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RESEARCH ARTICLE

Industrial Projects Investment Assets

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Abstract: This article tries to presents a vision of the industrial investment's assets, method of calculating them based on the spending time of the initial investment and the starting period of the project. So, were considering four indicators that reflect the size and losses due to these assets. Fixed assets are named and long-term assets, assets or real estates, including all of the economic value of the investment which has a utility and liquidity period bigger than a year. In the major industrial projects, due the large terms of building, appears very large financial assets, that are blocked until the starting of the project (after which appear the so-called amortizations). Economic evaluation of projects is an essential operation essential for the activity of investment decisions. All project solutions adopted are accompanied by calculations and technical, economic and financial analysis, for projects implemented to always be the most effective of the following alternatives and capital allocation.

Keywords: ***Analysis, Assets, Industrial investment, Economic evaluation, Industrial project.***

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Introduction

Establishing the efficiency of investments involves studying the results obtained by consuming them, so it is necessary to analyze the influence of the time factor in the period of exploitation of fixed capital created. For this, a staging of the phenomenon subject to research must be delimited:

- The period in which material and human resources are consumed without obtaining income, represented by the pre-investment and investment phases.
- The period in which the investments realize benefits and incomes, represented by the exploitation phase,

Industrial Investment Fixed Assets

The first is the period in which the funds are consumed without obtaining incomes and is characterized by immobilization of human and material resources in activities such as: elaboration of the feasibility study, design of the objective and execution of construction-assembly works on construction sites. The works executed at the beginning of this period lead to fixed assets, especially of highly qualified labor force, which represents a loss of net income, both for the economic agent and for the national economy [1].

It is necessary that the duration of the research-design stage be as short as possible, but long enough to ensure the quality of these works. But it can have many other beneficial effects and results:

- Reducing the risk of moral wear and tear on future products;
- Winning sales markets;
- Obtaining a high selling price (at least for a period of time);
- Recovery of investments in advance of the established term, etc.

During the execution of construction and assembly works, large funds are consumed, especially material resources, which are gradually immobilized on site and put into operation, eventually reaching the end of the entire investment fund to be immobilized. And in the case of these works, the size of the fixed assets is decisively influenced by the time allocated for their execution [2].

The execution time is the one in which most of the value of the investment is consumed. The staggering of investments directly

influences the capital assets that represent potential losses for the national economy.

In general, investments can be staggered (variant I), uniform (variant II) or descending (variant III).

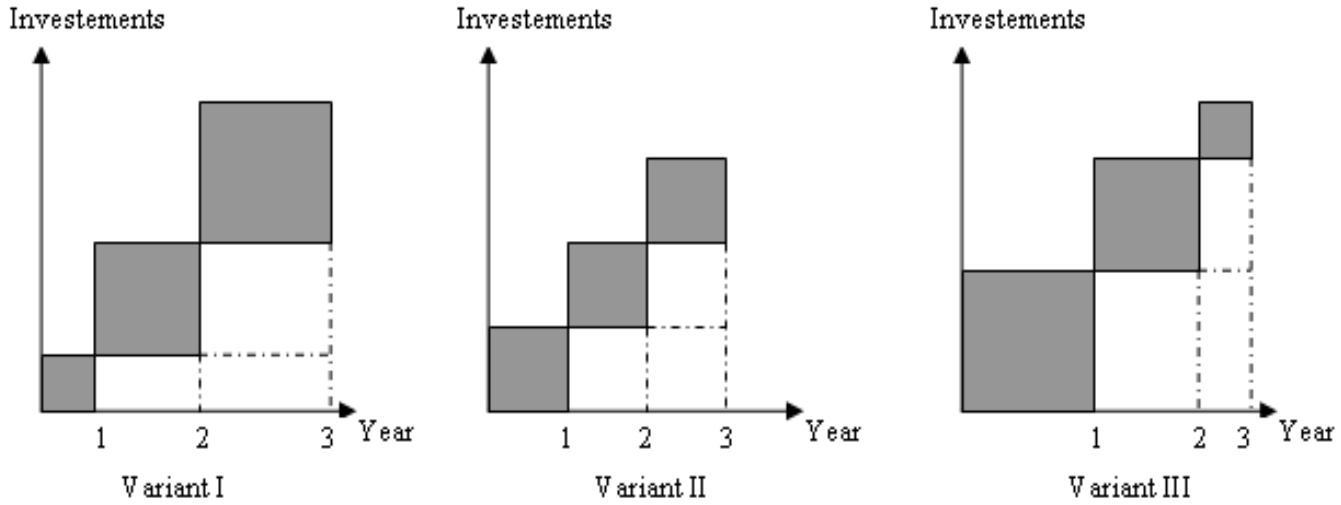

Figure 1: Ascending, uniform and descending evaluation of investments

It is clear that the first option is more convenient, because the fixed assets are the smallest in the first years (an amount spent remains fixed until the beginning of the operation of the objective and even beyond this moment, until the effective recovery) [3]. Time acts as a distinct factor on investments and their results, generating a dynamic analysis in which all values scattered over time are brought to a single moment, a process called updating (discounting). The update calculations are performed at any time before or after the execution period of the investment works, and the date on which the update is made is called the reference moment.

