

Integration of Logistics Systems of Developing Countries into International Logistics Channels

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Summary

Modern logistics significantly influences the globalization and internationalization processes. Logistics systems are becoming increasingly important in today's rapidly changing environment. On the other hand, the development of global economic integration, business globalization contributes to the creation and development of international logistics systems and global supply chains towards the international market. The aim of the article was to investigate the national logistics systems of developing countries in the context of their integration capabilities. The main methods used in this study are statistical analysis, index, graphical and analytical methods, methods for estimating structural dynamic shifts, comparisons. Commonly used methods of economic research, as well as statistical analysis and interstate comparisons, economic modelling (trend analysis to determine the forecast level of LPI for Ukraine), etc. were also involved. It is noted that the problem of development of logistics systems in developing countries was insufficiently covered in scientific research. The study suggests that the integration capabilities of national logistics systems are determined by the logistics performance of each country and the favourable logistics environment for integration transformations. This allowed analysing the state of the logistics systems of Poland, Bulgaria, India and Ukraine, and identifying the factors that determine it. The logistics environment of Poland, Bulgaria, India and Ukraine, as well as the factors of its formation are evaluated. The components of the logistic portrait of the country in the context of integration capabilities of the logistic system are offered. Trend analysis of LPI was carried out on the example of Ukraine, which showed positive trends in the logistics system and allowed drawing conclusions about increasing integration into international logistics channels based on its geopolitical location, improving the characteristics of the logistics environment,

including customs regulation, and improving the efficiency of the national logistics system. Prospects for further research involve studies of the impact of pandemics, globalization, digitalization on logistics systems, including that of developing countries.

Keywords:

logistics systems, logistics performance, integration, transit, LPI, logistics portrait of the country.

1. Introduction

The development of logistics systems and their integration into international logistics channels form the competitiveness of the state, because they are a factor of influence and allow diversifying the national economy, prepare the ground for economic growth and reduce poverty. After all, the state has the opportunity to become a transit country with all the positive consequences.

Developing countries are characterized by policy changes, unstable economies, lack of basic infrastructure and limited use of business management technologies, low standards, including environmental ones. The governments of these countries identify ways to succeed either through localization or through integrated globalization. At the same time, they must decide how to build supply chains: remain a unique market or integrate into global operations and scales.

Usually, these issues in global business have individual answers for each country or remain unanswered at all, because there are no correct and effective solutions.

Globalization focuses the attention of governments on the need to meet financial goals and increase the country's competitiveness. Thus, the Logistics Performance Index (LPI), which defines a country's competitiveness in terms of logistics and is a tool for benchmarking, is designed to help countries identify the challenges and opportunities they face in trade logistics and find areas for improvement. This indicator of the analysis of competitiveness and potential of logistics support reflects the logistics capabilities of the countries in which global freight forwarders and express carriers work, and trade partner countries.

Seeking to develop their own economies, countries resort to various measures, which includes improving the national logistics system. Focusing on logistics, developed countries receive additional benefits. However, developing countries need to review the status quo in favour of building and improving a logistics system. Therefore, the integration of logistics systems of developing countries into modern international logistics channels remains an urgent problem today.

The aim of the article is to study the national logistics systems of developing countries in the context of their integration capabilities.

Research objectives:

- identify the features of the integration of logistics systems of developing countries;
- analyse the dynamics of indicators used to assess logistics performance, in particular, the Logistics Performance Index (LPI) in terms of developing countries;
- study the change of digital expression of LPI structuring within the studied countries during 2010-2018;
- identify the stimulants and disincentives for the efficiency of logistics systems of the studied countries;
- analyse the logistics environment of the studied countries using appropriate indicators;
- outline the factors influencing the logistics environment of developing countries;
- draw analytical conclusions on the possibilities of integrating the national logistics systems of developing countries into international channels.

2. Literature review

Logistics and transport are playing a key role in international trade relations. Some studies link the logic of performance indicators to changes in international trade

[1,2], which shows a correlation between key logistics indicators and international trade.

Author [3] also notes that the rapidly growing interest in trade facilitation has stimulated many initiatives and projects aimed at increasing the competitiveness of logistics in developing countries. He drew attention to the studies conducted by researcher [Arvis et al. [4-7], which focus on the following:

- landlocked countries depend on transport corridors, foreign trade of these countries as a sector of the economy is directly interested in facilitating trade and reducing transport costs for goods and services;
- transport and logistics systems in developing countries, including support for integration into other international logistics channels, still face very significant obstacles.

The modern logistics industry has opened up new strategic prospects in establishing the relationship with economic growth. In recent years, understanding this impact has become a political issue, given the ever-increasing factors and their impact on this relationship. Most existing studies identified this relationship from a general perspective or for developed countries. Author [8] analysed dynamic variables and their impact in both short and long term on the relationship between the modern logistics industry and economic growth, which is quite important, especially for developing countries.

The relationship between logistics infrastructure and economic growth is dynamic, as the growth of the logistics industry accompanies economic development and vice versa. This is the point in the following studies:

- researchers [9,10] — logistics as a major factor in economic growth;
- researchers [10, 11, 12] — the impact of transport and logistics on economic growth.

Similarly, other studies have focused on logistics infrastructure in terms of positive impact on economic growth [13,14]. When studying correlation, researcher [15] found that long-term unidirectional economic development depends on infrastructure investment. Moreover, geographical features were also considered in the study of similar relationships [16,17,18].

In recent years, developing countries have competed fiercely trying to boost their economies by modernizing logistics systems [19,20]. Besides, discussing the logistical path to growth, author [21] argue that developing countries often find themselves in a vicious circle of low productivity. In general, these studies show that economic

growth is driven by the level of logistics performance in developing countries [19,20].

In order to create a logistical competitive advantage, governments need to evaluate the current logistics system at the country level and identify which subsystems need to be optimized, developed, created or completely removed, and address integration through policies and initiatives [22].

The logistics performance really plays an important role in economic growth and increasing the country's competitiveness. According to author [23], logistics is one of the most important factors in increasing national competitiveness. Inefficient logistics increase costs and reduce the likelihood of global integration. This places a huge burden on developing countries that are trying to compete globally [7].

Author [24] noted that logistics in developing countries is a product of complex interactions that are significantly influenced by geography, as well as the decisions of many manufacturers, consumers, transport/other service providers and governments. Logistics services in developing countries are mainly related to supply chains in the agricultural sector. Strategies can be simple consolidation services provided by traders or highly developed forms of vertical integration. They can be useful in low-income countries that are developing major commercial corridors, but which find it difficult to connect the corridor internally or globally.

