

# Improving Methodological Approaches to Assessing the Effectiveness of using Fixed Capital in Railway Transport

Abdulaziz Gulamov, Odil Abdurakhmanov, Said Shjaumarov Tashkent, Uzbekistan

\_\_\_\_\_\*\*\*\_\_\_\_\_\_\*\*\*

**Abstract:** The article discusses the problems of economic valuation of fixed capital, in particular, considers the most important tasks of the renovation process, the problems of creating and putting into operation more advanced models of tools for ensuring stable safety of train traffic, analyzed the qualitative and quantitative indicators of the use of fixed capital, made a conclusion about estimates of fixed assets in railway transport.

**Keywords:** fixed capital (assets), reproduction, railway transport, quantitative and qualitative indicators

# 1. INTRODUCTION

Economic assessment of fixed capital. The indicators of reproduction of fixed capital reflect the pace of scientific and technological progress, characterize the technical condition and movement of fixed assets, and also have a relationship with the indicators of their use.

Fixed capital of railway transport has its own CCA singularity. Firstly, these are longer useful lives than the fixed capital of other sectors of the economy. Secondly, pain shinstvo fixed assets can not be sold. Thirdly, the majority of fixed capital is unique in application, i.e. EC can not use for other purposes in other sectors of the economy of the Republic of Uzbekistan.

According to the results of 201 9, the share of railway transport accounts for slightly less than 10 percent of the fixed capital of all sectors of the economy. The sales volume and expenses of UTY JSC for 9 months of 201 9 amounted to more than 5 trillion. soums and 4.1 trillion sum, respectively. The average degree of reproduction of fixed capital over the past 10 years

amounted to 7-12 percent, but depreciation in some groups, such as buildings and structures, vehicles increased by 3.2 and 1.9 percent, respectively, which indicates the inefficiency of the economic valuation of fixed capital.

In this regard, the most important strategic task and an important problem for the railway company is the need to develop new economic methods for managing fixed assets and economic evaluation of their reproduction, taking into account the specifics of market relations. This leads to the undoubted relevance and need to improve existing methods.

### METHOD

Theoretical and methodological foundations of the study are based on the findings and suggestions of a scientist in the field of reproduction of fixed capital. The methodological basis for solving these problems is the concept of updating the fixed assets of a railway company. In the course of the study, various methods were used: system analysis, economic and statistical analysis, factor analysis, mathematical statistics, described in the works of domestic and foreign scientists.

# **RESULTS AND DISCUSSION**

The need for the embodiment of capital in technical means and systems is determined by their use value. In the most general interpretation, the use value of a thing is defined as its utility, its ability to satisfy needs, its value to the consumer. In economic science, the use value of fixed assets acts as a set of technical and operational properties characterizing the ability of the means of labor to produce the product that society needs (that is, in demand on the market), to save and facilitate labor<sup>1</sup>, as well as the efficient use of

© 2021, IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org | Page 1

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



productive resources. On the one hand, each technical tool, each element of a technical system, each technical system as a whole performs a production function that is determined in time and space, i.e. has a specific use value. On the other hand, even homogeneous technical means and systems can, to varying degrees, save, facilitate labor and increase its productivity, i.e. have different use value.

 $At^2$  it is proposed to determine the duration of fixed capital turnover at the following stages of finding it in the form of:

- ➢ means of labor;
- ➢ work in progress;
- deferred expenses; finished products;
- Money; funds in the calculation of goods, work, services.

Such a detailed analysis reveals the reserves for accelerating fixed capital turnover. Economic efficiency refers to the economic category of the relationship of results to costs.

Evaluation of future costs and results in determining the effectiveness of the reproduction process is carried out within the billing period, the duration of which is taken, taking into account factors such as the duration of operation, the standard life of fixed assets. It is also expected to calculate such important estimated indicators as the discounted amount of net income, internal rate of return, profitability, payback period.

However, not one of these criteria in itself is not an important evaluation indicator in itself for making a decision on investing in reproduction.

