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Research paper

The Financial Aspects of Innovative Development of the Railway Transport in Ukraine

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Abstract

The implementation of the strategy of re-industrialization of national economies is now the main trend in both Europe and Asia. In this context, railways are of great importance, as a mode of transport, capable of carrying large volumes of cargo and passengers with a sufficiently high speed. Special attention is paid to the innovative development of transport corridors connecting Europe and Asia to a single transport network. Mainly this paper is devoted to the financial aspects of the development of Ukrainian railway infrastructure, which has a significant transit potential. It is shown that underfunding of renewal of fixed assets of railways leads not only to the intensification of current problems, but to the formation of problems that will have a decisive influence in the future. The high cost of projects related to the innovative development of the railway infrastructure necessitates the attraction of private capital. The types of public-private partnership models as a mechanism for investment financing are considered. It has been determined that for the railway transport the most feasible are the BOT (build-operate-transfer) and BOOT (built–own–operate–transfer) models, which allow to ensure the innovative development of strategic infrastructure sites and maintain its integrity, by keeping it in state ownership.

Keywords: *financing; fixed assets; infrastructure; innovative development; railway transport.*

1. Introduction

The change in the paradigm of the development of the world economy, the declaration of the policy of re-industrialization by the leading countries has led to a change in the understanding of the importance of the railway transport in ensuring their development, primarily economic. This is explained by the peculiarities of the railway transportation, namely the possibility of a rapid implementation of the large volumes of freight and passenger transportation, their low cost, as well as environmental friendliness. At the same time, the requirements to the quality of transportation also increase, which necessitates the significant financial investments in the development of the industry. This issue is urgent for the railways of not only developing but also economically developed countries, since until recently railway transport was considered as an 'old-fashioned' mode of transport, gradually losing ground to the automobile and aviation ones.

2. Literature Review

The issue of the financial support of the innovative development are considered in the publications of leading scientists from the European countries, Asia, Australia, USA. Ukrainian researchers also focus on this issue. Special attention should be paid to the studies devoted to the formation of the models for financing the development of the urban and main railways [1, 2, 3, etc.]. The high cost and significant payback period of the innovative projects for the development of this infrastructure sector, the inability to finance them solely at the expense of the state or railway companies, necessitates the development and implementation of the management models for their activities that enhance the investment attractiveness, including through attracting private capital [4, 5, 6, etc.]. At the same time, with regard to the railway transport in Ukraine, this issue is almost not considered, and researchers focus on increasing the physical and moral depreciation of fixed assets, which resulted in a decrease in transport security, deterioration in their quality, etc. In addition, the unsatisfactory state of the infrastructure has become one of the reasons for the decrease in Ukraine's transit potential and the actual exclusion of the national network from the Eurasian transport system (One Belt – One Way Program does not foresee its passage through the territory of Ukraine). Of course, this factor is not the only one, but it can become the key in assessing the prospects for creating effective international transport corridors with the inclusion of the Ukrainian railway infrastructure.

Therefore, the purpose of this research is to study the issues of an innovative renewal of fixed assets of Ukrzaliznytsia, PJSC, primarily the infrastructure, taking into account existing financial issues, as well as the possibility of applying the public-private partnership mechanism to finance its innovative projects.

3. Results and Discussion

The policy of the industrial renaissance, as noted by the leading experts involved in the development of the railway transport, has become a 'drive for improvement' of the industry, which implies a radical transformation of the 'technical landscape' of railways to support their 'business base' and provide current and future customers (shippers and passengers) with the 'unprecedented service' and an optimum parity of the price and quality of the transportations [7]. Such technical improvements will be impossible without the implementation of a comprehensive program for the introduction of the innovative technologies that involve significant finan-

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cial investments, primarily in the improvement of the fixed assets (rolling stock and infrastructure). Precisely these 'technical improvements' are envisaged in the provisions of the Agreement on the Association of the EU and Ukraine in the field of the railway transport [8, pp. 67, 145, 659, 810, etc.] and the strategic plan for the development of the railway transport up to 2020 [9].