The main problem of logistics services in developing countries is low demand both in space and time. Therefore, special measures are needed to encourage and promote the consolidation of volumes in order to reduce the unit costs of logistics services. The strategies cover all major dimensions of logistics, including the provision of appropriate infrastructure, services, payment systems and mechanisms of coordination between producers. The development of basic infrastructure, taking into account the purpose, type and location of transport infrastructure has a great impact on the logistics performance.

An efficient logistics system can accelerate the country's industrialization through rapprochement within industrial centres, as well as create a basis for deepening economic cooperation and further integration of countries into the world economy. Moreover, the strategically advantageous geographical location of the country allows obtaining a significant source of income through the active introduction of transit opportunities.

Assessing the effectiveness of macrological systems for developing economies, we note that in 2020 the number of countries falling into the category of "developing" reached 132. The situation in early 2020 resulting from the pandemic, which caused negative changes throughout the world economy, has led to the fact that the market for transport and logistics services is now experiencing ups and downs: there has been an adaptation to the sanctions regime, oil prices and the national currency [25].

Transformation of the market of transport and logistics services, due to its underdevelopment, requires mechanisms to increase the competitiveness of logistics companies and manoeuvre in times of crisis and political tension [26]. Thus, a common feature of logistics systems in developed European, American and Asian markets is the focus on modernization through the introduction of modern information technology and expanding the range of IT services. The economies of developing countries face a wider range of transport logistics problems that need to be addressed [27].

The research focused mainly on developed economies [28]. In the complex of general problems of development of logistics systems of developing countries, researchers ignored the issues of integration of the logistics systems through participation in various international transport initiatives, in particular, transport and regional projects.

3. Methods

3.1. Research Design

In a generalized form, the research design is illustrated in Figure 1. The countries were selected for the study according to the World Bank's classification, where developing countries are low- and middle-income countries (measured by gross national income per capita in US dollars below \$3,855).

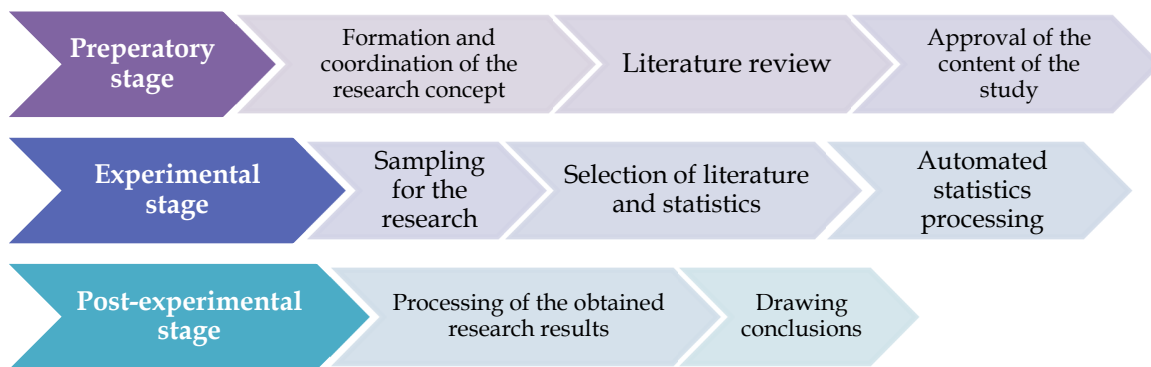


Figure 1 Abstract research design

The main methods used in this study are statistical analysis, index, graphical and analytical methods, methods for estimating structural dynamic shifts, method of comparison and monographic method.

Common methods of economic research were used to fulfil the research objectives, in particular: theoretical generalization and comparison, induction and deduction (in revealing the essence and features of integration of national logistics systems into international channels, drawing conclusions); synthesis and economic analysis (to assess the current state and development trends of logistics systems in developing countries); graphical, statistical analysis and interstate comparisons (for the analysis of structuring the indicators of efficiency of logistic systems); statistical groupings (to assess the logistics environment of the studied countries); economic modelling (trend analysis to determine the forecast level of LPI for Ukraine).

The complexity and ambiguity of economic processes that describe the peculiarities of the integration of logistics systems of developing countries in international channels, necessitated the use of the method of multidimensional comparisons in the research process. This approach allows carrying out the analysis on the basis of systematisation and generalisation of different indicators in order to obtain certain analytical conclusions. In this case, the range of representative indicators is wider than when using other methods. In addition, it allows assessing the nature of the impact of each of the indicators on the object of study, as it provides for their differentiation into stimulators and distimulators.

The basis for this division is the study of the impact of changes in the nature of each indicator on the state of the object. If the positive dynamics of the indicator reflects the efficient use of the logistics system, it is a stimulator. If the positive dynamics of the indicator has a negative impact on the efficiency of the logistics system, it is a distimulator. This, in turn, allows a comprehensive

assessment of the logistics capabilities of countries and the efficiency of their logistics systems.

The method of multidimensional comparisons has a fairly wide arsenal of algorithms for systematisation and allows combining different economic and mathematical approaches for research. In this case, it is used to implement benchmarking techniques and visualise the results of interstate comparisons by building appropriate graphical models, which allowed for a comprehensive study of the integration potential of developing countries in the logistics sector.

3.2. Sample

The following countries belonging to the group of developing countries, namely Poland, Bulgaria, India and Ukraine, were selected as the object of the study according to the typification of countries proposed by the World Bank, as they are comparable in terms of economic development and state of the logistics system.

3.3. Instruments

Currently, there are several approaches to assessing the logistics performance of countries, where the researchers note LPI, AEMLI and GCII. An analysis was performed to select the most relevant and accurate existing logistics measurement tool. We first compared the scope of each tool, with LPI covering 160 countries, AEMLI — 50 countries, and GCII — 140 countries. However, the study used the Agility Emerging Markets Logistics Index [29] in Poland, Bulgaria, India and Ukraine, which allows assessing the logistics potential of developing countries at different levels of regulation of the country's economy.

Another indicator used for the study was LPI. It is calculated on the basis of a global survey of global freight forwarding companies and logistics carriers. It is an online benchmarking tool developed by the World Bank that measures performance throughout the supply chain within

the country [30]. The index can help countries identify the problems of logistics systems and find opportunities to improve the efficiency of logistics activities. The World Bank conducts surveys every 2 years. The latest current rating was compiled by the World Bank in 2018 comprising 160 countries. The higher the value of LPI, the more developed the logistics system in the country.

The statistical function "Trend Line" in MS Excel was used for statistical analysis, which allowed predicting positive changes in the development of the logistics system in Ukraine.

4. Results

With the search for optimal directions of development for most developing countries, issues related to the effective realization of resource potential, in particular, logistics, become especially urgent. After all, the integration of national logistics systems into international channels is one of the vectors for harmonizing international cooperation between countries with different levels of economic development.

It is proposed to understand integration of logistics systems as formation of a system of international relations, which aims to ensure the smooth operation of supply chains through the effective use of the benefits of national logistics systems in the context of international logistics channels.