The objective functions of investment efficiency, characteristic for calculating the minimum and maximum, can be:

- $\succ$  the maximum of the product;
- minimum production costs;
- > maximum annual profit; maximum performance;
- minimum material -consumption .

The calculations for maximum and minimum for various objective functions selected from the above list may adversely affect decision making.

As a result of the reproduction of fixed assets at the "output" of the production system, an additional output and profit are generated that are caused by investments at the "input" of the system. Thus, we can consider the ratio of "costs - results" in the form of indicators of absolute efficiency:

- > increase in output per investment amount  $\frac{\sum p l_{\Pi p \mu B}}{I_{06 \mu \mu}}$ ;
- $\succ$  increase in profit per one sum of investments  $\frac{\sum P}{L_{\text{norm}}}$ .

In addition to assessing the economic efficiency of the reproduction process of fixed assets of a railway company, it is also necessary to evaluate the effectiveness of the process of managing the reproduction of fixed assets.

Reproduction management of fixed assets in a market economy plays an important role, as it determines their quantitative and qualitative state. Reproduction management of fixed assets is a complex of targeted management actions of subjects on specific management objects that affect the intensity of reproduction, size and structure of fixed assets.

Specific management objects are:

fixed assets;

- process of updating fixed assets;
- the existing system of depreciation of fixed assets in the railway transport;
- methods for assessing and reassessing the value of various elements of fixed assets;
- structure of fixed assets;
- economic assessment of the condition and efficiency of use of fixed assets;
- > assessment of financial and investment resources.

Page 2

© 2021, IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org |

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/

the railway transport [Text] / L.V. Shkurina // Science and technology of transport. - 2011. - No. 3.

<sup>&</sup>lt;sup>2</sup> Vovk, A.A. Measurement and analysis of the effectiveness of the use of fixed assets [Text] / A.A. Vovk. - M.: MIIT, 1995 .-- 104 p. 33. Vovk, A.A. Measurement of profitability [Text] / A.A. Vovk. // Economics of Railways - 1999. - No. 7., Vovk, A.A. The characteristic of the turnover of funds advanced in production [Text] / A.A. Vovk. // Economics of railways. - 1999. - No. 9, A.A Gulamov. The use of econometric models in forecasting the indicator of railway transport. T .: TIIZhT, materials of the international conference. - 2013.- p. 149.



In our opinion, the need to control the reproduction of fixed assets in rail transport is caused by the fact that it is an integral element of the economic process and in this sense (like all other elements) needs to be regulated. The process of managing the reproduction of fixed assets includes achieving strategic and tactical goals.

Management of course affects the results and costs, is the area of application of social labor, which includes requirements for the efficient use of resources. "It is legitimate to assume, according to VV Tomilov, A. S. Robotov, A. A. Zubarev," that more efficient production management leads to an increase in its production.

But such a correspondence may not exist, since production efficiency may depend on many factors that are outside the influence of the control system<sup>3</sup>. "... due to the weak sensitivity of aggregated generalizing indicators of social production to individual changes in the management system. It's difficult to use these indicators to solve the problem of measuring the effectiveness of management systems "[4]. Scientists also acknowledge that management is generally inherent in the uncertainty of cause and effect relationships between a decision and its outcome. This approach is called resource.

It is widely believed that the state of the system should be assessed through indicators characterizing the activity of the managed facility (according to the final results of the operation).

It is widely believed that the state of the system should be assessed through indicators characterizing the activity of the managed facility (according to the final results of the operation).

We share the point of view[5] that, as applied to the reproductive process control system, efficiency assessment should be based on the general methodology for determining the economic efficiency of production and at the same time take into account the specifics of the functioning of this system.

Achieving a high level of functioning of a railway company in a market environment requires the introduction of a mechanism for the effective management fixed assets reproduction of processes. Effective management of the process of updating the fixed assets of a railway company is reduced to the continuous measurement and calculation of a system of interrelated indicators, analysis of the compliance of indicators with formatted goals and the adoption of appropriate corrective actions to optimize the functioning of production processes (services). The system of indicators of the effectiveness of the process of managing the reproduction of fixed assets can be represented as follows (Fig. 1).



