FORMATION OF INDICATORS FOR ASSESSING THE FUNCTIONING EFFICIENCY OF A TRANSPORT HOLDING

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Abstract

The article proposes a new methodological approach to assessing the efficiency of a transport holding activity. The features and sequence of economic assessment of the company's efficiency are considered. The analysis outcomes allow working out a strategy and tactics for the development of both the enterprise and the group, make reasonable management decisions, monitor their implementation, and identify reserves for improving the financial condition of the group. The conducted research shows that the used system of indicators does not allow assessing the economic efficiency of the transport holding activity as a whole, since the integrated approach is preferable. A comprehensive system of private indicators, including indicators of production efficiency, financial and economic efficiency, and financial stability for a full-fledged assessment of the transport holding efficiency is formed due to the specifics of the transport holding functioning and the accounting peculiarities. Since private indicators are of a various nature and can change in different directions, it is proposed to apply an integral indicator calculated by the distance method, which is a feature of the given research in order to form an objective evaluative characteristic. The proposed methodology for assessing the activity efficiency based on the distance method application allows a comprehensive assessment of the company existing efficiency; evaluate dynamic changes in efficiency owing to an integral indicator; identify the most problematic blocks in performance management and work out measures to improve efficiency with respect to precise detailing of problem areas.

Keywords: Transport holding, indicator system, distance method

1. Introduction

The transport holding is one of the most promising areas for the development of economic business units in the context of the growing globalization of the world economy, within the framework of which the unification of world markets is taking place at an accelerated pace. Transport holdings that control the bulk of transport markets play a key role in ensuring international relations.

Transport holdings in Russia are currently in a difficult situation. Unstable traffic volumes caused by a significant decrease in the effective demand of the population and sanctions pressure on the economy, progressive moral and physical aging of the infrastructure and the fleet of vehicles, imperfection of the state regulation system and a number of other factors have led to the fact that the activity results of a significant part of enterprises decrease. Moreover, resources for maintaining high quality services and investment development have sharply declined. Innovative approaches to managing their efficiency are needed in the current conditions.

It is obvious that a positive change in the quality indicators of the transport holdings' work, a decrease in risks in the issue of providing high-quality transport services can be ensured by introducing a mechanism for a comprehensive assessment of the transport holding efficiency (Korolyova, 2018). A timely assessment and measures aimed at improving efficiency provide the competitiveness of the holding structure, quality control over the implementation of the tasks set by the parent company, search for hidden reserves of subsidiaries and optimization points. The author supports the opinion that today transport industry enterprises and holdings are forced to work under conditions of the inevitable use of information technologies and robotization of business and production processes, which requires a diverse approach to management (Botnaruyk & Klassovskaya, 2020). Therefore, the issues related to assessing the efficiency of its functioning are becoming increasingly important.

2. Problem Statement

The holding effective activity can be carried out only under conditions of optimal use of production resources, minimum costs and maximum profitability of production.

The functioning features of a separate holding structure and special aspects of the transport sector as a whole are regarded in the economic assessment of the activity results of a transport holding (Figure 1).

Most of the traditional methods of economic analysis are applicable to assessing the transport holding efficiency. These are methods for comparing absolute, relative and average values, tabular and graphical methods, and a balance method (Melnik & Pozdeyev, 2020; Voitolovsky et al., 2020; Zhilkina, 2020).