According to the World Bank's 6th Establishing Relationship to Improve the Competitiveness Report, which includes the Logistics Performance Index (LPI) and is published every two years, logistics performance in high-income countries is, on average, 48% higher than in low-income countries. Thus, the report contains a rating of 168 countries, which determines the degree of efficiency of supply chains that provide companies with access to national and international markets. The LPI for 2018 also pays special attention to new issues, such as the sustainability of supply chains, their impact on the environment and the need for skilled workers, in particular:

1. The problem of labour shortage in the field of logistics, which is typical for both developed and developing countries. However, developing countries need more managers, while developed countries face shortages of workers, such as truck drivers.
2. The desire of high-income countries to get better prepared to counter cyber threats compared to low-income countries.

3. High-income countries are much more likely to demand environmentally friendly logistics services than low-income countries. This is important because CO2 emissions from vehicles are a significant source of environmental pollution.

Low-income countries, as well as isolated, unstable countries, or countries facing conflicts or unrest typically occupy the bottom lines of the LPI rankings. In the group of below-average income, large countries such as India and Indonesia and developing economies such as Vietnam and Côte d'Ivoire have the highest logistics performance.

Developing countries are exporting goods and increasing their weight on the world market. However, transport costs remain quite high. Thus, regional integration becomes an effective tool for strengthening trade ties and reducing dependence on geographical location.

International trade in developing countries depends on transit through other countries. Additional border crossings and long distances from major markets, combined with costly transit procedures and inadequate infrastructure, significantly increase overall transport and other transaction costs, which undermine the competitiveness of developing countries, reduce economic growth, and subsequently adversely affect their ability to promote sustainable economic development, human and social progress and environmental sustainability. Integration of developing countries' logistics systems into international logistics channels is impossible without the support of transit countries, donor countries and appropriate organizational support.

The international integration process in the logistics sector can take place through functional (creation of joint ventures, firms and corporations in the transport sector as a result of international cooperation), institutional (participation of countries in international logistics organizations, dissemination of common standards, rules and regulations on logistics services) and infrastructural integration (unification of disparate logistics systems into a single logistics system of two or more countries (participation in joint projects for the development of international logistics infrastructure)).

The integration of some developing countries into international logistics channels is complicated by the fact that they do not have access to maritime transport. Landlocked developing countries have traditionally been unattractive in terms of foreign direct investment due to the small-size economies and unfavourable geographical location, as well as the impact of other factors, including underdeveloped infrastructure, high transport costs, inefficient logistics systems and a weak institutional framework.

Exporters and importers of landlocked countries face high logistics costs, which is detrimental to their competitiveness in world markets. These high costs are due to the unreliability of logistics suppliers and low predictability.

In 2003, the Almaty Declaration and Program of Action were adopted at the International Ministerial Conference held in Almaty, Kazakhstan. This measure and its results helped developing countries to participate effectively in the international trading system, among other things, by establishing transit systems. The most difficult task of the Almaty Program of Action is to create partnerships to overcome particular problems of developing countries, which arise due to their land lockness and remoteness, isolation from world markets [31]. This situation contributes to their relative poverty, significantly increasing transport costs and reducing effective participation in international trade.

Thus, it was noted that the improvement of railway, road, air and pipeline infrastructure will take into account local transport regimes, as it significantly depends on national peculiarities. In Africa, highways are the preferred mode of transportation, while it is most often a railway in South Asia. International technical and financial assistance has been introduced, which envisages that donor countries will borrow know-how and financial resources to developing countries to modernize logistics and transit.

In order to increase the effectiveness of the Almaty Program, an innovative targeted 10-year program of action has been established, based on strengthening partnerships

to accompany developing countries in supporting the benefits of international trade, structurally transforming their economies and achieving more inclusive and sustainable growth. The Vienna Programme of Action for Developing Countries for the decade 2014-2024 is based on the renewal and strengthening of partnerships between developing countries, transit countries and their development partners [32]. This document provides for the strengthening of partnerships in the context of triangular cooperation, as well as partnerships with relevant international and regional organizations and between public and private sector actors. Politicians understand that countries that are able to produce better products at a lower price or are able to be a convenient and cheap transport corridor for goods will have undoubted competitive advantages in the international market.

It is fair to assume that the integration capabilities of national logistics systems are determined by the logistics performance of each country and the favourable integration of their logistics environment.

Among the main indicators used to assess logistics performance, it is advisable to analyse the Logistics Performance Index (LPI) developed by the World Bank, which includes a comprehensive assessment of customs, infrastructure development, participation in international transport, logistics competence, tracking capabilities in the country, timeliness of transportation. Let's analyse the dynamics of this indicator on the example of some developing countries, namely: Poland, Bulgaria, Ukraine and India. In generalized form, the LPI dynamics is shown in Figure 2.

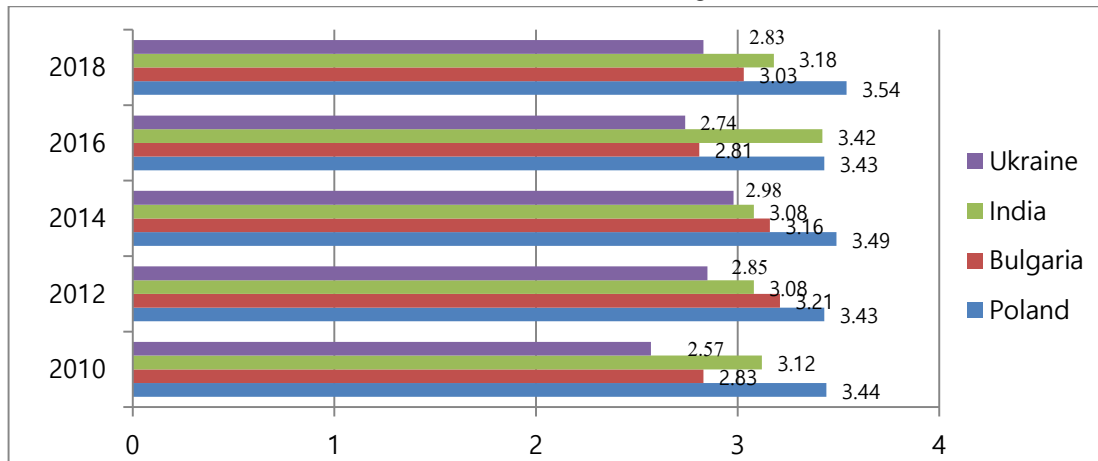


Figure 2 Dynamics of the LPI for the group of studied countries for 2010-2018 [33]

The obtained results allow drawing conclusions that from the group of studied countries Poland and India had the highest value of LPI during 2010-2018, while Ukraine — the lowest. The obtained results indicate the low efficiency of the logistics systems of the studied countries,

although they have a strong starting point for the development of this area.

