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## DESTRUCTIVE FACTORS OF EFFECTIVE FUNCTIONING OF NATURAL MONOPOLIES (AT THE EXAMPLE OF JSC “UKRZALIZNYTSIA”)

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**Abstract.** *The goal of the article is to identify and systematize the factors that interfere effective operation of natural monopolies. Analysis is made at the example of functioning of the domestic natural monopoly – JSC “Ukrzaliznytsia”. It is an example of emergence of destructive processes within the natural monopoly – deepening of negative internal conflicts in the organizational structure, almost complete depreciation of fixed assets, depletion of material resources, and presence of deep extractive institutions, at the same time, demonstrating negative financial performance for many years.*

*The importance of the study of crisis phenomena within the sectors of the Ukrainian economy, in particular, those the objects of which in monopolized markets are state-owned, led to the choice of the research topic. The paper systematizes the factors that are deepened by the monopolistic structure and do not allow natural monopolies to ensure efficient work within the organization, provide a high level of services to consumers, promote revenues to the state budget and economic growth in general. The performance of JSC “Ukrzaliznytsia” was analyzed through the prism of the disadvantages in the functioning of natural monopolies using statistical and empirical methods.*

**Keywords:** *natural monopoly, railway transport, passenger transportation, freight transportation, paid public goods, extractive institutions.*

**Formulation of the problem.** A natural monopoly is formed due to failure of the market to produce certain goods in a competitive market with the lowest average costs. Natural monopoly is an «economically justified» monopolistic structure, but there are a number of factors that can interfere its effective operation. We systematize it on the example of a situation when the natural monopoly is owned by the state and provides services in the category of paid public goods – this is the functioning of railway transport in Ukraine.

The permanent functioning of the domestic railway network is accompanied by a number of unresolved problems, demonstrating an unsatisfactory level of passenger service, and not providing adequate revenues to the state budget. As the proper operation of infrastructure in the country is extremely important for the balanced development of the economy, the issues

of improving and reorganizing the work of Ukrzaliznytsia have been raised frequently, but it has not been possible to significantly increase the efficiency of its operation.

At the beginning of 2021, the Government of Ukraine again put forward the issue of Ukrzaliznytsia's activities transformation, especially despite the large-scale losses from its operation. Thus, as of today, Ukrzaliznytsia is beginning to change its organizational structure, establish cooperation with foreign investors, but the problems that are deep and prevent a comprehensive restructuring can not be solved without proper institutional changes, and therefore the approach must include comprehensive strategy.

**Analysis of recent research and publications.** The issue of natural monopolies was in the interests of the study of such domestic and foreign scientists as V. Bazylevych, A. Ignatiuk, G. Filyuk, O. Shapurov, O. Savko, V. Wenger, J. Stiglitz, VK Viscuzi, J. M. Vernon, J. E. Harrington. In particular, such researchers as L. Martsenyuk, M. Mishchenko, M. Naumov, O. Matushevych, T. Charkina, N. Panchenko studied the problems of railway transport inefficiency in Ukraine as a natural monopolist. However, the cause of the crisis in the activities of this industry is not in its monopolization, which is economically justified, but in a number of problems that are deeply ingrained and cause losses from the activities of natural monopolies. Therefore, our task is to reveal the foundations of the inefficiency development of natural monopolies in domestic economy on the example of JSC «Ukrzaliznytsia».

**Presentation of the main research material.** When starting research, we should consider the statements of scientists who outline the concept of natural monopoly and the causes of its possible destructive activities.

According to O. Savko, a natural monopoly is an economic entity whose activities are subject to state regulation in connection with the production or provision of socially important goods and services in conditions of undesirable competition or its absence [18, c. 161].

Under natural monopoly W. Wenger understands the market infrastructure, which at the current level of scientific and technological progress provides specific services using network organization of production, is characterized by high fixed costs, therefore, there is a need to concentrate production on one manufacturer [5, c. 5].

V. Bazylevych and G. Filyuk believe that the natural monopoly in its socio-economic content and features of functioning is incomparably more complex phenomenon than other types of monopolies [4, c. 11].

