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STRATEGIC DEVELOPMENT OF CARGO TRANSIT SERVICES: A CASE STUDY ANALYSIS

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ABSTRACT

Purpose. Recently, foreign economic activity in Ukraine has gradually shifted towards the European Union (EU). The EU's special interest in the potential of Ukraine's transit transport lies in the geographical position of the country, which is located on the main routes of international freight traffic. The article aims to study the status and development opportunities in the field of transit freight transport of the Ukrainian railway joint-stock company (JSC Ukrzaliznytsya) within the framework of European integration. **Methodology.** The article presents the analysis of the activity of the JSC Ukrzaliznytsya in the field of transit freight transport for the period of 2005-2017 and outlines the strategic prospects for its development as a significant transit route considering the conditions of European integration. The methodology included theoretical and practical research using statistical methods; methods of comparative analysis; ABC analysis method; and taxonomic method.

Results. The JSC Ukrzaliznytsya was analysed to determine the status of its activity in the field of transit freight transportation for 2005-2017. A structural-dynamic analysis was made to estimate cargo volumes transported by railway enterprises and related revenues. 18 types of cargo were identified using the ABC analysis method based on two indicators, namely, "volumes of transportation" and "revenues from cargo transit". Also, taxonomic indicators of the level of system development were considered and revenues from cargo transit for the analysed period were estimated. Finally, recommendations were proposed regarding the development of a joint-stock company as a strategic cargo transporter under the conditions of European integration with Ukraine. Practical implications (if applicable). The results of the conducted research and performed calculations confirmed the need to refocus the management activity of the JSC Ukrzaliznytsya in the field of cargo transit towards strategically important cargoes, which have the largest share in the structure of financial results. This will enable the company to achieve its leading role as a strategic transit carrier of the European Union in the near future.

KEY WORDS

strategic development, transit transportation, railways, transit, management, income, European integration

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INTRODUCTION

Rail transport is one of the key strategic areas for the cooperation between the EU and Ukraine. The joint action plan of the EU and Ukraine should implement the concept of a national strategy for the

sustainable development of the transport system to improve all the transport modes in accordance with the White Paper on Transport of the EU. The plan also obligates the EU and Ukraine to work in partnership implementing transport and railways measures and reforms. Recently, foreign economic activity in Ukraine has gradually shifted towards the European

Union. However, Ukraine's economy is strongly dependent on metals, heavy industry and agriculture, and uses almost ten times more transport traffic relative to the gross domestic product than the EU countries. The volume of transit traffic is heavily dependent on bulk cargo by rail and sea. The level of development of the domestic transport infrastructure is much lower than the standards of the European Union and does not meet the existing security conditions. But Ukraine's significant advantage is its strategic and geographic location, which is on the main routes of international freight traffic. Four of the ten pan-European corridors that the EU has committed to support pass through the territory of Ukraine. All this leads to a great interest of the EU in the Ukrainian transit and transport potential. Given these facts, the article aims to study the status and development opportunities in the field of transit freight transport of the Ukrainian railway joint-stock company (JSC Ukrzaliznytsya) within the framework of European integration.

The paper is structured as follows. Firstly, the article describes the phenomenon of the efficient use of the Ukrainian transit potential. The emphasis was placed on different perspectives suggested by researchers of this topic. Secondly, research methods are presented followed by results and their detailed analysis. Finally, conclusions and limitations of the study are presented.

