Main Ways to Assess the Effectiveness of Railway Management

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Abstract: **This article is based on a theoretical basis for improving the efficiency of railroad management, developed a five-step algorithm for evaluating the effectiveness of railroad management, and studied the comparative indicators of freight transportation through the Sogd and Angren-Pap routes.**

*Keywords***:** Transport, indicators, management efficiency, performance, labor costs.

I. INTRODUCTION

In the developed economies of the world, the establishment of the railway transport system at the level of all requirements will not only have a multiplier effect on the development of other industries, but will also contribute to the development of industrial enterprises and social sectors. In this regard, the use of modern management methods for international cargo optimization, optimization and operation of the transport infrastructure of the country to international standards, and efficient management of rail transport are important. The economic reforms in the railway sector, the process of restructuring the economic system and changes in the socio-economic situation have radically altered the priorities and methods of governance. Therefore, carrying out a systematic analysis of the management system of the railway transport system, identifying directions for its development and the development of controls in the public interest are among the most pressing issues of the day.

Initially, the concept of "economic efficiency" and "management efficiency" needs to be clarified. Ya.N. Cornaya believes that economic efficiency determines the ratio between economic performance and labor costs. E.G. Yasin determines efficiency not only by economic results, but also by the ratio of total expenditure to achieve it.[1]

L.G. Aganbegyan has his own view of efficiency, he argues that effectiveness is primarily a description of management processes and effects that reflect the level of achievement of the intended goals, and therefore efficiency is purely interrelated.[3]

JV Rudman evaluates "management efficiency" as an economic category that reflects the contribution of management to the end result of management activities, noting that Covrijhnix management efficiency is determined by comparing management results and management resources.

Based on these approaches, the effectiveness of rail transport management is considered as a summary of the overall characteristics of the enterprise's operations, freight and passenger transport, financial and innovative investment activities. Effectiveness of railroad management means that the manager reflects his / her contribution to the development of the enterprise, that is, the effectiveness of management activities. The effectiveness of management is relative, reflected in both quantitative and qualitative indicators, and the basis of the management system consists of the following elements:

Efficiency of resource use system;

The effectiveness of the workflow coordination system;

Effective decision-making system;

Effectiveness of the employee incentive system;

Effective management mechanism (principles and methods of management, functions and concepts of management).[4]

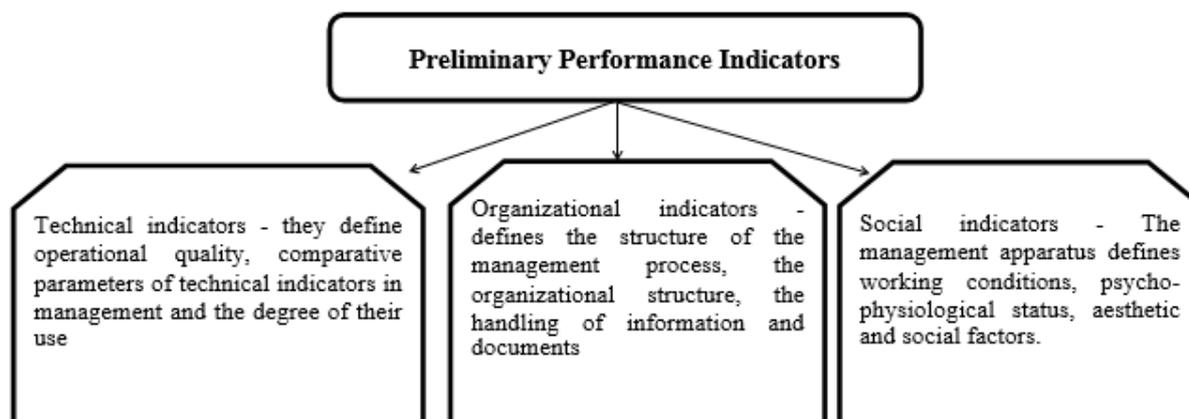Management effectiveness can be classified as follows:

Figure 1. Preliminary Performance Indicators [10]

Traditionally, the effectiveness of management can be evaluated as follows:

annual economic effect (cost savings);

Management costs ratio;

coefficient of managerial staff.

The annual economic effect is determined by the following formula:

$$C = T_N - X_{bn} * E_N \qquad (1)$$

here:

T_N – conditional annual savings;

X_{bn} – one-time costs;

E_N – Normative coefficient of efficiency (the amount opposite to the standard coverage costs).