Figures 3-6 illustrate the structuring of the LPI, calculated according to the indicators of the countries selected for the study. Based on the results obtained, the

following conclusions should be drawn. The values of individual indices representing the LPI components during the study period did not change significantly, maintaining an upward trend, and were characterized by an average level of values on the rating scale from 0 to 5. This indicates that each country has significant logistical potential, however, some factors constrain its development and effective use.

According to Table 1, it is worth noting that the most effective element of the studied national logistics systems from the standpoint of LPI evaluation is the timeliness of transportation (Timeliness). It is this component that was characterized by the highest value of the indicator during 2010-2018, and therefore is a stimulator of logistics development. At the same time, the distimulator of the national logistics system for Poland is infrastructure, for

Bulgaria and Ukraine — infrastructure and customs, for India — customs. It is these components that need priority attention in the context of increasing the integration capabilities of logistics systems, because the results indicate that they lag far behind international standards.

Summarizing the obtained results, it is reasonable to determine the constituent stimulators and distimulators for the efficient use of logistics systems of the studied countries (Table 1).

In addition, as already mentioned, in order to determine the ability of countries to integrate national logistics systems into international channels, it is advisable to analyse the logistics environment of each country.

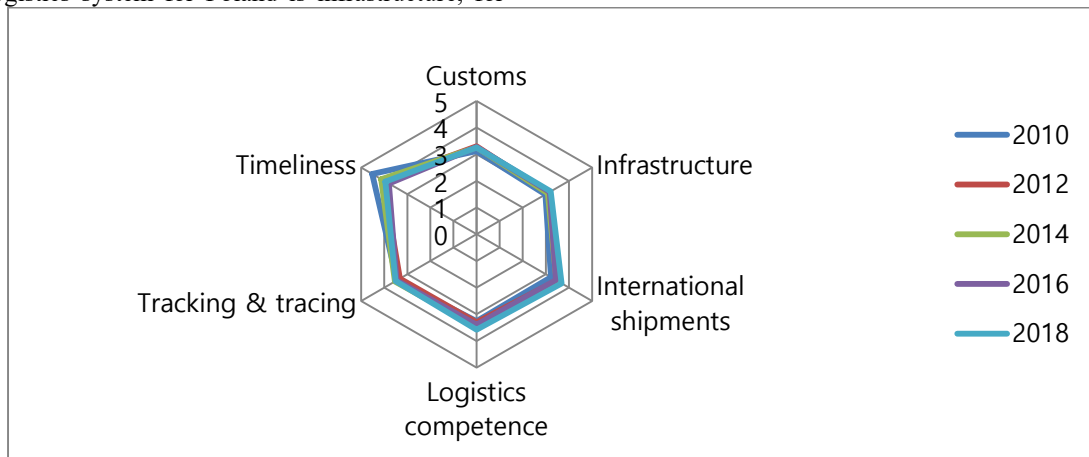


Figure 3 Graphic representation of the structuring of LPI in Poland in 2010-2018. [33]

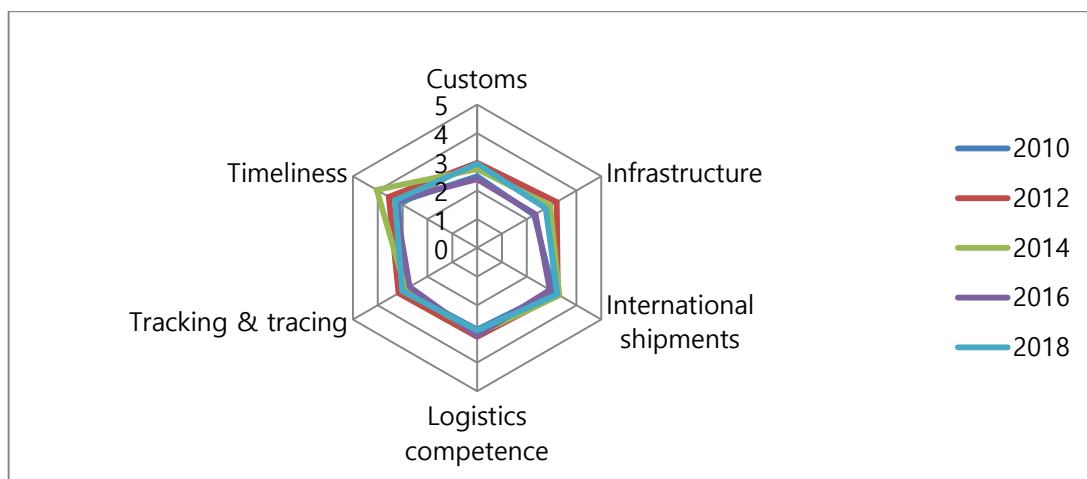


Figure 4 Graphic representation of the structuring of LPI in Bulgaria in 2010-2018 [33]

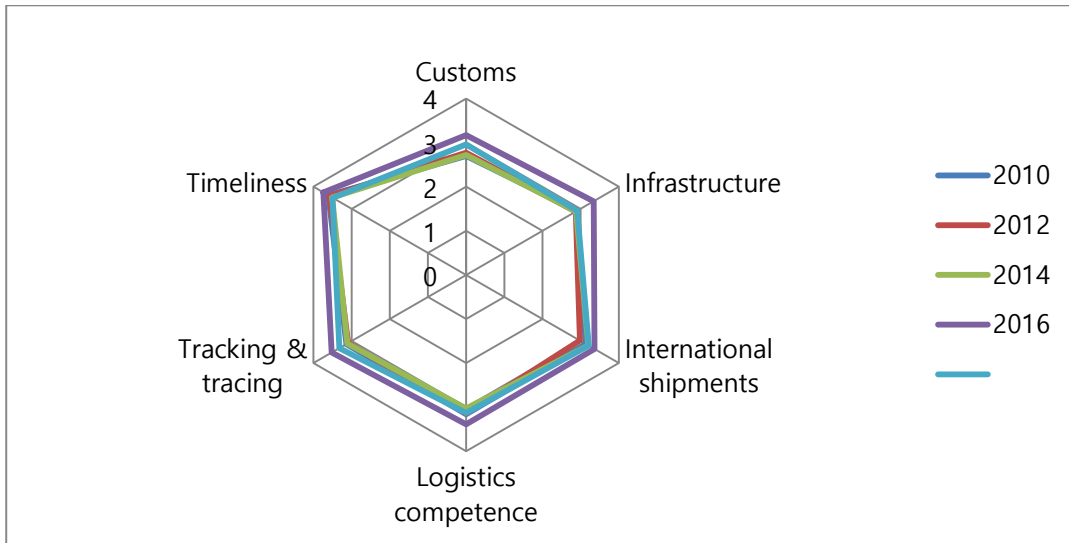


Figure 5 Graphic representation of the structuring of LPI in India in 2010-2018 [33]