1. LITERATURE REVIEW

The problem of the efficient use of the Ukrainian transit potential has been addressed in many research publications authored by domestic and foreign scientists. Various aspects of this issue have been investigated. For example, Minina (2010), Lyfar (2011) and Kovalska (2014) devoted their research to regional peculiarities of transit capacity building. In turn, Tkachenko (2008), Marov (2014) reflected on the existing strategies for the development of the Ukrainian transit potential. In the context of the economic safety of transport, the development of the transit potential was explored by Bludova (2006), Novykhova (2003), Platonov (2015), Britchenko & Cherniavska (2017), Moravcikova et al. (2017). The development basics of the Ukrainian transit potential with the use of cargo shipping were considered by Shyptsov (2008) and Lypynska (2012). Bludova (2006) and Chorny (2015) analysed the question of the development and

implementation of a flexible tariff policy for freight transportation in international communications. The estimation of the Ukrainian transit potential in relation to the world economy was made by Klietk et al. (2018a), Petrenko (2017) and Minich (2017), whilst Stroiko and Bondar (2017) conducted a comprehensive study of the state of the Ukrainian transport infrastructure and substantiated the possibility of integrating the Ukrainian economy into the European and global economic systems through the efficient use of the transit potential. The latter issue was also analysed by Androniceanu (2017). Karpenko et al. (2018) presented integral performance indicators that can be used to determine the impact on the overall operation efficiency of transport and logistics clusters as one of the conditions for the use of transit potential. Sroka (2015) concentrated on studies of the logistics network and produced a detailed analysis of their formation and functioning. Other researchers, such as Sobczak et al. (2018), proved that transport networks were the most important elements of the modern economy, and Sinkevičius et al. (2016) drew the attention to the necessity of integrating the railway transport into an intermodal or multimodal transport chain. Studies by Oláh et al. (2018a, 2018b, 2018c) will help to provide more transparency to the market segment of international logistics centres and will give a positive impulse to further successful development of sustainable macro-logistics concepts in Europe. With the help of taxonomic and econometric analysis methods, the research by Czech and Lewczuk (2016) proved the significant influence of transport on the level of economic development of a country. These findings were confirmed by Ciobanu & Androniceanu (2018) as well as Sebestova (2018). Yildiz (2017) identified the relationship between logistics efficiency indicators and global competitiveness levels, and Zhuravskaya et al. (2016) developed recommendations for the improvement of the management principles for rail transport enterprises. The available literature shows that the problem is complex and multidimensional as well as analysed from different perspectives and points of view.

2. RESEARCH METHODS

In order to achieve the set goal and solve certain tasks, the following methods were used in the article: 1) statistical methods and methods of comparative analysis — for the study and evaluation of the state of

the JSC Ukrzaliznytsya in the field of cargo transit for 13 years from 2005 to 2017; and for structural–dynamic analysis of cargoes transit volumes transported by railways as well as income from the cargo transit for the same period; 2) the ABC analysis method for grouping 18 types of cargo based on two indicators, namely, “volume of transportation” and “revenues from cargo transit” for 2005–2017.

The taxonomic analysis (Plyuta, 1980) was used to determine the development level of the revenue system used by the JSC Ukrzaliznytsya for earnings from cargo transit. Using this method to calculate the taxonomic development ratios, multidimensional statistics were used, and the revenues from cargo transit were analysed. The taxonomic index was calculated by constructing a matrix of observations, standardising the matrix elements, developing a matrix of standardised values, constructing the vector, i.e. the standard, defining the distance between the matrix elements and the vector, and calculating the taxonomy coefficient (Kliestik et al., 2018b). The use of the matrix of standardised values for the construction of the taxonomic indicators allowed avoiding the cost meters. Values of the taxonomic index range from 0 to 1, and indicate the development level of the system.

The scientific, theoretical and methodological basis of the research consisted of research efforts and publications, conference proceedings in the field of cargo transit transported by rail, and issues related to the European integration policy applicable to the JSC Ukrzaliznytsya in the field of transit transportation. The following information was used for the study: statistics of the Ministry of Infrastructure of Ukraine, the State Statistics Service of Ukraine (official website of the State Statistics Service, 2018), statistical reporting and initial documentation of the JSC Ukrzaliznytsya (official website of the Ukrainian Railways, 2018); Internet resources, etc. Economic calculations were made using modern methods and computer technologies for the processing of statistical materials.