J. Stiglitz argues that the natural monopoly is the most important supplier of public goods and proves the failure of competition in such industries [19, c. 120].

The Law of Ukraine provides the following definition of a natural monopoly – «a state of the commodity market in which the satisfaction of demand in this market is more effective in the absence of competition due to technological features of production and goods (services) produced by natural monopolies can not be replaced in consumption by other goods (services)». The list of areas of natural monopolies activity in Ukraine includes the railway industry, in particular, through the «use of railways, dispatching services, stations and other infrastructure facilities that provide the movement of public rail transport» [1].

Thus, a natural monopoly is a special structure in the industry market, which for a number of objective reasons explains its monopoly profit through the production of a unique product with the highest efficiency.

O. Lemenov, lawyer, Chairman of the Board of StateWatch and B. Prokhorov, economist of the Center for Economic Strategy identify the following main causes of unprofitable state monopolies: scattered responsibility, corruption, political appointments, lack of incentives for development, lack of compensation for social obligations [23].

O. Savko attributes the negative consequences of the functioning of natural monopolies: inefficient economic activity, lack of incentives for innovation, irrational staff structure, low quality of services provided, lack of interest in finding new consumers, because they are forced to use the goods or services of these enterprises and do not always receive proper and quality service [18, с. 162].

Focusing our attention on the activity of railway transport of Ukraine, we will consider specific adverse trends in its functioning. In particular, N. Panchenko highlights the following: rising tariffs and non-transparency of pricing, frequent changes of leadership and strict management style, low level of interaction with the business environment, low quality of transport and logistics services, low social standards and social protection, unsatisfactory participation in programs development of the country, technical and technological backwardness, weak information openness of the industry, corruption and clannishness, deterioration of the financial and economic situation, etc [16].

According to the Law of Ukraine, a natural monopoly entity is an economic entity of any form of ownership that produces or sells goods on the market that is in a state of natural monopoly [1]. To confirm that the subject of our study was chosen as a subject of natural monopoly, which is the Joint Stock Company «Ukrainian Railways», we turn to the Legislation and regulations.

As stated in Article 5 of the Law of Ukraine «On Natural Monopolies», one of the areas of regulation of natural monopolies is the use of railways, dispatching services, stations and other infrastructure facilities that provide the movement of public rail transport. Related markets regulated in accordance with Article 6 of this Law include: domestic and international transportation of passengers and goods by rail, air, river and sea.

It should be noted that a related market is considered to be a commodity market that is not in a state of natural monopoly, but for whose entities the sale of manufactured goods or use of goods of other economic entities is impossible without direct use of goods produced or sold by natural monopolies [1].

The Charter of the Joint-Stock Company «Ukrainian Railways» provides a list of all its activities, numbering 121st position, most of it belong to related markets of natural monopoly [2]. While several of these activities of the Company are included in the Consolidated List of Natural Monopolies, published by the Antimonopoly Committee of Ukraine, in particular, concerning:

- services for the use of railway tracks, dispatching services, stations and other infrastructure facilities that provide the movement of public railway transport management of dispatching services;
- distribution of electric energy;
- centralized water supply and centralized drainage;
- transportation of thermal energy by main and local (distribution) heating networks [8].

Focusing our attention on the activities of railway transport in Ukraine, let's consider specific adverse trends in its functioning, according to other researchers. V. Matvienko singles out the following negative factors that influenced the problems of the natural monopoly of JSC «Ukrzaliznytsia»: progressive aging of fixed assets, lack of state support for innovative development of the industry and imperfect legal framework for attracting investment, low tariffs for passenger transportation and lack of effective mechanisms for compensation of losses in the provision of public services, which leads to cross-subsidization of unprofitable passenger traffic at the expense of freight, outpacing the growth of prices for products consumed by rail, compared with the rate of change in tariffs for transportation [13].