#### Fig. 1. Recommended system of indicators of economic efficiency by the reproduction process of fixed assets of a railway company

The main purpose of the system of indicators of economic efficiency by the reproduction process of fixed assets of a railway company is to identify the possibility of managing the process of reproduction of fixed assets that are in the company, to provide an immediate reaction of an economic entity to external "challenges". Indicators of economic efficiency by the reproduction process of fixed assets are necessary to identify weaknesses in the economic and technical processes of the enterprise and the reasons that caused these weaknesses. The recommended system of economic efficiency by the reproduction process of

<sup>&</sup>lt;sup>3</sup> Tomilov V.V., Robotov A.S., Zubarev A.A. Marketing decisions in the activities of construction enterprises. - SPb .: Publishing house of SPbSUEF, 1997. - 159 p.

<sup>© 2021,</sup> IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org Page 3 Т

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



fixed assets of a railway company is a model that covers all divisions and processes in the company and takes them into account the strategic goals of the company, such as increasing capitalization, increasing profits and reduced output per unit of invested funds.

The proposed approaches should be presented in an economic-mathematical model for optimizing the reproduction of fixed assets of a railway company. The adequacy of economic and mathematical modeling to the real economic process is manifested, first of all, in the ability of such models to best take into account the probabilistic nature of the object under study and to predict with a high degree of reliability the nature of its development and the prospective period. Not one of the criteria for the effectiveness of the investment process in itself is not sufficient to make a decision on the implementation of a particular type of reproduction. All this determines the necessity and expediency of the formulation and solution of multicriteria problems (vector optimization problems).

Assuming that every investment decision

 $x \in M(1)$ 

characterized by scalar values (as a result of some generalization and reduction) of the result

 $\sum \sum P_j^i \to \max_{x \in M_{\mathcal{X}}}, \sum \sum pl_{\pi p \mu_B_j}^i \to \max_{x \in M_{\mathcal{X}}}(2)$ 

and investment costs

 $I_{\text{общ}} \to \min_{x \in M_x} (3)$ 

then we can single out the following concept for choosing the best options . (4)

 $\bar{x} \in M_{x}.(4)$ 

It should be noted that in the case of vectorial values of the result and costs, this approach also remains valid.

The concept of optimality. The solution  $\bar{x} \in M_x$  is optimal if:

 $\bar{x} = \arg \operatorname{extr}_{x \in M_{\mathcal{X}}} F(x), (5)$ 

where F(x) – is a certain function that determines the interaction of the result and costs

$$(\frac{\sum_{i=1}^{m}\sum_{j=1}^{n}p_{i}^{l}p_{i}p_{i}}{\sum_{j=1}^{n}I_{j}},\frac{\sum_{i=1}^{m}\sum_{j=1}^{n}p_{j}^{i}}{\sum_{j=1}^{n}I_{j}}),(6)$$

where j- is the number of the investment project ( $x, j \in [1;n]$ );

*i–is the number of the* factor of production, *i* $\in$ .

In the case of non-uniqueness of the solution  $\bar{x} \in M_x$  as the best solution, any decision can be made  $\bar{x}$  based on the specification of an additional optimality criterion or the result of random selection..

In general terms, the task of assessing the technical level of production and substantiating possible ways to increase it is mathematically formulated as follows::

it is required to find analytical expressions of the dependencies of general indicators of production efficiency on the technical level of production, determined by the magnitude and dynamics of the following factors:

-net cash flow, capital-labor ratio and labor productivity, that is, you need to find the functions:

$$F^{\text{H},\text{III}} = f(z_1, z_2, z_3, \dots, z_n);(7)$$
  
$$F^{\Phi} = f(z_1, z_2, z_3, \dots, z_n);(8)$$

 $F^{\Pi T} = f(z_1, z_2, z_3, \dots, z_n) (9)$ 

where  $F^{4}$ ,  $F^{\Phi}$ ,  $F^{\Pi T}$  - function expressing the efficiency of production (net cash flow, capital-labor ratio, labor productivity);;

 $z_n-factors \ affecting \ production \ efficiency;$ 

 $z_1$  – input ratio of fixed assets;

 $z_2$  – the coefficient of disposal of fixed assets;

- $z_3$  wear coefficient fixed assets;
- $z_4$  the average annual growth of fixed assets;
- z<sub>5</sub> capital ratio of one working railway company;

 $z_6$  – depreciation capacity of the railway company.

