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ASSESSMENT OF THE NATIONAL ECONOMY THROUGH THE APPLICATION OF LOGISTICS COSTS

This paper presents a study on the identification and calculation of logistics costs at the macro level in relation to different approaches to reflecting the cost of logistics operations in the statistical reporting of different countries. An analysis of international accounting practices and classifications of the logistics costs in different countries and their impacts on the competitiveness and performance of the national economy was conducted. The hypothesis that the cost of logistics significantly affects the competitiveness of goods and services but it does not reflect the performance of logistics operations in the country was proven. In that regard, a comparative analysis of the macroeconomic indicators of different countries and their rankings in terms of global competitiveness and logistics performance was elaborated. The estimation of the cost of logistics in Ukraine on the basis of statistical reporting was reviewed in greater details. The estimation of the logistics costs in Ukraine was carried out on the basis of the regression model and the MALC method. A review and a comparative analysis of the approaches to the assessment of logistics costs in Ukraine and China was made; the factors affecting their magnitude and dynamics were examined. Practical recommendations on the control and analysis of logistics costs in Ukraine and the development of logistics infrastructure were formulated.

Statement of the issue

This year, the World Economic Forum in Davos outlined new trends in the development of the world economy and ways of cooperation between business, various countries, sectors and companies in order to reduce global risks and enhance social responsibility. Experts noted the revolutionary role of new technologies, in particular, that of Industry 4.0, as well as the risks they have created.

The new paradigms of economic development stipulate the need for qualitative changes and the development of global integrated distribution networks between the various regions of the world. The processes of globalization, the internationalization of the production of finished products and the transnationalization of the world economy have contributed to the greater role of logistics as an effective tool for promoting the performance and competitiveness of national economies. International experiences

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show that the adequate coordination of the actions of the various parties involved in the supply chain creates significant economic, social and environmental benefits, reduces transaction costs and strengthens communication at the national level, as well as regional integration.

All of the above supports the assumption that logistics has a great bearing on the formation of the structure of the national economy and determines its profile. According to multiple estimates, the level of logistic costs (LLC) accounts for 12% to 28% of a country's GDP. The logistics service sector has higher growth rates than the other sectors of an economy. Its share in global domestic product is about 11%.

Despite the fact that the importance of logistics as a contributor to the competitiveness of the national economy is universally recognized, the determination of logistics costs at the national level has not been sufficiently studied.

This paper examines the identification and measurement of logistics costs at the national level in the economies that set the tune of the world economy, in particular the USA, China and the countries of the European Union, as well as the countries, and Ukraine in particular, that are vigorously developing and have significant logistical potential, due to being advantageously situated between Europe and Asia.

A review of the literature

Analysis of the literary sources on the topic makes evident the great passion of scientists for reducing the error of this estimate. In order to assess the national logistics costs, countries should have reliable data that researchers can use to identify and determine the logistics costs at the national level. This indicator is often used to compare the logistics performances of different countries, as well as to elaborate the various ratings and analytical reviews.

The first publications on the nature and significance of the size of logistics costs for assessing the general and macroeconomic performances of businesses were initiated in the past century and they are related to the researches of renowned scientists such as Bowel (2003), Rodrigues, Bowersox & Calantone (2005). They first proposed to classify logistics costs on the basis of the transportation, warehousing, inventory and processing orders. This classification is still widely used in the annual report on the status quo of logistics of the Council of Supply Chain Management Professionals (CSCMP), as well as by many other countries, for example, in the market research of logistics in Indonesia, Malaysia, Latin America, South Africa, etc.

At the beginning of this century, a number of renowned European researchers (Hansen & Hovi, 2010); Smith & Huber, 2005) applied a different approach to defining logistics costs, which was based on company surveys and the implementation of methods for expert assessments.

The ever-growing interest in determining logistics costs at the macro level had something to do with the introduction and implementation of the Logistics Performance Index (LPI) in 2007-2009 (Shepherd, 2011). Subsequently, due to the lack of an internationally-accepted approach to classifying and assessing logistics costs, this indicator was excluded from the rating. It should be noted that in their

study Farahani, Asgari, Davarzani (2009) observed a negative correlation between the value of logistic costs and that of the integrated LPI.

