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# WAYS TO EVALUATE AND INCREASE THE EFFECTIVENESS OF INVESTMENTPROJECTS IN INDUSTRIAL ENTERPRISES

***SULTONBOEVA MUNIRA, PULATOVA MOKHIRA***

**Abstract**

*The achievement of economic development of the country largely depends on the economic potential of industrial enterprises operating in the economy, the quality of their products, the level of their modernization. Of course, this cannot be achieved without investment. In the first years, a number of projects are being implemented to increase the investment activity of enterprises. However, the timing of investment projects in sectors of the economy, the assessment and analysis of their effectiveness, and the study of their role in creating added value are of great importance*

**Keywords:***economic growth, investment projects, effectiveness indicators, average return on investment*

**Author correspondence:**
***SULTONBOEVA MUNIRA***
*Associate Professor, Doctor of Science in Economics (DSc), Department of "Socio-economic sciences", Turin Polytechnic University in Tashkent, Tashkent, Uzbekistan*
*email: munira.khodieva@gmail.com*

***PULATOVA MOKHIRA***
*Associate Professor, Doctor of Philosophy (PhD) in Economical Sciences,The Department of "Finance", Tashkent Institute of Finance, Tashkent, Uzbekistan*
*email: pulatova_moxira@tfi.uz*

## INTRODUCTION

During the period of socio-economic development of the country, the investment factor plays an important role in increasing the level of economic activity and ensuring financial stability of any business entity operating in various sectors of the economy. Although there are a number of factors that contribute to the economic growth of the enterprise, the volume of investment as one of these factors can serve as a basis for the effective organization of financial and economic activities of enterprises.

President of the Republic of Uzbekistan Sh.Mirziyoev: "... economic growth will be achieved, first of all, through the creation of competitive industrial chains and increased investment in such projects. According to research from economic scientists, our country has all the opportunities and relative advantages in the production of more than 50 industrial products. In particular, there are all the necessary conditions for the petrochemical, metallurgical, mechanical engineering, electrical engineering, pharmaceuticals, construction materials, textiles, leather and footwear, food and "green economy" industries to become "drivers" of our economy. In particular, the identification of existing problems, their in-depth analysis, development of proposals for solutions" and research to increase the investment

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activity of industrial enterprises, which are recognized as a leading force in our economy, are among the most pressing issues.

The economic crisis of the global COVID-19 pandemic has led to a sharp decline in foreign direct investment in world practice in 2020 and 2021and a sharp decline in foreign direct investment is expected in 2020and economists predict that this situation will continue in 2021.

It is also acknowledged in scientific research that the crisis situation caused by the global COVID-19 pandemic could serve to trigger a long-term downward trend around the world. In order to assess the significance of this research, it is necessary to focus on the content of investment and justify its importance in the economy.

Therefore, it is necessary to accelerate the level of investment activity of industrial enterprises operating in our economy, to identify problems, eliminate them and form scientifically based conclusions by conducting research to expand investment in industries and sectors.

## LITERATURE REVIEW

A number of foreign economists have conducted research to improve the methodology of analysis of investment activity of enterprises. In particular, N.V. Although the textbook "Economic Analysis", published by Parushina, describes the specifics of the analysis of investment processes in enterprises and the methodology of analysis, but its methodological basis has not been sufficiently studied.

An analysis of the structural factors in the formation of investment capital of industrial enterprises of the Russian Federation is presented in the works of P.V. Golovanov and A.N. Kulikova, offering capital management tools to the company. The proposals of the authors are academic in nature, they do not sufficiently take into account the real situation of modern capital formation practices in the face of diminishing opportunities for affordable investments by Russian firms. In studies of a number of representatives of foreign economic thought, for example, such as R. Eschenbach and H. Schiller, the main factors of external influence on business processes occurring in a company and related aspects of a firm's investment activity are considered. This work, unfortunately, does not reflect the realities of companies' activities related to overcoming the difficulties associated with the war of sanctions. In some of the works available today, authors try to quantify the risks of investing. However, these works use verbal models that do not allow a probabilistic assessment of the influence of environmental factors on the effectiveness of investment projects. Such an assessment, in our opinion, is an important aspect of enterprise management to achieve sustainable industrial development during COVID-19.