3.1. Analysis of the Technical Condition of the Railway Transport of Ukraine

Ukraine has a developed network of railways, the operational length of which is about 19.8 thousand km (excluding the occupied territories, whose network is not currently operated), of which over 47.2% are electrified. The railways of Ukraine in terms of freight traffic take the fourth place on the Eurasian continent after China, Russia and India.

The Ukrainian railways directly border and interact with the railways of Russia, Belarus, the Republic of Moldova, Poland, Romania, Slovakia, and Hungary and provide operation of 40 international railway crossings, and also serve 18 Ukrainian sea ports of the Black Sea-Azov basin. The main lines, which carry out the main volumes of passenger and freight traffic (up to 90%), constitute the strategic network of Ukraine, which includes 45% of the total operational length of the Ukrainian railways [10].

Over 55% of freight and 28% of passenger traffic are carried by railway transport (Fig. 1-2). And although in recent years their share has been consistently decreasing (since 2014 the share of freight traffic has decreased by 6.6%, passenger - by 5.4%), the industry remains important as one of the main elements of the national transport system of Ukraine, since more than 50% of shipments are carried by bulk cargoes transported in large quantities over significant distances - coal and coke (14.4%), ore (19.1%), construction materials (12.1%), grain and milling products (10 ,5%).

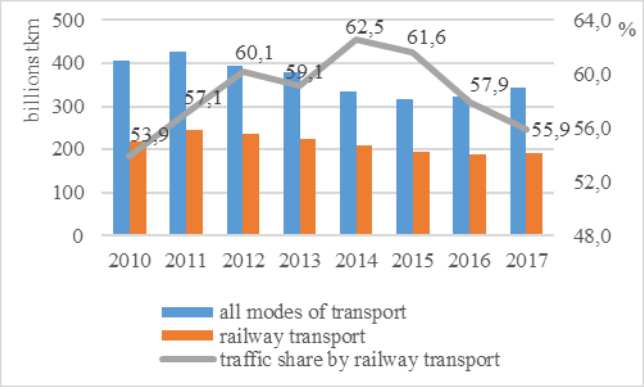


Fig. 1: Dynamics of freight traffic in Ukraine in 2010-2017 (data from [11])

An advantageous geographical position of Ukraine, developed transport network, availability of ice-free ports determines its high transit potential as one of the key elements of international transport and communication networks for the movement of the goods and passengers. Thus, the main trans-European corridors East-West, Baltic-Black Sea pass through the territory of the country. The transportation is carried out on three railway transport corridors (No. 3. 5, 9), through the ports of Izmail and Reni, the interconnection with corridor No. 7. In general, the length of the railway transit corridors is 3.2 thousand km. Also, transportation on the international transport corridor TRACECA (Europe-Caucasus-Asia) is developing.

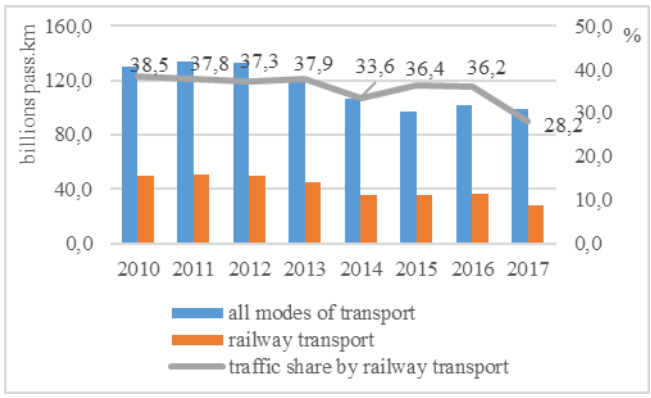


Fig. 2: Dynamics of passenger traffic in Ukraine in 2010-2017 (data from [11])

According to the estimates of the World Economic Forum in 2012, the infrastructure of Ukraine's railway transport was the best among the CIS countries, ranking 27th in quality. However, as early as in 2017, the railway infrastructure dropped to the 37th position [12].

