

However, existing railway transport management structure,

Railway infrastructure financial security: the Ukrainian case

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Abstract — Transport infrastructure reforming is of great importance for Ukraine given the economic and geographical position of the country and its strategic position on the world stage as well as for its long-term internal development. The article considers extensive railway network as a competitive advantage of Ukraine's economy. Extensive railway infrastructure availability is a potential area for economic growth in the future for Ukraine. Railway transportations market of Ukraine is considered deeply highlighting its main problems. Only cooperation with transport networks of other countries enables Ukraine's transport potential to be fully fulfilled. Current situation regarding Ukraine-EU Association Agreement requirements fulfillment is considered. Implementation progress for various areas is presented, but most attention is paid to transport and infrastructure. The essence and role of financial resources for Ukrainian railway infrastructure development on the way to European integration are substantiated. The priority actions necessary for railway infrastructure financing mechanism reorganization are proposed. Railway infrastructure in need of modernization as well as insufficient funding for railway industry affects pricing, as railway infrastructure is not only a key capacity for railway undertakings, but also a capacity that is part of a strategically important industry, leading to unsatisfactory national economy and even decreases country's defense capabilities to some extent. The need for effective railway infrastructure financing mechanism, in particular through the state support system is defined.

Index Terms — railways, railway infrastructure, railway infrastructure financing, public finances involvement.

I. INTRODUCTION

Railway transport possesses a leading position in meeting industrial sector and population needs in transportations, is an important factor in ensuring socio-economic growth and development of its foreign economic relations for Ukraine.

production and technical state of railways, as well as technological level of transportations do not meet the growing needs of society and European quality standards for transport services in many respects, do not improve the industry efficiency. One of the key indicators determined by The Global Competitiveness Index is country's railway infrastructure development level. Until recently Ukraine occupied a leading position among economically developed countries with respect to this parameter (2018 – 57th; 2019 – 34th) (The Global Competitiveness Report 2019). However, there was a deepening processes of technological degradation of its infrastructure due to financial and economic state deterioration characterizing railway transport. Progressive aging of railways, rolling stock, diagnostics, automation and telecommunication equipment causes customer services quality deterioration and thus brings to the surface a problem of large-scale railway infrastructure development projects implementation aimed at providing high-speed train traffic, European service quality standards and resolving infrastructural asymmetries of development globally for the area, resulting in preconditions for economic recovery of the country and life quality improvements for population. Attracting funding for the transport sector infrastructure projects is considered as a priority by the Ministry of Infrastructure of Ukraine.

Ukraine is a country with a rapid transport infrastructure development and favorable conditions for investment - the so-called "transit hub between Asia and Europe": 19 airports, 13 seaports, 16 river ports, 169 thd km of roads, 22 thd km of railways (Investment atlas – Transport sector). The Ministry of Infrastructure of Ukraine, with support of the European Union, the European Bank for Reconstruction and Development, the European Investment Bank, the World Bank, the International Finance Corporation and other international partners are working to upgrade the national transport system by attracting

investment, implementing public-private partnerships and private sector investment projects. That is why the problem of defining strategically necessary railway infrastructure of Ukraine and its sources of funding should be considered relevant. To substantiate financial resources essence and role in Ukraine's railway infrastructure development on the way to European integration and to propose priority actions necessary for the railway infrastructure financing mechanism reorganization.

II. ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS.

Today researcher considering railway infrastructure financing problem resolution proved to be actual in scientific space. Transport infrastructure impact on productivity and economic growth is described and analyzed in detail by the author in scientific paper (Taotao Deng 2013, p.5). A thorough study of transport infrastructure development impact on economic growth of EU member states is presented in (Korin M.V., Ovchynnikova V.O., Tokmakova I.V. 2020, p.114). The study of directions and tools of state regulation for railway transport strategic development is worth to be singled out (Shyba O.A. 2017, p.5-6). The study (M. Sasidharan, Dr. M. P.N. Burrow 2017, 1-11) examines UK infrastructure problems, takes into account track usage rates increase, outdated infrastructure upgrading problem, limited funding budgets. The article provides a critical review of current risk management practices for the railway industry to identify appropriate risk management models as well as offers recommendations for their further improvement along with improvements for the

financial management system. At this point in time problems of railway infrastructure should be considered more urgent than ever.