3. RESEARCH RESULTS

One of the important aspects in the policy of the European integration of Ukraine is the integration of the transport networks. The effective and economic operation of the Ukrainian transport system plays a strategic role in the development of the national

socioeconomic system. The development of international rail freight transport in general and cargo transit in particular, plays an important role in ensuring foreign economic relations of Ukraine. Consequently, the status of the JSC Ukrzaliznytsya is that of an important player in the market of international cargo transit, ensuring the growth in the profitable part of the railway operation. The company's role as a strategic transit carrier is ensured by the favourable geographic location of the country and the availability of international railway transport corridors. In general, the Ukrainian railway network in its length is the fourth in Europe and the thirteenth in the world (official website of the JSC Ukrzaliznytsya, 2018).

Rail transport enterprises carry the largest volumes of transit in comparison with other modes of transport (Luchnykova, 2016). It is also important to note that only bulk cargo is transported by rail: coal, iron and manganese ore, ferrous metals, wood, crushed stone, etc. Cargo transit is the most profitable type of international transportation, and income from such activities is the largest. The transit rate is higher than that of transportation of exports and imports, therefore, considerable attention should be paid to the problem of increasing the efficient use of the transit potential of the railway companies of JSC Ukrzaliznytsya to secure their share, role and status as a strategic transit carrier within the framework of the European integration of Ukraine.

The Association Agreement between Ukraine and the EU on 16 September 2014 (On ratification of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states, on the other side, 2015) was an impetus for the development of the Ukrainian economy and the effective use of transit potential. By fulfilling the requirements of this Agreement, Ukraine has an opportunity to become a full member of the European Union. Therefore, it is necessary to ensure the preconditions for the improvement of the organisational and economic bases for the use of the Ukrainian transit potential to create a European model of rail transport market that would promote the competition in the market of international cargo transit. As stated in the Strategic Plan for the Development of Rail Transport (Strategic Plan for the Development of Rail Transport up to 2020, 2015), developed in accordance with the requirements of the Association Agreement with the EU, a new model for the operation of rail transport enterprises should ensure the organisational and financial distribution of infrastructure operators and

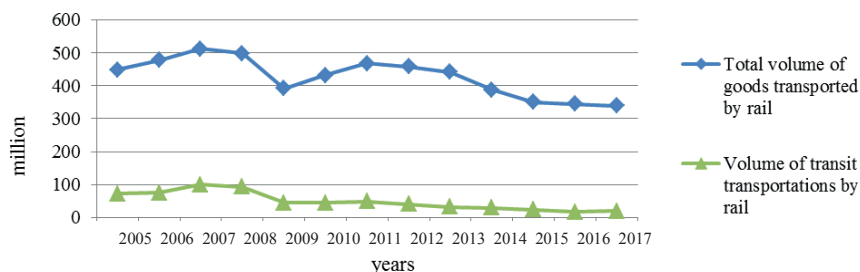


Fig. 1. Volumes of general and transit freight traffic of the JSC Ukrzaliznytsya for 2005-2017

Source: elaborated by the author based on Transportation of Freight by Railways of Ukraine, 2017.

the carrier, as well as create free access to the transportation market. This can be achieved by adopting appropriate rules and procedures for the access to the rail infrastructure (in accordance with the provisions of Directive 2001/14/EU of 26 February 2001). In order to integrate the Ukrainian and European transport systems, it is necessary to harmonise the national legislation in the transport sector with the European norms. Such coherence of legal acts regulating transit transportation and their forwarding services, as well as the implementation of the relevant EU directives that were enshrined in the relevant annexes of the Association Agreement, will create the legal preconditions for the improvement of the organisational and economic bases for the use of transit capacity by railway undertakings.

Calculations were made to compare the growth rates of freight transport by all the modes of transport with the growth rates of freight rail traffic according to official statistics (official website of the State Statistics Service, 2018; official website of the JSC Ukrzaliznytsya, 2018). The results made it possible to draw the following conclusions. Fig. 1 presents the total freight traffic by rail and volumes of transit freight traffic for 2005-2017 and illustrates a linear downward trend.