The effectiveness of control can be calculated using the following formula:

$$C_6 = \frac{\Phi}{X_6} \qquad (2)$$

here:

Φ – profit of the company (profitability of enterprise activity);

X_6 – management costs.

The coefficients of managerial personnel are as follows:

$$К_{6x} = \frac{Б_x}{X_{умумий}} \qquad (3)$$

here:

$Б_x$ – number of management personnel;

$X_{умумий}$ – the total number of employees in the organization.

The cost of management is determined by the ratio of management costs to total costs.

Thus, according to the targeted approach, the effectiveness of rail transport management is characterized by the possibility of achieving the qualitatively and quantitatively tactical and strategic goals of its operation and development.

The proposed railway route to China through Kyrgyzstan was proposed in 1996. The first negotiations on the construction of the station were held in December 1996 in Paris with the participation of representatives of Kyrgyzstan, Uzbekistan and China. The main objective of the project is to create a competitor for the Trans-Siberian highway, the only route that connects the Far East and Europe today.[5]

If this new transport corridor is built, it will be the shortest land route from Asia to Europe. It is 1.5 thousand kilometers shorter than the existing highway through Kazakhstan's Druzhba border crossing, and 4,000 kilometers less than Russian railways. The route envisages the delivery of goods from China's Pacific coast to Europe in 7-10 days instead of weeks or months, as it is today.

The railroad station across Kyrgyzstan crosses Kashgar in China's Xinjiang, Torugart near the border, then through the Barley Valley and the Ferghana Mountains to Uzgen and the border with Uzbekistan. This route connects the western part of China directly with the Fergana Valley, which provides great opportunities for the transit of goods through Europe to Uzbekistan. It will significantly reduce the road to the Caspian Sea and become a viable alternative to the existing rail line across Kazakhstan.[6]

However, the volume of direct transit through the section will depend on the capacity of the China-Uzbekistan railway line crossing the territory of Kyrgyzstan, which is planned to be built. In addition, Angren-Pop has an alternative to the Tajik railroad, such as the Sogd section of the Tajik Railways, to arrange transit of goods from China. Taking into account that the Angren-Pop section passes through the mountain, the freight owners prefer to send their cargo through the Sogd section. This situation negatively affects the transit potential

of the country (Table 1).

Table 1. Comparative indicators of railway freight transportation through Sogd and Angren-Pap [11]

Indicators	Unit of measurement	Information
Sughd section		
The length of the route	Km	110,0
Cargo volume	Tons	1 464 222,0
Cost of transportation	USD / 10 thous. ton-km	424,4
Freight turnover	thousand tons-km	161 064,4
The cost of rail transportation	USD thous.	1 100,1
Angren-Pap		
The length of the route	Km	122,7
Cargo volume	Tons	1 464 222,0
Cost of transportation	USD / 10 thous. ton-km	252,1
Freight turnover	thousand tons-km	179 718,6
The cost of rail transportation	USD	925 249
Difference	USD	**174 851**

According to the data, if the cargo holders prefer to transport 1464222 tons of cargo through the Sogd section, the cost of rail transport will be $ 1,100,100. If such cargo is transported through the Angren-Pop section, transportation costs will be $ 925,249. Cargo owners can save $ 174,851. The economic effect will also be achieved through the transfer of goods from Tajikistan's Sughd section to the local railway line.[7]

One of the first organizations to regulate international freight transportation by rail is the International Union of Railways, established in 1922 in Paris. Currently, more than 60 administrative and territorial railway departments, including Uzbekiston Temir Yollari, are also permanent members of the organization. It is also possible to refer to the International Railway Congress and the International Rail Transport Committee to international railroad organizations, which today unite many members.[8]

Railway transport system development in Uzbekistan has always been a priority. In particular, the Strategy of Action on the five priority directions of development of the Republic of Uzbekistan in 2017-2021, approved by the decree of the President of the Republic of Uzbekistan Sh. In particular, the State Program on implementation of the Strategy in the "Year of Dialogue with the People and Human Interests" provides for the following tasks: [2]

introduction of modern methods of transport communications security, development of infrastructure in this area;

increase of transit and transit potential of the country;

increasing competition among national transport logistics companies, encouraging lowering rates for export companies, expanding car parks, and simplifying loan obtaining for trucks;

rehabilitation of the country's railways, improvement of its condition.

