

Depreciation in the aspect of modeling strategy of investment and analysis of reproduction processes of fixed capital of railway transport

Depreciación en el aspecto de la estrategia de modelado de inversión y análisis de los procesos de reproducción del capital fijo del transporte ferroviario

Gulamov Abdulaziz Abdullayevich*

Tashkent Institute of Railways Engineers - Uzbekistan

abdulaziz.gulamov@gmail.com

ABSTRACT

Joint-stock company “Uzbek Railways” is the largest transport company in Uzbekistan and in some segments of the transport market works in conditions of tough competition. With the development of market relations and economic growth, as well as competitive pressure from other participants in the transport market, reliable condition, efficient use and intensive reproduction of fixed assets are becoming increasingly important. In this article, a retrospective analysis of the reproduction of the fixed capital of a railway company is carried out and suggestions are given for the intensification of this process.

Keywords: depreciation, financial sources, fixed assets (capital), reproduction, investment policy

RESUMEN

La sociedad anónima «Uzbek Railways» es la compañía de transporte más grande de Uzbekistán y en algunos segmentos del mercado de transporte trabaja en condiciones de dura competencia. Con el desarrollo de las relaciones de mercado y el crecimiento económico, así como la presión competitiva de otros participantes en el mercado del transporte, la condición confiable, el uso eficiente y la reproducción intensiva de activos fijos se están volviendo cada vez más importantes. En este artículo, se realiza un análisis retrospectivo de la reproducción del capital fijo de una empresa ferroviaria y se dan sugerencias para la intensificación de este proceso.

Palabras clave: depreciación, fuentes financieras, activos fijos (capital), reproducción, política de inversión.

*Corresponding author. Tashkent Institute of Railways Engineers, Tashkent, Uzbekistan. ORCID: 0000-0002-4702-7468

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Introduction

Modern concepts of reproduction and use of fixed assets are based on the theory of the functioning of capital as a production factor.

The capital theory is traditionally characterised by specialists as one of the most complexes. It has a deep genesis, and these problems have aroused the interest of researchers since the inception of economics.

The specificity of the evolution of the concepts of capital is their close connection with the dominant paradigm of the analysis of the development of society. Thus, at the early stage of the formation of science, theoretical trends in economics were considered in the applied aspect of studying artisan and commercial activities.

By the worldview of mercantilists, foreign trade was considered to be a priority area for the efficient circulation of capital. The essence of wealth and prosperity in this new course of economic thought is seen as the accumulation of money. As M. Blaug describes, quoting Charles Wilson, Britain of the XVII-XVIII centuries. in foreign trade with the Baltic and colonial countries simply did not possess anything that would be an attractive commodity for exchange.

The School of Economics of Physiocrats focused on the forms and mechanisms of capital utilization in agriculture. In this case, land and funds invested in it were considered as the basis of capital. F. Quesnay - they great French economist of the XVIII century. and his supporters believed that the source of wealth is the labour of agricultural workers, creating a surplus in excess of the product that is necessary for their existence. These political and economic theories rejected mercantilism for the unproductiveness of money capital and the reassessment of the role of trade. They sought for the external manifestations of wealth (primarily in trade and money circulation) to reveal its true nature. From the physiocratic concept, the primary concept of net income as a gift of nature, rent, a single tax, as well as the law of the BBB markets came to the scientific economy. Seya, who revealed the connectedness of supply and demand, and became, in essence, a continuation of this approach (Blaug, 1994).

In the transition to a real market economy, such concepts as capital and capitalization take on special significance. For improving the efficiency of a company, it becomes important to study similar and related concepts. The study of domestic and foreign researchers, legal documents and educational literature has shown that the economic category of capital is treated differently. For example, it is defined as a value characterizing the economic benefits of an economic entity at a certain point or an investment resource used for its simple and expanded reproduction, where the management of the reproduction process of a company or enterprise plays the most important role.

A brief description of the investigation of the issue and justification of the novelty of the questions that the authors consider in the article are given.

Material and research methods

This paper is describing research material and methodology of depreciation of fixed assets of the railway transport. The fundamental basis for the knowledge of capital as a category that has a complex economic, philosophical and legal nature, in classical political economy was laid by the English economist William Petty in the second half of the 17th century. A characteristic feature of his research was that they first began to study property relations in an internal relationship with the production relations of people. It is on the basis of these prerequisites that a classical approach was subsequently formed in economic theory, based on the concept of capital circulation and the creation of a surplus.

Results and discussion

The sphere of industrial production was introduced into the economic theory by A. Smith and D. Ricardo. L. Smith long before D. Ricardo and K. Marx substantiated the basic principles of the origin, formation and functioning of capital. In the works of A. Smith for the first time appears the division of productive capital into fixed and circulating. The division of capital used in the production process into main and negotiable is determined not only by the characteristics of the turnover of each of its constituent parts, but also by the method of transferring their value to the product (goods, services) produced in the process of transformation from the productive form to the commodity form.