According to statistics, the Ukrainian transit potential is not used in full, and more than 80% of potentially possible cargo transit volumes are lost. These data confirm that the Ukrainian railway network has an unused transit reserve.

The structural and dynamic analysis of the volumes of cargo transit by railways in Ukraine was carried out for the period from 2005 to 2017, focusing on 18 types of cargo categories according to official data of the JSC Ukrzaliznytsya (Transportation of Freight by Railways of Ukraine, 2017). In terms of volumes of rail transit traffic, 2016 was the worst of the 13 studied years with 16.93 million tons. Compared to the largest volumes of 2008, the decrease is more than four-fold. This testifies not only of the

negative tendency in the field of transit traffic by the Ukrainian railways but also indicates the deterioration of the rating and position of the JSC Ukrzaliznytsya as a strategic transit carrier within the framework of the European integration of Ukraine. During 2017, 19.55 million tons of cargo transit were transported by rail enterprises, which is 2.62 million tons more than in 2016. A rather insignificant growth indicates the remaining problems of the significant reduction in transit traffic by this strategically important mode of transport. In summary, the following conclusions can be made. During the investigated period 2005-2017, there was a nonlinear trend in the change of volumes of cargo transit by the Ukrainian railways (Fig. 2). For most of the types of cargo, change in volumes was characteristic and reflected the general dynamics.

Comparing the change in the volumes of transit traffic in 2017 and 2005, growth can be observed in the transportation of coal, oil and petroleum products, iron and manganese ore, timber, automobiles, minerals and cement, while the remaining 11 cargo types demonstrate a reduction. The analysis of data particular to 18 cargo types by year revealed an uneven and unstable change. For a period 13 years, a stable trend is represented by the data on transportation volumes of half of the analysed goods: non-ferrous metals and their products; cars; machinery and equipment; salt; coke; ferrous metal scrap; cement; mine construction materials; ferrous metal ores, sulphur raw materials. The transit volumes of ferrous metals, chemicals and mineral fertilisers, grains and grain products increased by almost 6 times during the investigated period. The greatest changes among the different types of goods over the past 13 years were observed for coal, oil and petroleum products, and iron and manganese ores. Their variations were in the range of 0.155 to 0.407; 0.072 to 0.318; and 0.155 to 0.390, respectively. These results demonstrate a very uneven distribution of cargo volumes transported by the Ukrainian railways both in terms

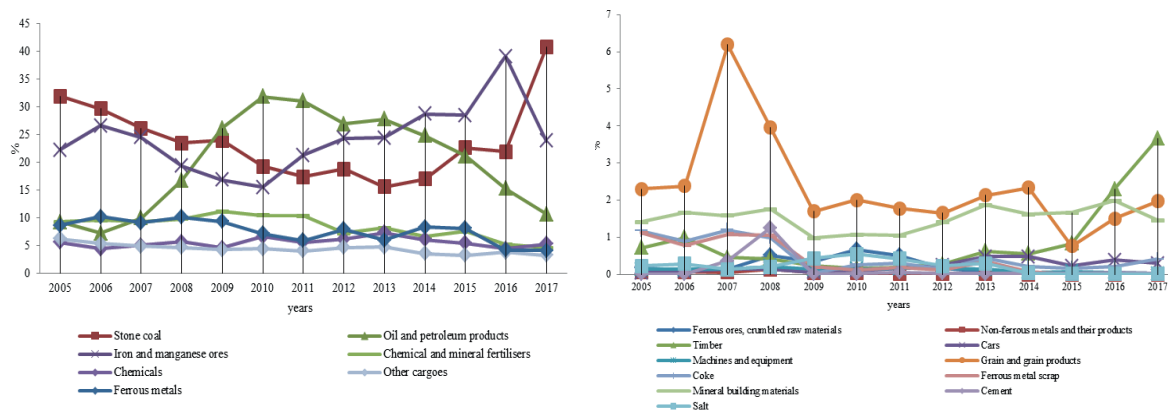


Fig. 2. Specific volumes of cargo transit by the Ukrainian railways for 2005-2017 [%]