It is recommended to apply both universal efficiency indicators and specific ones for assessing the transport holding efficiency. Universal indicators of the efficiency of transport companies include: sales revenue, income, profitability, labor productivity, capital productivity, financial stability ratios and other indicators. Specific key performance indicators for a transport company can be: cargo turnover, its structure, volume of transhipment, container turnover, etc. (Kiselyova, 2018).
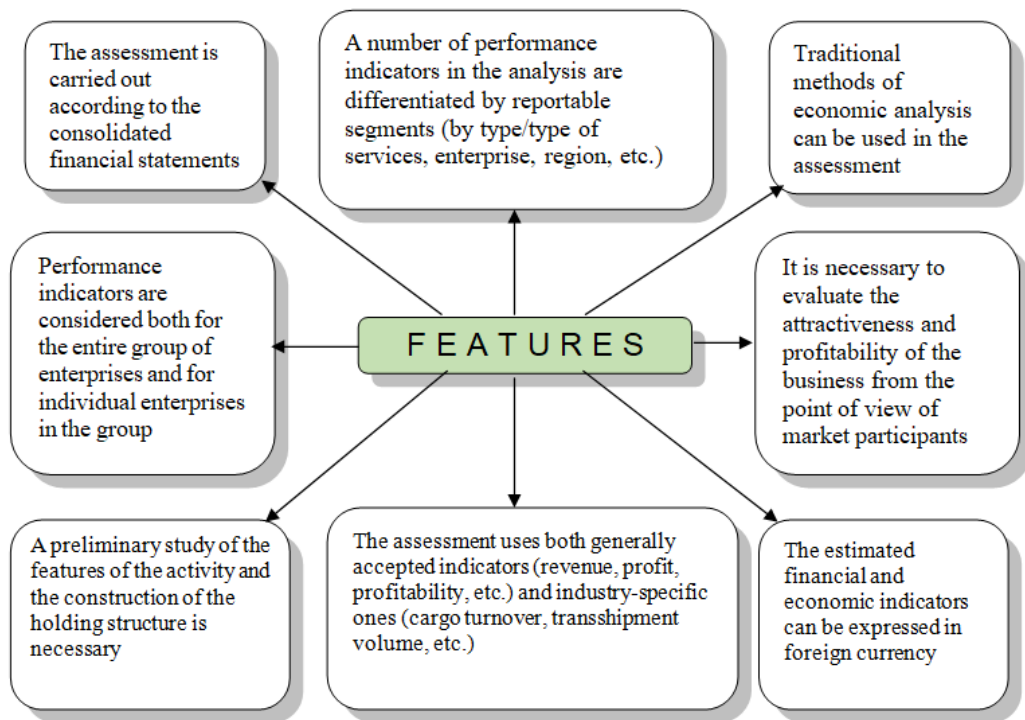
Figure 1. Features of the economic assessment of the efficiency of the transport holding functioning, compiled by the author

Summarizing the analysis of economic literature, the following algorithm for assessing the holding structure in transport is considered (Figure 2).
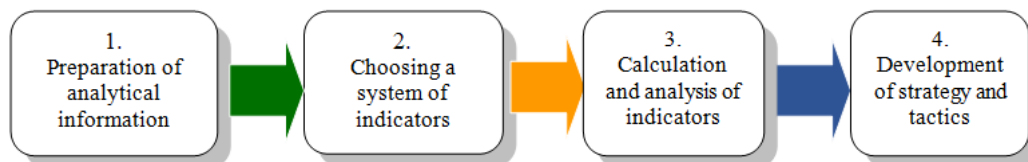

Figure 2. Main stages of the economic assessment of the holding structure efficiency in transport, compiled by the author

Currently, there is no clear unified system that can assess the economic efficiency of a transport holding. The methods proposed by economists do not allow for a comprehensive assessment of its work effectiveness, do not consider the specifics of transport, and, moreover, do not estimate the effectiveness of the holding structure by the consolidated reporting data. The given situation is associated with a number of complexities when conducting an economic assessment of a holding structure in transport. They involve:

- intangible nature of transport products;
- various performance indicators are differentiated by reportable segments (by class/type of service, company, region, etc.);

- estimated financial and economic indicators can be expressed both in rubles and in foreign currency;
- assessment is carried out according to the data of the consolidated financial statements including the indicators of not one enterprise, but several companies, which activity types differ (Cherkasova, 2017; Drutskaya, 2018).
- large amount of disclosed information, as well as its diversity, reflecting the work specifics of individual companies of the group.

In current conditions, an integrated approach to assessing the transport holding efficiency is considered to be preferable. In our opinion, the system of indicators should consider both the features of the holding structure functioning and the special aspects of the economy transport sector, and be based on an integral assessment.