Investment Indicators

Total Immobilization

In the current economic situation of our country, total fixed assets are the primary indicator of interest to an investor. The reason is simple, he wants to know how much capital he will have to consume until he has production including income (investment funds allocated in the h years of execution, remain immobilized until the implementation of the investment objective) [4].

Table 1: Investment immobilization model

Investment value / Fixed assets years	I_1	I_2	....	I_h	....	I_{d-1}	I_d
1	I_1						
2	I_1	I_2					
: *:*	*:* *:*	*:* *:*					
h	I_1	I_2	....	I_h			
: *:*	*:* *:*	*:* *:*	*:* *:*	*:* *:*			
d-1	I_1	I_2	....	I_h	....	I_{d-1}	
d	I_1	I_2	....	I_h	....	I_{d-1}	I_d

Using the model presented in table 1 we can calculate the value of the total fixed asset:

$$X_j = \sum_{h=1}^{d} I_h (d - h + x), \qquad (1)$$

Where:

X_j - Total immobilization of the project *j*;

n - Project total life *j*;

$n = d + D$, *d* – Execution time;

D – Functional time;

I_h - The investment value spent in *h* year;

x - Correction factor, which takes values depending on when the capital is spent;

$x = 1$, If the capital is spent at the beginning of the year;

$x = 0.5$, If the capital is spent at the middle of the year;

$x = 0$, If the capital is spent at the end of the year;

In this way, X_j gets:

Table 2: Values of total fixed assets

$x = 1,$	$x = 0.5,$	$x = 0,$
$X_j = \sum_{h=1}^{d} I_h (d - h + 1)$	$X_j = \sum_{h=1}^{d} I_h (d - h + 0{,}5)$	$X_j = \sum_{h=1}^{d} I_h (d - h)$

Table 3: Variation model of total fixed assets

D (years	$x = 1,$	$x = 0.5,$
$d = 1$	$X_j = \sum_{h=1}^{1} I_h (1 - 1 + 1) = I_1$	$X_j = \sum_{h=1}^{1} I_h (1 - 1 + 0{,}5) = 0{,}5 I_1$
$d = 2$	$X_j = \sum_{h=1}^{2} I_h (2 - h + 1) = 2I_1 + I_2$	$X_j = \sum_{h=1}^{2} I_h (2 - h + 0{,}5) = 1{,}5 I_1 + 0{,}5 I_2$
$d = 3$	$X_j = \sum_{h=1}^{3} I_h (3 - h + 1) = 3I_1 + 2I_2 + I_3$	$X_j = \sum_{h=1}^{3} I_h (3 - h + 0{,}5) = 2{,}5 I_1 + 1{,}5 I_2 + I_3$
	$x = 0,$	
$d = 1$	$X_j = \sum_{h=1}^{1} I_h (1 - 1 + 0) = 0$	
$d = 2$	$X_j = \sum_{h=1}^{2} I_h (2 - h + 0) = I_1$	
$d = 3$	$X_j = \sum_{h=1}^{3} I_h (3 - h + 0) = 2I_1 + 1I_2$	

Table 3 presents the evolution model of the total fixed assets depending on the execution duration, *d* of the project. There are projects that cannot be put into use until they are completely completed (for example, the production line of a certain product, it cannot be put into use with a missing machine), but there are also projects from certain industries in which partially puts into use production capacities, which of course will lead to a certain production, respectively to the decrease of the total immobilization [5]. Thus, it comes to adjusting the value of the investment in a year h with:

$$I_h^{'} = I_h - P_h, \qquad (2)$$

Where:

$I_h^{'}$ - Adjusted value of investment;

P_h - The profit obtained by putting into partial use the production capacity;

The adjusted value of the resulting total asset:

$$X_j^{'} = \sum_{h=1}^{i-1} I_h (d - h + x) + \sum_{h=i}^{d} I_h^{'} (d - h + x), \quad (3)$$

Where:
i - The year in which the production capacity was partially put into use.The adjusted value of the total fixed asset as a function of x becomes:

Table 4: Adjusted values of total fixed assets

$x=1,$	$x=0.5,$	$x=0,$
$X_j^{'}=\sum_{h=1}^{i-1} I_h(d-h+1)+\sum_{h=i}^{d} I_h^{'}(d-h+1)$	$X_j^{'}=\sum_{h=1}^{i-1} I_h(d-h+0.5)+\sum_{h=i}^{d} I_h^{'}(d-h+0.5)$	$X_j^{'}=\sum_{h=1}^{i-1} I_h(d-h)+\sum_{h=i}^{d} I_h^{'}(d-h)$