Historically, the territory of Ukraine was located at the intersection of important trade routes from Asia to Europe, due to its advantageous location in central Eastern Europe. Our state still has a huge transit potential, which belongs to the acquired types of resources. However, due to the unsuccessful organizational structure, destructive institutions that are the result of the market monopolization (as the activities of the most powerful in terms of freight and passenger traffic – rail transport are show) loses ample opportunities for its use.

As part of the USSR, Ukraine had one of the longest railway networks among the republics and modernized equipment, as the leadership was interested in increasing freight turnover to export resources from our territory – agricultural products from the South-West region, industrial products – from Donbass and Kryvyi Rih. Therefore, after the declaration of independence, Ukraine was left with a developed and extensive network of railways equipped with numerous modernized locomotive depots at that time. The Cabinet of Ministers of Ukraine decided to establish the State Administration of Railway Transport of Ukraine (Ukrzaliznytsia) to manage railway transport. However, even after 30 years of Ukraine's independence, it has not been possible to establish effective and profitable activities of this structure, which would ensure consumer comfort, a rational transportation system for entrepreneurs and revenues to the state budget.

On June 25, 2014, in accordance with the Law of Ukraine «On Peculiarities of Establishment of a Public Railway Transport Joint-Stock Company» and the Resolution of the Cabinet of Ministers of Ukraine, the Ukrainian Railways Joint-Stock Company was established as a national railway carrier of goods and passengers. The entity did not change its ownership and 100% of the Company's shares remained in state ownership, on the basis of Ukrzaliznytsia, together with all enterprises, institutions and organizations of public railway transport, which were reorganized by merger.

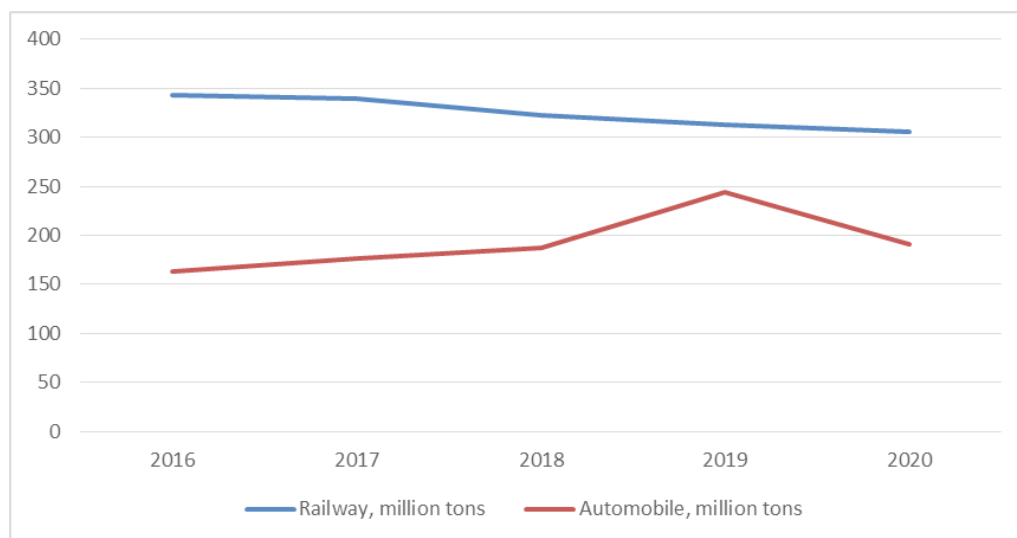
As we can see from Table 1, rail transport is the undisputed leader in the field of freight transport, occupying half of the total market in the last 5 years. In Figure 1, we see a significant lag between rail and road freight volumes, despite significant depreciation on locomotives and tanks. This can also be explained by the fact that, according to M. Naumov, there is not only a monopoly but also a monopsony in the field of railway transportation, as 38% of freight traffic in Ukraine is formed by only two companies – SCM and Ferrexpo. According to the researcher, 52% of cargo is transportation of the mining and metallurgical complex, whose representatives have the opportunity and incentives to coordinate their behavior in cooperation with Ukrzaliznytsia. After analyzing the reporting, the scientist concludes that

the 5 largest customers of JSC «Ukrzaliznytsia» provide 52% of its revenue, but do not generate net profit [14].

