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Abstract. The purpose of the article is to study the current state of international transport and logistics cooperation between Ukraine and the EU and the problems and prospects of its development under the conditions of the Association Agreement between Ukraine and the EU. To achieve the goal, the construction of the polygon of the overall rating and rating points according to the indicators of Ukraine in the Logistics Performance Index (LPI), statistical analysis of the indicators of the export of services of the transport sector of Ukraine to the EU was carried out. A statistical analysis of the export of transport services was applied in terms of the most important sectors: sea, road and railway transport. A generalization of the main directions of the current state of cooperation between Ukraine and the EU in various types of transport and legislative support of the integration process has been carried out. Based on the results of the study, it was found that the LPI indicators for Ukraine are experiencing a significant drop. It was determined that the main geographical destinations for the export of international road transportation services to the EU are Poland, Germany, Hungary, Romania, Italy, the Czech Republic, and the Netherlands (with a share of about 60% of the value of the total turnover with the EU); the EU is an important market for the export of Ukrainian maritime transport services (about 27% of the country's total export of maritime services); the volume of export of rail transport services to the EU decreased by almost 3 times compared to 2013. It is noted that in order to ensure Ukraine's integration into the EU transport system, it is necessary to strengthen cooperation in the implementation of agreements in the field of transport; to harmonize the legal framework with the relevant legal norms of the EU; bring technical, technological and environmental standards and requirements in the field of transport closer to EU standards; to develop directions for the development of the transport network of Ukraine in the format of integrated transport corridors; to develop a plan to restore the integrity of the transport system of Ukraine in the post-war period. The practical significance lies in the further development of research on international transport and logistics cooperation between Ukraine and the EU, which should become the basis for the formation of decisions for the post-war development of the economy.

Keywords: international cooperation in the transport sector, the Association Agreement between Ukraine and the EU; international road transport, international rail transport, international water transport, export of transport sector services.

JEL Classification: F150, R400.
Formulation of the problem. An effective multimodal transport and logistics system is of priority importance for economic growth and the post-war revival of Ukraine's economy. Effective logistics is important both for the domestic market, so that affordable and reliable transport and logistics services can help the economy develop, and thanks to the complex and integrated, in particular in the European space, the transport and logistics system of Ukraine, the export, import and transit of goods and passengers can be intensified.

With the development of integration processes in the EU, a separate direction of European integration emerged - transport logistics in the European dimension, which reflects the process of forming a pan-European transport and logistics network with the creation of appropriate communications and logistics terminals. Ukraine is increasingly joining the integration into the European transport space. Cooperation in the field of transport is regulated by the Association Agreement between Ukraine and the European Union, the European Atomic Energy Community and their member states and aims to promote the development of stable transport systems, the implementation of efficient and safe transport, as well as the intermodality and interoperability of transport systems. In accordance with Chapter 7 of Section 5 of the Agreement, this cooperation is aimed at facilitating the restructuring and renewal of the transport sector of Ukraine and the gradual harmonization of current standards and policies with those in the EU. Cooperation is also aimed at improving the movement of passengers and goods, increasing the flow of transport flows between Ukraine, the EU and third countries of the region due to the elimination of administrative, technical, border and other obstacles, improving the transport network and modernizing the infrastructure.

Analysis of recent research and publications. International cooperation between Ukraine and the European Union in general and transport and logistics cooperation in particular is a popular topic among scientists, so it is possible to note the presence of a significant number of publications on the stated problem. In particular, the works of O. Krylyenko, I. Zarubinska and V. Novak, V. Yanovska; N. Fediyai were devoted to the study of the integration of the transport and logistics infrastructure of Ukraine into the European transport network [1–3]. Separate issues of the development of mutual trade, including transport services, the development of regional cooperation and the effects of trade after the signing of the Association Agreement, as well as the impact of the war on the effects of cooperation between Ukraine and the EU are revealed in the works of V. Astrov, M. Ghodsi, R. Grieveon; M. Dabrowski, M. Domínguez-Jiménez and G. Zachmann; S. Matuszak [4–6], etc.

Separation of previously unresolved parts of the overall problem. Since the international transport and logistics cooperation between Ukraine and the EU has a constant tendency to develop, especially in the context of the further implementation of the provisions of the Association Agreement and the acquisition of the status of a candidate for the EU, the need for the post-war renewal of the country's transport sector, the problem remains relevant and requires further research in the dynamics of time.