The cycle diagram of the cycle of production capital used in modern management concepts was formed much later, but nevertheless, in A. Smith's works all the basic prerequisites for its creation were laid.

In the works of D. Ricardo considerable attention is paid to the study of the means of production. The appeal of modern economists to the works of Ricardo occurs whenever the paradigm of the economy and its apparatus changes.

Studies on the use of capital occupy a central place in Marx's teaching. In the Marxist concept, capital appears in concrete forms - in the means of production (constant capital), money (money capital), people (variable capital), goods (commodity capital). According to the listed material carriers, they are capital not by themselves, but rep-

resent a special production relationship in direct connection with depreciation and reproduction of fixed assets.

In classical economic theory, questions of the methodology for using depreciation deductions were practically not raised due to the fact that business practice did not require the economic theory to solve this issue. Nevertheless, K. Marx discussed the problem of compensation for the fixed capital in the course of his correspondence with F. Engels. In a letter to Engels dated August 24, 1867, Marx asked for an answer to the question: "You, as a manufacturer, should know what you are doing with the money coming in to repay the fixed capital before the time when it must be replaced in natura. And you must answer me this question (without theory, purely practical). " Answering the question, F. Engels described in detail the practice of using the amounts of the "renewal fund." This practice still occurs today when making decisions on the use of depreciation funds.

The neoclassical economic theories of using capital significantly deepened some of the essential characteristics of this process and proceeded to solve the problems of quantitative measurement of the parameters of its flow. At this stage of development of economic thought, concepts of normative greatness began to appear as points of reference, which marked the beginning of the formation of a normative approach.

At the end of the 20th century, such scholars as V. Zombart, E. Bem-Bawerk, P. Sraffa, X. Kurtz, as well as neo-Ricardian economists J. Steedman and L. Mainvoring made a significant contribution to the study and development of capital capital issues. B. Sheffold. Relying on the classical economic theory of A. Smith, D. Ricardo and K. Marx, they developed it by examining the questions of the formation of the value of capital. A Japanese economist Sh. Hoshimura based on the theory of capital K. Marx built mathematical models of reproduction and capital accumulation.

Despite the idealization of modern Western economic science in Russia, it should be noted that in the west the theory of Karl Marx's capital is far from being forgotten by everyone. As P. Samuelson said, "Marxism is too valuable to leave it alone to Marxists".

Along with the concept of "fixed capital", the concepts of "fixed assets" and "fixed assets" are used in theory and practice. The concept of "fixed assets" is interpreted as "a set of tangible assets operating for a long time: buildings, structures, machinery, equipment, vehicles, etc.", and "fixed assets" - as "basic funds in monetary terms "" . However, in the practice of economic work of business entities and even in official legal documents there is no clear distinction between these concepts. Fixed assets and fixed assets are often used as synonyms. The fixed capital is a part of production capital (the cost of machinery, equipment, buildings, structures), which transfers its value, the newly created product in parts and returns to the capitalist in monetary form gradually, but the degree of wear and tear during a series of capital cycles. In the modern economic sphere, the acquisition of fixed capital is identified with fixed assets. So, in the Big Economic Dictionary will be given the following definition: "The main capital, fixed assets are the fixed assets necessary for the company to carry out its production activities, the depreciation period of which exceeds one year.

Economic theory analyzes the nature of capital associated with the time factor. Time is treated as an independent factor, creating income.

The time factor has been studied in detail in the theory of evaluating the effectiveness of investment projects. It is studied in three dimensions: dynamism; se-zoning; physical deterioration of fixed assets (deterioration).

Depreciation of fixed assets causes general tendencies to decrease in their productivity and increase in costs for their maintenance, operation and repair during the billing period.

The modern approach to the theory of capital, significantly different from the traditions of past years, at the same time continues to use and develop approaches of classical political economy, guided by the fundamental principle, the essence of which is that in any formation social production is based on the use of fixed assets full circuit.

The main production capital in the process of the full cycle of the cycle goes through three stages:

At stage 1, the main production capital in cash () is advanced into the means of labor, taking respectively the form of productive fixed capital ().

At stage II, fixed assets in productive form () gradually transfer their value in parts as they wear out (i.o.c.) to their products (goods, services), transforming into a certain part of capital (). This process is carried out in the course of many production cycles and continues until the complete depreciation of certain types of means of labor, in which the fixed capital is advanced.