It should also be noted that railway infrastructure problems are considered in the context of railway liberalization process. Foreign scientist researches (W. Peetawan, K. Suthiwartnarueput 2018; M. Ahi, K. Yildiz 2018; L. Xuemei, K. Alam, S. Wang 2018) provide a lot of expertise to develop recommendations adapted to realities Ukrainian railway is operating in. The railway network financing problem proves to be relevant but requires more detailed recommendations.

railway market in ukraine

Railway market is considered to be one of the key sectors of Ukrainian economy. There is one point of great importance among transport requirements for European integration of Ukraine - market liberalization. According to world experience, railway market liberalization process is capable of solving a number of important and unresolved problems for the industry, increase Ukrainian railways competitiveness, ensure potential transformation into competitive advantages at global level, integration into EU single transport space. First of all, liberalization envisages railway transportations market main player restructuring, namely a number of actions should be taken to separate infrastructure management functions and transportation within JSC Ukrzaliznytsia by 2022.

Table 1 presents directives and regulations provided by European Union, which should be implemented by Ukraine in the field of rail transportations.

TABLE 1.
UKRAINE-EU ASSOCIATION AGREEMENT REQUIREMENTS (RAIL TRANSPORTATION)

Area	Directives and regulations list
Market and infrastructure access	Council Directive 91/440 / EEC of 29 July 1991 on the development of the Community's railways; Council Directive 95/18 / EC of 19 June 1995 on the licensing of railway undertakings; Directive 2001/14 / EC of the European Parliament and of the Council of 26 February 2001 on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure; Regulation (EU) 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight.
Technical conditions and safety precautions	Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways; Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community.
Accounts and statistics standardization	Regulation (EEC) No 1192/69 of the Council of 26 June 1969 on common rules for the normalization of the accounts of railway undertakings.
Interoperability	Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community.
Combined transportation	Council Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between Member States.
Others	Regulation (EC) No 1370/2007 of the European Parliament and of the Council of 23 October 2007 on public passenger transport services by rail and by road; Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations.

Source: author's own elaboration based on data provided by State agency "Stock market infrastructure development agency of Ukraine".

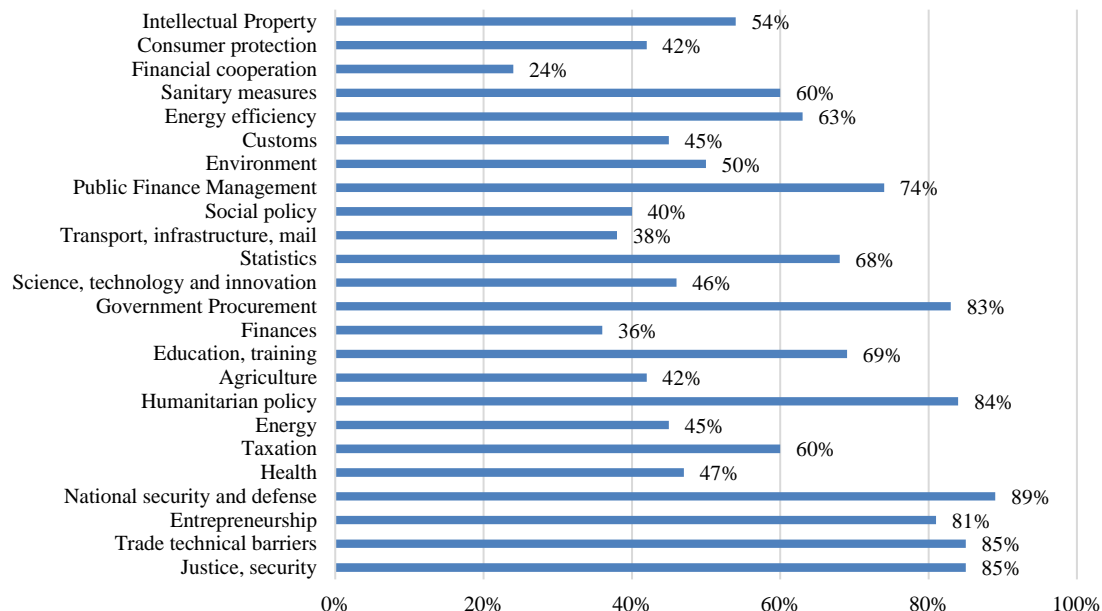
According to publicly available official statistics, these requirements are currently fulfilled at a level of approximately 38%. Despite the fact that some points have been achieved, experts consider a number of important issues yet to be addressed. Infrastructure component related issues are met at a level of 0 to 30%, namely: regulatory framework creation for

equal access to railway infrastructure, restructuring in

accordance with EU legislation providing for infrastructure management and transportation separation, tariffs for railway infrastructure, railway enterprises systematic licensing in order to provide access to infrastructure. Figure 1 presents association's requirements fulfillment results as of the first

quarter of 2021.