The ultimate goal of the developed optimal program for managing the reproduction of fixed assets of a

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



 $\frac{\sum_{i=1}^{m} \sum_{j=1}^{n} pl_{\text{hpub}_j}^i}{\sum_{i=1}^{n} l_j} \to \max_{x \in M_x}(10)$ 

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140 | p-ISSN: 2615-7071 Volume: 03 Issue: 10 |Oct 2021

railway company is to select reproduction objects, that is, to optimize the program using economic and mathematical methods:

$$M_{x} = \begin{cases} F_{j}^{\mathsf{Y}\mathcal{A}\Pi} \geq F_{\Phi^{\mathsf{A}\mathsf{K}\mathsf{T}}}^{\mathsf{Y}\mathcal{A}\Pi} \\ F_{j}^{\Phi} \geq F_{\Phi^{\mathsf{A}\mathsf{K}\mathsf{T}}}^{\Phi} \\ F_{j}^{\Pi\mathsf{T}} \geq F_{\Phi^{\mathsf{A}\mathsf{K}\mathsf{T}}}^{\Pi\mathsf{T}} \end{cases} (11)$$

We propose an iterative procedure for selecting projects based on this model (Table 1)

Page 5

# Table 1Stages of program optimization using economic-mathematical methods4

No.	Title	Content	
1	The first stage is optimization	Reproduction of fixed assets of a railway company according	
		to one of the previously defined limitations of the optimality	
		model - the net discounted flow.	
2	The second stage is the program	Reproduction of fixed assets of the railway company, which	
		meets another limitation of the optimality model - the	
		maximum capital-labor ratio and labor productivity	
3	The third stage in the formation of	The reproduction of the fixed assets of the railway company is	
	the optimal program	associated with the projects of the same name $x_j$ , that is,	
		projects that are present simultaneously as a result of solving	
		both local problems - maximizing net cash flow, capital	
		productivity and labor productivity.	

Projects of the same name form an optimized program for the reproduction of fixed assets of the first level. Further refinement is made according to the criterion of maximizing the additional work presented in comparison with the investments spent in the railway company. In general, the procedure for the formation of an optimal program for the reproduction of fixed assets of a railway company is presented below in Fig. 2.

The resulting economic and mathematical model according to the proposed criteria will allow us to create the optimal program for the reproduction of fixed assets of the railway company, the use of which will make it possible to increase the efficiency of the company by increasing the technical level of the services provided and determining the reserves of the company.

When developing an investment policy and strategy for the reproduction of fixed assets, it is necessary to determine the measure of the influence of factors on the reproduction rates of fixed assets of a railway company.

In our opinion, it is advisable to solve the problem by developing a correlation and regression model, on the basis of which the main factors and the degree of their influence on the intensity of reproduction of fixed assets are established, and the amount of investment required for the reproduction process of the fixed assets of the company is determined.

For a quantitative analysis of factors affecting reproductive processes, it is necessary to highlight their characteristic defining indicators to be calculated. The study identified four key indicators that determine the rate of renewal of fixed assets and compiled a linear model of the dependence of the rate of renewal of fixed assets on investment. The regression equation has the form:

 $K_{\text{BB}} = 2,877 - 1,198 * X_1 + 2,127 * X_2 + 5,961 * X_3 - 0,863 * X_4,$ 

<sup>&</sup>lt;sup>4</sup> Compiled by the author on the basis of the studied literature

<sup>© 2021,</sup> IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



wherein,  $X_{I}$ - invested profit per one thousand priv.t -km. Sum;

 $X_2$ - depreciation invested per 1 thousand priv . t-km, sum;;

 $X_{3}$ - attracted funds invested per 1,000 priv . t-km, sum;

 $X_4$ - invested borrowed funds per 1,000 priv . t-km, sum.