The proposed sequence for a comprehensive assessment of the transport holding efficiency is shown in Figure 03.
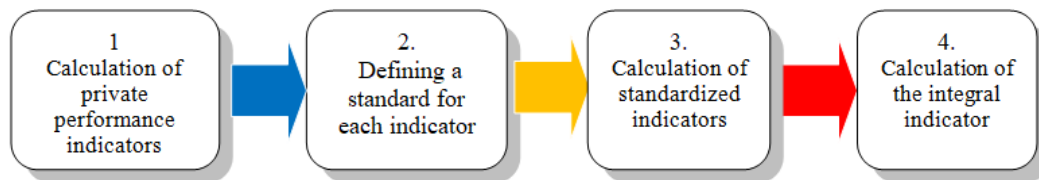

Figure 3. Algorithm for a comprehensive economic assessment of the transport holding efficiency based on an integral indicator

It is advisable to present a system of private indicators by indicators of three groups for a transport holding with regard to the specifics of its functioning and accounting features (Figure 04).

It is required to proceed from qualitative and quantitative indicators when assessing and determining the efficiency of each of the business processes inherent in a particular process.

Thus, the proposed system of comprehensive assessment includes indicators that allow estimating the transport holding efficiency from every angle. Since private indicators are of different nature and can change in various directions, an integral indicator should be applied in order to form an objective evaluative characteristic (Tonkikh et al., 2010).

The integral indicator calculation is carried out by the distance method. The basis of the method is taking into account the proximity of the analysis objects by compared indicators to the reference object (Vasilyeva, 2017). The advantages and disadvantages of the distance method are systematized in the form of Figure 05.

At the initial stage of the assessment, we calculate the private indicators of "NMTP" transport holding efficiency. The calculations are summarized in Table 01.
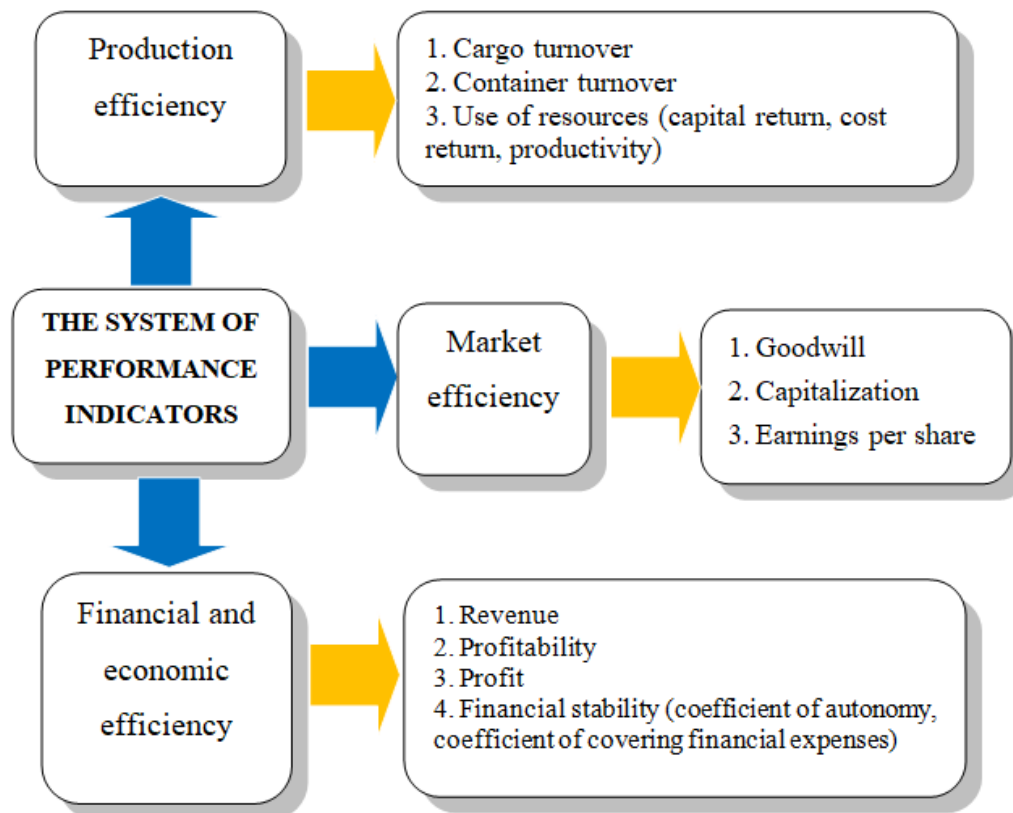
Figure 4. Integrated system formation of private indicators for assessing the transport holding efficiency
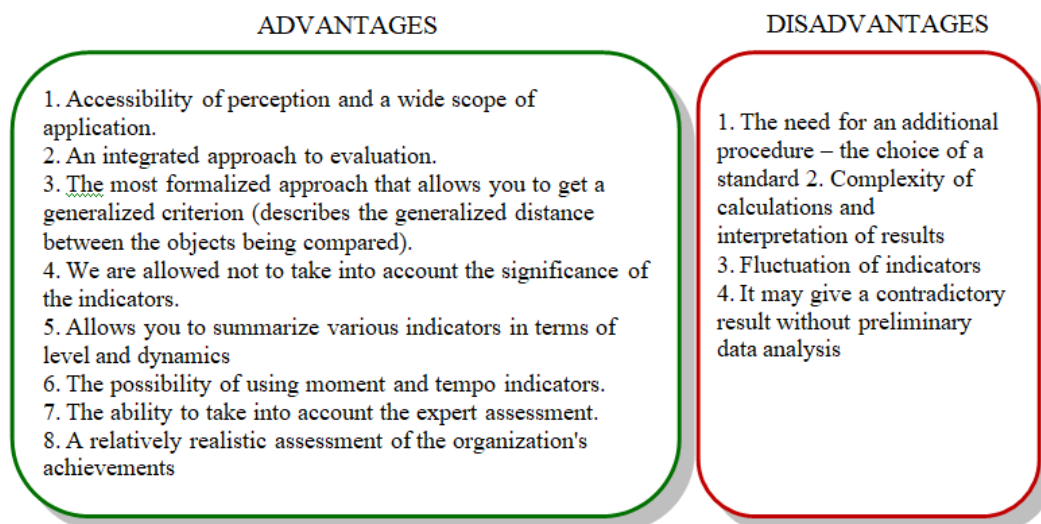
Figure 5. Advantages and disadvantages of the distance method (Vasilyeva, 2017)