Of remarkable relevance to our study were the publications of Ranatasila Karri and Ojala Lauri (2012, 2013, 2015) in which an in-depth historical and terminological analysis of the identification and comparison of logistics costs at the level of national economic systems was made. It was found that the analysis of logistics costs using national accounts was attempted in many countries (the USA, Canada, Sweden, Norway, Indonesia, etc.) without a comprehensive method being proposed that could be borrowed in order to consistently compare the performances of logistics at the macro level. This point of view is supported by Pishvaee, Basiri, and Sajadieh (2009). They point out that calculating the cost of logistics at the national level is very difficult or even impossible. Only an assessment of these costs and therefore, of the transportation and stocks efforts, can be made. Without such information, the estimate of logistics costs would be very complex and the results would be unreliable.

Similar conclusions were drawn by other researchers: Kumar (2010), Weng, and Du (2015), Chunge (2015), Slusarczyk, Kot (2013), Lukinsky, Semenov (2012), Sergeev, Zinina (2013).

In their views, the main reason for the complexity of calculating logistics costs is the undesirable traditional accounting methods used by enterprises. Accounting methods provide the necessary information, which includes the financial operations of the entire company, but they do not solve the problems of modern logistics. Worse still, the existing metrics and methods used to collect and analyze information on the logistics costs of a company are not suitable for analyzing macroeconomic indicators.

Nevertheless, studies on logistics costs at the macro level have never failed to interest researchers and consulting organizations, which becomes evident by the numerous publications on the topic. For instance, Rakovska (2013) explored the relationship between logistics costs and national competitiveness and verified the necessity of a national logistics strategy in logistics management.

Zakariah and Pyeman (2013) have developed practical recommendations for confronting the complexity of managing logistics costs and striking a balance between complexity and reliability, which should in turn enhance the revival of implementing logistics costs management. *(The deeper understanding can provide practical guidance on how to overcome the complexity issue in the logistics cost management and find a balance between complexity and reliability, leading to a renaissance in the use of logistics cost management).*

The basis for the conclusion drawn from the analyzed scientific publications is that the measurement of logistics costs is not the ultimate goal of scientific research, but a type of indicator for monitoring and evaluating the national economy. Therefore, it is very important to find the most suitable method to measure their magnitude, and make recommendations about reducing the logistics-related expenses in the final cost of any product or service.

Research methods

The analysis of various publications on the definition of logistics costs at the national level has uncovered a barrage of methods. In the paper by Rantasila and Ojala (2015, p. 10), 66 textbooks, scientific journals, case studies and others were reviewed. The authors identified three major methodological approaches – based on statistical research, survey studies and case studies. Among the studies reviewed, 37.9% employed the method of case study, 34.5% used the survey method and 27.6% employed the statistics method. The majority of them (79.2%) were multi-purpose studies, in which a number of topics were discussed, while the rest were focused on a single topic.

The essence of these methods should be considered in greater detail.

1. The method of collecting and processing the statistical data that national statistical offices or international organizations (in particular, the World Bank) apply while determining the proportion of logistics costs in the GDP structure of a country or the world as a whole and, as a step further, deciding the absolute value of these costs. The total costs of logistics consist of the costs of all industries and types of economic activities for the implementation of logistics processes over a period of time. This approach proves simple and is often used in real practice.

The main drawbacks of this method lie in its non-universality, the presence of the inflationary component and the impact of exchange rate when comparing national indicators in international statistics. A. Dolgov notes that this indicator actually reflects the cost of the services of the logistics providers, but not that of the logistic part of the produced products (see Sergeev, Zinina, 2013).

Thus, the lack of uniformity in the approach to assessing the logistic part of GDP obstructs the objective picture of benchmarking in this measure of logistics performance.

