets)

The fourth group	quality of warehouse service and customer satisfaction
1. Compliance with meeting shipping deadlines	
2. Fulfilment of shipment applications	
3. Errors in the fulfilment of shipment applications	
4. Consumer Complaints	
5. Consumer service satisfaction	

It is suggested that all company's expenses should be distributed between the main activities, part of which are seen as profit centers, and the rest as cost centers. The analysis must be carried out according to the following indicators:

the share of logistics costs for regional sales and sales outside the region. This process is necessary to determine profitability of each of the geographic markets that the company serves.

the share of logistics costs for each of the sales channels (dealer, active and sales through the retail network). After this operation, it will be possible to compare profitability of product sales through each of the channels and select the most and least priority sales channels.

the share of logistics costs for each product group. This will allow you to find out the true profitability of each product group and determine the highest profitable segments of the range.

All approaches proposed in the literature do not allow us to evaluate the influence of external factors on the company's activities. The authors suggest using econometric methods for these purposes, in particular, to build an ADL model that allows taking into account a variety of factors [16,17]. To do this, it is necessary to choose endogenous indicators that characterize the company's performance and show the degree of its international participation. Since the company's activities are influenced by a multitude of factors, the authors propose to highlight areas, for example, technological, economic, investment and others, and determine exogenous indicators in them. The authors put forward an approach to evaluate the impact of global trends on the activities of an international logistics company, which consists of several stages.

The stages of the research are as follows:

1. Problem statement. The opening of new promising trade routes entails the need for international logistics companies to adapt to the new environment conditions in order to develop and increase their market share, and to expand their geographical presence with the ultimate goal of increasing their own profits.

2. Environment analysis. An analysis of the environment and its components should be included in the study of new conditions for the company's activities. Such components can influence profitability of international logistics companies operating in the Arctic under the industrial revolution.

3. Definition of endogenous indicators ( $y_{-}(t)^n$ ), which characterize the result of the international logistics companies' activity, are obtained under the influence of exogenous factors. These may be:

- $Y_{-}(t)^1$  is earnings per share, USD;
- $Y_{-}(t)^2$  is a number of shipments per year, pcs.;
- $Y_{-}(t)^3$  is a value of company net assets, USD;
- $Y_{-}(t)^3$  is a transnationalization index;
- $Y_{-}(t)^4$  is a network distribution index.

4. Identification of factors. Each environment can be characterized by indicators or a system of indicators classified in accordance with areas of the activity. Due to the possible large number of input data for exogenous variables ( $x_{-}(t)^n$ ), each area can be represented as an index. Indices for each area are to range from 0 to 1:

- Infrastructure  $x_{-}(t)^1$ : the distance of ground, air and sea northern routes (km or miles), number of terminals, pcs;
- Social  $x_{-}(t)^2$ : population growth (in thousands of people), number of highly qualified workforce (in thousands of people);
- Investment  $x_{-}(t)^3$ : Volume of direct and portfolio investments in Arctic regions (USD);
- Financial and economic: (market)  $x_{-}(t)^4$ : currency rate, tax rate, tariff level, rate of inflation, value of the resources;
- Political  $x_{-}(t)^5$ : political security index;
- Natural environment  $x_{-}(t)^6$ : ice thickness, ice-covered area (sq km), share of environmental costs in Arctic regions (USD);
- Competitive  $x_{-}(t)^7$ : number of competitors operating in the area (quantity), their market share (%);
- Legal  $x_{-}(t)^8$ : number of regulations (quantity) and tax rates related to business activities in northern regions (%);
- Innovative and technological  $x_{-}(t)^9$ : share of expenses from the R & D budget, the rate of innovation in this market segment (number of patents per year).

5. Data collection and model building. Since the model is based on the regression analysis, data collection includes searching for both current values of the specified indicators and their historical values. The model should be represented as a system of interrelated equations:

$$\begin{cases} y_t^1 = f(x_{t-i}^1, x_{t-i}^2, x_{t-i}^3, x_{t-i}^4, x_{t-i}^5, x_{t-i}^6, x_{t-i}^7, x_{t-i}^8, x_{t-i}^9, y_{t-i}^1, \dots, y_{t-i}^5) \\ y_t^2 = f(x_{t-i}^1, x_{t-i}^2, x_{t-i}^3, x_{t-i}^4, x_{t-i}^5, x_{t-i}^6, x_{t-i}^7, x_{t-i}^8, x_{t-i}^9, y_{t-i}^1, \dots, y_{t-i}^5) \\ y_t^3 = f(x_{t-i}^1, x_{t-i}^2, x_{t-i}^3, x_{t-i}^4, x_{t-i}^5, x_{t-i}^6, x_{t-i}^7, x_{t-i}^8, x_{t-i}^9, y_{t-i}^1, \dots, y_{t-i}^5) \\ y_t^4 = f(x_{t-i}^1, x_{t-i}^2, x_{t-i}^3, x_{t-i}^4, x_{t-i}^5, x_{t-i}^6, x_{t-i}^7, x_{t-i}^8, x_{t-i}^9, y_{t-i}^1, \dots, y_{t-i}^5) \\ y_t^5 = f(x_{t-i}^1, x_{t-i}^2, x_{t-i}^3, x_{t-i}^4, x_{t-i}^5, x_{t-i}^6, x_{t-i}^7, x_{t-i}^8, x_{t-i}^9, y_{t-i}^1, \dots, y_{t-i}^5) \end{cases}$$

6. Model Solution: Exogenous factors from each field of activity are determined for each endogenous indicator. We recommend analyzing data covering the decade period. To carry out preliminary data verification (in terms of validity, interdependence and accuracy) will help to obtain the most accurate econometric model.

The solution to this system of equations will allow us to reveal the factors that have the greatest influence on the speed and effectiveness of all the processes. It will also help to choose the best policy for international logistics company functioning and development.

### 3. Conclusions

The approach that the authors put forward will allow professionals to estimate the way the processes, practices and trends accompanying the global economy development influence the activities of international logistics companies, including the ones that are planning to operate under severe climatic conditions and in the context of the poorly developed infrastructure.

#### 4. Directions for future research

It is possible to forecast the company's development and to make the right decisions if the new environment conditions are taken into account. To achieve this, it is important to carry out a qualitative and quantitative analysis of all stages, collect data for the maximum possible period of time, and to accurately allow for interim assessments of reliability and the level of data interdependence at every stage of model building.

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