The multiple correlation coefficient between the rate of renewal of fixed assets and the above factors was R=0,84.

A high level of the multiple correlation coefficient shows that the correlation between the studied factors is close. The determination coefficient D = 0.71 shows that the rate of renewal of fixed assets by 71% depends on the variation of factors included in this model. Since the actual value of the *F* - Fisher test with  $\alpha = 0.05$  exceeds the table

 $(F_{\phi a \kappa m} = 22,78 > F_{ma \delta n} = 2,45 \times 10^{-9}),$ 

then the equation is statistically significant and can be used as an objective function.

The regression coefficients are also significant, since the actual value of t – Student's t -test of each of them exceeds the tabular indicator (table 2).

 Table 2

 Determination of significance and boundaries of confidence intervals of regression coefficients<sup>5</sup>

Factors	Regression	Standard	t - student	The bound	laries of the
	coefficients	error	criterion	coefficient	S
				Lower	Тор
Y intersection	0	-	-	-	-
Invested profit in the calculation of 1	-1.198	0.573	2.0911	-2,3603	-0.0361
thousand priv.t- km, sum					
Depreciation invested per	2,127	0.681	3.1220	0.7454	3,5096
1,000 pref . t-km, sum					
Invested borrowed funds per 1	5,961	1,949	3.0583	2,0082	9.9150
thousand priv km, soum					
Invested borrowed funds per	- 0.863	0.485	2.777	-1.8491	0,1221
1,000 priv . t-km, sum					

Based on the analysis of the parameters of the regression equation, we can conclude that the greatest impact on the rate of renewal of fixed assets of a railway company is exerted by depreciation charges aimed at reproduction of fixed assets, to a lesser extent, the rate of renewal of fixed assets, which depend on the amount of borrowed funds aimed at investment financing. With an increase in depreciation deductions, the reproduction of fixed assets by 1 thousand soums and an increase in the amount of profit aimed at financing reproduction by the same amount of 1 thousand soums per 1 thousand priv- km, the rate of renewal of fixed assets at the railway company increases, respectively, by 1.19%, 2.12%, 6.01% and 0.86%. There is no functional relationship between the factors included in the model, which may also indicate the adequacy of the compiled model. The paired correlation coefficients do not exceed the established limit r = 0.7 (Table 3)

Page 6

Т

<sup>&</sup>lt;sup>5</sup> The author's calculations according to the data of JSC "Uzbekistan railways"

<sup>© 2021,</sup> IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



# **INTERNATIONAL JOURNAL ON ORANGE TECHNOLOGY**

## https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140 | p-ISSN: 2615-7071 Volume: 03 Issue: 10 |Oct 2021

#### Table 3

#### Paired correlation coefficients between influencing factors of the regression model<sup>6</sup>

	Profits invested per	Depreciation	Invested borrowed	Invested borrowed
	1,000 Priv . t-km,	invested per	funds per	funds per
	sum	1,000 pref . t-km,	1,000 priv . t-km,	1,000 priv . t-km,
		sum	sum	sum
Invested profit	1	-	-	-
per 1				
thousand priv				
km, soum				
Depreciation	0,6933	1	-	-
invested per				
1,000 pref . t-				
km, sum				
Invested	-0,6227	-0,68	1	-
borrowed				
funds per				
1,000 priv . t-			and the last	
km, sum				
Invested	0,6474	0,4935	-0,6346	1
borrowed				
funds per				
1,000 priv . t-				
km, sum			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

Thus, the main factors of increasing the rate of renewal of fixed assets in the railway company under consideration are own profit and accrued depreciation funds.

Modeling elements of the depreciation system will allow to regulate the investment flows of the railway company and manage the reproduction of fixed assets in order to intensify the reproduction of fixed assets.