Assessing the dynamics of performance indicators of the "NMTP" transport holding in 2018, we note the following positive aspects: an increase in container turnover by 4% compared to 2017, in capital productivity and labor productivity by 6.8% and 10.6%, respectively, and a growth revenue by 13.6%. There are much more problem areas: destabilization of production and financial and economic indicators -

a decrease in transshipment volumes by 2.3%, a drop in revenue by 38.6%, a decline in all indicators of profitability, autonomy and cost recovery ratios without exception, as well as a reduction in cost-return by 4, 5%.

Table 1. Calculation of private indicators of "NMTP" transport holding efficiency for 2017-2019

Indicators	2017	2018	Growth rate, %	2019	Growth rate, %
Production efficiency indicators					
Volume of transhipment, thous. tons	14351 8	14020 9	97,7	14250 1	101,6
Container turnover, thous. TEU	596	620	104,0	638	102,9
Capital productivity, rub.	0,53	0,56	106,8	0,52	92,6
Labor productivity, mln rub/person.	6,84	7,57	110,6	7,42	98,1
Cost-return, rub.	2,71	2,59	95,5	2,80	108,2
Indicators of financial and economic efficiency					
Revenue, mln rub.	52508	59651	113,6	56089	94,0
Net profit, mln rub.	27544	16813	61,0	61017	362,9
Return on sales ROS, %	63,12	61,40	97,3	64,32	104,7
Return on assets ROA, %	21,31	12,15	57,0	32,73	269,4
Return on equity ROE, %	56,74	33,06	58,3	59,67	180,5
Financial autonomy ratio	0,38	0,37	97,8	0,55	149,3
Coverage ratio of fixed financial costs FCC	8,89	5,38	60,5	12,61	234,7
Market performance indicators					
Goodwill, mln rub.	35547	33617	94,6	30779	91,6
Earnings per share, rub.	1,478	0,897	60,7	3,290	366,8
Market capitalization, bln rub.	151,2	131,9	87,2	144,1	109,2