Table 1 [7]

**Dynamics of shares in the freight market by type of transport for 2016–2020 (Ukraine)**

		2016	2017	2018	2019	2020
<b>Railway</b>	Volumes, million tons	343,4	339,5	322,3	312,9	305,5
	Market share	55,4 %	53,3 %	51,6 %	46,2 %	50,9 %
<b>Automobile</b>	Volumes, million tons	162,8	176,4	187,2	244,2	191,4
	Market share	26,1 %	27,7 %	30 %	36,1 %	31,9 %
<b>Water</b>	Volumes, million tons	6,6	5,8	5,6	6,1	5,6
	Market share	1 %	0,9 %	0,9 %	0,9 %	0,9 %
<b>Air</b>	Volumes, million tons	0,1	0,1	0,1	0,1	0,1
	Market share	0,01 %	0,01 %	0,01 %	0,01 %	0,02%
<b>Pipeline</b>	Volumes, million tons	106,7	114,8	109,4	112,7	97,5
	Market share	17,2 %	18 %	17,5 %	16,7 %	16,2 %
<b>Total</b>	Volumes, million tons	619,6	636,6	624,6	676,0	600,1



**Fig. 1. Dynamics of shares in the freight market for rail and road transport for 2016–2020 (Ukraine)**

Analyzing the dynamics of shares in the passenger transport market (Table 2), we observe almost the same volume of services by rail and automobile, in addition, over the past 4 years, road transport is the leader in passenger traffic in Ukraine. There is also a tendency to take the «second place» of air transport, which allows us to draw conclusions about the unsatisfactory provision of services to passengers during railway transport, which does not compensate for even the lower cost. Significant wear, lack of new rolling stock procurement and unsatisfactory level of logistics leads to the decommissioning of railcar rolling stock sections, which negatively affects the level of passenger comfort. Thus, the passenger, who is willing to pay the full cost of travel, is looking for an alternative and switches to a more convenient mode of transport.

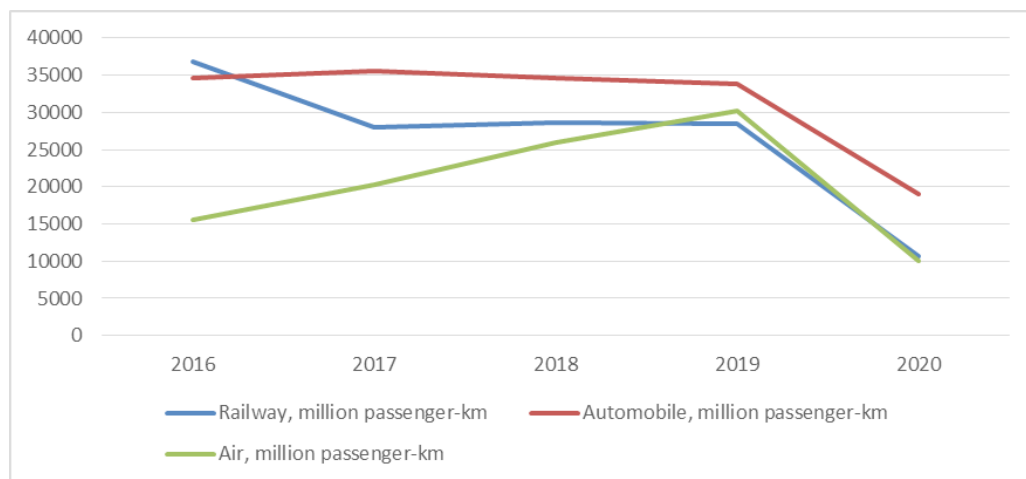
Table 2 [7]