One of the main reasons for this was a progressive deterioration of fixed assets of Ukrzaliznytsia, PJSC as infrastructure facilities and rolling stock. If at the beginning of 1992, the fixed assets had an average wear of 30%, by 2000 - almost 50%, by 2010 - more than 90%, and since 2015 - 99%. This situation is exacerbated by the fact that fixed assets account for up to 90% of the assets of railway companies. At the same time, the level of physical and moral depreciation is one of the main indicators of the technical and economic safety of the operation of the railway companies.

The consequence of a high physical deterioration of rolling stock and infrastructure facilities of Ukrzaliznytsia, PJSC was almost complete exhaustion of the technical resource of railways. As of January 1, 2018, 27% of the main lines need capital repairs, 78% of track equipment have an over-standard service life, 67% of traction substations, 55% of the contact network are completely worn out. The state of the rolling stock is also unsatisfactory: rolling stock wear is more than 96%, freight cars – 90%, passenger cars – 86%, railcar trains – 84%, diesel trains and rail buses - 93%; over 88% of traction rolling stock, 57% of freight cars, 62% of passenger cars, 95% of diesel trains are operated beyond the normative service life [13].

In addition, Ukrzaliznytsia, PJSC has significant issues with financing the costs associated with servicing the fixed assets. So, until 2014, the cost of the ongoing repairs was 8-10%, then from 2015 it was reduced to 2% (Fig. 3), which has a very negative impact not only on the speed of transportation, but also its safety (here and hereafter, the conversion was made based on the rate of the National Bank of Ukraine of the US dollar to the Ukrainian hryvnia in a certain year). The issue is aggravated by the fact that even current expenses are financed at the level of 30-50% as required, which is unacceptable, since it directly affects the safety of the railway transport.

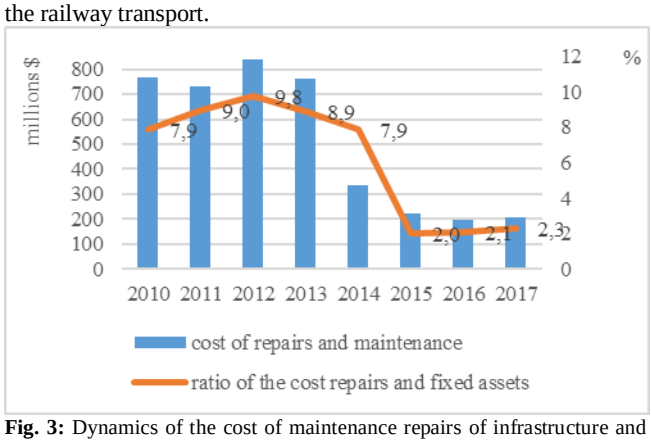


Fig. 3: Dynamics of the cost of maintenance repairs of infrastructure and rolling stock of Ukrzaliznytsia, PJSC (data from [13])

Only in order to maintain the infrastructure in working order and not accumulate overdue repairs, it is necessary to annually upgrade 800 km of roads and overhaul 1000 km. However, these indicators are not met: if 1446.1 km were modernized (180.8% as needed) in 2007, in 2009 - 411.3 km (51.4% of as needed), 2013 – 276.0 km (34.5% as needed), 2017 - 265.4 km (33.2% as needed).
With such a critical deterioration and inadequate functioning, the railway transport of Ukraine continues to operate and carry out freight and passenger transportation at the expense of the potential created in the Soviet Union's times and designed for much larger volumes of traffic. As a result of the reduction in traffic volumes, only 25% of the roads remain profitable, 80% of the transportation work is accounted for by 15% of the track (100 sites). This resulted in losses associated with the maintenance of inefficient areas. So, on the average the maintenance of 1 km of unprofitable railways requires more than US $ 7,7 thousand annually, and all such infrastructure - more than US $ 570 million. The management of Ukrzaliznytsia, PJSC declares the need to optimize such areas for redirecting of the released funds for the innovative development of the key sections of the railway infrastructure, primarily the international corridors. However, this issue remains unresolved due to the inconsistent implementation of the industry reform strategy, the systemic social and economic crisis in Ukraine, etc.