In order to quantify the amplitude of the change in the effective factor — the intensity of the reproduction of OF, under the influence of the factors considered in the complex, it is advisable to draw up an economic-mathematical model for managing the reproduction of fixed assets, with the help of which it would be possible to assess the possible boundaries of the fluctuation of the input coefficient (update) and solve her to the maximum.

For this, it is necessary to select a criterion that could be used as a target function in the preparation of a simulation economic-mathematical model, and objectively characterizing the process of reproduction of fixed assets.

The correlation matrix of independent factor characteristics, presented in table 3, shows that they are moderately correlated with each other. An analysis of the pair correlation matrix shows that the dependent variable is most affected by investments, profits per 1 thousand pref. t-km, sum

As such indicators, attempts were made to use the costs of reproduction and management systems, the constituent members of which were used indicators of reproduction of fixed assets and terms of their use. The practical

<sup>&</sup>lt;sup>6</sup>The author's calculations according to the data of JSC "Uzbekistan railways"

<sup>© 2021,</sup> IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org | Page 7

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



application of one approach or another when trying to simulate the reproduction process of fixed assets of railway transport is fraught with a number of obstacles. The large volumes of calculations and the use of mathematical differentiation and integration techniques, as well as the lack of necessary data in the calculation, make the application of these approaches in railway transport often difficult.

In our opinion, when modeling such an economic object as a railway company, the approach proposed by N. Wiener, known as the "black box" method, is of some scientific interest <sup>7</sup>. The object as a whole is considered as a "black box" due to its complexity.

This approach can be used in economic and mathematical models that allow solving problems of identifying functional relationships:

- determination of quantitative relationships between influencing factors of the studied object;
- analysis sensitivity is the establishment of a variety of factors acting on a system, those that are more likely to affect the characteristics of an integrator;
- ➢ forecast determination of the system's behavior under some expected combination of external conditions;
- > assessment –determining how well the object under study will meet certain criteria;
- optimization –exact determination of such a combination of variables is an equation in which the extreme value of the objective function is provided.

To describe the subject of research (the process of reproduction of fixed assets) in the form of mathematical dependence, we use the method of regression analysis. As the objective function, we use the regression equation obtained on the basis of multivariate correlation – regression analysis:

 $K_{\tt EE}^{max} = 2,877 - 1,198 * X_1 + 2.127 * X_2 + 5.961 * X_3 - 0.863 * X_4, \rightarrow max$ 

To establish a logical connection between the parameters of the economic and mathematical model, the factors that determine the process of reproduction of fixed assets, a factor model is made (Fig. 3)

The intensity of the reproduction process  $(K_{EE}^{max})$  in our model is determined by the following factors:



#### Fig. 3. The mechanism of the influence of factors on the intensity of reproduction of fixed assets <sup>8</sup>

Page 8

© 2021, IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/

<sup>&</sup>lt;sup>7</sup> Orekhov N. A. Mathematical methods and models in economics: a textbook for universities / N. A. Orekhov, A. G. Levin, E. A. Gorbunov. - M.: UNITY-DANA, 2004 .-- 302 p.

<sup>&</sup>lt;sup>8</sup> Orekhov N. A. Mathematical methods and models in economics: a textbook for universities / N. A. Orekhov, A. G. Levin, E. A. Gorbunov. - M.: UNITY-DANA, 2004 .-- 302 p.

RESEARCH

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140 | p-ISSN: 2615-7071 Volume: 03 Issue: 10 |Oct 2021

*I*<sub>*n.c.*</sub>- invested borrowed funds;

 $I_{3.c.}$ - the amount of the investment of borrowed funds

 $A_{\mathcal{M}_{H}}$ - depreciation rate;

 $O\Phi_{cm}$ - the value of fixed assets of the company;

ЧП- net profit;

 $K_{off}^{max}$ - update rate.