At stage III, in the process of selling products, its part of the cost of fixed capital in the commodity form () is converted into fixed capital in cash (which is called the "amortization fund" (AF). As it accumulates funds of a depreciation fund, fixed capital in cash is again ready for advances to the means of labor, carried out through their repair or the acquisition of new analogues.

Expanding the scheme of circulation, the researchers clarify the nature of wear and mechanisms of capital reproduction.

Thus, capital, taking various forms, is a necessary resource for carrying out the economic activity of any organization. The main phase of capital turnover in railway transport is the productive captain, and first of all, as indicated below, and the form of the means of labor.

In economics, the following concepts are used that characterize productive capital in the form of means of labor: fixed capital, fixed assets, and fixed assets. The use of these concepts in the modern economic science introduces certain difficulties in understanding the economic relations that arise during the transition from one phase of capital movement to another. A number of authors believe that the terms “fixed capital” and “Fixed assets” are identical (Vovk, 1995). Others use the term “fixed capital” to mean the set of fixed assets of an enterprise and investments in fixed assets (Malyshev, & Mansurov, 1998).

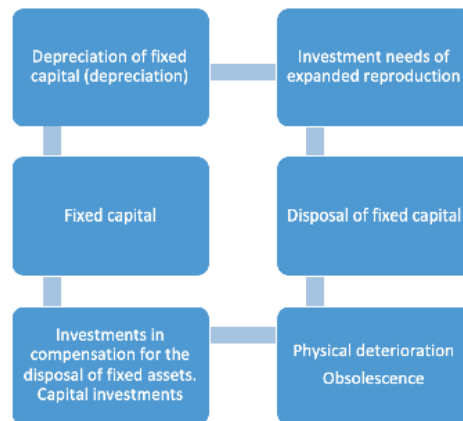


Figure 1. Capital reproduction scheme

Until now, economics has no uniform understanding of the essence of the concepts “fixed assets” and “fixed assets.” Some economists believe that “fixed assets” is a term of economics, and “fixed assets” is a term used in accounting. Others define the concept of “fixed assets” as the denotation for “fixed assets” (Morsin & Moldovova, 1989; Vovk, 1999). Still others, on the contrary, define the concept of “fixed assets” as the monetary expression of “fixed assets” (Dmitrova, 1979; Bezrukikh, 1994). The fourth identify these concepts (Large Economic Dictionary, 1994; Large Commercial Dictionary, 1996).

There is no uniformity in economic dictionaries (Konoplitsky & Filina, 1996). An analysis of normative legal acts (Order of The Ministry of Finance of the Republic of Uzbekistan dated October 9, 2003 No. 114) showed that the concepts of “fixed assets” and “fixed assets” are identical from these positions.

Fixed assets - is part of the means of labor, participating entirely in the production or management process, acting in an unchanged natural form for a long period and reimbursing their value as they wear out in the form of depreciation deductions included n cost of products or services that contribute to economic benefits (income).

The means of labor include tools of labor, t.s. What is the process of production, as well as buildings, structures, devices, i.e. what provides the production process. K. Marx noted that economic epochs differ not by what is produced, but by how it is produced by what means, therefore it is necessary to study the patterns of development of the means of labor and use the knowledge gained in practice and the goals of increasing production efficiency as a whole. The means of labor are a real-material category, and economics as science operates with economic categories. Therefore, for their characteristics they use, as a rule, the economic category - fixed assets.

To assign the object under study to this category, the following features are highlighted. Firstly, participation in the production process is a goal. Secondly, the action and unchanged natural form and for a long period. Third, the reimbursement of its value as it depreciates in the form of depreciation deductions included in the cost of products or services. Fourthly, the excess of its value of the established limit for assignment to objects and circulation (Boyko, 1962; Tereshina, 2011). For the purposes of this study, fixed capital should be understood as capital embodied or embodied in fixed assets. If embodied fixed capital characterizes the phase of its productive use, then capital embodied in fixed assets is characterized by the phase of its reinvestment.

Assessment of the effectiveness of the use of fixed assets, p, therefore, the capital embodied in them, and the effectiveness of investments in their reproduction, and, consequently, the capital embodied in them adequately to external conditions is impossible without a scientifically based classification of fixed assets and investments.

The classification of the studied objects means their distribution into specific groups according to certain characteristics in order to achieve the goal set by the researcher. Classification sign is a distinctive feature of a particular group, the main feature that distinguishes it from other groups.

Classification of fixed assets allows you to clearly define the place of each asset in the general system and its distinctive characteristics. This creates the possibility of effective use of methods and methods of management, evaluation of the effectiveness of use, determining the dynamics of change, assessment of capitalization, etc., corresponding only to this group of fixed assets.

