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Research paper



Financial and Economic Stability of Railway Sector in the Context of Globalization and Integration

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Abstract

This paper is dedicated to the study of financial and economic security of the railway sector in the context of globalization and integration through the example of PJSC Ukrzaliznytsia. The study covers theoretical and methodological approaches to identification of criterion for assessment of financial and economic security of the railway sector.
It provides the proof of the increasing competition, diversity of internal and external risks and uncertainty in conditions of contemporary integration processes. The paper offers the cause-and-effect analysis through the "Tree of Problems". Key indicators of financial and economic security of the railway enterprises are singled out of the overall system of threats (risks). Each indicator is assessed for impact on the overall value of the Pareto-efficient integral risk and the equation for calculation of the integrated risk value is formulated.
Findings of the study confirm that monitoring of the existing and potential threats determines the operating and prognostic goals of functioning of the financial and economic security, which allows to formulate the relevant mechanisms and tools for the attainment thereof.

Keywords: *financial and economic security; integrated risk index; level of threats; railway transport.*

1. Introduction

Globalization and integration are the main trend in the development of modern global economy. Certain countries are actively affecting the integration processes through operation of their communication systems. The state of transport component of integration process is exactly what helps one make conclusions regarding the adequate ways of handling the problems and tackling the tasks by individual subjects who shape out the global systems.
Global community is actively promoting the establishment of universal transportation industry through making a good use of geographic location of the resource potential of specific countries while offering integrated services to the same. However, quite a number of factors are detrimental to integration of individual transportation systems into one universal complex, thereby impeding the overall integration of global economy. These factors include discrepancies in political and economic systems, specifics of national transport regulations and the background of specific means of transportation that had impact on their development.
Transportation is one of the keystones in cooperation between the European Union and Ukraine. According to Article 368 of the Association Agreement, "cooperation between the Parties shall aim to facilitate the restructuring and modernization of Ukraine's transport sector and gradual approximation towards operating standards and policies comparable to those in the EU" [1]. However, railways in Ukraine and in the EU are ages apart when it comes to the level of development and, unfortunately, as far apart in terms of competitive strength. About 10% of total cargo in EU is carried by railways, earning them EUR 13 bln. a year. Importance of railways in Ukraine is 6-8 times higher. However, intense operation of railways brings considerable loss: in accordance with international accounting standards, Ukrainian Railways (Ukrzaliznytsia) ended the year of 2015 with UAH 15 bln. in the red (vs. UAH 6 bln. in 2016) [2].
In addition, Ukraine is lagging behind and losing its potential as a transit country while the neighboring countries are actively expanding their transport infrastructure, not to mention the increasingly fierce competition in transportation sector and servicing of the main transcontinental and transnational traffic flows [3]. Therefore, prospects of efficient integration of the Ukrainian Railways in the European transport system require urgent solutions to the problem of securing their financial and economic security.

2. Results and Discussion

Efficient promotion of financial and economic security implies timely detection and avoidance of potential threats to proper functioning of the railway companies, as well as minimizing the negative impact caused by the integrated risk to macro- and micro-level relationship.
Financial and economic security of the railway companies in conditions of integration and globalizations is exposed to a number of risks and threats, the quality and nature of which from the macroeconomic point of view comprise of a combination of three fundamental factors.
Factor 1 – increasingly fierce global competition caused by restructuring of industries worldwide and technological expansion. It all causes changes in national and international cargo- and passenger flows, higher quality standards of transport services, safety and sustainability of transport system.
Factor 2 – the increasing role of human capital in boosting the social and economic growth. The importance of quality of professional personnel for competitive ability of modern, innovative economy keeps growing, and it is particularly visible in the advancement of transport sector that is based on innovation. The

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public demands considerable improvement of affordable and top quality transport services. This improvement would require better application of labor resources in transportation sector, especially higher productivity, which, in turn, is important for cutting the transportation costs and bolstering the competitive ability of the Ukrzaliznytsia on the global market.

Factor 3 – depletion of the resource base, prioritizing the innovative techniques and promoting the deeper processing of raw materials, which requires higher mobility of population, cargo, services and capital.