2. The method of data collecting based on surveys of the companies in the different sectors reveals the actual logistics costs from the point of view of consumers of logistics services. It is noteworthy that the lower the level of logistics outsourcing in a company is, the more likely it is that all the necessary logistics costs will be taken into account as a basic standard format of financial reporting. On the other hand, the costs of logistics outsourcing are reflected in the GDP-related statistics. This approach highlights the national accounts of Finland, Germany (BVL),[1] Switzerland and Thailand and is seen in 30% of all existing reports, according to reports on logistics costs (see Rantasila, Ojala, 2015).

3. Data collection using a case study involves processing the statistical reports of enterprises and macroeconomic information provided by reputable consulting firms. They compare the logistics costs of different countries on the basis of statistical data and technical expertise. This is essentially a method of peer

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[1] Bundesamt für Verbraucherschutz und Lebensmittelsicherheit (Federal Office of Consumer Protection and Food Safety in Germany).

review and is applied the most across the world, by approximately 47% of the relevant reports.

A significant demerit of this approach is the inadequate subjectivity of the results obtained and its heavy dependence on experts who are familiar with the environments being analyzed. Despite these shortcomings, expert methods are often used in those cases where there is insufficient statistical information about the dynamics and magnitude of the analyzed indicator. The method of expert assessments allows one to move on to the next stage of data analysis, namely, the stage of abstract thinking and the generalization of the observed facts. For the sake of objectivity, it should be noted that there are other approaches available, for instance, estimating logistics costs based on multiple regression (see State of Logistics Indonesia, 2013; Yu, 2015).

In addition to choosing the method for estimating the value of the logistics costs, it is important to choose the model for their formation. In the present study, the method involving the investigation of logistics costs at the macro level in Indonesia and Malaysia was a relevant subject (see Zakariah, Pyeman, 2013; State of Logistics Indonesia, 2013).

An integrated analysis of the methods and models of reporting and the structure of logistics costs applied in different countries uncovered a lack of uniformity in the approach to their assessments. Nevertheless, the indicator for estimating the value of logistics costs at the macro level has widely been used in measuring the performance of logistics operations in a country and in the benchmarking of national economies.

Main text

●*Hypothesis 1.* A comparative analysis of the logistic performances of different countries in the context of the geo-economic panorama will be carried out.

Nowadays, the geo-economic panorama of the world is characterized by the blurred boundaries between the internal and external socioeconomic activities of different countries amid globalization, the tremendous influence of economy on the state policy, the development of interregional integrated logistics systems and international security standards for supply chains, and the formation of an integrated system of world economic ties. Therefore, the economic growth of many countries is geared toward increasing their national competitiveness. Large logistics costs ultimately increase the prices of finished products, and this negatively affects their competitiveness in the global market.

First, a hypothesis must be developed: the weight of logistics costs in the structure of the GDP can be taken as a measure of the competitiveness of the national economy and the performance of the country's economic system.

Thus, the relationship between the results of logistics operations at the macro level and the corresponding national and global competitiveness must be determined. To test this hypothesis, the statistical indicators of countries that contain their rankings of global competitiveness and the performances of logistics operations

was used. Special attention was paid to some leading economies in the world – the USA, China, Germany etc.

The World Bank's World Development Indicators (World Development Indicators) database was used as a source of information on the size of the GDP of various countries in the world. And the present study employs the GDP of the country in question for the year of the study.

In terms of the research that was carried out, the collection of the information about the costs of logistics at the national level was the most difficult task. For most countries, the results of a study of the global Third Party Logistics (3PL) Market made by Armstrong & Associates were used. For Bulgaria and Ukraine, expert assessments and statistical reports from national statistical offices were used. Table 1 shows the aggregate data for analysis.

An attempt was made to quantify the statistical relationship between the chosen factors. The correlation coefficient between a country's place on the global competitiveness rankings list and that on the logistics performance rankings list is 0.78, which indicates that the two are actually interrelated in this way or another. Meanwhile, the correlation coefficient between a country's gross domestic product and its place on these ranking lists is between 0.3 and 0.5. It is the opinion of the authors of this study that the absence of a close statistical connection between the competitiveness and logistics performances and the specific weight of the logistics costs in the GDP supports the conclusions drawn by the researchers that the information from the state statistical authorities does not provide accurate data on the costs of logistical operations.