3.2 Issues of Innovative Development Financing of Ukrzaliznytsia, PJSC

The disastrous deterioration of fixed assets was the result of chronic underfunding of simple and extended reproduction of the fixed assets. The investment needs of the railway transport of Ukraine in 2017 were estimated at US $ 0.71-1.07 billion annually. In 2017, the capital investments were planned in the amount of US $ 0.57 billion. For 9 months of 2017, the investment plan was implemented at 56.8% (US $ 0.21 billion was actually invested with a plan of US $ 0.37 billion), including for the acquisition (production) of the fixed assets - for 69.4% (plan - US $ 0.9 billion), modernization and modification of the fixed assets - 54.0% (plan - US $ 0.10 billion), and for major repairs - 49.9% (plan – US $ 0.07 billion) [13, 14].
The main source of the capital investments in the industry are own funds, the volume of which is much higher than the borrowed ones. It was a consequence of a violation of the optimal (desirable) correlation between own and borrowed funds (60% own, 40% borrowed). At the same time, the imbalance towards own financial resources has only increased in recent years: if in 2015 the ratio between own and borrowed funds was 1400, in 2017 - it increased to 1800 (Fig. 4). The situation did not become critical solely because of the insignificant volumes of investment in comparison with the value of assets of Ukrzaliznytsia, PJSC. But even with such a resource structure, only 30% of the required capital investments can be financed, which increases the importance of increasing the amount of borrowed funds in the innovative development of the industry. The financial issues of Ukrzaliznytsia, PJSC, a technical default announced in 2016 and, as a consequence, a decrease in credit ratings negatively affect the ability to attract credit resources from the external sources. In 2017, the plan for the capital investments was fulfilled by 68.4% (in fact, they amounted to US $ 0.39 billion with a plan of US $ 0.57 billion), while 86.2% - at the expense of own funds and 13.8% - at the expense of the credit resources (actually US $ 0.02 billion with a plan of US $ 0.11 billion, fulfillment of the plan - 18.2%). Budget funds as a source of funding are not planned at all.
As it was already noted, the main source of the capital investments financing in the railway transport of Ukraine is its own funds. However, due to the systemic political and socio-economic crisis in Ukraine, there is a decrease in the volume of freight and passenger traffic. This led to a reduction in the income base of Ukrzaliznytsia PJSC (in 2015 the transport output of the railway transport (the sum of freight volumes in ton-kilometers and passenger in passenger-kilometers of traffic) decreased by 6.3% compared to 2014, in 2016 2.4% in 2017 and 1.9% in 2017) and forces the managers to initiate a rise in tariffs for the transportation, which, in the conditions of a systemic crisis of the national economy, is not an effective strategy and has a short-term positive effect. So, in 2016, net cash received from the operating activities increased by 23.6%, and in 2017, despite the growth of tariffs by 15%, decreased by 4.1%.

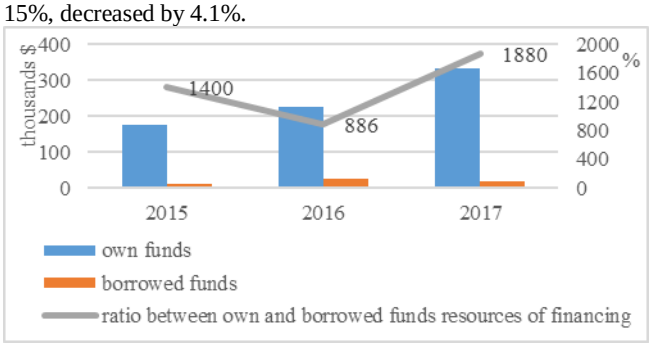


Fig. 4: Volumes of capital investments of Ukrzaliznytsia, PJSC by sources of financing and the ratio between them in 2015-2017 (data from [14])