In 2018, market efficiency indicators of the "NMTP" Group have also worsened compared to 2017. Goodwill decreased from 35,547 to 33,617 million rubles, by 5.4%. Since the original goodwill, which the company records as an asset, was 48,101 million rubles, the impairment of goodwill in 2018 increased from 12,554 up to 14,484 million rubles.

An ongoing decrease in goodwill and an increase in the amount of impairment is a signal that the asset value is fallen below the sum the holding has paid for it and deterioration sign of business reputation. Most of the impairment of goodwill means that the "NMTP" Group does not make reasonable investment decisions in relation to physical assets.

Earnings per share have significantly declined - from 1.478 to 0.897 rubles, or by 39.3%, which indicates lower income for shareholders and an unfavorable outlook for stock returns in prospect.

The market capitalization of the "NMTP" Group was computed as the total value of all the company's shares, calculated by current quotations on the Moscow Exchange. In 2018, it decreased by almost 13%, that is, the Group, due to the fall in revenue and earnings per share became less attractive to investors compared to 2017.

In 2019, most of the indicators showed positive dynamics. Basic production indicators and most of the financial and economic indicators, including revenue and profitability, increased, as well as two

indicators of market strength - earnings per share by 3.66 times and market capitalization by 9.2%. The deterioration of dynamic indices was noted for certain private indicators, namely, capital productivity, labor productivity, revenue and goodwill.

We define a standard for every private indicator of efficiency. Then, we designate the standard for every indicator on the condition that the growth trend is a positive phenomenon for each of the indicators under consideration. Therefore, the indicator maximum value for a three-year period is taken as a standard.

For instance, the standard for cargo turnover is the indicator value achieved in 2017 - 143,518 thousand tons; for container turnover - value in 2019 (638 thous. TEU), and etc.

We calculate the standardized indicators according to the following formula (Vasilyeva, 2017):

$$x_{ij} = \frac{a_{ij}}{\max a_{ij}},$$

where a_{ij} – actual values of every indicator; *max a_{ij}* – reference values of every indicator.

One example is the computation of standardized indicators for the first of the private performance indicators - cargo turnover:

max a_{ij} = {143518; 140209; 142501} = 143518 thous. tones

$$x_{11} = \frac{143518}{143518} = 1 \; ; \; x_{12} = \frac{140209}{143518} = 0{,}977 \; ; \; x_{13} = \frac{142501}{143518} = 0{,}993$$

For container turnover, the calculation is as follows:

max a_{ij} = {596; 620; 638} = 638 thous. TEU

$$x_{21} = \frac{596}{638} = 0{,}934 \; ; \; x_{22} = \frac{620}{638} = 0{,}972 \; ; \; x_{23} = \frac{638}{638} = 1$$

Calculation for capital productivity:

max a_{ij} = {0,53; 0,56; 0,52} = 0,56 rub.

$$x_{31} = \frac{0{,}53}{0{,}56} = 0{,}937 \; ; \; x_{32} = \frac{0{,}56}{0{,}56} = 1 \; ; \; x_{33} = \frac{0{,}52}{0{,}56} = 0{,}926$$

Calculations for the rest of the indicators are carried out identically. The calculation results are summarized in Table 2.