Source: elaborated by the author based on Transportation of Freight by Railways of Ukraine, 2017.

of years and the types of goods. Consequently, the existing structure is unstable and ineffective. The persistence of such negative nonlinear trends and unreasonable policy in the field of cargo transit through Ukraine and the continued tendency for significant reductions in cargo volumes predict the loss in the Ukrainian share of cargo transit by rail in the total volumes of domestic and international freight. Aiming to identify the reasons behind the given problem as well as proposals and recommendations for strengthening the role of the Ukrainian railways within the framework of European integration of Ukraine, to study must focus on the main countries of departure and destination of the goods passing through the territory of Ukraine. The main reason for the reduction in the volumes of cargo transit is the deflection of freight flows to the ports of the Russian Federation (RF). The Russian Federation is the main source of cargo transit for Ukraine. According to the reported data, 80% of the cargo transit originates in the Russian Federation. In the structure of transit volumes of 2017, the largest share belongs to coal (40.7%). This type of cargo is sent by Russian enterprises through the territory of Ukraine to Slovakia, Turkey, Poland, Romania and the United Kingdom. The Russian Federation is the main country of transit of iron and manganese ore. The bulk of this type of transit cargo, namely about 40%, goes to Slovakia, and the remaining 60% — to Poland, the Czech Republic, Iran, Romania and Italy. In 2017, the volume of transit of this type of cargo decreased by almost 30%. The main reason for this was a partial re-routing of Russian iron ore supplies to the domestic market, increased competition from Australian and Brazilian suppliers, partial deflection of traffic in the direction of Russian seaports and reducing numbers of European construction projects. The second

place in the formation of transit In 2016-2017, Kazakhstan and Belarus were the second largest source of transit cargo, sending petroleum products as energy gases via Ukrainian railways. The countries of destination for this type of cargo were Turkey and Eastern Europe.

Fuel oil is sent from Belarus via Ukraine to the Netherlands (80%) and Great Britain (20%). Hungary, Turkey, Poland, Romania, Greece, Slovakia and Croatia are recipients of Russian and Belarusian potash fertilisers. Lithuania, Finland, the Russian Federation and Belarus send other mixed mineral fertilisers to Hungary, Moldova, Serbia, Romania and the United Arab Emirates. Nitrogen fertilizers are transported from Kazakhstan and the Russian Federation to Moldova, Turkey, Romania, Hungary and Serbia. Ferrous metals come from Belarus, the Russian Federation, Hungary and Poland. Their share in the overall structure of cargo transit in 2017 was 4%. Countries of destination for this type of cargo were Israel, Egypt, Slovakia, Poland. Cast iron (Transportation of Freight by Railways of Ukraine, 2017) was also sent to the USA and Slovakia from the Russian Federation. In 2016-2017, there was a certain decrease in transit volumes from Belarus, which was mainly due to the deflection of transported petroleum products to the ports of the Baltic States. It should be noted that the main competitor of the JSC Ukrzaliznytsya is the Belarusian railway. This is due to the re-routing of significant volumes of Russian transit traffic, namely, coal to Poland and Germany and ferrous metals to the EU countries. Also, the countries of the Customs Union have been allocated benefits. As a result, the Belarusian transit by rail significantly exceeds the Ukrainian. Besides, in 2016-2017, shipments from Kazakhstan to Turkey decreased significantly (by 31.7%) due to the re-routing of cargo flows