Therefore, in order to rate the impact of these factors (positive, negative or neutral) on financial and economic security, one would reasonably expect to establish an integral value of the risks (threats) based on the statistical data of the PJSC Ukrzaliznytsia and expert opinion of the railway professionals.

On the early stage of the research, one should consider the problem through the cause and effect analysis, with the exception of the external, subjective factors. Graphic research methods are ostensibly the most fitting, especially the one involving the 'Tree of Problems' that illustrates mutual relationship between the cause and the effects. The 'trunk' represents the essence of the problem shaping up, the 'roots' represent the cause of the problem and the 'crown' represents the consequences (Fig. 1).

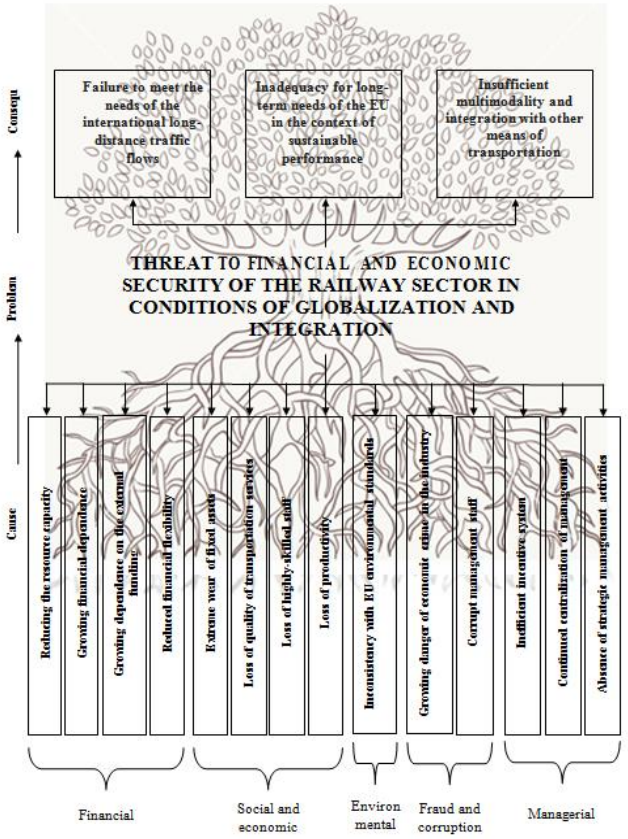


Fig. 1: Tree of Problems – Threats to Financial and Economic Security of Railways

Studies of financial and economic security of the railway companies yielded a number of indicators that appear to be inter-related but do not duplicate each other and, when combined, define the integral risk (threat) index. These indicators cover the financial, social, economic and environmental spheres, as well as fraud and corruption, and managerial problems.

Financial security of the railways defines the financial limits sufficient for PJSC Ukrzaliznytsia to counter the internal and external threats and facilitating the execution of its development strategy. Assessment of financial security is one of the most important aspects of the system promoting the financial and economic security, which requires continuous monitoring of profitability ratios, as the latter represent the efficient application of all resources.

Financial standing of any enterprise is characterized by the absolute and the relative indicators financial condition, performance and market activity. (Fig. 2)

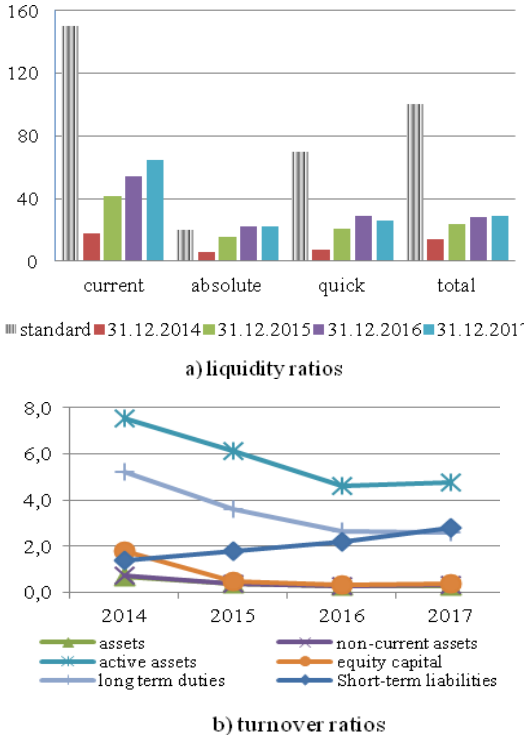


Fig. 2: Dynamics of Key Indicators of Financial Standing of PJSC UZ

According to liquidity and business activity indicators calculated on the basis of consolidated statements made in accordance with International Accounting Standards, the situation is rather grim. Despite some growth in 2014-2017, the liquidity ratios are far behind the recommended values. Turnover ratios are, on the contrary, going down, which is indicative of poorer performance of PJSC Ukrzaliznytsia.