Table 1

Benchmark data on the GDP volumes of different countries and their global competitiveness and logistic performance rankings for the year 2016

	Gross domestic product, in billion USD	Rating of global competitiveness GCI	Index of global competitiveness GCI	Rating of logistics performance (RLP)	Logistics performance index (LPI)	Logistics industry share in GDP structure, in %
USA	17 947.0	3	5.7	10	3.99	8.2
China	10 982.8	28	5	27	3.66	18
Germany	3357.6	5	5.6	1	4.23	8.8
Finland	229.7	10	5.4	15	3.92	11.4
Poland	474.9	36	33	33	3.43	9.3
Bulgaria	49.0	56	4.4	72	2.58	14
Russia	1324.7	43	4.5	99	2.57	19
Turkey	733.6	55	4.4	34	3.42	10.7
India	2090.7	39	4.5	35	3.42	13
Kazakhstan	217.9	53	4.41	77	2.75	*16*
Slovenia		65	4.28	50	3.16	
Hungary	138.3	67	4.2	31	3.43	
Romania	199	62	4.3	60	2.99	
Ukraine	90.5	85	4	80	2.74	8.8

Source: The World Economic Forum. The Global Competitiveness Report 2016-2017: The Logistic Performance Index. The Global 3PL Market Size Estimates.

That makes even more sense for Ukraine which ranks 85th in the global competitiveness list and 80th in the logistics performance list. At the same time, the share of logistics costs in its GDP is 8.8%, which is comparable to those of the leading economies.

Based on the National classification of economic activities in Ukraine, group H "Transport and Warehouse Services, Courier and Postal Activity" stands as a separate sector that includes transport, warehousing, courier and postal services. Therefore, it's only the costs of transport and warehousing services provided on an outsourcing basis that count for this group. It should be noted that the data on the logistics costs of the other countries has the costs of inventory and administration included.

To ensure a fair comparison between the absolute value of logistics costs and their specific weight in the national GDP, it is necessary to standardize the components of logistics costs and the methods for measuring them. It is equally important to formulate a generally acceptable system of logistical accounting and standardize those components of costs that must be included in the total cost of logistics and the process of its calculation.

In order to determine the logistics costs in Ukraine, the multiple regression method was applied. The following indicators were chosen: population (X1), landmass (X2), GDP (X3), export volume (X4), import volume (X5), global competitiveness (X6), logistics performance (X7) and volume of the logistics services market (Y).

While making the calculations, a linear function was chosen whose equation is written as follows:

$$Y = a + b1*X1 + b2*X2 + b3*X3 + b4*X4 + b5*X5 + b6*X6 + b7*X7 + \varepsilon,$$

where: Y is the resultant sign of the multiple regression equation; a, bi – the parameters of the multiple regression equation; Vi is a sign of the multiple regression equation; ε – the value of the random deviation.

Table 2 shows the benchmark data for the selected countries.

Table 2

Benchmark data for the regression-correlation analysis and the definition of the logistics costs of Ukraine

Country	Population, in million	GDP of the country, in billion USD	Volume of exports of goods and services, in billion USD	Volume of imports of goods and services, in billion USD	Global competitiveness rankings	LPI rating	Share of the logistics industry in the GDP
USA	321.6	17947.0	1471.0	2205.0	3	10	8.2
China	1374.6	10982.8	2011.0	1437.0	28	27	14.9
Germany	81.9	3357.6	1283.0	987.6	5	1	8.8
Finland	5.5	229.7	57.1	53.5	10	15	11.4
Poland	38.0	474.9	188.3	189.5	36	33	12.0
India	1292.7	2090.7	271.6	402.4	39	35	13.5
Russia	146.3	1324.7	259.3	165.1	43	99	18.0
Turkey	77.7	733.6	150.1	197.8	55	34	11.0
Ukraine	42.6	90.5	34.0	38.3	85	80	

Source: The World Economic Forum. The Global Competitiveness Report 2016-2017: The Global 3PL Market Size Estimates.