Purpose of the study. The purpose of the article is to study the current state of international transport and logistics cooperation between Ukraine and the EU and the problems and prospects of its development under the conditions of the Association Agreement between Ukraine and the EU.

Basic material. Ukraine has geographical advantages that determine its exceptional conditions for the development and functioning of the logistics industry. Meanwhile, according to a study of the EU technical assistance project, logistics costs in Ukraine are almost 18% of GDP. For example, in the EU, costs for logistics services, such as transportation and storage, make up 10–12% of the cost of finished products. Logistics costs for transporting grain, Ukraine's key export product, from agricultural enterprises to Black Sea ports are approximately 40% higher than costs for similar services in France and Germany. As a result, for example, agricultural producers in Ukraine receive a smaller share of world market prices and cover the costs of inefficient logistics, which, according to various estimates, lead to a loss of income in the amount of 600 million dollars. up to USD 1,600 million USA every year [7].

Here are some indicators that characterize Ukraine's position in world logistics rankings. So, for example, an important index characterizing the development of the country's transport and logistics sector is the Logistics Performance Index (LPI), developed by the World Bank. The LPI is a composite index based on representative data on transport and information infrastructure, supply chain management and trade facilitation, calculated from a survey of international freight forwarders and express carriers. The Logistics Performance Index (LPI) is used to measure the efficiency of international supply chains. More than 160 countries of the world participate in the studies, which are evaluated according to a five-point system and several separate characteristics.
[8]:
• Infrastructure – availability and quality of trade and transport infrastructure (ports, railways, highways, information technologies);
• Customs – efficiency of customs and customs control;
• International shipment – ease of organizing international cargo transportation at competitive prices;
• Logistics competence – the competence of specialists in the field of logistics and the quality of logistics services;
• Tracking & tracing – the ability to track and detect the condition, location and fact of cargo delivery;
• Timeliness – frequency of shipments, timeliness and reliability of delivery.

In 2018, Ukraine took 66th place out of 160 participating countries in the ranking of logistics efficiency compiled by the World Bank. Compared to the previous version, Ukraine rose 14 positions and took third place in the post-Soviet region, behind only Lithuania (54) and Estonia (36). Previously, Ukraine occupied the 66th position in 2012. However, in 2014, Ukraine's indicators were even higher — 61st place in the overall ranking. The overall LPI of Ukraine was 2.83 points (<3.0), which indicates a significant number of problems in the logistics system of the country. It is quite clear that almost all six indicators of the LPI for Ukraine (customs, infrastructure, international deliveries, logistics competence, tracking of goods, timeliness of delivery) as a result of military operations will experience a significant drop in the next rating, and the logistics potential of the country is significantly destroyed today.

Meanwhile, it should be noted that even before the start of the Russian military aggression, Ukraine was lagging behind neighboring European countries in many of the components studied in the LPI. The position of Ukraine in the LPI in 2007 and 2018 can be demonstrated with the help of the following figure 1 [9].

![Fig. 1. Position of Ukraine in LPI in 2007 and 2018: overall rating and rating points by indicators](image)

Source: compiled from [9]

It can be seen that from 2007 to 2018, almost all indicators of the Index had an upward trend, for example, the indicators of "Logistics competence" and "Tracking & tracing" increased significantly - from 2.41 to 2.84 and from 2.53 to 3.11, respectively. Meanwhile, it should be noted that the "Infrastructure" indicator fell from 2.35 to 2.22.
Considering the decline of logistics cooperation between Ukraine and the EU, it should be noted that the transport sector is an industry that has experienced a catastrophic decline compared to other areas of Ukraine-EU foreign trade. You can demonstrate the indicators of recent years with the help of table 1 and figure 2.

**Table 1**

Statistics of the export of transport sector services of Ukraine to the EU 2018-2021, thsd. USD

<table>
<thead>
<tr>
<th>According to Classification of External Economic Services</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>Transport services</td>
<td>1274007,3</td>
</tr>
<tr>
<td>Sea transport services</td>
<td>145042,7</td>
</tr>
<tr>
<td>River transport services</td>
<td>κ/с*</td>
</tr>
<tr>
<td>Air transport services</td>
<td>544231,1</td>
</tr>
<tr>
<td>Rail transport services</td>
<td>228010,7</td>
</tr>
<tr>
<td>Motor transport services</td>
<td>235999,4</td>
</tr>
<tr>
<td>Pipe transport services</td>
<td>κ/с</td>
</tr>
<tr>
<td>Electricity transmission</td>
<td>κ/с</td>
</tr>
<tr>
<td>Other auxiliary and additional transport services</td>
<td>81136,9</td>
</tr>
<tr>
<td>Mail and courier services</td>
<td>18932,5</td>
</tr>
</tbody>
</table>

Note: the data are not made public in order to ensure compliance with the requirements of the Law of Ukraine "On State Statistics" regarding the confidentiality of statistical information.