Social and economic security of the railway transport reflects the economic and social conditions enabling the company to provide quality cargo- and passenger traffic services in the longer terms. It implies prevention of negative impact on the economic stability through liquidation or mitigation of the risks and threats to the company's resources, such as physical facilities, the staff, its intellectual potential and labor relationship on the whole.

Social and economic security of the railway sector can be promoted through a combination of administrative and market management techniques, which, however, implies the need for compromise solutions.

With this in mind, assessment of the social and economic security of the railway sector shall proceed on the basis of indicators characterizing the extent of personnel engagement, the balance between the productivity of labor and remuneration, and the quality and state of fixed capital assets. One needs to provide more incentives to the railway sector personnel, as human factor has a profound impact on this sector.

One should be wary of the poor competitive ability of the Ukrainian railways in certain aspects on the international market due to the obsolescence of fixed assets and the increasing expenses in the industry. Natural and geographic conditions make Ukraine an attractive player in terms of international transit flows, promising some considerable economic benefits. However, these are not enough for making the Ukrainian transport system sufficiently competitive on international level.

It should be noted that, in terms of salaries, the railway sector was down to No. 15 in 2016 compared to other industries (in December alone down to No. 19). Meanwhile, average salary in PJSC Ukrzaliznytsia in December 2016 (UAH 6,378) was smaller than

the average salary nationwide (UAH 6,475), much to the personnel's displeasure, ultimately resulting in protests [4].
In addition, the company is suffering from shortage of prospective young personnel with leadership skills. Over the last few years, Ukrzaliznytsia has been losing its staff at an alarming rate (Fig. 3). People have been moving mostly to Europe where the pay is higher and labor conditions are better.

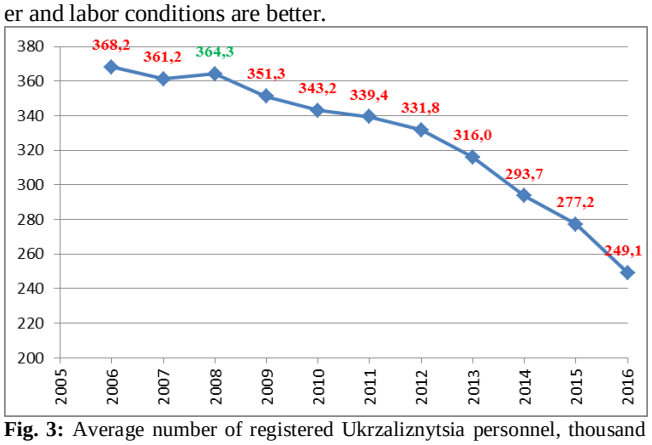


Fig. 3: Average number of registered Ukrzaliznytsia personnel, thousand persons [5]

Therefore, development of competence of the management is a must, especially with individuals who are first appointed to executive positions. So far, management staff on various levels is poorly motivated, which keeps the people from active participation in the reforms and inhibits the innovative development of the management system.
Environmental safety defines the key components of negative environmental impact caused by railways (air pollution, consumption of non-renewable natural resources, and high consumption of energy resources) and identifies the ways of minimization thereof.
European integration today requires harmonization of the railway operation practices with the EU environmental standards and regulations. In developed countries, railways represent the most energy-saving and environmentally friendly means of transportation. This status has been attained through advancement of superior technologies and application of special managerial solutions and arrangements. The Ukrainian railways are traditionally functioning under the kind of management system that still results in uncompensated negative impact on environment.
The biggest commitment in Ukraine is to promote protection and rational use of the land, minerals and plant resources – almost two-thirds of total allocations to environmental arrangements (see structure on Fig. 4).