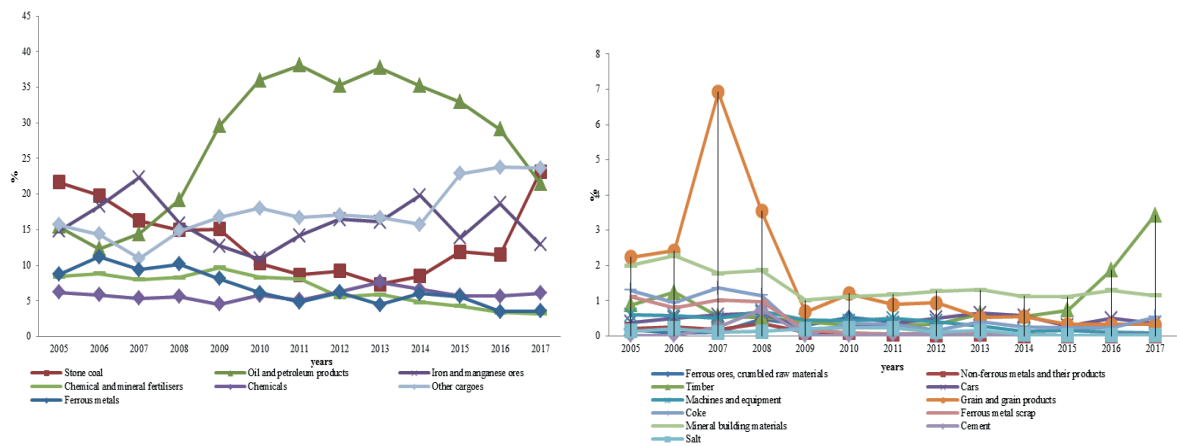


Fig. 3. Share of revenues from transit by railways of Ukraine for 2005-2017 [%]

Source: elaborated by the author based on Transportation of Freight by Railways of Ukraine, 2017.

from the Ukrainian port of Odessa to the port of Taman. The main reasons for reducing the volume of cargo transit was is the loss of a part of the Ukrainian railway infrastructure due to military actions in eastern regions.

To ensure the comparability of data on revenues from cargo transit by Ukrainian railways by type and time, it is expedient to analyse the relative values of the structure presented in Fig. 3.

The structured and systematised data on revenues for 2005-2017 indicates variations in the structure by year and type of goods. The analysis of revenues from coal transit showed that during the analysed 13 years, the share varied from 0.074 in 2013 to 0.231 in 2017. It is worth noting that the unstable structure of distribution was observed for 11 years.

The ABC analysis allowed to investigate the share of freight volumes and revenues from cargo transit by railways of Ukraine for 2005-2017. The results of calculations and their division into three groups by the contribution to the total volume by year showed a significant inconsistency in the distribution of the types of cargo based on two indicators ("volumes of transportation" and "revenues from cargo transit", %). In the distribution of cargo volumes, Group A consisted of mainly three to five types of cargo, with their total share in the range of 75.2% to 81.0%. Group B included chemicals and other cargoes. And the Group C consisted of the remaining 11 items: ferrous ores, sulphur raw materials; timber; cars; machinery and

equipment; grain and grain products; coke; ferrous metal scrap; mineral building materials; cement and salt. Grouping by the indicator "revenues from cargo transit" transported by the Ukrainian railways allowed to divide the goods into three groups. Group A was mad of goods with the cumulative share of 75.0% to 85.8% in 2005-2017. Consequently, the goods in this group amounted to an average of 80% of the revenues from the total cargo transit. The distribution of Group A goods by this indicator was different for each year for 13 years. In terms of "volumes of transportation", other cargoes were a part of Group B, because their share in the total volume ranged from 3.2% to 6.1%. However, in terms of "revenues from cargo transit", they were placed in Group A, since their contribution to the total revenues from cargo transit was from 11.0% to 23.8% each year. Consequently, the traffic of other cargoes amounted to an average of 5% and contributed an average of 17% – 18% of revenues.

The calculated values of the taxonomic index for 2005-2017 presented in Table 1 showed a tendency to decrease the value of this indicator. The system of revenues from cargo transit was best developed in 2005-2008, and since 2009, including from 2017, it was average. In 2017, it was 0.45. This testifies to the inefficient and inappropriate development of the system of revenues from cargo transit by JSC Ukrzaliznytsya for 2005-2017.