**Dynamics of shares in the market of passenger transportation  
by types of transport for 2016–2020 (Ukraine)**

		2016	2017	2018	2019	2020
<b>Railway</b>	Volumes, million passenger-km	36839,2	28075,0	28685,2	28413,5	10696,2
	Market share	36 %	28,2 %	27,5 %	26,5 %	21,8 %
<b>Automobile</b>	Volumes, million passenger-km	34555,3	35509,1	34560,3	33879,9	19092,2
	Market share	33,8 %	35,7 %	33 %	31,6 %	38,9 %
<b>Water</b>	Volumes, million passenger-km	30,4	30,3	27,6	25,8	4,0
	Market share	0,03 %	0,03 %	0,026 %	0,024 %	0,008 %
<b>Air</b>	Volumes, million passenger-km	15532,6	20346,0	25889,3	30241,8	10106,9
	Market share	15,2 %	20,5 %	25,8 %	28,2 %	20,6 %
<b>Tram</b>	Volumes, million passenger-km	3994,8	3923,5	3925,4	3729,2	2541,0
	Market share	3,9 %	3,9 %	3,7 %	3,5 %	5,2 %
<b>Trolleybus</b>	Volumes, million passenger-km	5896,5	6017,4	5804,8	5407,0	3452,9
	Market share	5,8 %	6 %	5,6 %	5 %	7 %
<b>Metropolitan</b>	Volumes, million passenger-km	5350,5	5507,3	5553,4	5477,8	3141,6
	Market share	5,2 %	5,5 %	5,3 %	5,1 %	6,4 %
<i>Total</i>	Volumes, million passenger-km	102199,3	99408,6	104446,0	107175,0	49034,8

In our opinion, we can identify the following main problems in the activities of JSC «Ukrzaliznytsia», which do not allow it to properly perform its functions and lead to losses and loss of the first place in the industry:

1. Poorly organized management structure.
2. Lack of capital investment.
3. Extractive institutions of functioning.



**Fig. 2. Dynamics of shares in the freight market for rail, road and rail transport for 2016–2020 (Ukraine)**

Today, the management structure of JSC «Ukrzaliznytsia» includes:

I. Supreme unit of management – functions are performed by the Cabinet of Ministers of Ukraine alone.

II. The supervisory board – is a collegial body of seven members, most of whom are independent directors and a minority are state representatives. The primary function of the board is to protect the rights of the Company's shareholders.

III. The Board – is a collegial executive body of the Company, which manages its current activities. The activity of the board is regulated by the principles of economic expediency and is aimed at making a profit.

IV. The apparatus of the board [12].

At the sitting of the parliament on September 9, the Temporary Commission of Inquiry presented a report stating that in which pointed out that the board and the supervisory board do not perform their control function: issues were reviewed on the results of inspections of branches, departments, or officials last year.

TSC made the following recommendations to address these issues: dismissal of the Acting Chairman of the Board, Member of the Board and all Acting members of the board of Ukrzaliznytsia; reducing the number of board members, accelerating the company's structural reform and establishing a National Commission for State Regulation of Transport.

The division of JSC «Ukrzaliznytsia» has been an important issue in reforming the Company's activities for several years now. In particular, the Supervisory Board and the Management Board are proposed to create separate verticals for freight and passenger transportation, infrastructure and repair work. Such «unbundling» will allow to stop cross-subsidization of passenger traffic at the expense of freight, to accumulate the necessary funds for their development, to attract investment and to meet growing demand [15].



During 2020, JSC «Ukrzaliznytsia» invested UAH 794.1 million in procurement, UAH 2.9 million in production, UAH 2,266.8 million in modernization and UAH 1,718.9 million in capital repairs of rolling stock. The total amount of investments in the renewal of the Company's rolling stock in 2020 amounted to UAH 4,782.7 million [12, с. 102].

From the Table 3 we observe that most of the investment goes to the modernization of rail freight transport (in 2018 the cost of freight rail transport was 45 times higher than the cost of production of railway locomotives and rolling stock, and in 2020 this share was – 20).