Specific measures have been identified to achieve these objectives, which include:

Construction of the new Bukhara-Miskin railway line;

Electrification of the Karshi-Termez railway line in 2017;

Electrification of the Pop-Namangan-Andijan railway section in 2017-2019;

Purchase of two high-speed passenger trains of Talgo-250;

Renewal of passenger carriages in 2017-2019;

Realization of the project "Construction of a new international passenger terminal of Tashkent airport (Tashkent-4)";

introduction of electronic payment system on public transport;

construction and reconstruction of bus stations (13);

introduction of new bus routes (86);

purchase of modern buses (537).

It is well-known that this Strategy of Action is designed for 5 years and its logical continuation is the development of long-term strategies adopted within each sector of the economy. The long-term transport strategy is reflected in the transport policy pursued by the relevant competent authority.[8]

Taking into account the fact that currently 20 tons of international freight (for example, textile products) are

transported by road in Uzbekistan, the average cost is $ 1.75, and the average cost is $ 5.15 for 1 km (60.2 tons).), The total annual costs of automobile and rail transport for international transportation of textile per 1 km are calculated using the following formula:

For motor transport:

$$T_x aв = \frac{Юx}{20} \times \mathbf{1,75} \qquad (4)$$

here,

$T_x aв$ – Total annual road transport costs per 1 km;

Юx – The volume of international freight transport (textile) in 2017 (512,722 thousand tonnes);

1,75 – 20 The average cost of transporting a ton of textile (textile) per 1 km.

Cost per 1 km of road transport:

$$T_x aв = \frac{Юx}{20} \times 1,75 \ = \ \frac{512\ 722 \ \times 1,75}{20} = 44,86 \ thous. USD$$

For railway transport:

$$T_x тй = \frac{Юx}{60} \times \mathbf{5,15} \qquad (5)$$

here,

$T_x тй$ – Total annual rail transport cost per 1 km;

Юx – International freight (textile) volume of rail freight in 2017 (353,193 thousand tons);

5.15 - Average transportation costs of 1 ton of rail freight of 60 tons.[9]

Annual cost of rail transport for 1 km:

$$T_x тй = \frac{Юx}{60} \times 5,15 \ = \ \frac{353\ 193 \ \times 5,15}{60} = 30,31 \ thous. USD$$

Thus, at the end of 2017, US $ 44,86,000 was spent on road transport and $ 30.31 thousand for railroad export and import of textile products.

Taking into account that the share of transport costs in the cost of export and import goods in the countries of the region is about 20% (up to 35-40% for some types of goods), the reduction of these costs by 50% will reduce the transport costs accordingly. leads to For example, while the cost of transporting 20 tonnes of textile per kilometer is $ 44,86,000 today and $ 30,31,000 on rail, this figure can be seen as a result of regional transport integration, including tariff coordination. will be:

For motor transport:

$$T_x aв = \frac{Юx}{20} \times 0,875 \ = \ \frac{512\ 722 \times 0,875}{20} = 22,43 \ thous. USD$$

For railway:

$$T_x тй = \frac{Юx}{60} \times 2,575 = \frac{353\ 193 \ \times 2,575}{60} = 15,16 \ thous. USD$$

That is, for each km, only for the transport of textile products, international transportation of textile products can save up to $ 22.43 thousand a year and $ 15,16,000 on rail. In addition, a 1% increase in transit traffic would result in an additional $ 20 million in additional revenue, for example, by Uzbekistan's railways. Given the potential for a 15% increase in freight traffic across the region, one can expect a corresponding 15% increase in transit revenues by rail. That would bring in additional $ 300 million in annual revenue.[11]

The five-step algorithm for evaluating the effectiveness of railroad transport management is presented in Figure 2, whose content needs to be adequate to the evaluation object, depending on the complexity and sequence of the functions performed. In turn, the selection of facilities for evaluating the effectiveness of railroad transport management will depend on whom it is intended and for what purpose.

In our opinion, in evaluating the effectiveness of railroad transport management it is advisable to divide the management efficiency indicators into three groups:

Guruhi a group of indicators describing the effectiveness of the management system, expressed in the final results of transport activities and management costs;

Ko'rsatkich Indicators that describe the nature and organization of management activities, including the direct results and costs of management activities. It includes performance characteristics of the controller, such as performance, economy, flexibility, efficiency and reliability;[9]