In addition, there is an artificial understatement of depreciation charges. So, in 2017 the value of fixed assets of Ukrzaliznytsia, PJSC decreased by 0.8%, and depreciation charges - by 18.1%, despite the fact that their depreciation level has not actually changed. The consequence of this is a reduction in the ability of even simple reproduction of fixed assets.
This in turn leads to an increase in the financial costs of their repair and maintenance (keeping in an operational state), which are derived not only from the value of the existing fixed assets and the transport work performed, but also the level of their physical and moral wear and the amount of the capital expenditure, executed in previous periods of time.
Some failures in financial management also have a negative impact on the formation of the financial resources of the railway transport enterprises. So, during 2015-2017 years there is a negative dynamic in attracting financial resources from the external sources (Table 1), which indicates not only the irrational use of the credit resources, including long-term ones, for repayment of the obligations received in previous years, but also the washing-out of cash from the economic turnover of Ukrzaliznytsia, PJSC, which further reduces its investment opportunities.

Table 1: Volumes of attraction and repayment of borrowed funds of Ukrzaliznytsia, PJSC in 2015-2017 (data from [14])

Indicators	Years		
	2015	2016	2017
Borrowed funds raised, US $ million, total,	51.97	50,98	577.51
including long-term liabilities	51.97	35.98	378.70
Borrowed funds returned, US $ million, total,	497.55	268.25	597.91
including long-term liabilities	297.91	197.66	442.08
Increase in borrowed funds, US $ million, total,	-445.58	-217.27	-20.40
including long-term liabilities	-245.95	-161.68	-63.38

Insufficiency of own resources for financing the functioning and development of the railway transport is characteristic not only for Ukraine, but also for other countries. For example, in many EU countries, state subsidies to the industry are more than 50% of the required level of costs for the passenger transportation and infrastructure maintenance. In the United States, financing of Amtrak is 80% due to own funds and 20% from the state budget. In Ukraine, railway transport is one of the largest payers in the state and local budgets. At the same time, the state virtually completely moved away from financing the development of Ukrzaliznytsia, PJSC. In addition, from 2014, the provision of the guarantees for the external debt obligations of the railway transport enterprises was terminated. It is assumed to eliminate the existing shortage of funds only by increasing tariffs for transportation and, as a result, income from operating activities, but in times of crisis it will have a retarding effect on the national economy.

This 'inattention' to the issues of the development of the industry, the growing social and economic issues, the decline in the industrial production led to the fact that the railway transport of Ukraine is now in a 'dead-end' state when there is an urgent need for large amounts of capital investments and there is no real possibility of its satisfaction. In such a situation, the state should adopt a regulatory framework for using new mechanisms to raise funds for updating fixed assets of Ukrzaliznytsia, PJSC.

3.3 Public-Private Partnership as a Mechanism for innovation financing in Railway Transport

One of the effective mechanisms of the interaction between the state and private capital is public-private partnership (PPP). In the world practice, a significant positive experience of its use for the implementation of the large infrastructure projects, including those related to the development of the railway transport, has been accumulated. At the same time, a direct implementation of existing 'successful' concession models to Ukraine is impossible, since they take into account the institutional peculiarities of the states, for which they were developed. Therefore, the development of the PPP model should be based both on the existing experience of its use in the industry, and on the specifics of the state regulation of the industry, its importance for the social and economic development of Ukraine, and the strategic directions of the transport infrastructure.

The use of the concessions as an instrument for attracting financial resources to finance capital investments actualizes the issue of choosing the type of concession agreement that would be equally acceptable for both state and private investors, that is, the concession should (1) be attractive to the private partners, which implies the possibility of obtaining the expected economic effect and the safety of investing in state-owned assets (guaranteeing the preservation of the invested capital); (2) ensure the development of the strategic facilities under the state ownership, as well as increase the efficiency of their operation through the improvement of their management system. Thus, the concession agreement should act as a parity decision for both state and private investors.