**Source:** compiled from [10]

Fig. 2. Statistics of the export of transport sector services of Ukraine to the EU 2018-2021, thsd. USD

**Source:** compiled from [10]

If we analyze the situation by sector of the transport and logistics industry, it should be noted that in 2020 the EU was the key market for the export of Ukrainian road transport (78%). Meanwhile, it is still not possible to talk about the full use of Ukraine's trade potential: after consecutive years of falling indicators of the export of automotive services, they have not been restored. Poland,
Germany, Hungary, Romania, Italy, the Czech Republic, and the Netherlands were the main geographical destinations for the export of international road transport services to the EU in the analyzed period. Their share was about 60% of the value of the total turnover with the EU.

Fig. 3. Export of road transport services before and after the entry into force of the Free Trade Agreement between Ukraine and the EU, million US dollars

Source: compiled according to [10; 11]

It should also be noted that Ukraine does not fully use the trade potential of foreign trade in maritime transport services: exports to the EU market are decreasing, but the Association Agreement provides for a regime of the internal market, which can potentially stimulate the development of the industry in the future.

Fig. 4. Export of maritime transport services before and after the entry into force of the Free Trade Agreement between Ukraine and the EU, million US dollars

Source: compiled according to [10; 11]
Thus, it is noted that the European Union is an important market for the export of Ukrainian maritime transport services, the share of which is about 27% of the total export of maritime services of our country, meanwhile, after 2016, it is not possible to note a significant increase in the volume of exports.

It can also be noted that Ukraine does not fully use the trade potential of railway transportation services. It can be stated that the volume of export of railway transport services to the EU decreased by almost 3 times compared to 2013.

![Graph showing export of railway transport services to the EU and general export](source: compiled according to [10; 11])

Ukraine and the EU have been cooperating for a long time within the framework of various regional initiatives, in particular TRACECA, at the international level - within the framework of international transport organizations, agreements and conventions ratified by the parties. Thus, at the end of 2011, an additional multilateral format of interaction on transport issues was created - the Eastern Partnership Transport Panel (Thematic Platform No. 2 "Economic Integration and Rapprochement with EU Policies"). An important step in the direction of strengthening the integration between the EU and the countries of the Eastern Partnership was the creation of a common transport network between the EU and its eastern neighbors in 2013. The network was developed in accordance with the TEN-T connections in Lithuania, Latvia, Poland and other EU member states. In the same year, Ukraine and the EU initialed the Agreement on Common Aviation Space as part of the Vilnius Summit of the Eastern Partnership, which defined the path to the creation of a common aviation space between Ukraine and the EU and offered new commercial opportunities for consumers and airlines of both parties.

In 2016, the transport ministers of the Eastern Partnership countries, EU member states and the European Commission adopted a decision to extend the Trans-European Transport Network (TEN-T) to countries neighboring the EU, including Ukraine. One of the target formats of cooperation with the EU is the annual meeting at the ministerial level on the development of cooperation in the use, restoration and maintenance of the infrastructure of waterways on the Danube River and its navigable tributaries.

Today, the Association Agreement between Ukraine and the EU is among the main documents regulating cooperation in the transport and logistics sphere. In accordance with Chapter 7 of Section 5 ("Economic and sectoral cooperation"), cooperation is aimed at facilitating the restructuring and renewal of the transport sector of Ukraine and the gradual harmonization of current standards and policies with those existing in the EU, in particular by implementing the measures set out in Annex XXXII to this Agreement. Cooperation is also aimed at improving the movement of passengers and goods, increasing the flow of transport flows between Ukraine, the EU and third countries of
the region due to the elimination of administrative, technical, border and other obstacles, improving the transport network and modernizing the infrastructure.

Today, the main directions of European integration of Ukraine in the transport and logistics industry can be characterized as follows (Table 2).