Using the standard methodology for determining a, bi and ε, we obtain a linear equation for estimating the logistics costs of Ukraine:

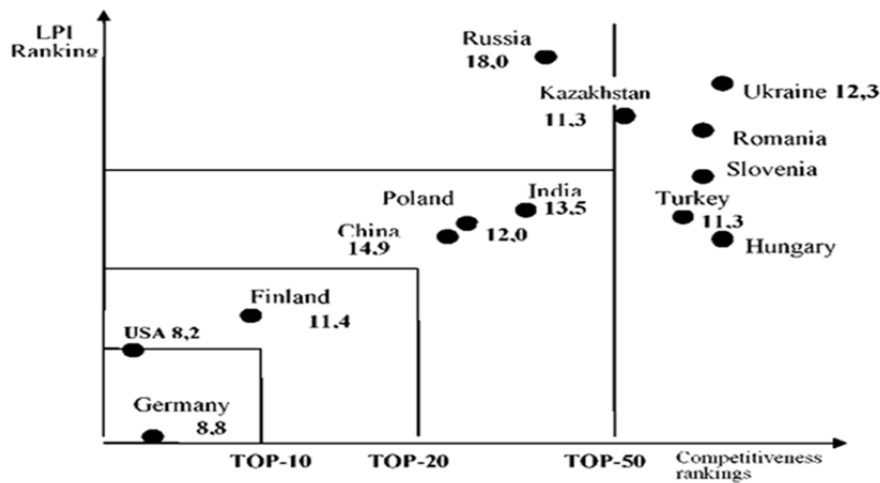$$Y = 52.46*X1 - 5.71*X2 + 4.39*X3 - 1.30*X4 + 0.8*X5 + 0.18*X6 + 0.06*X7 - 549.1$$

For this equation and the presented benchmark data, the coefficient of determination R^2 is 0.999976, which denotes a strong connectivity between the selected factors and the assessment of the country's logistics costs.

Thus, it is concluded that the weight of the cost of logistics in Ukraine's GDP measures 12.5%.

Adjusted by the multiple regression method, the estimates of the logistics costs are correlated with the place on the rankings lists for global competitiveness and logistic performance (Figure 1).

Figure 1

Places of various countries in the global competitiveness and logistics performance rankings and their comparison in terms of the value of the logistics costs

The distribution of the countries in the TOP-10, TOP-20 and TOP-50 roughly coincides with the hypothesis that the proportion of logistics costs in the overall GDP would mirror the economic competitiveness of a country and the performance of its management system. A sound competitiveness means to produce good and/or cheap products that are desperately needed. In order to turn out the required goods and services, constant innovations, modern logistics infrastructure and sensible policies are needed to stimulate the production of high-tech products of the best quality and to gain impressive profit from them. Countries focused on the export of raw materials and goods with low added value are compelled to ensure their competitiveness through price compromises, that is, to struggle to retain export prices or reduce them. The reason why countries with significant logistics costs are

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less competitive than is supposed is the fact that their transport and logistics systems are ineffective and their organization of internal logistics is inefficient. Other stumbling blocks include the improper role that raw materials play in the economy, the large distance of the main export industries from ports, the irrational placement of many enterprises and the outdated delivery of goods from the producer to the consumer.

The underdevelopment of Ukraine's logistics infrastructure, its inefficient customs procedures, its inadequate logistics competence and the insufficient integration of business entities and their involvement in the supply chain collectively sustain its 85th place in the global competitiveness ranking.

China and India are marked by a large logistics costs rank in the second quantile of the rankings, implying that they are relatively competitive.

Nevertheless, it is the belief of the authors of this paper that the data used in the various studies on the logistics costs of various economies are in fact a representation of the capacity of the logistics services market. Yet, they do not reflect the logistics of the products. The proportion of the logistics costs to the GDP signifies only the size of the logistics industry but not the productivity and performance of the management system.

●*Hypothesis 2.* Involvement in international supply chains and industrial production based on imported components would increase the cost of logistics operations, but at the same time it would enhance the competitiveness of the national logistics and the performance of the management system.