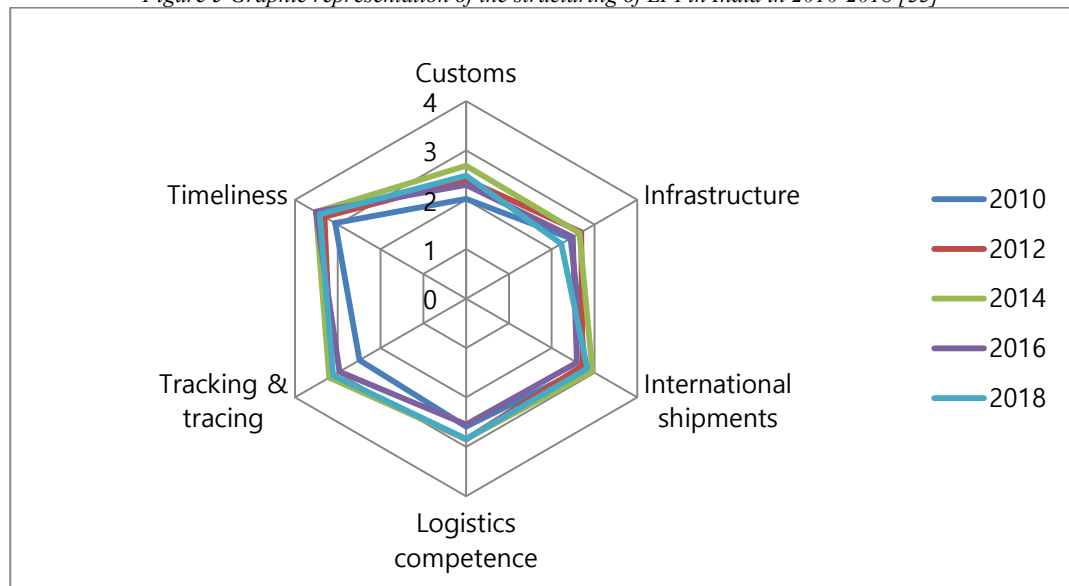


Figure 6 Graphic representation of the structuring of LPI in Poland in 2010-2018 [33]

Table 1 Constituent stimulators and distimulators of national logistics systems

| Indicator | 2010 | 2012 | 2014 | 2016 | 2018 |
|-------------------------|------|------|------|------|------|
| Poland | | | | | |
| Customs | | | | | |
| Infrastructure | - | - | - | - | - |
| International shipments | | | | | |
| Logistics competence | | | | | |
| Tracking & tracing | | | | | |
| Timeliness | + | + | + | + | + |
| Bulgaria | | | | | |
| Customs | | - | - | | |

| | | | | | |
|-------------------------|---|---|---|---|---|
| Infrastructure | - | | | - | - |
| International shipments | | | | | |
| Logistics competence | | | | | |
| Tracking & tracing | | | | | |
| Timeliness | + | + | + | + | + |
| India | | | | | |
| Customs | - | - | - | - | - |
| Infrastructure | | | | | |
| International shipments | | | | | |
| Logistics competence | | | | | |
| Tracking & tracing | | | | | |
| Timeliness | + | + | + | + | + |
| Ukraine | | | | | |
| Customs | - | - | | - | |
| Infrastructure | | | - | | - |
| International shipments | | | | | |
| Logistics competence | | | | | |
| Tracking & tracing | | | | | |
| Timeliness | + | + | + | + | + |

Source: developed based on the research results

Such factors of formation of the logistic environment include the following:

- natural and geographical location and length of the country, maritime borders;
- economic and political situation in the country;
- regulatory support for logistics;
- level of development of logistics infrastructure and logistics service;
- customs efficiency;
- availability of qualified labour resources;
- technical and technological development of the country;
- transit potential of the country.
- the level of investment in the development of the logistics sector.

Index [29], which allows assessing the logistics potential of countries at the macro (International Logistics), meso (Domestic Logistics) and at the micro level (Business Fundamentals). Of the countries selected for the study, only India and Ukraine are included in the list for which this indicator is calculated. The comparison of the specified indicator is illustrated in Figure 7.

In order to assess the favourableness of the logistics environment for integrational transformations, it is advisable to use the Agility Emerging Markets Logistics

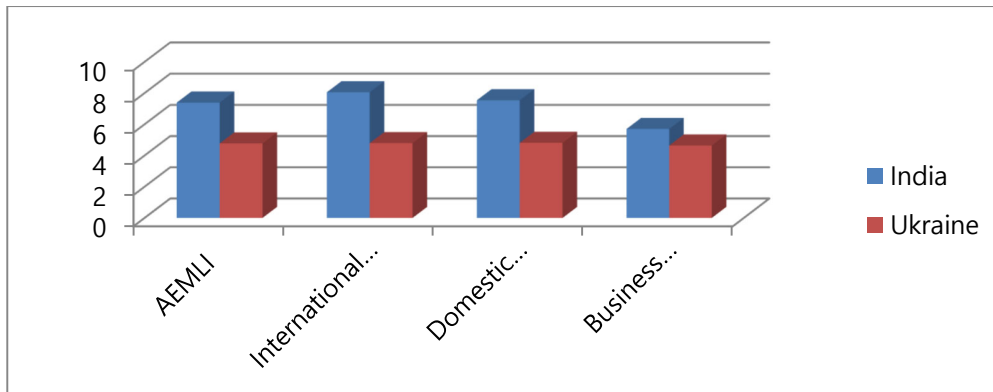


Figure 7 Structuring of AEMLI for India and Ukraine in 2020 [29]

According to Figure 6, it is worth noting that in 2020 India had a much higher logistics potential than Ukraine. At the same time, the most favourable in India are domestic opportunities for logistics development (Domestic Logistics), while the business environment (Business Fundamentals) needs to be improved. Analysing the situation observed in Ukraine, it should be noted that international (International Logistics) and domestic (Domestic Logistics) opportunities logistics development were approximately at the same level, while the value of the indicator that describes the conditions of doing business (Business Fundamentals) was slightly lower than the previous components. Thus, Ukraine is characterized by a relatively low level of logistics market development, imperfect regulatory framework on the issues under study, political bias of domestic markets, low purchasing power of the population, low efficiency of customs control and quality of logistics services, which in turn determine the country's logistics environment. Thus, when making a logistical portrait of the country from the standpoint of determining its integration capabilities the following components should be taken into account:

- geopolitical location of the country;
- features and favourableness of logistics environment;
- efficiency of the national logistics system.

We will test the expediency of applying such an approach on the example of Ukraine.