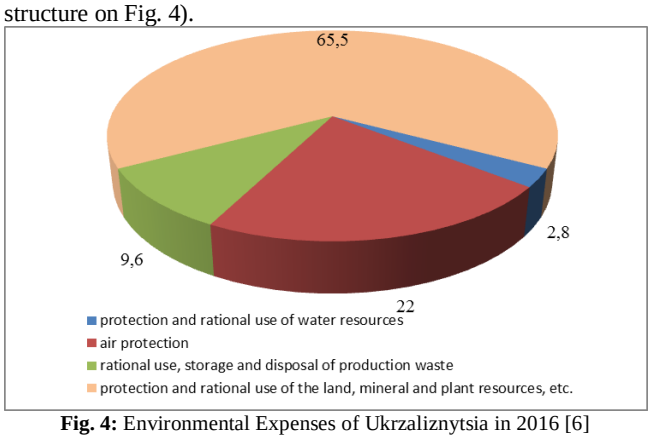


Fig. 4: Environmental Expenses of Ukrzaliznytsia in 2016 [6]

However, according to the study of the expense structure in the context of environmental arrangements in 2007-2016, the amounts allocated by the railways to environmental arrangements kept going down since 2012, as no arrangements seeking to promote rational use of natural resources and to minimize negative impact on environment are de facto planned, and, therefore, no amounts are allocated.

Environmental planning over the last few years has been increasingly focusing on compliance with applicable environmental regulations, viz: laboratory tests and instrumental surveys, drafting of documents necessary for acquisition of permits and licenses, shipment of industrial waste to specialist contractors, etc.
Fraud and corruption index allows one to estimate the impact of unlawful and other detrimental activities of the public and industry-specific officials on the performance of railway operators.
According to the study of economic conditions and the state of crime at the Ukrzaliznytsia enterprises, overall threat of economic crime in this sphere manifests itself through disruption of smooth operation of the railways, undermining of their capacity and technical state of equipment and facilities comprising the infrastructure, and smaller budget revenues from operation railway facilities.
The study points out the increasing impact on public safety and the extent of economic crime committed by certain categories of individuals on the railway facilities, especially through abuse of one's official position.
For example, under the procedural guidance of the SAP prosecutors, the detectives of NABU (National Anti-corruption Bureau of Ukraine) filed charges against four individuals who were suspected of misappropriation of almost UAH 20 mln. from the budget of the state-owned company Ukrzaliznychpostach (branch of PJSC Ukrzaliznytsia). The NABU detectives have been investigating these facts since July 2016.
The NABU detectives are working on grand total of 20 criminal proceedings involving disclosure of corrupt practices in Ukrzaliznytsia [7].
Courts of various instances are handling cases involving PJSC Ukrzaliznytsia. Legal claims exceeding UAH 1 mln. now add up to almost UAH 2.5 bln. To protect its interests in the courts of cassation, PJSC Ukrzaliznytsia seeks legal counsel and services specifically provided by the third parties. According to its financial statement, PJSC Ukrzaliznytsia spent UAH 41.5 mln. on legal fees in 2016 alone (UAH 40.9 mln. in 2017) [4].
The poll helped establish the significance (specific weight) of various factors in terms of their ability to affect financial and economic security of the railways. Influence of economic crime is rated in Fig. 5 below