Table 3 [7]

**Capital investments, UAH million**

	2016	2017	2018	2019	2020
Manufacture of railway locomotives and rolling stock	75 157	156 102	371 545	573 741	214 103
Freight rail transport	11 170 916	6 916 976	16 858 461	10 880 020	4 265 168

The loss is an important factor that hindering the investment and renewal of Ukrzaliznytsia's fixed assets. One of the factors of its formation is the increase in uncovered amounts of compensation for the transportation of privileged categories. In 2020, the actual amount to be compensated by Ukrzaliznytsia amounted to UAH 537.1 million, of which UAH 102.8 million was received, the amount of uncollected compensation amounted to UAH 434.3 million (coverage is 19%). Currently, the debt of budgets to the state monopolist for suburban transportation is UAH 2 billion (table 4).

Table 4 [ 10, 11, 12, 13]

**Compensation for preferential transportation in 2018-2020, UAH million, including VAT**

	2017	2018	2019	2020
The amount of services provided	409,8	389,4	515,7	537,1
Compensation received	72	88,6	112,3	102,8
Indebtedness	337,8	300,8	403,4	434,3

Forecasts for JSC «Ukrzaliznytsia» are unfavorable – it will bring losses to the state in the next 3 years: in the baseline scenario, the company's loss in 2021 should amount to UAH 725 million, in 2022 – UAH 967 million, in 2023 – UAH 2.62 billion, and in 2024 – UAH 724 million. The pessimistic scenario envisages even greater losses of JSC «Ukrzaliznytsia»: in 2021 – UAH 852 million, in 2022 – UAH 1.45 billion, in 2023 – UAH 2.84 billion and in 2024 – UAH 2.95 billion [18].

According to the Budget Code of Ukraine, expenditures on compensation payments for concessional travel of certain categories of citizens belong to the expenditures of local budgets, thereby local authorities must allocate funds for compensation of losses for concessional travel of certain categories of citizens.

Suburban railway transport is the most worn-out asset of «Ukrzaliznytsia». In general, the wear of the car fleet and traction is estimated at about 95%, which were manufactured in the 1970s. The law on rail transport, which should introduce the PSO (Public Service



Obligation) mechanism, which provides for a market model for ordering transport services, under which the state and local authorities pay carriers the cost of socially significant routes, will help to improve the situation.

The management considers the search for funds to renew the company's material fund in three directions:

- Receipt of investment funds from international investors

The partners with which JSC «Ukrzaliznytsia» cooperates are the European Bank for Reconstruction and Development, the European Investment Bank, the World Bank, the International Finance Corporation, and the Global Infrastructure Fund.

Also this summer, the Swiss Confederation Stadler won the tender and have selected for cooperation, in particular, it will not only provide export financing of up to 500 million euros to upgrade the train fleet of Ukrzaliznytsia, but also localize production through the construction of a new plant in Ukraine [22].

- Issue of Eurobonds

The decision has made at a meeting of Ukrzaliznytsia's board in early autumn this year envisages the start of work on attracting foreign borrowings from the international capital market by issuing additional bonds of at least \$ 200 million for the needs of «Ukrzaliznytsia». The funds raised will be used to service debt obligations and to replenish the company's working capital [20].

- Sale of non-core assets

According to JSC «Ukrzaliznytsia», they have started measures to start privatization, and by the end of the year it is planned to sell the Company's non-core assets for UAH 500 million. So far, most of the objects ready for sale are old buildings that are not suitable for use, but the land on which it is located is of interest to developers [6].

Along with the fact that Ukraine is increasingly proposing the partial privatization of JSC «Ukrzaliznytsia», the experience of one of the most successful railways in the world – the Swiss, shows that rail transport, being 100% state-owned, can provide profitable activities, subject to the state invests a significant amount of investment in its modernization and development. However, if the earmarked funds do not come in full and are not spent on planned modernization, but «disappear» due to corruption and lobbying, then we have reason to consider the activities of this industry within the framework of extractive institutions.

The Report of the State Audit Service on the audit of JSC «Ukrzaliznytsia» for 2017–2020 reveals financial violations, external and internal risks in the total amount of UAH 61.4 billion. It includes financial violations that led to the loss of financial and material resources in the amount of UAH 1.3 billion; risky operations that led to a loss of income or extra expenses in the amount of UAH 29.9 billion; violations in the field of procurement – UAH 21.5 billion, other violations and shortcomings – UAH 7.2 billion.