## RESEARCH METHODOLOGY

In the study of statistical data and theories on the topic, the methods of logical thinking, scientific observation, systematic approach, statistical and comparative analysis, as well as the theory of ambiguous sets, which provide opportunities for economic and mathematical modeling, were used.

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## ANALYSIS AND RESULTS

On the basis of economic reforms in our country, it is important to establish modern industrial enterprises that produce competitive export-oriented products with high added value based on deep processing of local mineral resources, attract foreign direct investment to effectively use the region's production and resource potential.

Of particular importance in our country are areas of economic activity that meet the requirements of economic modernization. These areas are important as they are included in the state policy program on the production of import-substituting products due to certain external restrictions. It is obvious that the implementation of such a policy should lead to the creation of new industrial technologies, new types of goods and services based on the attraction of effective investment projects. Therefore, it is important to focus on developing methods for calculating investment efficiency indicators and evaluating their effectiveness. This not only increases the efficiency of the analysis of calculations, but also uses the opportunities of economic and mathematical modeling to analyze different options in making important investment decisions. In our view, applying the theory of uncertain sets to the final state would be much more effective. Because in any case, the decision will depend on the end result. Depending on the outcome, the return on investment should be evaluated according to three factors: good, medium, and bad, in order to clearly reflect that an effective decision has been made. This, in turn, benefits both the investor and the consumer. In our view, the selection of an uncertain set theory is a new, dynamically evolving approach to risk assessment that is one of the most active and promising areas of applied research in modeling, management, and decision making. Applying the theory of uncertain sets to the process allows, first of all, to express quality indicators without quantitative indicators without experts, to analyze uncertain data, to compare complex dynamic systems at a given level of accuracy, to reduce the risks of investment processes.

Of course, minimizing potential losses when investing in investment projects is the best option for any investor. Typically, the revenue from the start-up of such projects will be higher than for other projects and will decrease at the end of the payback period. Since the above-mentioned methods of analysis in determining the return on capital investment apply only to one-time decisions, the selected project is carried out only once and involves a certain period. It follows that in any situation, i.e., even in conditions of uncertainty, it would be appropriate to link the sets of uncertainties to the methods cited in order to ensure that the decision made is appropriate and that the chosen project is effective. This is because it can be said that uncertainty in NPV has already been accounted for by the discount rate. However, some researchers argue that the discount rate does not make a wise decision given the impact of potential losses on their actual financial value. In fact, a discount rate reduces the impact of potential losses, but using a higher discount rate means that the investor wants to make more money and he wants to risk his money. This, in turn, poses more risk followed by higher profits. On the other hand, if an investor applies a low discount rate, it means that he wants to make less money and does not accept the possibility of large losses - usually less risky for low-income investments. Thus, in our view, the discount rate reflects the level of risk preference of the investor, not the level of uncertainty.

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One of the main functions of corporate finance is to develop investment policy and make sound investment decisions. In making investment decisions by financial managers, it is important not only to focus on the results achieved over the past years, but also to be able to calculate and forecast the cost-effectiveness of investment projects in the future. In the theory and practice of financial management there are several methods of assessing the cost-effectiveness of investment projects and a system of indicators corresponding to them. Summarizing them , the methods of assessing the cost of effectiveness of investment projects can be divided into the following two groups:

1. Dynamic (discount) valuation method.
   - net present value or net present value (NPV);
   - internal rate of return (IRR , MIRR);
   - discounted return on investment (DPP);
   - profitability k index (PI);
2. Statistical (accounting) method.
   - average return on investment (ARR);
   - investment payback period (PP);

In addition, alternative methods are used to assess the cost-effectiveness of investments, i.e., real options and value-added methods.

One of the most common and widely used methods of assessing the cost-effectiveness of investment projects is the method of determining the NPV (Net present value). The net present value of the project is determined as follows.

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} = \sum_{t=0}^{n} \frac{CIF_t}{(1+r)^t} - \sum_{t=0}^{n} \frac{COF_t}{(1+r)^t} \qquad (1)$$

where r is the discount rate (norm);

n is the duration of the project;

$CF_t$ –t Free cash flow from the project during period [1];

$CIF_t$ - project receipts during period t;

$COF_t$ - t Total payments for the project in the period.