Ukraine as a transit country is characterized by a very favourable geographical position, and therefore is quite interesting in terms of integrational transformations in the logistics sector. Nevertheless, since 2014, political instability in the country and the annexation of Crimea have significantly affected the development of logistics in the country. It should be noted that there are 33 airports, more than 20 seaports, 6 railways and a well-developed market of logistics intermediaries in Ukraine. It is crossed by 4 Pan-European Corridors (PECs), 4 Transcontinental Transport Corridors (TCTC) moreover, the country is part of the Black Sea Pan-European Transport Area (BlackSeaPETrA). According to the results of the study, it is obvious that the logistics system is in poor condition, the logistics environment is unfavourable. Nevertheless, Ukraine has a high transit rating, which indicates the country's logistical attractiveness. Understanding the benefits of integrational transformations in the field of logistics, Ukraine has ratified a number of international agreements, initiated accession to international transport entities and organizations, is taking measures to improve logistics infrastructure, improve regulations, urge issues of logistics hubs, etc. In the near future, this is expected to positively affect the logistics performance, which significantly shapes the country's ability of integrational transformations in this area. For this purpose, it is reasonable to carry out the trend analysis of LPI. Table 2, Figure 8 contain the initial data for the analysis.

Table 2 Initial data for trend analysis of LPI

| Period | Value of LPI |
|--------|--------------|
| 1 | 2.57 |
| 2 | 2.85 |
| 3 | 2.98 |
| 4 | 2.74 |
| 5 | 2.83 |

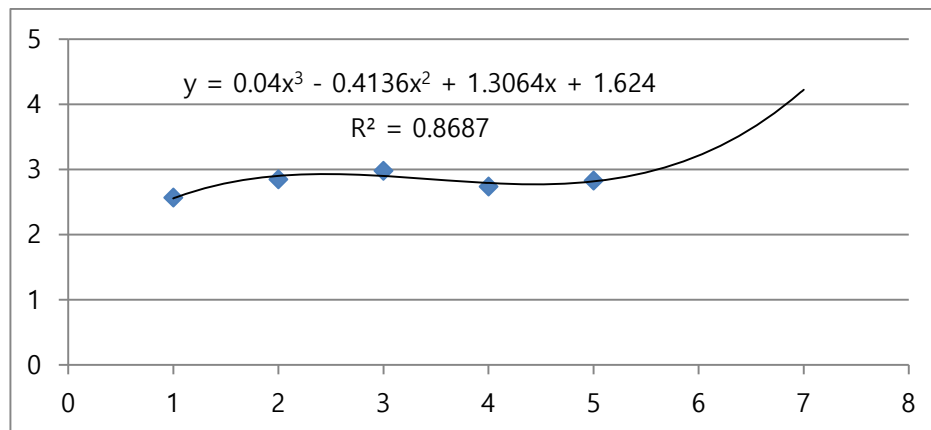


Figure 8 LPI trend line of Ukraine
Source: based on the results of the study

It can be concluded from the obtained results that in the next 2 forecast periods the value of LPI will still tend to increase, which indicates the probable positive changes in the development of the logistics system in Ukraine.

Thus, Ukraine is characterized by significant logistics potential, however, the actual state of development of its logistics system, like most developing countries, needs significant improvement and optimization of efficiency by intensifying the development of its key components, such as infrastructure, customs and others. It is the attraction of additional funding in these areas, the formation of appropriate conditions for international cooperation that will be key aspects of the feasibility of integrating the national logistics systems of developing countries into international systems.

4.1. Limitations and implications for the research

LPI, AMELI do not take into account the state of inland waterways that can be used to transport goods within the country, as such information is missing in the statistical database, which excludes it as the international tool for assessing logistics performance. Both tools do not take into account any distance parameters. Although many countries benefit and/or depend on large hubs and ports for their trade, it is logical that, except for the emergence of new hubs, the distance between countries will remain constant, which requires taking into account the distance. We believe that the impact of the state of transport logistics in the field of air, rail and road transport may also require further research in the future to adjust the actual assessment of LPI, AMELI.

5. Discussions

Analysis of scientific research allows concluding that the integration of logistics systems of developing countries in modern international logistics channels provides opportunities in the following areas of national economy:

advantages of the transit country;

transformation into modern logistics systems by improving the relevant institutional, organizational, financial, personnel support of logistics.

It is necessary to:

- develop a state ideology of intensifying transit, taking the achievements of other countries, such as the Netherlands, Central and Eastern Europe, etc. as an example. It should be taken into account that the e-commerce system is developing rapidly, which is an important factor in changing the structure of world trade and its transport support;
- develop a program for the development of transit (international) transport corridors, taking into account that it should also serve the domestic needs of developing countries;
- introduce new modern forms of investment, which are used by many countries (concessions, etc.);
- increase the volume of international loans for the development of infrastructure projects;
- take reasonable protectionist measures in relation to national transport companies, potential shipowners, ports

and other transport infrastructure facilities involved in transit traffic;

- develop international cooperation in the field of transit traffic;
- conduct an active image campaign to promote and coordinate the efforts of government and commercial entities in the field of transit development [34].

However, the logistics systems of developing countries do not meet modern standards and requirements, and are significantly behind in terms of infrastructure, equipment and standards, so at this stage of development of logistics systems in these countries it is necessary to maximize opportunities that cooperation provides, such as neighbourhood policy, routes transport networks, international transport corridors and new transnational transport logistics axes. We are talking about the implementation of international transport and logistics projects with the involvement of various financial instruments and funds of financial institutions.

This thesis is confirmed by certain studies on individual developing countries in the context of the research issue, in particular Ukraine, China, EAEU countries. Thus, Ukraine, having a favourable transit location, must take into account the concept of Eurologistics, which is aimed at creating a single European transport and logistics system. Authors [35] identify areas of Ukraine's integration into the European transport and logistics system:

- 1) pan-European transport corridors (No. 3, 5, 7, 9);
- 2) transcontinental transport corridors (Organization for Cooperation between Railways No. 3, 4, 5, 7, 8, 10, and the Transport Corridor Europe Caucasus Asia (TRACECA));
- 3) pan-European transport zones, which are characterized by the geo-spatial organization of transport communications and logistics terminals as their part;
- 4) international logistics terminals (or centers).

According to researcher [36], the integrated transport and logistics system of Ukraine is a subsystem of the economic system of the country and international transport logistics systems.

Author [37] also noted the Greater Europe concept, considering Eurologistics as the basis for the creation of a single European transport and logistics system, which would connect the transport and logistics systems of Asia and other parts of the world. However, in his opinion, it is necessary to unite all components of logistics in Ukraine into integrated logistics systems (chains).