And a group of indicators describing the rationality of the organizational structure and its technical and organizational level. Structural characteristics include the degree of control system, the degree of centralization of management functions, the accepted norms of control, the balanced distribution of rights and responsibilities.
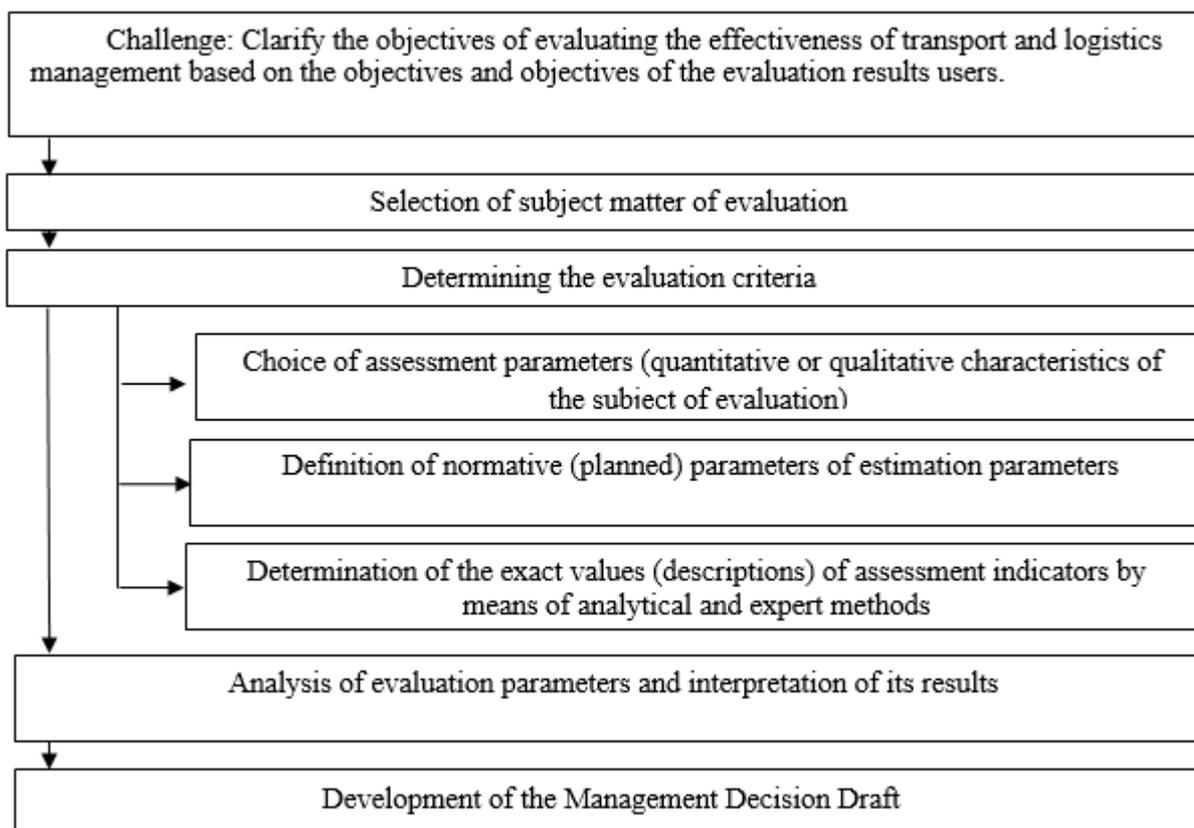
Figure 2. The main stages of evaluating the effectiveness of railway transport management

The systematic approach to management, which is a modern concept of management, involves a whole set of interrelated elements, an overlap of interacting entities, a union of essence and relations, and the consideration of an object as a system. Thus, the use of the concept of a systematic approach to management in evaluating the effectiveness of railroad transport management will help achieve a positive result.[10]

II. CONCLUSIONS AND SUGGESTIONS

In conclusion, the development of a comprehensive strategy for the development of the railroad transport sector is an urgent task today. The development and implementation of this strategy should take into account the joint-stock company "Uzbekiston temir yullari":

creation of the necessary conditions to meet the growing needs of the economy and the population in transport services;

harmonization of the comprehensive strategy for the development of all segments of the railway transport system with the needs of the economy;

Stimulation and effective management of the integration of automobile, rail, air and river transport and logistics centers to improve the quality and efficiency of the transportation system;

integration of databases (customs, tax, statistics, etc.) to ensure the effectiveness of multimodal transportation;

creation of equal conditions for all market participants, promotion of competitive national transport and logistics companies;

implementation of intelligent and innovative transport management systems.

One of the main tasks of transport policy should also be focused on reducing the share of transport in the final commodity cost. To fulfill this task, a government agency will be required to pursue a single transport policy. This is because any business entity values its services and strives to increase their prices. Therefore, it is advisable to coordinate the activities of agencies and companies authorized in the transport sector.

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