In our model, we simulate the process of formation of investment resources at a railway company, and also assesses the impact of this process on the results of the company and the process of circulation of fixed capital in general in rail transport. The starting point for modeling is the formation of investment resources based on the current structure of sources of financing investments in fixed assets. Modeling the size of sources of financing the reproduction of fixed assets, we get the opportunity to influence the reproduction of fixed assets. This will allow you to find the optimal investment in fixed assets of the railway company. We introduce the following restrictions (Table 4)

#### Таблица 4

#### Оптимальные объемы инвестиций в основные фонды железнодорожной компании<sup>9</sup>

N⁰	Формула	Результат
1	$X_1 \ge 0$ , where $X_1 - X_2 \ge 0$ , where	Invested earnings per 1 thousand. Priv.t -km. Sum;
	$X_1$	
2	$X_2 \ge 0$ , where $X_2$	Depreciation invested per 1,000 priv.t-km.sum;
3	$X_3 \ge 0$ , where $X_3$	Borrowed funds invested per one thousand. Priv.t -km. Sum;
4	$X_4 \ge 0$ , where $X_4$	Invested borrowed funds per 1,000 priv.t-km.sum;
5	$K_{EE}^{max}$ (0:100),	A set on which there is a solution acceptable for a given economic and
		mathematical problem;
6	где К <sup>тах</sup>	The rate of renewal of fixed assets, %.

When solving the economic and mathematical problem to the maximum, we will see for what values of the influencing factors the objective function reaches its extremum. At the same time, an additional restriction should be introduced in the form of profitability, so profitability should not exceed 17-18%. The rate of renewal of fixed assets reached their maximum - 9.6 percent per year with the following values of the arguments (table. 5).

The highest rate of renewal of fixed assets at the railway company - 9.6 percent will be achieved provided that the amount of invested funds per 1,000 priv. t-km. will be at the level of 27.508 billion soums of profit, 24.046 billion soums of depreciation deductions, 0.001 billion soums of borrowed funds and 13.289 billion soums of borrowed loans.

#### <sup>9</sup> Compiled by the author on the basis of the studied literature

© 2021, IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/

Page 9



Table 5						
<b>Results of solving the economic and mathematical problem</b> <sup>10</sup>						
Indiantors	The values of the	The values of the				
Indicators	indicators at K <sub>BB</sub> =9,2%	indicators at K <sub>BB</sub> =9,6%				
Invested profit in the calculation of 1 thousand priv.t-	26 706	27,508				
km, sum	20,700					
Depreciation invested per 1,000 pref . t-km, sum	25,806	24,046				
Invested borrowed funds per 1,000 priv . t-km, sum	0,012	0,001				
Invested borrowed funds per 1,000 priv. t-km, sum	12,655	13,289				

The results of solving the economic and mathematical problem are subject to the presence in the studied railway company at a rate of 9.6%. This leads to the conclusion that the primary task to increase the rate of renewal of fixed assets is to improve the depreciation policy and increase the profitability rate of the railway company. Using the "Regression" function in the Microsoft Excel package , the dependence of cargo volumes on the intensity of updating fixed assets was established. It is expressed by the following regression equation (Fig. 4.)



# Fig. 4. The influence of the rate of renewal of fixed assets on the volume of transportation of a railway company

# $Y = 9442.3 * e^{0.0561 * K_{06H}};$

where, Y- is the volume of railway transport production, mln. UZS.

The connection between the volumes of railway transport production and the renewal of fixed assets is very close (0.7 < D = 0.712 < 1) and the change in traffic volumes by 62 percent depends on the amount of renewal.

Thus, the solution to the problem of determining the share of optimal investment shares for the reproduction of fixed assets showed that the relationship between renewal and investment is high.

<sup>&</sup>lt;sup>10</sup> The author's calculations according to the data of JSC "Uzbekistan railways"

<sup>© 2021,</sup> IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org | Page 10

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



#### Conclusion

The methodology proposed by the author for a multivariate analysis of the economic valuation of fixed capital covers all practical activities. The new methodological approach presented in the article to the economic assessment of the efficiency of using fixed assets, based on the indicators of the efficiency of using the company's production resources and assessing the impact of quality indicators on the depreciation capacity of its work.