Average Annual Fixed Assets

This indicator is calculated as the ratio between the total fixed asset and the execution duration and expresses the average value of the annual fixed asset [1]:

$$X_{aj}=\frac{X_j}{d_i}=\frac{\sum_{h=1}^{d} I_h(d-h+x)}{d_i}, \quad (4)$$

Where:
X_{aj} - Average annual immobilization of the j project;
X_j - Total immobilization of the j project;
d_i - Execution times;

Specific Immobilization of an Investment Project

In the case of an investment project, in which there are several investment variants, and these differ in production capacity, most likely the variant with a higher production capacity will require larger investment funds compared to the others and will of course lead to a higher total fixed asset. Thus, if the investor bases his choice of investment only on minimizing the total fixed asset, there is a high probability that the decision will be wrong [6]. That is why the specific fixed asset indicator expressed in terms of production capacity and production value is used.

- Expression of the indicator according to the production capacity.

$$X_{vj}=\frac{\sum_{h=1}^{d} I_h(d-h+x)}{r_{vj}}, \quad (5)$$

Where:
X_{vj} - Specific immobilization of variant v of project j;
r_{vj} - Production capacity of variant v of project j;

- Expression of the indicator according to the value of production

$$X_{vj}=\frac{\sum_{h=1}^{d} I_h(d-h+x)}{Vr_{vj}}, \quad (6)$$

Where:
Vr_{vj} - The value of the production of variant v of the project j;

$$Vr_{vj}=\sum_{p1=1}^{m} V_{p1}+\sum_{p2=1}^{m} V_{p2}+\ldots+\sum_{pn=1}^{m} V_{pn}, \quad (7)$$

Where:

$p1$ - The type 1 product from the production capacity;
m – The number of products of a certain type;
V_{p1} - Production value for product $p1$;

If a production capacity is put into partial use X_{vj} gets:

$$X_{vj}^{'}=\frac{\sum_{h=1}^{i-1} I_h(d-h+x)+\sum_{h=i}^{d} I_h^{'}(d-h+x)}{r_{vj}}. \quad (8)$$

$$X_{vj}^{'}=\frac{\sum_{h=1}^{i-1} I_h(d-h+x)+\sum_{h=i}^{d} I_h^{'}(d-h+x)}{Vr_{vj}}. \quad (9)$$

The Economic Effect of Total Fixed Assets

By immobilizing some investment funds for a certain period of time, an unrealized economic effect result [7].

$$E_{xj}=e\cdot\sum_{h=1}^{d} I_h(d-h+x), \quad (10)$$

Where:

E_{xj} - The economic effect of total fixed assets;

e - The economic efficiency coefficient of the respective project (this indicator shows how many lei annual profit will be obtained at one lei of invested capital; its level must be as high as possible) [8].

$$e = \frac{P_h}{I_j}, \qquad (11)$$

Where:

P_h - Profit of the h year;

I_j - The total initial investment of the j project;

The economic effect of the specific asset is:

$$E_{X_{vj}} = \frac{e \cdot X_{vj}}{r_{vj}}. \qquad (12)$$

Degree of Projects Acceptability

According to the concept of acceptability of industrial projects, the variant or alternative of investment project *j*, whose calculated values, results of economic indicators reach or exceed their limit levels (limit values requested as necessary or desired by the investor/ beneficiary), is rational, satisfactory, adoptable and implementable. In fact, the expected values of the economic indicators, which correspond to the maximization principle, represent the minimum level, their minimum acceptable threshold for the investor [9]. The expected values of the economic indicators, which correspond to the minimization principle, represent their maximum admissible ceiling, so that the investors consider the respective investment project convenient and achievable.

Conclusion

The economic evaluation of the projects represents an essential operation, indispensable to the activity of preparation of the investment decisions. All the adopted project solutions are accompanied by calculations and technical - economic and financial analyzes (presented in this chapter), so that the implemented projects are always the most efficient among the possible variants and alternatives of capital allocation.

The economic evaluation of investment projects refers to economic phenomena (including financial ones) and operates with notions, models, techniques and tools specific to the economic field, achieving the essential correspondence between resources and needs (benefits), so that resource consumption is justified only by obtaining significant results [10].

The economic evaluation of investment projects must provide clear, concise answers to a large number of questions, problems and concerns of investors and beneficiaries. The most important of these are presented in Table 5:

Table 5: Pparameter of economic evaluation of investment

What are the goals of the investor by initiating this project?
Do the project solutions adopted or envisaged contribute to achieving the stated goals?
What constraints are there in choosing the possible and admissible solutions identified?
Which solutions and variants ensure the highest efficiency of the allocated capital, analyzing the established indicators and efficiency criteria and, therefore, must be chosen?
How many and which of the analyzed projects must be accepted within the established budget?

In fact, the economic-financial evaluation (the financial one derives from the fact that any economic result can be expressed with a certain degree of precision in money, so any result has an analyzable financial correspondent) deals with the study of cause-effect relations.

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