Upon analysing the logistics system of the EAEU countries, Researchers [38] also came to the conclusion that the logistics system of the EAEU countries needs to be restructured and further integrated with the systems of more developed countries. In addition, it is necessary to increase the level of regulatory framework governing the industry to address the training of highly qualified personnel, the introduction of new technologies and improve the quality of services provided. It is also important to use public-private partnerships, as evidenced by the international experience of the world's leading countries, which currently take the lead in the LPI rankings.

Author [7] underlined China's One Belt, One Road initiative, which has significant implications for logistics operators, which is led by China and targeting more than 60 countries. This ambitious program aims to improve trade links between the Silk Road economies as well as countries on major sea routes from China. In the initial stages, the initiative aims to develop logistics infrastructure in different locations by attracting financial and investment resources and reforming regulatory bodies in the markets of services such as transport, logistics and telecommunications.

6. Conclusions

In modern conditions, increasing the efficiency of logistics is of particular importance, especially for developing economies. The development of logistics is the driving force of competitiveness of the country's economy, improving the quality of life and rational integration into the world economy. Therefore, the developing economies face the global task of becoming a transit and logistics hub of the region, a "bridge" between Europe and Asia, which directly depends on the development of transport logistics, a major factor in stimulating sustainable industrial growth and competitive advantage of the economic system.

It was found for the studied countries that the distimulator of the national logistics system is infrastructure (for Poland), infrastructure and customs (for Bulgaria and Ukraine), customs (for India). It is these components that need priority attention in the context of increasing the integration capabilities of logistics systems, because the results indicate that they lag far behind international standards. In addressing integration issues, it is necessary to take into account the geopolitical location of the country, the features and favourability of the logistics environment, as well as the efficiency of the national logistics system. Therefore, developing countries need to significantly improve their logistics systems and integrate them into international logistics channels for the

sake of their development, strengthening their transit and logistics potential.

Currently, we expect the development of logistics in emerging markets, the emergence of new trade corridors, new flows of goods, the development of the market for certain logistics products and services in Ukraine. The next scientific explorations may be changes in logistics systems in the context of globalization, sustainable development and determining the impact of the pandemic on the logistics capabilities of the world.

References

- [1] Beysenbaev, R.: The importance of country-level logistics efficiency assessment to the development of international trade, *British Journal for Social and Economic Research*, Vol. 3, No. 6, pp. 13-20., 2018. doi:10.22406/bjser-18-3.6
- [2] Gani, A.: The logistics performance effect in international trade, *The Asian Journal of Shipping and Logistics*, Vol. 33, No. 4, pp. 279-288, 2017. doi:10.1016/j.ajsl.2017.12.012
- [3] Yildiz, T.: The performances of logistics services in developed and developing countries: A review and cluster analysis, in *Business Logistics: Theoretical and Practical Perspectives with Analyses*, pp. 43-73, 2014. doi:10.13140/RG.2.1.4815.0568
- [4] Arvis, J.F., Marteau, J.F., Raballand, G.: The Cost of Being Landlocked: Logistics Costs and Supply Chain Reliability, [Online], Available: <https://openknowledge.worldbank.org/handle/10986/2489> [10 June 2021], 2010.
- [5] Arvis, J.F., Mustra, M.A., Ojala, L., Shepherd, B., Saslavsky, D.: Connecting to Compete 2010: Trade Logistics in the Global Economy-The Logistics Performance Index and Its Indicators, [Online], Available: <https://openknowledge.worldbank.org/handle/10986/24599> [10 June 2021], 2010.
- [6] Arvis, J.F., Mustra, M., Ojala, J., Shepherd, B., Saslavsky, D.: Connecting to Compete: Trade Logistics in the Global Economy, [Online], Available: <https://openknowledge.worldbank.org/bitstream/handle/10986/12689/704170ESW00P120BLIC00LPI020120final.pdf?sequence=1&isAllowed=y> [10 June 2021], 2012.
- [7] Arvis, J.F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., Raj, A., Naula, T.: Connecting to Compete: Trade Logistics in the Global Economy. The Logistics Performance Index and Its Indicators, [Online], Available: <https://openknowledge.worldbank.org/handle/10986/24598> [10 June 2021], 2016.
- [8] Hanif, S., Mu, D., Baig, S., Alam, Kh.M.: A Correlative Analysis of Modern Logistics Industry to Developing Economy Using the VAR Model: A Case of Pakistan, *Journal of Advanced Transportation*, No. 2020, Art. No. 8861914, 2020. doi:10.1155/2020/8861914
- [9] Lean, H.H., Huang, W., Hong J.: Logistics and economic development: experience from China, *Transport Policy*, Vol. 32, pp. 96-104, 2014. doi:10.1016/j.tranpol.2014.01.003
- [10] Wang, H., Han, J., Su, M., Wan, S., Zhang, Z.: The relationship between freight transport and economic development: A case study of China, *Research in Transportation Economics*, Vol. 85, Art. No. 100885, 2021. doi:10.1016/j.retrec.2020.100885
- [11] Saidi, S., Mani, V., Meftah, H., Shahbaz, M., Akhtar, P.: Dynamic linkages between transport, logistics, foreign direct investment, and economic growth: empirical evidence from developing countries, *Transportation Research Part A: Policy and Practice*, Vol. 141, pp. 277-293, 2020. doi:10.1016/j.tra.2020.09.020
- [12] Wang, C.-N., Jen-Der, D., Lien, N.K.: Applying EBM model and grey forecasting to assess efficiency of third party logistics providers, *Journal of Advanced Transportation*, Vol. 33, pp. 1-14, 2018. doi:10.1155/2018/1212873
- [13] Sharapiyeva, M.D., Antoni, A., Yessenzhitova, R.: The Impact of Port Transport-logistics Infrastructure and LPI for Economic Growth: on the Example of Landlocked Countries, *Pomorstvo*, Vol. 33, No. 1, pp. 63-75, 2019. doi:10.31217/p.33.1.7
- [14] Rokicki, B., Stepniak, M.: Major transport infrastructure investment and regional economic development - an accessibility-based approach, *Journal of Transport Geography*, Vol. 72, pp. 36-49, 2018. doi:10.31217/p.33.1.7
- [15] Mohmand, Y.T., Wang, A., Saeed, A.: The impact of transportation infrastructure on economic growth: empirical evidence from Pakistan, *Transportation Letters*, Vol. 9, No. 2, pp. 63-69, 2016. doi:10.1080/19427867.2016.1165463
- [16] D'ariano, A., Corman, F., Fujiyama, T., Meng, L., Pellegrini, P.: Simulation and optimization for railway operations management, *Journal of Advanced Transportation*, No. 2018, Art. No. 4896748, 2018. doi:10.1155/2018/4896748
- [17] Mishenin, Y., Koblianska, I., Medvid, V., Maistrenko, Y.: Sustainable regional development policy formation: role of industrial ecology and logistics, *Entrepreneurship and Sustainability Issues*, Vol. 6, No. 1, pp. 329-341, 2018. doi:10.9770/jesi.2018.6.1(20)
- [18] Vulevic, A.: Linkage between regional accessibility, economic development, and logistic infrastructure, in *Intelligent Transportation and Planning*, pp. 719-744, [Online], Available: <https://www.igi-global.com/chapter/linkage-between-regional-accessibility-economic-development-and-logistic-infrastructure/197159> [12 June 2021], 2018.
- [19] Lee, M.-K., Yoo, S.-H.: The role of transportation sectors in the Korean national economy: an input-output analysis, *Transportation Research Part A: Policy and Practice*, Vol. 93, pp. 13-22, 2016. doi:10.1016/j.tra.2016.08.016
- [20] Tang, C.F., Abosedra, S.: Logistics performance, exports, and growth: evidence from asian economies, *Research in Transportation Economics*, Vol. 78, No. 100743, 2019. doi:10.1016/j.retrec.2019.100743
- [21] Khan, S.A.R., Jian, C., Zhang, Y., Golpira, H., Kumar, A., Sharif, A.: Environmental, social and economic growth indicators spur logistics performance: from the perspective of South asian association for regional cooperation countries, *Journal of Cleaner Production*, Vol. 214, pp. 1011-1023, 2019. doi:10.1016/j.jclepro.2018.12.322
- [22] Jhavar, A., Garg, S.K., Khera, S.N.: Improving logistics performance through investments and policy intervention: A causal loop model, *International Journal of Productivity and Quality Management*, Vol. 20, No. 3, pp. 363-391, 2017,