For example, in 2018, Ukrzaliznytsia had to purchase freight cars worth \$ 150 million, received on a loan from the European Bank for Reconstruction and Development. The project was not completed, Ukrzaliznytsia refused the loan, but paid UAH 75 million for the transaction of this money, incurring useless losses.

Free provision of Ukrzaliznytsia services by contractors in the amount of UAH 108 million, write-off of UAH 35 million of the company's revenues due to the lack of claim work of UZ lawyers, payment of UAH 113 million of sanctions due to Ukrzaliznytsia's non-compliance with the terms of contracts. The audit report also describes the labor costs of Ukrzaliznytsia board members, namely UAH 63 million. In particular, without concluding the relevant acts of JSC «Ukrzaliznytsia» from corporate cards incurred expenses for the maintenance of individual members of the Supervisory Board in the amount of UAH 15 million [3].

On January 17, 2020, JSC «Ukrzaliznytsia» signed a Memorandum of Partnership with UNIC, the purpose of which is cooperation aimed at promoting the idea of ethical and responsible business conduct, strengthening transparency, combating corruption and abuse.

On October 30, 2020, JSC «Ukrzaliznytsia» and NABU signed a Memorandum of Cooperation and Exchange of Information. Its purpose is to develop cooperation in the field of prevention and counteraction to criminal acts of corruption; other crimes under investigation by NABU; information exchange and information-analytical activities to prevent and detect criminal corruption and other acts related to corruption. After the signing of the Memorandum, joint work with NABU began on specialized anti-corruption trainings for employees of the security vertical, prevention of corruption and procurement of the Company [12].

Also important is the issue of self-awareness of citizens and increased control over fares, especially in suburban transportation. According to the calculations of JSC «Ukrzaliznytsia», solving the problem of «hare travel» will cover more than 50% of current costs.

On the example of JSC «Ukrzaliznytsia» operations were systematized three main factors that prevent natural monopolies to operate effectively under public administration, namely: poorly organized management structure, lack of capital investment, extractive institutions of functioning. Such situations arise when the government, which assumes responsibility for ensuring access to paid public goods, is unable to do so properly due to a number of formal and informal obstacles. The railway is a strategic object for the national economy and should be used as a tool for rational transportation of resources, provision of comfortable services to the population and international cooperation in investment and transit, so reforming its activities is one of the priorities for Ukraine's holistic development.

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## **ДЕСТРУКТИВНІ ЧИННИКИ ЕФЕКТИВНОГО ФУНКЦІОНУВАННЯ ПРИРОДНИХ МОНОПОЛІЙ (НА ПРИКЛАДІ АТ «УКРЗАЛІЗНИЦЯ»)**

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**Анотація.** Мета статті – виокремити та систематизувати чинники, що перешкоджають ефективній діяльності природних монополій. Аналіз проведено на прикладі функціонування вітчизняного природного монополіста – АТ «Укрзалізниця». Вона є зразком виникнення деструктивних процесів всередині природної монополії – поглиблення негативних внутрішніх конфліктів в організаційній структурі, майже повного зношення основних засобів, вичерпання матеріальних фондів та наявність глибинних екстрактивних інститутів, демонструючи від’ємні результати фінансової діяльності впродовж багатьох років.

Важливість дослідження кризових явищ всередині галузей економіки України, зокрема тих, чий об’єкти на монополізованих ринках перебувають у державній власності, зумовила вибір теми дослідження. Систематизовано чинники, що поглиблені монополістичною структурою та не дають змоги природним монополіям забезпечувати ефективну роботу всередині організації, надавати високий рівень послуг споживачам, сприяти надходженням у державний бюджет та зростанню рівня економіки в цілому. Використавши статистичний та емпіричний методи, було проаналізовано показники діяльності АТ «Укрзалізниця» крізь призму недоліків функціонування природних монополій.

**Ключові слова:** природна монополія, залізничний транспорт, пасажирські перевезення, вантажні перевезення, платні громадські блага, екстрактивні інститути.

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