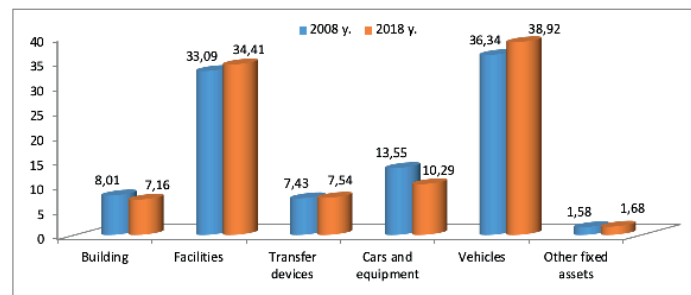


Figure 2. Species structure of the share capital of JSC “Uzbekistan Railways”

An analysis of the specific structure of the fixed capital of railway transport shows that the main share is occupied by buildings and vehicles (more than 70%). The share of structures increased from 33.09% to 34.41%, the share of vehicles also increased from 36.34% to 38.92%. This is primarily due to the fact that over the past decades new lines have been actively introduced, such as Tashguzar-Baysun-Kumkurgan, Pap-Angren, and others. The active part of fixed capital, such as electric locomotives and rolling stock, is being updated.

In recent years, in general, the enterprises of society have seen a positive trend in the ratio between input rates and rates of disposal of fixed capital, which has led to a decrease in physical deterioration and moral depreciation of funds, as well as to an improvement in the age structure (Table 1).

The rate of renewal of fixed capital (that is, the share of fixed assets put in place for the year at the end of the year), determined in comparable prices, was in 2009 10.07%, in 2018 9.20%. In general, we can state the fact that the renewal in society is carried out at a tremendous pace. Disposals are carried out at a uniform pace, so if in 2009 the retirement rate was 2.90%, then in 2018 this figure was 3.14%. A lagging decline in the rate of renewal of fixed capital over the rate of their disposal leads to further accumulation of worn-out physical equipment.

Table 1. Indicators of the reproduction process of the share capital of the jsc “uzbekistan railways”

Years	Reproduction rates, %				
	K_{vv}	K_{vyb}	K_{int}	K_{pr}	Kiz
2009	10,07	2,90	0,288	0,712	42,7
2010	9,01	3,18	0,353	0,647	41,0
2011	27,7	2,74	0,099	0,901	39,2
2012	32,43	1,98	0,061	0,939	34,0
2013	9,51	3,76	0,395	0,605	38,07
2014	30,42	3,51	0,115	0,885	35,25
2015	14,47	2,93	0,202	0,798	36,9
2016	13,59	2,85	0,210	0,790	38,7
2017	23,27	3,22	0,138	0,862	40,2
2018	9,20	3,14	0,341	0,659	40,3

Statistical data and studies indicate an increase in the recent years of a slight aging of the fixed capital of joint-stock company “Uzbekistan railways”.

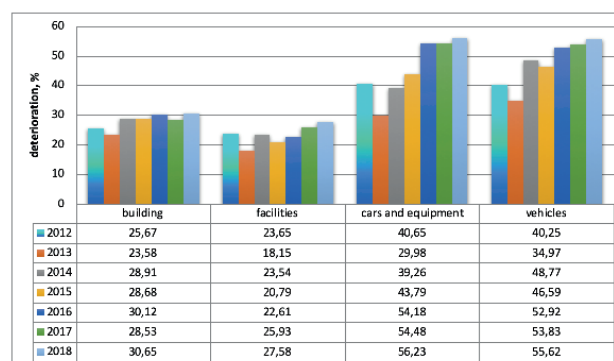


Figure 3. Dynamics of depreciation of fixed capital of JSC “Uzbekistan Railways”

Analyzing the data presented in Fig. 3, it should be noted that along with the general decrease in depreciation of fixed assets as a whole, an increase in depreciation is observed for certain groups of fixed assets. In particular, the largest increase in the depreciation rate can be traced in the following groups:

- 1) buildings and structures - from 2012 to 2018 this ratio increased 3.29% and 7.75%, respectively;
- 2) vehicles - for the period 2012-2018. This ratio increased by 1.9% and amounted to 01.01.2018. 56.8%.

Indicators of the dynamics of fixed assets were calculated on the basis of the statistical reporting of the company (Form No. 3 “Report on the movement of fixed assets”) for the analyzed period.

Based on the data presented in Fig. 3 we can draw the following conclusions:

1) The input coefficient for 2012-2018. tends to decrease in most groups. Unstable growth is observed in the “Buildings” group (an increase of 2.94% over the analyzed period) and in the “transfer devices” group. The input factor in such groups of fixed assets as “Facilities”, “Machinery and Equipment”, “Vehicles” has slightly decreased, although in general the update is carried out at a high rate. So for example, the annual input ratio of “vehicles” does not decrease less than 9-10%. This is explained by the fact that today the highest depreciation of fixed assets was formed in the active part of fixed assets.