FIGURE 1.
UKRAINE-EU ASSOCIATION AGREEMENT IMPLEMENTATION PROGRESS



Source: authors grouped on the basis of Pulse of the EU Agreement: monitoring the implementation of the action plan for the implementation of the EU Agreement

Association Agreement requirements Compliance is extremely important both for the railway market and for the country as a whole. Transport is an important part of the economy, participating in a number of processes that make a significant contribution to economic growth as well as ensuring socially important functions of the country. Despite great transport sector importance and in particular rail transport, presented results indicate an extremely low level of compliance with the requirements for the transport and transport infrastructure agreement.

Ukraine's railway transportation market is showing a dynamic decline and is in a critical state. Liberalization is an effective way out of the crisis for this industry. Rail transport and infrastructure problems could be solved by deregulating market in accordance with European standards.

III. RAILWAY INFRASTRUCTURE AS COMPETITIVE ADVANTAGES

Ukraine's railway transport is undergoing reforming process. Extensive railway network is undeniably a significant competitive advantage for the country's transport system. Such infrastructural diversification is considered as a priority on the way to integrated European transport space creation. The fact that Ukraine is aiming at European integration proves a significant competitive advantage for Ukrainian railways.

Let's highlight the main competitive advantages of the extensive railway network of Ukraine:

- favorable geopolitical position at the crossroads of trade routes between Europe and Asia, the Baltic and the Black Sea region; Center of Europe - creates prospects for European

integration cooperation, advantageous position on the Silk Road - prospects for cooperation with China;

- world transport space involvement (Pan-European transport corridors 3,5,7,9, the Organization for Railways Cooperation (RSO) corridors 3,4,5,7,8,10 and Europe-Caucasus-Asia transport corridor (TRACECA) are passing through the territory of Ukraine);

- extensive railway network - the third largest in Europe (the operational network of Ukrainian railways is almost 19.8 thousand km excluding the occupied territories, where railways currently are not operated)

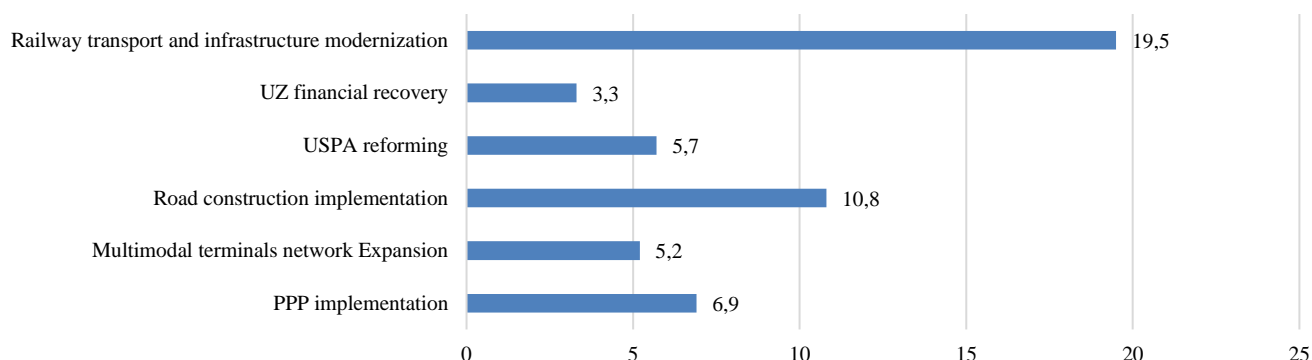
Despite a number of leading positions, the railway cannot turn them into its competitive advantages due to the accumulated unresolved problems. Main problems for the railways include: necessity for repair and modernization of more than 40% of tracks, reduced quality of infrastructure, wear of cars about 80%, electric locomotives 87%, staff turnover.

Ukraine is delaying international projects implementation that are considered as one of priority methods for overcoming existing problems. First of all, these projects are waiting for proper implementation: European integration of Ukraine (where railway market liberalization is among most important points), The New Silk Road (opens up prospects for large investments in infrastructure). The state role in logistics infrastructure development is considered extremely large. As part of transport corridors, Ukraine must strive to be a strong link (ally with other states) in the struggle for transit on a global scale. The country's rail transportation prospects depend greatly on the state's policy and strategy in this direction. The national transport strategy of Ukraine until 2030 "DRIVE UKRAINE

2030" defines a task of creating transit transport bridge connecting Europe, Asia and Eastern countries as high priority perspective. According to experts' forecasts as per Figure 2,

Ukraine's GDP could receive an additional \$ 51.4 billion over 10 years, provided transport direction of economic strategy is fully implemented.