To prove this hypothesis, the method of estimating logistics costs described in Weng and Du (2015) was applied. According to the authors of that publication, there are some industries that do not directly consume logistics resources – for example, finance and insurance, information technology, etc. Much as these activities involve logistic services, they will be put down to other industries. Therefore, some scientists proposed the MALC (Macro Logistics Cost) method which contains the total social cost of logistics. All the products (including services) of a country or region have direct contact with the logistics operations and products.

Consequently, the weight of the logistics costs in the national economy can be calculated by the following formula:

$$MALC/(H1H2+L1H2)$$

where: H1 – high value-added products output; L1 – low value-added products output; H2 – products having direct contact with the logistics operations.

As Xingang Weng and Xufeng Du (2015) have pointed out, formula 2 more accurately reflects the principle of cost reporting in accordance with the expended logistic resources per unit of output. If the value of the denominator of the formula decreases, the ratio will increase, that is, the weight of the logistics part in the national economy will rise. Thus, according to the proposed model, one can verify the assumption that countries with a larger volume of industrial production will have a greater demand for logistics operations and, hence, the share of logistics costs in the GDP will be greater.

The level of the logistic components of the GDP was recalculated with formula 2 for China and Ukraine and the results of the calculations are shown in Figures 2 and 3.

Figure 2

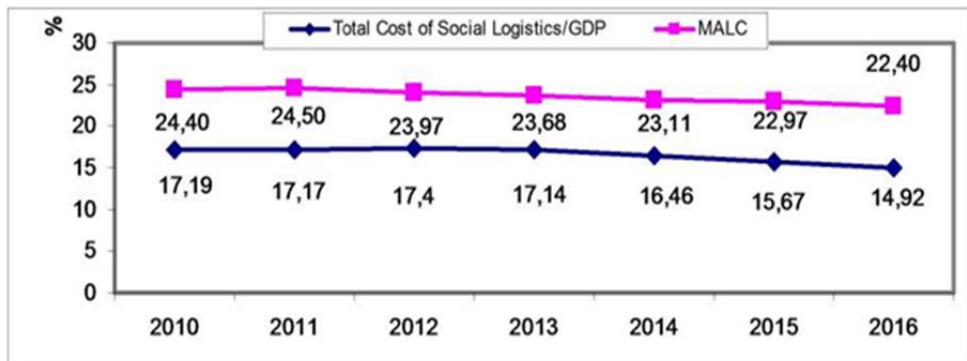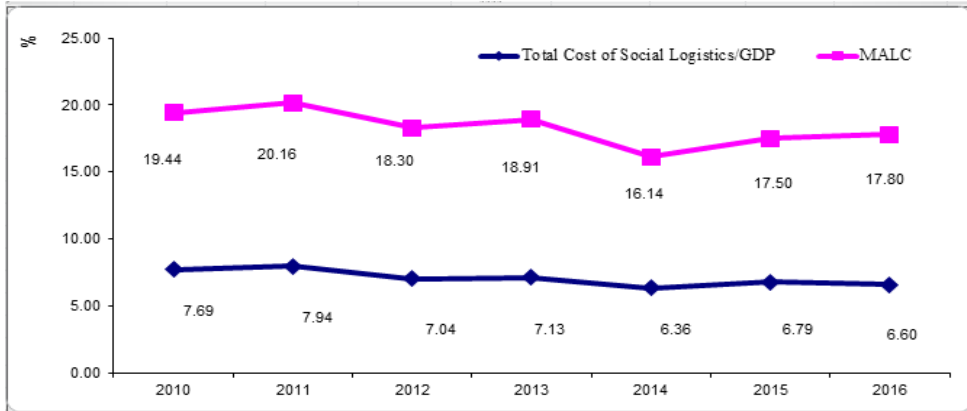Dynamics of the logistics costs and the MALC indicator for China

Figure 3

Dynamics of transport and storage costs and the MALC indicator for Ukraine

Thus, Figure 2 reflects the trend of the Chinese economy to reduce the share of logistics in the value of the goods and services produced. As is shown in Figure 3, the cost of logistics operations in Ukraine is lower than that in China, but it does not exhibit any sharp reductions. At the same time, the proportion of logistics to GDP is much higher than the previously received estimates. The nature of this phenomenon must be further explored. To that end, an analysis of the dynamics of Ukraine's GDP in hryvnia and in USD is made (Figure 4).