2) The retirement rate, which characterizes the share of fixed assets retired for various reasons (due to decay, wear and obsolescence) in the total value of the value at the beginning of the period, for the analyzed period increased in groups: “Vehicles” (from 2.34% in 2012, up to 5.10% in 2018), “Machinery and equipment” (14.61% in 2012. up to 15.11% in 2018) and other fixed assets. The data presented show that at the railway company as a whole, worn, unused facilities are being decommissioned at an accelerated rate, which, in turn, will further allow the enterprise to more objectively address the problem of reproduction.

3) The growth rate, which characterizes the growth of fixed assets for the period under review, decreased in the “Vehicles” and “Structures” groups, and increased in such groups of fixed assets as “Buildings”, “Transfer devices” of fixed assets. For the group of fixed assets “Other”, this indicator has a negative value. This indicates an increase in the disposal of fixed assets over their income.

It should also be noted that over the period under review, this indicator for all groups of fixed assets as a whole decreases in dynamics, which indicates that the enterprise is increasing its production capacity to a greater extent due to the intensive approach, i.e. reproduction of fixed assets is carried out on the intensive type.

In the last two decades of development of railway transport to replenish the share capital of the joint-stock company “Uzbekistan railways” (hereinafter UTY) is carried out at the expense of the company’s own funds.

The analysis showed that the UTY depreciation and the profit are important sources of the reproduction process. The above sources form more than 95% of all investments, due to which simple and expanded reproduction of fixed production assets of fig. 1 is carried out.

From figure 1 it is clear that the reproduction of fixed capital is carried out in an expanded form. The analysis showed that the depreciation charges in the investment package occupy 35-55 percent of all invested funds. These proportions show the importance of depreciation deductions as the main source of simple and expanded reproduction of fixed capital, but it should be recognized that this source is not enough.

Under the influence of the time factor and inflation, the nominal value of depreciation of fixed capital, as a rule, differs from the investments made during the period of their acquisition.

Moreover, the depreciated funds are not always used for their intended purpose. So for example, in 2017 year over 50 percent (196 million US dollars) depreciation governmental funds were aimed at updating the instruments of labor (Kobilov, 2018).

The task of targeted use of accumulated depreciation funds is complemented by the task of finding additional resources for the reproductive processes of the means of labor of society. The solution in the interconnection of these tasks will allow us to identify and set the trend, as well as the amount of necessary funds for simple and advanced reproduction.

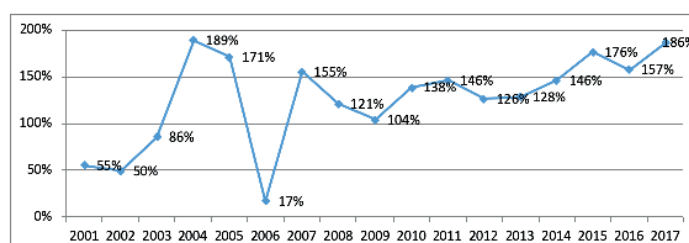


Fig. 4. Ratio of capital investments and incomes in the period 2001-2017 (State Committee of the Republic of Uzbekistan for Statistics, 2017).

In modern literature, such concepts as “Fixed assets” and “Fixed capital” are identified. For example, in the Big Economic Dictionary (2002) the following definition is given: “Fixed assets, fixed assets are fixed assets necessary for a company to carry out production activities with a depreciation period of more than one year”.

The basis can be taken as an indicator of net present value (NPV) as the zero value of the total return of the used funds with the scientist temporarily and the inflation factor (Mazo, 2000; Efanov et al., 2005; Gulamov, 2011):

$$NVP = -K_0 + \sum_{i=1}^{T_n} \frac{NV_t}{(1+E)^t} + \frac{K_t}{(1+E)^{T_n}} \quad (1)$$

where K_0 investment in basic production assets;

T_n – standard term of use, years;

NV_t - part of the net income of the enterprise, reinvested in reproduction the property of fixed capital in the t year of the exploitation of funds;

K_t - liquidation cash flows at the end of the period of operation of the funds (T_n);

E - discount rate.

With regard to individual objects of fixed assets, the condition for self-reproduction of fixed capital will be written in the form:

$$F_0 = \sum_{i=1}^{T_n} \frac{NV_t}{(1+E)^t} + \frac{F_r}{(1+E)^{T_n}} \quad (2)$$

In this formula, the residual value is considered as the possible liquidation value. object of funds with the initial cost of acquisition F_0 .

According to the National Accounting Standard of the Republic of Uzbekistan, the linear method of writing off depreciation is determined by the following ratio:

$$T_n = \frac{1}{n_a} \quad (3)$$

where n_a - the rate of depreciation on the full restoration of fixed assets (in units of units).