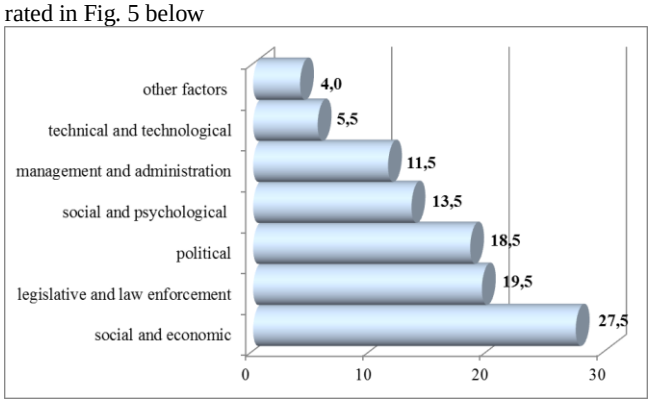


Fig. 5: Example of an image with acceptable resolution

According to the interviews with experts, the reforms caused a number of legal deficiencies and conflicts which rendered tenders and deliveries almost uncontrollable, thereby increasing the risk of fraudulent activities.
Managerial safety allows to assess the quality of modern integrated corporate management systems operated by the carriers.
Government control over the railway sector is one of the key factors influencing its performance and results. Preservation of centralized control over the entire railway sector, including management of the carriage, financial, economic, pricing and personnel aspects, makes railways profoundly different from all other means of transportation and industries. Government control is not necessarily positive for financial and economic security of the railway sector, as there is no clear and understandable way of subsidizing the sector to indemnify it against the losses incurred from provi-

sion of carriage services to welfare beneficiaries. As regards the antimonopoly regulation, one should emphasize its importance and yet point out that rate-setting makes it impossible to liquidate the losses resulting from passenger traffic.

Cabinet of Ministers of Ukraine approved the reform program up to the year of 2019. Step by step, this country intends to establish a modern organizational, legal and economic governance model for its railway sector.

One can say the reforms proceed at a languid pace and their results are quite contradicting. Modern practices of privatization of big and medium-sized enterprises do not yield positive results of restructuring in the absence of governmental control, inadequate governance and shortage of qualified managers. All it leads to is the ever increasing energy- and materials intensity, shrinking capital investments, absence of quality control, neglect of consumers' needs, absence of long-term business ties, etc., which only accelerates decline of the industry.

Standard & Poor's Ratings Services downgraded the long-term credit rating of the State Administration of Railways of Ukraine "Ukrzaliznytsia" to CC. The international agency points out that the carrier failed to perform its obligations to the creditors in full. In turn, Fitch Ratings confirmed the long-term issuer default rating (IDR) of PJSC Ukrzaliznytsia – CCC in foreign currency and RD in national currency; short-term IRD – C in foreign currency and RD(ukr) in national currency [8].

Therefore, choosing the reform model is still the issue for the Ukrainian railways, which implies predictive valuation of the reforms already completed, analysis of tendencies of development of the Ukrainian railway sector, and design of the Ukrzaliznytsia economic security models.

Apparently, all these diverse factors need to be generalized, as the control and evaluation of financial and economic security require consideration of the current state of the industry and its further development tendencies, monitoring of the actual and critical levels of the indicators mentioned hereinabove, etc.

Assessment of the risk level is primarily based on the concerns of negative consequences on the enterprises of railway sector caused by the impact of individual factors. We will proceed by traditionally taking into account two key parameters: the extent of potential loss and the likelihood of its further accumulation. The assessment is based on the algorithm that combines the expert evaluation method and the analytical methods, which helped take into account specifics of impact on the financial and economic security caused by each group of risk factors.

Impact of each component and its share in aggregate value of the integral risk is shown in Table 1 below.

Table 1: Allocation by types of probability of the occurrence of main risk parameters

Risk	Probability of loss	Specific loss ratio,%
Financial	0.34 (max)	32
Social and economic	0.29	35 (max)
Environmental	0.08	5
Fraud and corruption	0.17	9
Managerial	0.12	19

In accordance with the criterion analysis theory, one may single out the Pareto-efficient – a list of alternatives which are no worse than any other by at least one criterion. In our case, the Pareto-efficient solution implies financial, social and economic risks. That is why these two groups shall be the focus of monitoring of the financial and economic security of railway sector. Indicators of these two risks should be reasonably included in the integral index of financial and economic security of the railway sector.

As a rule, grand total of financial risk indicators applicable to transport industry is subdivided into the following groups:

– financial state indicators (financial security and liquidity of the enterprise), viz:
  – equity ratio;
  – leverage ratio;
  – borrowed capital concentration ratio;
  – own sources to fund circulating assets;
  – receivables and payables ratio;
  – financial risk index;
  – coverage ratio;
  – current liquidity ratio;
  – absolute liquidity ratio, etc.;
– operational performance indicators (business activity and profitability):
  – average weight of revenues in total GDP;
  – innovative activity index;
  – investment demands coverage index;
  – asset turnover ratio;
  – equity capital turnover ratio;
  – sustainable economic growth rate;
  – production profitability;
  – return on equity; and
  – other indicators of business activity and profitability.