The process of implementing the provisions of the Association Agreement in the part that concerns the transport sector of Ukraine requires the adoption of legislation that meets the requirements of the European Union. For this purpose, the National Transport Strategy for the period up to 2030 has been developed.

Directions of European integration of Ukraine in the transport and logistics industry

<table>
<thead>
<tr>
<th>Implementation of projects involving financial instruments and funds of EU financial institutions</th>
<th>Cooperation in the field of harmonization of legislation and current standards</th>
<th>Participation in EU regional transport and logistics projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>-EU international technical assistance in the field of transport; -cooperation with EU thematic programs and agencies in the field of aviation, sea, river, railway transport.</td>
<td>-Association Agreement between Ukraine and the European Union, the European Atomic Energy Community; -the legal framework of Ukraine regarding the adaptation of Ukrainian legislation in the fields of transport, tourism and postal services to EU legislation.</td>
<td>-Eastern Partnership -EU strategy for the Danube region -Interregional program &quot;TRACEKA&quot;</td>
</tr>
</tbody>
</table>

Source: compiled from [12]

This Strategy is designed to comprehensively solve existing problems in the transport industry and contains priorities for its development, in particular in the context of the implementation of the European integration course and the implementation of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their states-members, on the other hand. The strategy defines the main directions of improving the quality of the provision of transport services, foresees bringing the level of their provision and infrastructure development closer to European standards, increasing the level of safety and reducing the negative impact on the surrounding natural environment, responds to the need to improve the management system, carry out administrative reform and decentralize the powers of central executive bodies authorities, introduction of anti-corruption policy, corporate governance in the state sector of the economy [12]. The Cabinet of Ministers approved the plan of measures for the implementation of the National Transport Strategy of Ukraine for the period until 2030, which contains defined steps for the implementation of tasks and measures of global transport policy priorities, the formation of effective state management and determines the directions of the industry's development. In particular, the plan envisages the design and development of a model of the future transport and logistics system, improvement of passenger and cargo transportation conditions, development of multimodal transportation, modernization and construction of transport and logistics infrastructure facilities, improvement of state management of transport safety, development of urban transport networks and others activities [13].

Individual directions of the current state of cooperation between Ukraine and the EU in various types of transport and legislative support of the integration process can be characterized as follows (Table 3).

Meanwhile, it should be noted the slowness of the tasks specified in the Agreement, which is explained by many factors. On the one hand, we are talking about general problems, such as a difficult socio-economic situation, an imperfect European integration policy in recent years, and unfavorable external factors. On the other hand, the state of implementation of the Agreement is influenced by a complex of specific factors, such as the quality and professionalism of the actions of power structures in the direction of European integration, the coordination of their efforts, the
effectiveness of planning and management of enterprises, etc. The main problems of virtually all structural elements of the transport and logistics industry in Ukraine have long been a high level of physical and moral wear and tear. In fact, the transport and logistics infrastructure does not meet EU requirements and standards.

Industry integration in the transport sector

<table>
<thead>
<tr>
<th>Direction of cooperation</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>road transport</td>
<td>In 2020, a draft law &quot;On Amendments to Some Legislative Acts of Ukraine Regarding Regulation of the Road Transport Services Market&quot; was developed. However, a conflict situation has arisen with Poland regarding permits for international truck transportation. At the time of signing the Agreement, the permit quota was 200,000 per year, in 2018 Poland reduced the quota to 160,000, reducing the number of additional permits for Ukraine each year. In May 2022, Ukraine and Poland reached an agreement on the cancellation of permits for all carriers engaged in international fuel transportation, and in August additional permits will be increased by 20,000. For 2022, Bulgaria also increased the permit quota by almost 25%, from 20,300 to 25,500.</td>
</tr>
<tr>
<td>railways</td>
<td>In the fall of 2018, a long-term loan agreement was signed between JSC &quot;Ukrzaliznytsia&quot; and the EBRD as part of the project to renew the fleet of freight cars. The new Beskydy railway tunnel was put into operation (capacity increased from 47 to 100 trains per day), which is part of the V Pan-European transport corridor. At the end of December 2019, a plan of measures for the reform of railway transport was adopted, which concerns the restructuring of JSC &quot;Ukrzaliznytsia&quot; with its division into operators of infrastructure, freight and passenger transport. An important aspect remains the technical-technological compatibility of European and Ukrainian tracks, which leads to the delay of trains at the border due to the change of wheel pairs.</td>
</tr>
<tr>
<td>inland water transport</td>
<td>It is one of the most promising in terms of environmental friendliness and low cost, although the level of cargo transportation by river transport remains low. The draft Law &quot;On Inland Water Transport&quot;, prepared taking into account EU standards, has been registered. The integration of inland waterways into the intermodal logistics scheme will strengthen Ukraine's competitive position, stimulate the development of the shipbuilding industry, and relieve road and rail traffic. Ukraine concluded a memorandum with the ministries of 13 countries within the framework of the European strategy for the Danube region.</td>
</tr>
<tr>
<td>sea transport</td>
<td>In 2017, the Strategy for the implementation of the provisions of EU directives and regulations in the field of international maritime and inland water transport was approved, and the plan of measures for the implementation of EU legal acts was approved. In 2018, Ukraine passed an audit by the International Maritime Organization and began implementing a corrective action plan.</td>
</tr>
<tr>
<td>air transport</td>
<td>A project of the Aviation Transport Strategy of Ukraine for the period until 2030 has been developed, the implementation of which will contribute to the gradual integration of Ukraine into the common aviation space. Work on the liberalization of air transport between Ukraine and EU member states (Poland, Bulgaria, Greece and Estonia) in terms of the abolition of restrictions on the number of designated airlines, points of departure/destination, and the number of flights is active.</td>
</tr>
</tbody>
</table>