Figure 4

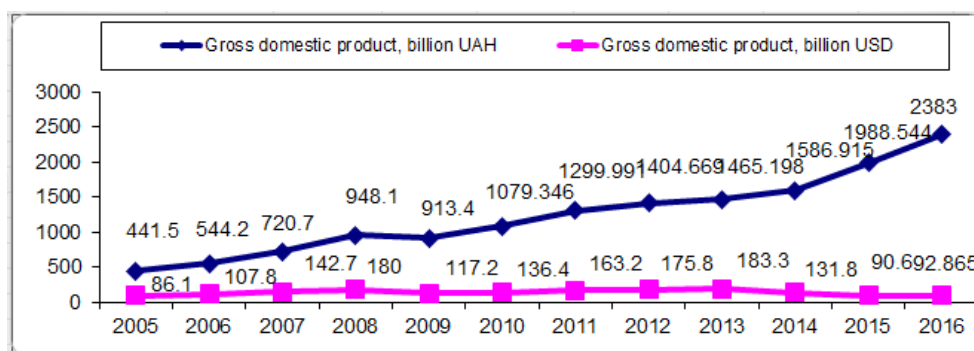Dynamics of Ukraine's GDP for 2005-2016 (UAH and USD)

Figure 4 shows that Ukraine's GDP grew every year due to the devaluation of the national currency, but in dollar terms it dropped in the year 2014. In 2016, it was likely that economic stability or even a small growth of 2.3% would be achieved. Such negative dynamics affected the decrease in the volume of cargo transportation, namely, the volume of logistics activities, which is shown in Figure 3. The greatest demand for transport services was recorded in agriculture, manufacturing and mining. The exported goods included mainly grains, ferrous metals and semi-finished products. The share of high-tech products and services with high added value in 2015 was 5.5%.

The Data on the comparison between the GDP structure of China and Ukraine is shown in Table 3.

Table 3

Comparative analysis of the GDP structures of China and Ukraine
for 2013-2016

	China (100 million CNY)				Ukraine (million UAH)			
	2013	2014	2015	2016	2013	2014	2015	2016
GDP	595 244	643 974	689 052	744 127	1 465 198	1 586 915	1 988 544	2 383 000
Primary Industry	55 329	58 344	60 862	63 671	209 997	240 265	334 947	379 654
Three industry composition – The added value of the primary industry (%)	9.3	9.1	8.8	8.6	14.3	15.1	16.8	15.9
Secondary Industry	261 956	277 572	282 040	296 236	250 896	282 998	336 929	344 614,3
Three industry composition – The added value of the secondary industry (%)	44	43.1	40.9	39.8	17.1	17.8	16.9	14.5
Tertiary Industry	277 959	308 059	346 150	384 221	1 004 305	1 063 652	1 316 668	1 658 732
Three industry composition – The added value of the tertiary industry (%)	46.7	47.8	50.2	51.6	68.5	67.0	66.2	69.6

Source: Governmental Statistical Office of Ukraine; National Bureau of Statistics of China.

For the Chinese economy, the share of products with low added value is declining but that of services is growing. At the same time, industrial production, which consumes a significant amount of the logistics resources, take up about 40% of the total. Therefore, logistics costs are high. Yet, these changes imply that the state policies for the development of the logistics industry have been working quite well. The significant investments in transport infrastructure, the tax incentives and the elimination of double taxation help to reduce the operating costs of logistics service providers and consolidate the market.

Analysis of the sectoral structure of Ukraine's GDP shows, firstly, the raw-material dominance of the economy and the tendency to increase exports of agricultural products and minerals, and secondly, the reduction of the industrial production share, which in 2016 was only 14.5% (almost 3 times less than the one in China). And yet, it is the production enterprises that are in the greatest need of high-quality logistics services. The sharp decline in industrial production led to a decrease in cargo flows, which, in times of economic crisis, often led to the dumping of the prices of logistics services.