Table 2. Calculation of standardized indicators of "NMTP" transport holding efficiency

Indicators	Actual values of indicators			Reference value of the indicator	Standardized indicators		
	2017	2018	2019		2017	2018	2019
Production efficiency indicators							
Volume of transhipment, thous. tons	143518	140209	142501	143518	1,000	0,977	0,993
Container turnover, thous. TEU	596	620	638	638	0,934	0,972	1,000
Capital productivity, rub.	0,53	0,56	0,52	0,563	0,937	1,000	0,926
Labor productivity, mln rub/person.	6,84	7,57	7,42	7,57	0,904	1,000	0,981

Cost-return, rub.	2,71	2,59	2,80	2,80	0,968	0,924	1,000
Indicators of financial and economic efficiency							
Revenue, mln rub.	52508	59651	56089	59651	0,880	1,000	0,940
Net profit, mln rub.	27544	16813	61017	61017	0,451	0,276	1,000
Return on sales ROS, %	63,12	61,40	64,32	64,32	0,981	0,955	1,000
Return on assets ROA, %	21,31	12,15	32,73	32,73	0,651	0,371	1,000
Return on equity ROE, %	56,74	33,06	59,67	59,67	0,951	0,554	1,000
Financial autonomy ratio	0,38	0,37	0,55	0,55	0,685	0,670	1,000
Coverage ratio of fixed financial costs FCC	8,89	5,38	12,61	12,61	0,705	0,426	1,000
Market performance indicators							
Goodwill, mln rub.	35547	33617	30779	35547	1,000	0,946	0,866
Earnings per share, rub.	1,478	0,897	3,29	3,29	0,449	0,273	1,000
Market capitalization, bln rub.	151,2	131,9	144,1	151,2	1,000	0,872	0,953

We calculate the integrated indicators in each of the periods according to the data of the above Table 2:

$$K_{j17} = \sqrt{\begin{array}{c}(1-1)^2 + (1-0,934)^2 + (1-0,937)^2 + (1-0,904)^2 + (1-0,968)^2 + \\ + (1-0,88)^2 + (1-0,451)^2 + (1-0,981)^2 + (1-0,651)^2 + (1-0,951)^2 + \\ + (1-0,685)^2 + (1-0,705)^2 + (1-1)^2 + (1-0,449)^2 + (1-1)^2\end{array}} =$$

$$= 0,974$$

$$K_{j18} = \sqrt{\begin{array}{c}(1-0,977)^2 + (1-0,972)^2 + (1-1)^2 + (1-1)^2 + (1-0,924)^2 + \\ + (1-1)^2 + (1-0,276)^2 + (1-0,955)^2 + (1-0,371)^2 + (1-0,554)^2 + \\ + (1-0,67)^2 + (1-0,426)^2 + (1-0,946)^2 + (1-0,273)^2 + (1-0,872)^2\end{array}} =$$

$$= 1,454$$

$$K_{j19} = \sqrt{\begin{array}{c}(1-0,993)^2 + (1-1)^2 + (1-0,926)^2 + (1-0,981)^2 + (1-1)^2 + \\ + (1-0,94)^2 + (1-1)^2 + (1-1)^2 + (1-1)^2 + (1-1)^2 + \\ + (1-1)^2 + (1-1)^2 + (1-866)^2 + (1-1)^2 + (1-1)^2\end{array}} =$$

$$= 0,172$$

Based on the calculations, the highest rating is in 2019, in which the minimum value of the indicator is reached and the integral indicator is equal to 0.172. The lowest rating is in 2018, where the maximum value of the indicator is equal to 1.454. The indicator for 2017 has an intermediate value and it is worse than in 2019, but better than the result for 2018.

3. Research Questions

The research question is the system formation mechanism of indicators for the economic assessment of the efficiency of a transport holding functioning.

4. Purpose of the Study

The purpose of the paper is improvement of theoretical provisions and methodological approaches to assessing the efficiency of a transport holding functioning in modern conditions.

5. Research Methods

Research methods include methods of economic analysis, systemic, statistical, factorial and situational analysis, graphical and tabular presentation of information, methods of analytical groupings, as well as methods of comparative comprehensive assessment of the enterprise economic activity.