Tab. 1. Dynamics of the taxonomy regarding the level of development of the system of revenues from cargo transit

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----------------|-------------|------|------|------|------------|------|------|------|------|------|------|------|------|
| Indicator value | 0.61 | 0.62 | 0.60 | 0.67 | 0.46 | 0.49 | 0.48 | 0.50 | 0.50 | 0.46 | 0.43 | 0.46 | 0.45 |
| Standard | 0.60 – 0.79 | | | | 0.4 – 0.59 | | | | | | | | |

4. DISCUSSION OF THE RESULTS

The conducted research using the structural-dynamic analysis, the ABC method and the taxonomy method resulted in conclusions indicating the need to revise the strategy for the development of JSC Ukrzaliznytsya as a competitive carrier. The analysis of revenues from cargo transit revealed the non-conformity between the revenues from cargo transit and their volumes for 13 years. Considering the structure of transported goods, it's the system is considered unstable. In summary, such significant structural changes do not correspond to strategic goals of the European integration in respect to the JSC Ukrzaliznytsya as a transit carrier.

The ABC analysis showed inconsistencies and instability in Groups A, B and C based on indicators "volumes of transportation" and "revenues from cargo transit". Additional analyses are required to identify the causes, main threats, and opportunities, and problems and assess the situation in the context of the world market of goods to further substantiate the managerial decisions on the rational planning of the volume of cargo transit through the territory of Ukraine by domestic railways aiming to increase the volumes and the flow of cargo transit as well as maximise the profits.

CONCLUSIONS

The conducted comprehensive research allowed to propose recommendations for the development of the JSC Ukrzaliznytsya as a strategic cargo carrier under the conditions of European integration:

1. Improve the state of the domestic rail network. Much of the road network is in poor condition. The railway network has bottlenecks on the main nodes and overload areas requiring double tracks. Most of the rolling stock of the JSC Ukrzaliznytsya is already outdated or will become such soon.
2. Remove customs barriers at the borders of Ukraine. Many countries encounter problems with cargo transportation at the border, among which is the insufficient railway capacity and non-transparent tariffs for rail operations.
3. Rational use of the railway infrastructure. The railway infrastructure in Ukraine is multifunctional because it is used for both passengers and

cargos. This creates difficulties in scheduling and the use of railway infrastructure.

4. Ensure a uniform distribution of rail transport. The existing railway infrastructure contains part of roads and stations that are not sufficiently used or do not work at all. At the same time, about a third of railways are significantly overloaded.
5. Improve regulatory compliance and regulation of transport issues. Ukraine is delaying the ratification of a large number of transport and border-crossing agreements supported by the United Nations Economic Commission for Europe. The volume of agreements ratified by Ukraine is very low.
6. To conduct multifaceted research of the cargo transit system. Constant systematic monitoring and study of changes in transit traffic with the use of economic and mathematical tools will allow railway enterprises to reach a qualitatively new level in the field of cargo transit, thus ensuring the JSC Ukrzaliznytsya the role of a strategic partner in the freight transport market within the framework of European integration.

Refocusing the JSC Ukrzaliznytsya strategically important cargoes will ensure greater revenues from cargo transit and the necessary strategic development of the JSC Ukrzaliznytsya in the context of the European integration.

The study makes an important contribution to the existing literature. Firstly, though this research adopts a single-country approach, analysing a Ukrainian company, it allows comparing the results with other sectors of the economy. Secondly, this detailed analysis may become a substantial advantage that allows formulating hypotheses to be verified in the context of other industries and/or countries. And thirdly, the results of this study can offer guidance to companies willing to benefit from the European integration.

Our study has several limitations, the first of which is the analysis of only one national company. Secondly, the study was qualitative, whereas a quantitative approach might be used in future research. These limitations need to be addressed in future research. Despite the limitations, the results achieved allowed to determine a true picture of the situation in the analysed sector.

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