FIGURE 2.
ECONOMIC EFFECT FROM INITIATIVES IMPLEMENTATION IN THE FIELD OF "TRANSPORT AND INFRASTRUCTURE", \$ BILLION



Source: authors grouped on the basis of "Drive Ukraine 2030" - the National Transport Strategy

Investment attracting importance for the industry to develop infrastructure is clearly presented as this is the basement keeping transport industry afloat, without which economy as a whole is likely to die. Such an initiative primarily contributes to country's transport potential development and its involvement into globalization processes.

Here is a specific example where due to railway infrastructure problems the country loses its competitive advantage in the global transport market. One of the main railway routes connecting Europe and Asia crosses the Ukrainian-Polish border at Mostyska II station. It is an important hub for the New Silk Road, but it is also of great importance for transporting goods between Ukraine, Poland and Western Europe. Analysts consider this site to have great potential. At first stage, cargo played across the ocean from China to European ports, but there was a shortage of sea containers so ships were overloaded and blocked. There was a solution proposed for this problem to switch to rail transcontinental container traffic. Logistics company GOL is stated to be able to provide two or three trains a week that will cross EU border in Mostyska II. PCC Intermodal company draws attention to road transport problems caused by delays at customs, limited permits for transportation, delivery prices doubled as a result; there are no such problems if railways are used on the other hand and this is its competitive advantage in modern logistics. Thus Mostyska II station presents a huge potential for The New Silk Road, however, infrastructural development is still lacking. It is Mostyska II station at Ukrainian-Polish border considered only railway station well adapted for handling containers. There are also Izov and Yahotyn, but they have insufficiently developed infrastructure.

Strategic aspects of industry development for 2017-2021 targeting at financial and economic stability increase for the industry involve specific business model of railway transport development incorporating a corporate center and five business verticals creation: "Freight and logistics", "Passenger", "Infrastructure", "Traction Services" and "Production and

Service" (The main aspects of PJSC "Ukrzaliznytsia" development strategy for 2017-2021).

According to the reforming program, infrastructure component will remain state-owned and will be subordinated to the infrastructure operator. The infrastructure component will include the following currently operating facilities: track economy, power supply, signaling and communication facilities; facilities providing maintenance, repair and modernization for tracks, engineering structures, signaling, centralization, blocking and communication equipment; centralized process of traffic management facilities; regional traffic management centers operation support facilities; diagnostics and monitoring for infrastructure, tracks, power supply, signaling, centralization and blocking, engineering structures facilities; branches of "Central Communication Station" and "Energozbut" (Ukrainian railways infrastructure of JSC "Ukrzaliznytsia").

Such reformation is necessary, as further infrastructure self-financing by Ukrzaliznytsia poses two important threats: 1. If all the infrastructure costs are covered in tariff - the final cost will increase rapidly, most of the cargo transportations will move to vehicles. Regarding a solution being applicable at this situation, it should be noted that most EU countries keep access fees at a level competitive with road transport; 2. Without proper funding for the infrastructure operator from the state budget, the access tariff will be higher than in Western Europe. Most EU countries provide marginal cost pricing (access to direct costs) for accessing infrastructure; state support availability for infrastructure operators.

Priority actions needed for reorganizing railway infrastructure financing mechanism:

1. Vertical separation (infrastructure should be separated from the transportation business);
2. Horizontal separation (infrastructure operator operating activities should be separated from the carrier);
3. Partial non-core assets privatization.

Expected results:

1. Clearly defined investments required for infrastructure

modernization amount;

2. Cost accounting and cross-subsidization termination;
3. Fair competition establishment for freight operators;
4. Opening the way for transportations liberalization and investments.

IV. CONCLUSIONS

Ukraine's railway transport occupies strategic positions on the map for European infrastructure corridors. Ukraine has great foundation for the growth of rail freight flows that are so relevant throughout the world today. Most of Ukrainian railway lines are heavy. There are obvious prospects for development of a country with high transit potential, as Ukrainian railways interact with the railways of 7 neighboring countries, provide operation with 40 international railway crossings, serve 18 Ukrainian seaports. However, the state and parameters of its infrastructure indicate numerous problems presence that limit the possibility of Ukrainian railways inclusion into the system of trans-European transport communications and ensuring the implementation of a favorable transit situation for the country. First of all, the railway infrastructure financing mechanism needs to be regulated, namely it is necessary to determine a specific amount that should be financed from the state budget to keep the network in working order at legislative level. The Railway Administration announces that it will be first quarter of 2021 when it will offer its customers a single logistics tariff. Transportation costs will include two main components - a state-regulated payment for infrastructure access, as well as market value for cars rental. But this is only the first step, as future goals include combining these two tariffs into one, so that shippers and freight forwarders can receive a comprehensive service. The future of railway infrastructure, as a country's competitive advantage on the world stage, will depend on the amount of possible funding from the state budget, as world experience proves a considerable reduction in network capabilities without proper state support.

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