Considering that by the end of the useful life of a fixed asset object its residual value will be zero, the condition for the simple reproduction of any inventory number of fixed assets can be expressed as:

$$F_0 = \sum_{i=1}^{T_n} \frac{NV_t}{(1+E)^t} \quad (4)$$

Own annual cash flows of the company, providing the current reimbursement of the initial investment in fixed assets, consist mainly of depreciation and that part of the profit paradise is sent to the modernization, reconstruction, restoration and maintenance innovation of funds, i.e.

$$NV_t = A_t + P_t^f \quad (5)$$

where A_t - depreciation in the t-th year of operation of the object background;

P_t^f - part of the profit directed to the reproduction of fixed capital and distributed to the object of the main background.

With the linear method of depreciation its annual amount will be

$$A_t = n_a \cdot F_0 \quad (6)$$

Profit for the reproduction of fixed assets, distributed on the considered object of funds, can be expressed as

$$P_t^f = p_t \cdot F_o, \quad (7)$$

where p_t - reproductive profitability of the fixed assets in the t - th year.

Then, with uniform financing of the reproduction of fixed assets from the profits ($p_t = p = \text{const}$) the annual cash flow to recover the initial investment in the fixed asset is determined by the amount

$$NV_t = n_a \cdot F_o + p \cdot F_o = (n_a + p) \cdot F_o, \quad (8)$$

And the conditions for the self-reproduction of fixed assets will be recorded in the form

$$F_o = \sum_{i=1}^{T_n} \frac{(n_a + p) \cdot F_o}{(1+E)^i} \quad (9)$$

Discounting a number of equal and uniform throughout the term of calculation of payments to their one-time value in the initial period, we get:

$$F_o = (n_a + p) \cdot F_o \cdot \left[\frac{(1+E)^{T_n} - 1}{E(1+E)^{T_n}} \right] = 1. \quad (10)$$

It is obvious that in the absence of reinvestment in the main capital from profit self-reproduction of fixed assets only at the expense of the use of depreciation is not achieved. Therefore, solving equation (10) with respect to the reproduction profitability index p of the funds object, we define its minimum required value reading

$$p_{min} = \frac{E}{1 - \frac{1}{(1+E)^{T_n}}} - n_a. \quad (11)$$

The minimum reproductive profitability of fixed assets determines the rate of reinvestment of profits in the fixed capital of enterprises necessary to ensure its self-reproduction (return based on the time factor). In tab. 1 shows the minimum reconstructions production profitability of fixed assets with different linear depreciation rates at a discount rate of $E = 0.12$.

Table 2. Minimal Reproductive Return on Funds

Linear depreciation rate, n_a	0,02	0,05	0,077	0,10	0,20	0,25
Useful life period, T_n , years	50	20	13	10	5	4
Real reproduction profitability, p_{min}	0,100	0,084	0,079	0,077	0,077	0,079

The results are shown in table. 2, show that the rate of reinvestment from the profits necessary to ensure the self-reproduction of the company's fixed capital depends on the weighted average norm on his balance of funds. At the same time, when considering item by object fixed assets it is necessary to note the disproportionality of the relationship between their depreciation rates and the required reproduction profitability. So, for funds with terms useful over 10 years of use, the standard for the required reinvestment from profits begins to exceed the standard for deductions to the depreciation fund, substantially exceeding the latter in the passive part of fixed assets (buildings and structures).

In this regard, given that to date there are no uniform methodological principles for the allocation of effective productive assets in the composition of fixed assets of enterprises, we can recommend carry to them those objects in the structure of the reproductive potential of which depreciation begins to predominate.

This approach is based on an obvious ratio: the smaller the profit share intended for simple reproduction of fixed capital, the more net profit can be used by the enterprise for paying dividends to shareholders, material incentives for workers, maintaining their own social infrastructure facilities, as well as for the development of production.

Questions of methodological validity of the definition of efficient and high-tech production assets are relevant because the regulated NSBU of Uzbekistan No. 5 can be extended to these items of fixed assets.

The use of accelerated depreciation in the practice of accounting for fixed assets allows you to increase at the initial stage of operation of funds the size of the accumulated depreciation fund in comparison with the linear method of depreciation. Simultaneously, the cancellation in the early stages of the greater hour these initial cost of funds protects depreciation from the current inflation and increases as a result the reduced integral value of the total accrued depreciation, thereby reducing the required funding for the reproduction of fixed assets from the profits.

The minimum amount of reinvestment from the profits necessary for the self-reproduction of fixed capital also depends on the discount rate. Therefore, a reasonable choice of its value is of great importance when planning the investment resources of enterprises.