The general rule for NPV is that if an NPV > 0 situation is observed, the project can be accepted, if the opposite situation is observed, the project should be canceled because it cannot cover the costs incurred in advance of the project. If NPV = 0, the project has reached a "break-even point" and the costs incurred will be equal to the revenues received. Numerous studies show that the NPV indicator adequately reflects the relationship between cash inflows and outflows over a period of time, as well as the recovery of production costs and the achievement of a return on investment. In addition to being an absolute indicator, NPV has the property of aggregating, ie it is possible to aggregate NPV for different projects:

$$NPV\ (A, B, C) = NPV\ (A) + NPV\ (B) + NPV\ (C)$$

One of the important features of this criterion is the availability of a clear estimate of the rate of reinvestment of funds received for the project. The amount of NPV allows to assess the change in the value of the enterprise as a result of the implementation of projects, and this issue is one of the main objectives of financial management. In practice, the use of

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the NPV indicator as a comparative assessment is somewhat difficult because the comparison of absolute quantities is a complex process. For this shortcoming, financial management uses IRR-Internal rate of return and PI-Profitability index in making investment decisions. The internal rate of return is one of the most widely used and important criteria in assessing the economic efficiency of investments. The internal rate of return is the percentage of the discount rate when the current value of cash flows from an investment project is zero. The internal rate of return means the average return that can be obtained by using investment opportunities. The internal rate of return (IRR) is based on the following idea: If the average return (i.e., IRR ) is higher than the alternative investment opportunities, which are mutually equal in terms of market risk and payback period (i.e., cost of capital), the investment project must be accepted. In other words, any investment opportunity that is higher than the IRR capital value can be accepted. Any investment projects below the IRR capital value should be discarded.

The following equation is used to determine the internal rate of return:

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+IRR)^t} = \sum_{t=0}^{n} \frac{CIF_t}{(1+IRR)^t} - \sum_{t=0}^{n} \frac{COF_t}{(1+IRR)^t} = 0 \qquad (2)$$

It follows from this equation that the higher the IRR, the correspondingly higher the economic efficiency of the investment. There are different approaches to the IRR indicator, first it sets a clear limit on the maximum interest rate of the source being attracted and it is possible to set the amount of interest payment for the source involved by determining the minimum threshold interest rate. Second, the IRR allows to determine the lower level of return on investment costs. Third, the internal rate of return can be expressed as the marginal rate of return on investment. This criterion means that it is expedient to make additional capital investments in the project.

In turn, it should be noted that IRR also has some shortcomings in practical use. In some foreign literature, IRR is interpreted in the same way as the annual rate of return on investment. This interpretation makes the IRR method attractive and widespread. In fact, the IRR can express the average annual return on investment only if the following conditions are met for the project:

- if no cash flows are made on the project at certain intervals;
- the proceeds from the project are reinvested at a rate equal to the IRR.

Taking into account these shortcomings, scientists have developed a method of modified internal rate of return (MIRR - Modified Internal Rate of Return) to determine the cost-effectiveness of investments by improving the IRR. The following formula is used to determine MIRR.

$$MIRR = \sqrt[n]{\frac{\sum_{t=0}^{n} CIF_t(1+r)^{n-t}}{\sum_{t=0}^{n} \frac{COF_t}{(1+r)^t}}} - 1 = \sqrt[n]{\frac{FV_{CIF}}{PV_{COF}}} - 1 \qquad (3)$$

The MIRR indicator, determined using the above formula, typically assumes that the user, like the average value of the enterprise capital, will reinvest the proceeds from the project at a rate r. In this case, other rates may be used as a criterion for reinvestment of funds

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received. For example, prudent investors may use risk-free rates or deposit rates of trust banks as a criterion for reinvesting funds. In this case, formula (4) looks like this:

$$MIRR = \sqrt[n]{\frac{\sum_{t=0}^{n} CIF_t(1+j)^{n-t}}{\sum_{t=0}^{n} \frac{COF_t}{(1+r)^t}}} - 1 = \sqrt[n]{\frac{FV_{CIF}}{PV_{COF}}} - 1 \quad (4)$$

where, j is the estimated reinvestment rate.

In general, the method of determining the modified internal rate of return - MIRR - is not a very ideal method, but in comparison it allows to determine the exact rates of reinvestment of funds and calculate the real annual rate of return. The use of the MIRR method in determining the cost-effectiveness of investments requires consideration of the following two important issues.