Currently, the Ukrainian government is taking active steps to stimulate economic development and elevate the competitiveness of Ukrainian goods and services in the international markets. In order to accelerate the reforms of the transport infrastructure and improve the performance of the logistics, the Cabinet of Ministers of Ukraine established the Logistics Committee, which is made up of representatives of various ministries and departments, business and the expert community. The National Transport Strategy of Ukraine for the period until 2030 was elaborated, assuming a 40% increase in the output of agricultural products and a 15% increase in the output of high-tech goods and services. These industries, along with metallurgy, machine building and mining, as well as the imports of mineral products, will be the main consumers of transport services. Consequently, their needs will determine the ways of investing in transport infrastructure and they will set the trends for the development of the logistics industry in Ukraine.

Conclusions and discussions

The study of the structure of the logistics costs of an economy and the determination of the total cost of logistics are of great importance. Since logistics has become an essential indicator and driver of the development of the economy, it largely speaks for the country's competitiveness in the world markets of goods and services, and thus determines its geopolitics. However, the absence of standardized procedures for measuring logistics costs in the system of global economic statistical reporting disallows one to the use the value of logistics costs as a barometer of the logistics performance. Worse still, it makes an appropriate comparison between the logistics markets of different countries impossible. That was invalidated by the comparative analysis of the logistics industry of Ukraine conducted in this paper in relation to those of the leading countries of the world, as well as to those of its neighboring countries.

When developing methodological approaches to assessing logistics costs at the global level, it is extremely important to enrich the data sources for further analysis. In many cases, such sources refer to company reports and information from state statistical authorities, which, for reasons already described, cannot be fully applied in Ukraine. Despite the fact that the Ukrainian GDP is calculated in accordance with the International Statistical Classification of Economic Activities of the European Community (NACE Rev.2), it is likely that only the lower estimate of the volumes of transport and storage services provided by third parties will be determined.

The regression analysis method and the MALC method used in this paper have made it possible to establish the range of estimates that determine the lower and upper limits of the logistics costs in Ukraine. The lower limit is set on the basis of statistical data regarding the volumes of provided transport and storage services under outsourcing terms. The upper limit takes into account the sectoral structure of GDP and the needs of industries that are direct customers of logistics services, and determines the quality and cost of services.

The analysis of logistics cost research in different countries, particularly in Finland, Malaysia, Indonesia and South Africa, and the analysis of statistical data about Ukraine and China made it possible to formulate and substantiate the hypothesis that when comparing the logistics performances of different countries, one must take into consideration the branch structure of the national economy. The production of low added-value products requires significant logistics costs, which increases their share in the national GDP. To manufacture high value-added products using imported components also expands the cost of logistics, but it will lead to high-quality goods and services that would do good to the competitiveness and performance of the management system. In developed countries, the demand for logistics services comes from companies who are specialized in the production and trade of goods with high added value, engaged in foreign economic activities or devoted to implementing projects that require special conditions and schemes for the delivery of goods.

Therefore, it can be concluded that the share of logistics costs in GDP serves as a guideline only, and not as a full-fledged diagnostic tool for the performance of the national economy. The cheapest logistics is not always the best solution. To better the performance of the national economic system, great importance must be attached to products with high added value. The engagement of economic entities in the international (global) supply chain will improve the competitiveness of the economy, and logistics competence, trade facilitation, inter-country (inter-regional) cooperation must be constantly updated and innovation continuously ensured. Modern information and communication technologies, business virtualization and the commercialization of novel ideas create unprecedented opportunities for us to optimize business processes, including finding the best logistics solutions, which will generally help to reduce the cost of logistics and, therefore, its share in GDP. That is why further studies on the costs of logistics at the macro level should figure

out how logistics costs should be differentiated when importing and exporting goods and how they should be accounted for by international and national statistical bodies. Once such data becomes available, it will be much easier to effectively manage logistics costs at macro and micro levels and to develop innovative strategies to improve the performance of supply chains.

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