It should be borne in mind that with the growth of the accepted discount rate, the standard for financing the self-reproduction of fixed assets from profits increases. This is evidenced by the calculated data given in table. 3

Given in table 3 the minimum reproductive profitability of objects of funds with a linear depreciation rate of 10% ($n_a = 0.1$), increases from 7.7% to 18% with an increase in the required rate of return on investment from 12% ($E = 0.12$) to 25% ($E = 0.25$).

Table 3 Minimal Reproductive Return on Funds

Depreciation rate E	The rate of return on investment in the main fed					
	0,02	0,05	0,1	0,15	0,2	0,25
0,06	0,043	0,037	0,036	0,036	0,037	0,039
0,12	0,100	0,084	0,077	0,076	0,077	0,079
0,15	0,130	0,110	0,099	0,097	0,098	0,100
0,20	0,180	0,155	0,139	0,134	0,134	0,136
0,25	0,230	0,203	0,180	0,173	0,172	0,173

Providing the minimum required deductions from profit, the payback period for investments in the acquisition of funds will be determined by the duration of the useful life of fixed assets or the standard service life of fixed assets.

With a different reproductive profitability of fixed capital payback period T_{avr} can be obtained from equation (10):

$$T_{avr} = -\frac{\ln[1 - E/(n_a + p)]}{E}, \quad (12)$$

This shows that to ensure the return of investments in fixed assets during the useful life of fixed assets. It is necessary that the sum of the norms for the formation of their reproductive resources exceed the total efficiency ratio of the target capital investments, that is, should be the ratio

$$n_a + p > E. \quad (13)$$

(at $n_a + p \geq E$, by $[1 - E/(n_a + p)]$ not determined).

In inequality (13) the sum of the depreciation rate and the reproductive profitability of fixed assets $n_a + p$ can be seen as a return of capital, the excess of which is above the reference price of money (E). It is a prerequisite to break-even capital forming investment. Thus, deductions from the profit at the $p = p_{min}$ providing simple reproduction (self-reproduction) of capital, and when $p > p_{min}$ there are grounds for its expansion.

However, when analyzing the effectiveness of investments in fixed capital in the framework of specific investment projects, the break-even criterion will be implemented if the expected internal rate of return on investment (E_{int}), calculated from net profit before over the minimum reproductive profitability of its new funds: $E_{int} \geq p_{min}$.

If during any period of T in the period of operation of fixed assets with a standard duration of service life T_0 along with the use of depreciation, there was a reinvestment of profits into the company's fixed capital, then, with respect to an item of fixed assets in the time remaining ($T_0 - T$) before the write-off, the break-even principle of capital-forming investments is realized under the condition:

$$F_0 = (n_a + p_1) \cdot F_0 \cdot \left[\frac{(1+E)^T - 1}{E(1+E)^T} \right] + (n_a + p_2) \cdot F_0 \cdot \left[\frac{(1+E)^{T_0 - T} - 1}{E(1+E)^{T_0}} \right], \quad (14)$$

where p_1 - the reproductive profitability of the object of funds in the period T ;

p_2 - the necessary reproductive profitability of the object of the funds for the period of operation remaining before it is written off.

After transformation, solving this equation is relatively unknown we get:

$$p_2 = \frac{n_a + p_1(1+E)^T - (n_a + p_1 - E)(1+E)^T}{(1+E)^{T_0 - T} - 1}. \quad (15)$$

Denote the ratio T/T_n , determining accrued regulatory (accounting) depreciation of the assets of the object, through d . Then $T = T_n \cdot d$, but

$$p_2 = \frac{n_0 + p_1(1+i)^{T_n(1-d)} - (n_0 + p_1 - n_1)(1+i)^T}{(1+i)^{T_n(1-d)} - 1}. \quad (16)$$

For example, if investment resources for the reproduction of funds with annual depreciation of 10% ($n_0=0.1$), the standard service life of 10 years ($T_n=10$) and accounting wear of 50% ($d = 0.5$) were formed in the ongoing operational period of depreciation and profits, which was refinanced at a rate of 5% ($p_1=0.05$) per year of the initial value of fixed assets against the mini - the required value of 7.7% (Table 3.1) at a discount rate - 12% ($i=0.12$), then for the remaining period until the funds are written off, this standard of investment returns must be increased to at least

$$p_2 = \frac{0,1 + 0,05(1 + 0,12)^{10(1-0,5)} - (0,1 + 0,05 - 0,12) \cdot (1 + 0,12)^{10}}{(1 + 0,12)^{10(1-0,5)} - 1} = 0,125.$$

The obtained value makes it possible to estimate the required minimum reproductive profitability of funds, taking into account their depreciation and the reinvestment of profits into fixed assets.