In the international practice, five types of concession models are used:

1st type: BOT 'build-operate-transfer'. The peculiarity of this type of agreement is that the concessionaire who carried out the construction of the facility within a certain (fixed) period carries out its operation. At the end of this period, this object is transferred to the state;

2nd type: BTO 'build-transfer-operate'. This model assumes the transfer to the state of the object, which was built by the private investors, and then its transfer into operation by the concessionaires;

3rd type: BOO 'built-own-operate': an object is created (built) by concessionaires and managed on the basis of title. The peculiarity of this model is that the period of validity of the concessionaire's ownership right is not limited;

4th type: BOOT 'built-own-operate-transfer': the concessionaire obtains ownership of the constructed object and uses it for a certain period, after which the object passes into the ownership of the state;

5th type: BBO 'buy-build-operate'. The peculiarity of this concession model is that it is a kind of form of transferring an already existing object to private ownership of concessionaires on the condition of its restoration, modernization or expansion.

In addition to the choice of the type of concession model, the issue of determining the scope and objectives of PPP implementation is significant. In world practice, there are two approaches to solving this issue:

1) traditional, based on the idea that PPP is possible only in the spheres (industries) in which the transfer of the state property to private ownership is prohibited. If the property can be transferred to the private ownership, then it is better to privatize and not to make sufficiently complex schemes of interaction between the state and private structures;

2) adaptive, which is more flexible in determining the spheres of possible interaction between the state and private business and determining the possibility of PPP in any spheres where such interaction will be effective and mutually beneficial.

Infrastructure in accordance with the Law of Ukraine On Railway Transport was and will remain exclusively in the state ownership, which predetermines the use of the traditional approach to determining the scope of PPP usage. Experience of other countries (Great Britain, Germany, Columbia, etc.) shows that this is advisable, since the transfer of the infrastructure into private ownership often leads to its partial or even almost complete destruction. Therefore, the most effective is the transfer to the private business of individual sections of the network for their innovative development and further exploitation. High social and economic importance of the railway transport in Ukraine, its determining role in ensuring national security makes it impossible to transfer ownership of the individual sites, as this can lead to disruption of the network integrity, as well as the emergence of the social tensions in certain regions.

Therefore, BOT and BOOT concessional models are most effective, the implementation of which can provide the significant advantages for both state and a shareholder of Ukrzaliznytsia, PJSC, and private investors, namely: (1) railway network, as well as the rolling stock will remain state-owned, which will allow to maintain its integrity, as well as exercise a strict control over the operation of the facilities transferred to concession; (2) reduction of the financial burden on the state and Ukrzaliznytsia, PJSC, as the private investors make commitments to finance the development of the facilities; (3) creation of conditions for an effective operation of the state-owned facilities, through the use by concessionaires of the best (from their point of view) management policies and financial management within the concession agreement. In addition, the concessions will allow to attract the domestic and foreign private capital for the development of the railway transport of Ukraine without losing state control over objects of the strategic importance for both national economy and state security.

4. Conclusion

The conducted research showed that failures in the financial management and irrational management of the railway transport in Ukraine led to a critical depreciation of its fixed assets. The consequence of this was that one of the most important conditions for not only the development, but also the further functioning of the railway transport is the renewal of its fixed assets, primarily the infrastructure. The main factor that determines the unacceptably low intensity of innovative development of the railway network in Ukraine is the irrational structure of the financial resources directed to its renewal, namely, an excessively high level of own funds in the conditions of reducing the revenue base. In such conditions, an effective mechanism for financing capital investments is public-private partnership; in this case, concession agreements such as BOT and BOOT should be used, which presuppose the preservation of the state ownership of the created infrastructure facilities. It is expected that the introduction of the concessions will contribute to the innovative development of the railway transport of Ukraine, which will make it possible to increase, above all, its attractiveness as a transit territory connecting the East and the West of the Eurasian continent. In this context, the further research should be devoted to the definition of the infrastructure areas to be transferred to the concession, evaluation of its effectiveness from the perspective of the state and private businesses, as well as the definition of the rational conditions (volume of investments, terms of operation, etc.) of the concession agreements.

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