- Available:
<https://ideas.repec.org/a/ids/ijpqma/v20y2017i3p363-391.html>
- [23] Mustra, M.A.: Logistic Performance Index, connecting to compete 2010, in UNESCAP Regional Forum and Chief Executives Meeting, [Online], Available: <https://openknowledge.worldbank.org/handle/10986/24599> [12 June 2021], 2011.
- [24] Brar, S., Farley, S.E., Hawkins, R.: Logistics in Lagging Regions: Overcoming Local Barriers to Global Connectivity, [Online], Available: <https://openknowledge.worldbank.org/handle/10986/2543> [12 June 2021], 2010.
- [25] Bykova, O.N., Pustokhina, I.V.: Challenges and prospects for the development of the market of transport and logistics services, *Journal of Economics Entrepreneurship and Law*, Vol. 10, No. 1, pp. 63-70, 2020. doi:10.18334/epp.10.1.41562
- [26] Repnikova, V.M., Bykova, O.N., Skryabin, O.O., Morkovkin, D.E., Novak, L.V.: Strategic aspects of innovative development of entrepreneurial entities in modern conditions, *International Journal of Engineering and Advanced Technology*, Vol. 8, No. 4, 32-35, 2019. doi:10.18334/epp.10.1.41562
- [27] Kunyazov, Y., Shakhman, Y., Rakhimova, S., Mussina, A., Ernazarov, T.: Design and evaluation of efficiency of macro-logistic systems for countries with developing economy, *Entrepreneurship and Sustainability*, Vol. 8, No. 2, pp. 1062-1082, 2020. doi:10.9770/jesi.2020.8.2(64)
- [28] Navickas, V., Sujeta, L., Vojtovich, S.: Logistics systems as a factor of country's competitiveness, *Economics and Management*, Vol. 16, No. 1, pp. 231-237, 2011, Available: <https://www.semanticscholar.org/paper/LOGISTICS-SYSTEMS-AS-A-FACTOR-OF-COUNTRY%27S-Navickas-Sujeta/116b23dc7d62a2c25287535fcc0a576a06f82b03>
- [29] Agility, www.logisticsinsights.agility.com: Agility Emerging Markets Logistics Index 2020, [Online], Available: <https://logisticsinsights.agility.com/wp-content/uploads/2020/02/Agility-Emerging-Markets-Logistics-Index-2020.pdf> [10 June 2021], 2020.
- [30] Arvis, J.F., Mustra, M., Ojala, J., Shepherd, B., Saslavsky, D.: Connecting to Compete 2018: Trade Logistics in the Global Economy, [Online], Available: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/576061531492034646/connecting-to-compete-2018-trade-logistics-in-the-global-economy-the-logistics-performance-index-and-its-indicators> [10 June 2021], 2018
- [31] UN General Assembly, www.unecce.org: Almaty Programme of Action: Addressing the Special Needs of Landlocked Developing Countries within a New Global Framework for Transit Transport Cooperation for Landlocked and Transit Developing Countries, [Online], Available: https://unece.org/DAM/trans/doc/cd/Almaty_PoA.pdf [11 June 2021], 2004.
- [32] United Nations, www.unohrrls.org: Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014–2024, [Online], Available: <https://unohrrls.org/custom-content/uploads/2015/03/Vienna-Programme-of-Action.pdf> [12 June 2021], 2014.
- [33] The World Bank, www.lpi.worldbank.org: Aggregated LPI, [Online], Available: <https://lpi.worldbank.org/international/aggregated-ranking> [12 June 2021], 2021.
- [34] Poliakova, O. M., Solomnikov, I. V.: Reconsider the formulation of multimodal transport and logistics centers in Ukraine, *Bulletin of Transport Economy and Industry*, Vol. 34, pp. 217-222, 2011, Available: http://nbuv.gov.ua/UJRN/Vetp_2011_34_187
- [35] Tkach, O. V., And Voloschuk, I. A.: Formation of a single logistic system: storage of European integration processes is important, *Naukovy Visnik of the Kherson State University. Series: Economics of Science*, Vol. 9, No. 1, pp. 208-212, 2014, [Online], Available: http://nbuv.gov.ua/UJRN/Nvkhdu_en_2014_9%281%29_4_7
- [36] Sokolova, O.Ye.: Theoretical and methodological foundations of the formulation of the transport and logistics system of Ukraine, [Online], Available: <http://jrn1.nau.edu.ua/index.php/PPEI/article/view/182/173> [10 June 2021], 2009.
- [37] Malovychko, A. S.: Integration of Ukraine to the transport and logistics system of the European Union, *Black Sea Economic Studies*, Vol. 7, pp. 55-58, 2016, Available: http://nbuv.gov.ua/UJRN/bses_2016_7_12
- [38] Raimbekov, Z.S., Syzykbayeva, B.U., Mussina, K.P., Moldashbayeva, L.P., Zhumataeva, B.A.: The Study of the Logistics Development Effectiveness in the Eurasian Economic Union Countries and Measures to Improve it, *European Research Studies Journal*, Vol. XX, No. 4B, pp. 260-276, 2017, Available: <https://ideas.repec.org/a/ers/journal/vxxy2017i3bp260-276.html>