The theoretical and methodological base of the master's study includes scientific works of specialists in the field of assessing the efficiency of economic activity, financial analysis of an enterprise, assessment of consolidated reporting, legislative and regulatory acts controlling transport activity at the federal level, including the Constitution of the Russian Federation, the Civil Code of the Russian Federation, as well as laws and normative acts of the Russian Federation governing the activities of the transport holding; data from the Federal State Statistics Service of Russia, information from the websites of the Ministry of Transport of the Russian Federation, the Association of Sea Trade Ports of the Russian Federation, materials from analytical publications; materials from periodicals, scientific and practical seminars and conferences, articles in scientific journals on the issues under study; external and internal economic reporting of PJSC "NMTP" and its subsidiaries, compiled and summarized by the author.

6. Findings

Based on the calculation, it can be concluded that in 2019 the activities of the "NMTP" Group were the most effective over a three-year period. There was a sharp decrease in the integral indicator computed by the distance method, which means the closest approximation of the period results to the reference values. Indicators of revenue, capital productivity, goodwill, labor productivity were different from the standard. Therefore, it is required to seek for efficiency improvement in the given areas.

The system of measures to improve the transport holding efficiency is as follows (Figure 06).

The most significant event contributing to an increase in the efficiency of the transport holding functioning is the creation of conditions for high-speed processing and storage of highly marginal cargo, namely, coal. Currently, the "NMTP" Group does not have sufficient storage capacity, although the volume of handling operations for this cargo is stable. Moreover, it is indispensable to ensure the technology versatility for transshipment of bulk cargo, including coal, with the possibility of a reverse cycle.
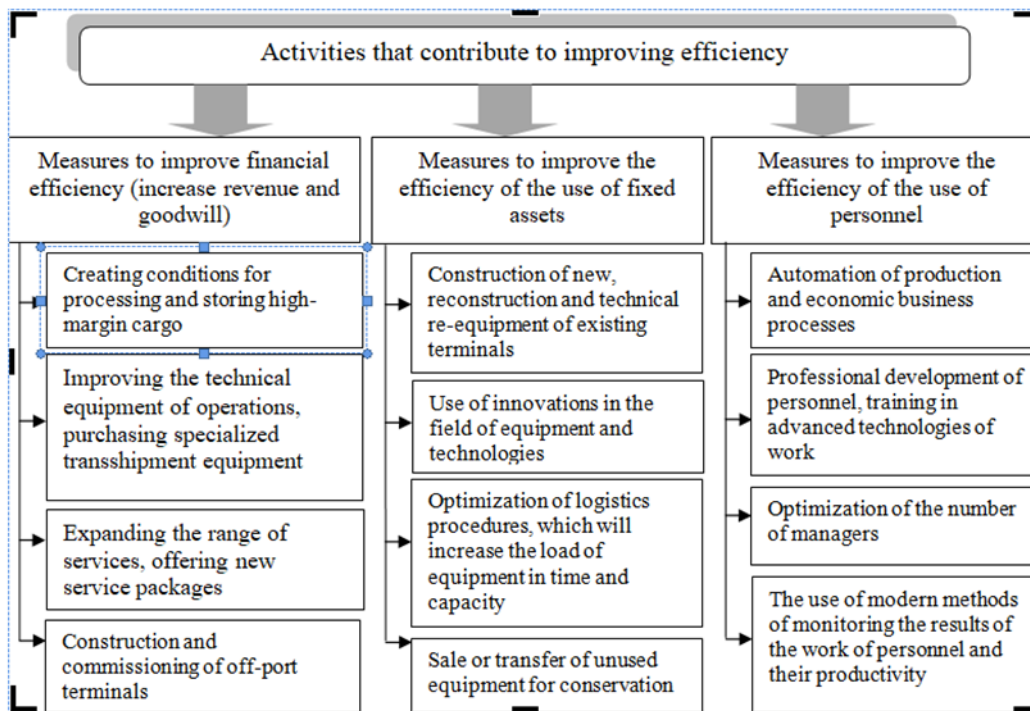
Figure 6. Proposed set of measures to improve the "NMTP" Group efficiency

The improvement of the technical equipment of port operations and the purchase of specialized transshipment equipment should take into account the current needs of the "NMTP" Group. To date, the Group's enterprises are not sufficiently equipped with mechanization equipment to perform such auxiliary operations as inspection of container cargo, their filling and unloading. Therefore, the purchase of small-sized specialized loaders is essential (for example, Meclift M).