The range of financial risk indicators is rather extensive and diverse. To obtain an integral value out of the variety of data, one needs to pick indicators that are consistent with the two key requirements:

1) the indicators need to be independent from each other; and
2) the indicators need to be 'unidirectional': positive change in each indicator is characterized by the increase (or decrease) of its value.

Therefore, we will build the integral value of financial risks of the railway sector (Kfr) as a geometrical mean of:

– equity ratio (equity-to-assets ratio) – $K_{f.1}$;
– current liquidity ratio – $K_{f.2}$;
– investment demands coverage index – $K_{f.3}$;
– asset turnover ratio – $K_{f.4}$;
– return on equity – $K_{f.5}$;
– innovative activity index – $K_{f.6}$:

$$Kfr = \sqrt[6]{K_{f.1} \cdot K_{f.2} \cdot K_{f.3} \cdot K_{f.4} \cdot K_{f.5} \cdot K_{f.6}} \,. \quad (1)$$

The economic component is related primarily with efficient production index and availability of production facilities comprising the material and technical resources required for the production process – carriage, such as:

– operating performance ratios:
– output indices movement and total revenues earned by the railways;
– capacity utilization rate;
– efficient operation of the rolling stock;
– return on assets (capital output ratio);
– capital-labor ratio;
– material intensity of carriage;
– property status of the enterprise;
– share of fixed assets in corporate capital;
– share of the active fixed assets;
– fixed assets depreciation and operability ratios;
– fixed assets renovation indices (renewal, acquisitions and disposals).

Social component is based on the indicators of social environment of development, such as:

– personnel structure (age, skills, qualification, etc.);
– labor intensity of product (carriage);
– productivity of labor;
– personnel turnover (hiring, dismissals, fluctuation);
– ratio of productivity and average salary growth rates;
– average salary in the sector and in the entire economy.

Terms of selection of indicators for characterization of social and economic risks remain the same, so the integral value (Kc-e) should be estimated on the basis of:

– ratio of the railways revenues and overall GDP growth rates – $K_{c.1}$;
– return on assets (capital output ratio) – $K_{c.2}$;
– fixed assets suitability index – $K_{c.3}$;

– fixed assets replacement ratio – $K_{c.4}$;
– productivity of labor – $K_{e.1}$;
– average salary in the sector and in the entire economy – $K_{e.2}$:

$$Kc-e=\sqrt[6]{K_{c.1}\cdot K_{c.2}\cdot K_{c.3}\cdot K_{c.4}\cdot K_{e.1}\cdot K_{e.2}}\,. \quad (2)$$

According to the summary of estimates, both components – financial and social and economic – have the same weight:

$$Ki=\sqrt{Kfr\cdot Kc-e}\,. \quad (3)$$

Continuous monitoring of the estimated risk index will fix the actual level of threats to financial and economic security of the enterprises comprising the railway sector and help monitor the tendencies to changes and identify the factors causing any such changes.

3. Conclusion

Integration of Ukraine into the EU railway system requires profound changes on every level and in every structure of Ukrzaliznytsia. According to the study of the existing threats to financial and economic security of the railway sector, the ongoing reformation does not contribute to the competitive capacity of the sector so far. Financial and economic security shall be based on proper protection of corporate interests, sufficient competitive capacity and social security system that would protect the employees from the external and internal threats.
In order to neutralize the threats, Ukrzaliznytsia needs to keep working on its key spheres, including the financial, social and economic, environmental, and managerial components, without regard for the improved performance. In doing so, the company needs to take into account current changes in the parameters of the external and internal environment. Unification of the suggested integrated index would allow assessing the level of financial and economic safety for each structural unit of Ukrzaliznytsia.
Results of the study confirm that monitoring of the existing and potential threats defines the operating and prognostic targets of functioning of the financial and economic security. This will help establish the appropriate mechanisms and tools for the attainment of the said security and, subsequently, enable the budgeting of management process with due account for permissible deviations while establishing the projected values of the relevant indicators.

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