The solution of such a task becomes especially relevant when shaping the investment policy at ULY, when for each type of fixed capital, renewal is carried out at different rates, thereby managing the company's investment processes, which will contribute to the correct redistribution of resources.

At the same time, questions of the necessary investment reimbursement of capital-forming costs arise in the case of an enterprise acquiring used assets.

In accordance with the NSBU No. 5 "Fixed Assets", the depreciation rates are set as a percentage of the book value of funds, which is understood as their initial or restoration - new value. In this regard, the norms of depreciation charges are applied to the value of funds reflected in the accounts of the first acquirer of the asset. Expenditures for the purchase of used property will not reflect the original (or restituted significant, given the results of revaluation), and its residual value - the bridge

Therefore, the condition of the recoupment of investments spent on the acquisition of previously operated funds, for the remainder - lifetime fixed assets can be written as

$$F_T = \sum_{t=T}^{T_n} \frac{(n_0 + p_{min})^{t-t_0}}{(1+i)^t}, \quad (17)$$

where F_T - residual value of the object of funds at the time T of its acquisition ;

$$F_T = F_0(1 - d). \quad (18)$$

Then after the conversion we get

$$F_0(1 - d) = (n_0 + p_{min}) \cdot F_0 \cdot \left[\frac{(1+i)^{T_n} - 1}{i(1+i)^{T_n}} \right]. \quad (19)$$

Hence, given that $T = T_n \cdot d$,

$$(n_0 + p_{min}) \left[\frac{(1+i)^{T_n} - 1}{i(1+i)^{T_n}} \right] = (1 - d). \quad (20)$$

Solving this equation for p_{min} we define the required minimum standard for the formation of a production development fund from the profits whether the company to ensure the return on investment in the acquisition - the flow of fixed assets with varying degrees of wear:

$$p_{min} = \frac{E(1-d)}{1 - 1/(1+E)^{T_n(1-d)}} - n_0. \quad (21)$$

Included in the resulting formula (17, 21) indicators - the depreciation rate and the reproductive profitability of funds - are relative values applied to the initial book value of fixed assets.

We will use data on real investment resources of JSC “Uzbekistan Railways” and determine the possibilities reproduction of a fixed capital of the company from its own IP financing sources.

So, in 2017, the value of the equity capital amounted to 13198.1 billion. sum with a weighted average degree of wear 40,3%. The amount of accrued depreciation on fixed assets was determined by the value of 838.7 billion sum. The company’s income amounted to 746.6 billion sums.

On the basis of these data, we calculate the weighted average rate of depreciation and the required reproduction profitability of funds with the standard profit on investments in fixed assets of enterprises $E = 0.12$ (12%):

$$n_a = \frac{A}{F_0} = \frac{838,7}{13198,1} = 0,063 \text{ (6,3\%);}$$

$$T_n = \frac{1}{n_a} = \frac{1}{0,063} = 16, \text{ years;}$$

$$P_{\min} = \frac{E}{1 - 1/(1 + E)^{T_n}} - n_a = \frac{0,12}{1 - \frac{1}{(1+0,12)^{16}}} - 0,063 = 0,14339$$

Thus, to ensure that only a simple reproduction of fixed capital of UTY is required, along with the targeted use of depreciation annually reinvest in fixed capital of the profit in the amount of 1 to 4,339% of its book value. And this composition amount of about 1892.4 billion sums, which is two and a half times higher than that received in society in 2017 year income.

Conclusions

In the conditions of market principles of management, an important problem facing the railway company is to increase the efficiency of its work by improving the use of all types of production resources, and above all the basic means of labor. In this regard, the most important strategic task of the railway company is the need to develop new economic methods for managing fixed assets and economic evaluation of their reproduction.

Reproduction of fixed capital is a rather complex and multifactorial process, therefore, when evaluating the author, we propose to use a systematic approach, which is based on the theoretical proposition that fixed capital is designed to save living labor and efficiently use materialized labor — all production resources. Based on the formulated general approach in the author’s opinion, it is proposed to carry out an economic assessment of the reproduction of the fixed capital of the joint-stock company “Uzbekistan railway” on the basis of three groups of interrelated indicators characterizing:

- the technical and economic condition of the fixed capital;
- the efficiency of fixed capital;
- the availability of resources for the reproduction of fixed capital.

Also, the results of the research show that the task of reproduction of fixed capital at the expense of own funds can be solved by the presented method when accumulating depreciation funds strictly in a certain account and using it for its intended purpose.

This method of accumulating the reproduction of fixed capital can be applied both to all enterprises that are part of UTY and individual groups or objects.

The overall need for identifying sources of financing with setting optimization parameters for investment and depreciation policies can also be calculated by this methodology.

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