Implementation of methodological provisions, proposals and recommendations postulated during the construction of the improvement of the reproductive process management system will allow Uzbekistan Temir Yollari joint-stock company to formulate an adequate accounting, tariff, innovative, investment and depreciation policy in the interests of its own development, justify a system of criteria for intensifying the reproduction of fixed capital, determine reserves for increasing the efficiency of using fixed capital and other resources owls, which will not only enhance their targets, but have a positive impact on the development of the national economy as a whole.

# THE LIST OF USED LITERATURE

- Lapidus, B.M. Economic problems of railway management in Russia during the formation of market relations (system analysis) / B.M. Lapidus.
   M.: Publishing House of Moscow State University, 2000. - 288 p.
- Lukashev, S.V. Improving the management efficiency of fixed assets of railway transport: abstract of thesis. ... doctor of philosophy: 08.00.05 / Lukashev Sergey Vladimirovich. - M., 2001 .- 24 p.
- Maso, L.A. Modern methods of managing economic processes in railway transport / L.A. Maso. - M .: Publishing House of MPEI, 2000 .--268 p.
- Vorotilov V. A., Gaidenko Yu. K., Lavrikov Yu. A. Ways to improve the efficiency of capital investments and fixed assets. - L .: Nauka, 1982. -215 p.

- 5. Economics of railway transport / ed. V.A. Dmitrieva. M .: Transport, 1996.
- 6. Economics of railway transport / ed. E.D. Hanukova M. Transport. 1979, 544 p.
- Vovk A. A. Characteristic of the turnover of funds advanced in production // Economics of Railways, - №9, 1999.
- 8. Polikarpov A. A. Vovk A. A., Measurement and analysis of the effectiveness of the use of fixed assets: tutorial. M .: MIIT, 1995 .-- 104 p.
- 9. Domar E.D. Essays in the Theory of Economic growth, New York, Oxford University Press, 1957. 224 pages.
- 10. Statistical data of the joint-stock company "Uzbekistan railways".
- Gulamov A.A. Development of methodological approaches to the assessment of fixed capital of a railway company // Economics and Education, -№2, 2019. -112-118 p.
- 12. Gulamov A.A. Economic valuation of fixed capital of the joint-stock company "Uzbekistan railways" // "Economics and innovation technologies" scientific and electronic journal, -№2, 2019.
- 13. Gulamov A.A. Depreciation in the aspect of modeling strategy of investment and analysis of reproduction processes of fixed capital of railways transport // Religacion, Vol. 4, №16, June 2019. pp. 742-753
- Shaumarov S.S., Adilhodzhaev A.I., Shipacheva E.V., Kandakhorov S.I. Development of New Constructive and Heat-Insulating Materials. International Journal of Recent Technology and Engineering (IJRTE). ISSN: 2277-3878. Vol.7. Issue-5S3. p. 577-580. (2019)
- 15. Adilhodzhaev A., Shaumarov S., Tsoy V., Khodzhaev S. Research of the influence of siliconorganic hydrophobizer on the basic properties of Cement stone and mortar // International Journal of Advanced Science and Technology Vol. 29, No. 5, 2020, pp. 1918-1921

<sup>© 2021,</sup> IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org | Page 11

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/



- 16. Shaumarov S.S., Adilhodzhayev A.I., Kondrazhenko V.I. Experimental research of structural organization of heat-insulating structural building materials for energy efficient buildings. XXII International Scientific Conference on Advanced In Civil Engineering «Construction the formation of living environment», 2019. p. 1-7
- 17. Shaumarov, S., Kandakhorov, S., Abduraimov, U., Improving the optimal composition of heatinsulating structural aerated concrete based on industrial waste, E3S Web of Conferences, 2021, p. 264-272, 02023.



© 2021, IJOT | Research Parks Publishing (IDEAS Lab) www.researchparks.org | Page 12

Copyright (c) 2021 Author (s). This is an open-access article distributed under the terms of Creative Commons Attribution License (CC BY). To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/