The increase in the area capacity can be achieved by applying advanced warehouse equipment that allows enhancing the density of cargo storage, namely, RTG-cranes (rubber tired gantry cranes) and ASC-cranes (automatic stacking crane), for example, by "Kalmar" or "Liebherr" production. The indicated systems make it possible to provide a stacking density of containers of about 1000 cont/ha, while currently the stacking density of containers at the terminals of the "NMTP" Group does not exceed 500 cont/ha.

The construction and commissioning of off-port terminals is required due to the limited territory of PJSC "NMTP" and JSC "NLE": the companies do not have the ability to expand their production areas. The use of off-port terminals will make it possible to carry out long-term storage of cargo, form large vessel parties, and provide a number of ancillary services.

Expanding the range of services, offering new packages of services is the most significant measure aimed at increasing the competitiveness and efficiency of the "NMTP" Group's economic activities. For instance, they may include services in the field of integrated forwarding services: payment of customs duties at the expense of the consignee, engaging independent experts to control the reloading of wagon containers and loaded wagons, sealing wagons, providing locking and sealing devices, drawing up all the necessary set of shipping documents for sending loaded wagons from Novorossiysk station, etc.

Reorganization and optimization of the organizational and functional structure of the "NMTP" Group contributes to the management level optimization: reduction in the number of management levels and the amount of governance, establishment of precise vertical and horizontal communication, ensuring effective communication, correct planning of work, optimal decision-making process, and timely monitoring of results.

The use of innovations in the field of equipment and technologies is a strategically crucial direction for the transport holding development. For instance, the application of innovative platforms for sawn timber with 20 racks, an increased loading length (18.5 meters) and a capacity of 130 to 145 m^3 of sawn timber allows loading 70-90% more finished products compared to standard gondola cars, the capacity of which is about 76 m^3. The design features of such a model provide a reduction in time and costs for loading and unloading, and make it possible to speed up loading and unloading operations by 1.5 times.

Information technology innovations are implemented in various ports around the world:

PortNet system of electronic document management designed to receive applications for a vessel's entry into the port. The operator of the vessel (transport company), within the time interval from 1 month to 24 hours before arrival, submits an application through the system to the port, containing information on the number of containers on board, the order of their location, final destination and the expected date of arrival. The port provides planning of all operations required to service the vessel based on information obtained from vessels;

Internet-oriented tools for customers, which include EZShip (management of slots and orders), GEMS (management of supplying vessels with necessary materials and equipment), EZBill (electronic settlement system between companies involved in the port activities), CargoD2D (management of booking cargo for transport companies), TRAVIS (formation of specialized reporting on the port activities and transport companies), COPLANS (allows transport companies to plan the optimal way to lay containers on the vessel board in advance);

Vessel traffic management and planning system (CIMOS) provides an integrated management of the vessel traffic on the approaches to the port. CIMOS subsystems allow automatic scheduling of tugboats, mooring boats and pilotage. All this information is available online;

Operations Planning System (CITOS), which is used for the automated preparation of plans for the provision of berths and container unloading, as well as the planning of all other significant resources.

7. Conclusion

Thus, the system formation for assessing the transport holding efficiency is an urgent issue from the point of view of determining further development prospects, since a high-quality business assessment creates the required analytical basis for forming conditions towards the effective operation of the group's companies and determining rational measures to increase profitability. It has been proposed to evaluate the transport holding efficiency based on the application of a system of performance indicators, divided into three blocks.

The system application of private indicators and an integral indicator in diagnostics, computed by the distance method, will contribute to making rational decisions when developing strategies for the perspective growth of the transport holding as a whole and individual enterprise of the group.

Moreover, according to the author, it is worth focusing on the need to include indicators of business digitalization in the system of indicators, for example, the level of information technology application (online communications and cloud technologies); e-commerce readiness index (Botnaruyk & Klassovskaya, 2021). This reveals supplementary opportunities for solving the problem of increasing the holding's efficiency and presupposes further research in the given direction.

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