Source: compiled on the basis of [12; 13; 14]

Of course, the war waged against Ukraine by the Russian Federation actually led to a complete
stop, and in cases of port receipt often even to the destruction of enterprises in the transport and logistics sector. After the large-scale invasion of Russian troops on the territory of Ukraine on February 24, 2022, export-import, as well as cabotage cargo transportation services were practically not carried out by sea ports of Ukraine, cargoes in small volumes are received and shipped by ports on the Danube River. We can talk about a certain recovery only with the start of the "grain corridors". Thus, since the beginning of August, 12 vessels have been transported to the Mediterranean Sea through the Ukrainian ports of Chornomorsk, Odesa, and Pivdenny through the maritime humanitarian corridor, and a total of about 375,000 tons of grain cargo and other food products have been exported from Ukrainian ports. The State Enterprise for Air Traffic Services of Ukraine has suspended the provision of air traffic services to civilian users of the airspace of Ukraine due to the high risk to aviation safety for civil aviation. Meanwhile, a number of logistics hubs have been created within the railway connection in the western regions of Ukraine for the simplified import of humanitarian aid, and to ensure the most prompt delivery of humanitarian aid, 14 European countries have introduced permit-free passage to Ukraine for carriers of humanitarian goods by road transport. The government of Ukraine is conducting negotiations on sending agricultural exports through European seaports, in particular through the port of Constanta in Romania. The possibility of railway transportation and increasing the volume of transit transportation by freight transport is also noted, and Poland is currently working on the creation of a "dry port" on the border with the aim of increasing the transportation capacity for Ukrainian agricultural products, in particular to third countries.

Conclusions. Thus, it can be noted that in order to ensure Ukraine's integration into the EU transport system, it is necessary to: expand and strengthen cooperation in the implementation of agreements in the field of transport; to harmonize the legal framework in the field of transport with the relevant legal norms of the European Union; to develop and implement measures to ensure technical and technological convergence of the rolling stock and transport network of Ukraine with the European transport system; bring technical, technological and environmental standards and requirements in the field of transport closer to EU standards and gradually introduce them in the domestic transport and logistics market; to develop directions for the development of Ukraine's transport network in the form of integrated transport corridors, as well as the restoration of connections that were actually lost due to the termination of cooperation within the framework of Pan-European transport corridors; conduct an analysis of the "bottlenecks" of the national transport network, which are combined with the TEN-T network, engage in the preparation and prioritization of infrastructure projects, in particular for the inclusion of the internal waterways of Ukraine (the Dnipro River, the Southern Bug River and a section of the Danube River) into the regional network TEN-T.

In addition, it should be remembered that in the conditions of a large-scale war of the Russian Federation against Ukraine, the effectiveness of the functioning and integration of the transport system into the common European space will largely depend on the restoration of its integrity: passenger and cargo routes, taking into account the demand for transport services and security needs, organization of multimodal interaction, improvement of logistics connectivity of domestic and international transportation, restoration of unhindered traffic of road transport in regions that were in war zones.

References

Policy, 19, 331–381.

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