1. What should be the reinvestment rates of cash flows over a period of time? The results of a study of the activities of foreign companies in this practice show that usually when companies make decisions on the MIRR, they assume the reinvestment of cash flows for a certain period of time at the cost of capital.

2. determining the future value of project revenues, it is necessary to answer the question of what rate is equal to the initial investment costs, ie the future value of cash flows from production activities as FV (CF) at the end of t year and the current value of investment costs as PV (Inv). In this case, the following equation is formed for MIRR:

$$PV(Inv) = \frac{FV(CF)}{(1+MIRR)^T} \quad (5)$$

One of the important methods used in financial management to determine the cost-effectiveness of investment projects is the project profitability index method. Profitability Index ( *PI-Profitability Index* ) - represents the share of discounted proceeds from the project in investment costs and is determined as follows:

$$PI = \frac{\sum_{t=0}^{n} \frac{CIF_t}{(1+r)^t}}{\sum_{t=0}^{n} \frac{COF_t}{(1+r)^t}} = 1 + \frac{NPV}{I_0} (6)$$

If the projects are mutually exclusive, then we need to determine which of the projects has a positive NPV and then group them to determine which of them is the best. To further explain the essence of the above, we cite the following problem, developed on the basis of conditional indicators (Table 1). The joint-stock company was offered vacant real estate at zero value on the condition of investment. The financial manager forecasted the following cash flows (including the purchase price of the property) based on a review of a number of options and based on the investment assessments made.

To calculate the NPV, we find the present value of the individual cash flows and then sum those discounted cash flows. The sum is the value the project adds to or subtracts from shareholder wealth.

The internal rate of return is defined as the discount rate that equates the present value of a project's cash inflows to its outflows. In other words, the internal rate of return is the

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interest rate that forces NPV to zero. The calculation for IRR can be tedious, but it provides an IRR function that merely requires you to access the function and enter the array of cash flows.

**Table 1**

**Project Cash Flows and Cost of Capital**

| **Inputs for Project Cash Flows and Cost of Capital, r** | | | | | |
|---|---|---|---|---|---|
| **INPUTS:** | | | | | |
| **r =** | **10%** | | | | |
| | **Initial Cost and Expected Cash Flows** | | | | |
| **Year** | **0** | **1** | **2** | **3** | **4** |
| **ProjectS** | **−$100000** | **$53000** | **$43000** | **$18740** | **$15000** |
| **Project L** | **−$100000** | **$19000** | **$27000** | **$23450** | **$78000** |

The IRRs for Project S and L are shown below, along with the data entry for Project S.The IRR method of capital budgeting maintains that projects should be accepted if their IRR is greater than the cost of capital. Strict adherence to the IRR method would further dictate that mutually exclusive projects should be chosen on the basis of the greater IRR. In our example, each project has an IRR that exceeds the cost of capital (10%) so both projects should be accepted if they are independent. If, however, the projects are mutually exclusive, we would choose Project S because it has the higher IRR. Recall that this differs from our conclusion when using the NPV method. So, we have a conflict between the NPV and the IRR methods for ranking Projects S and L (Table 2).

**Table 2**

**Summary of Selected Evaluation Measures**

| **Evaluation Measures** | **Project S** | **Project L** |
|---|---|---|
| Netpresentvalue, NPV | $8 043,85 | $10 480,16 |
| Internal rate of return, IRR | 14,69% | 13,79% |
| Modified IRR, MIRR | 12.15% | 12.78% |
| Profitabilityindex, PI | 1,08 | 1,10 |
| Payback | 2,21 | 3,39 |
| Discountedpayback | 3,21 | 3,80 |

An NPV profile shows how a project's NPV declines as r (the cost of capital used to calculate the NPV) increases. The crossover rate is the rate at which the NPV of Project S is equal to the NPV of Project L. The easiest way to find the crossover rate is to subtract one project's cash flows from the others and find the IRR of this differential cash flow stream.

However, the NPV of the project is positive, and its amount is doubled, in which case the NPV is also doubled: According to economic laws, if the cash flow of an investment opportunity is doubled, its value is also doubled. However, the IRR rule does not have this specificity - it is not provided for in the scope of investment opportunities. Because IRR is an

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indicator of the average return on investment, financial managers should not use the IRR rule when comparing different amounts of projects (Fig. 1).

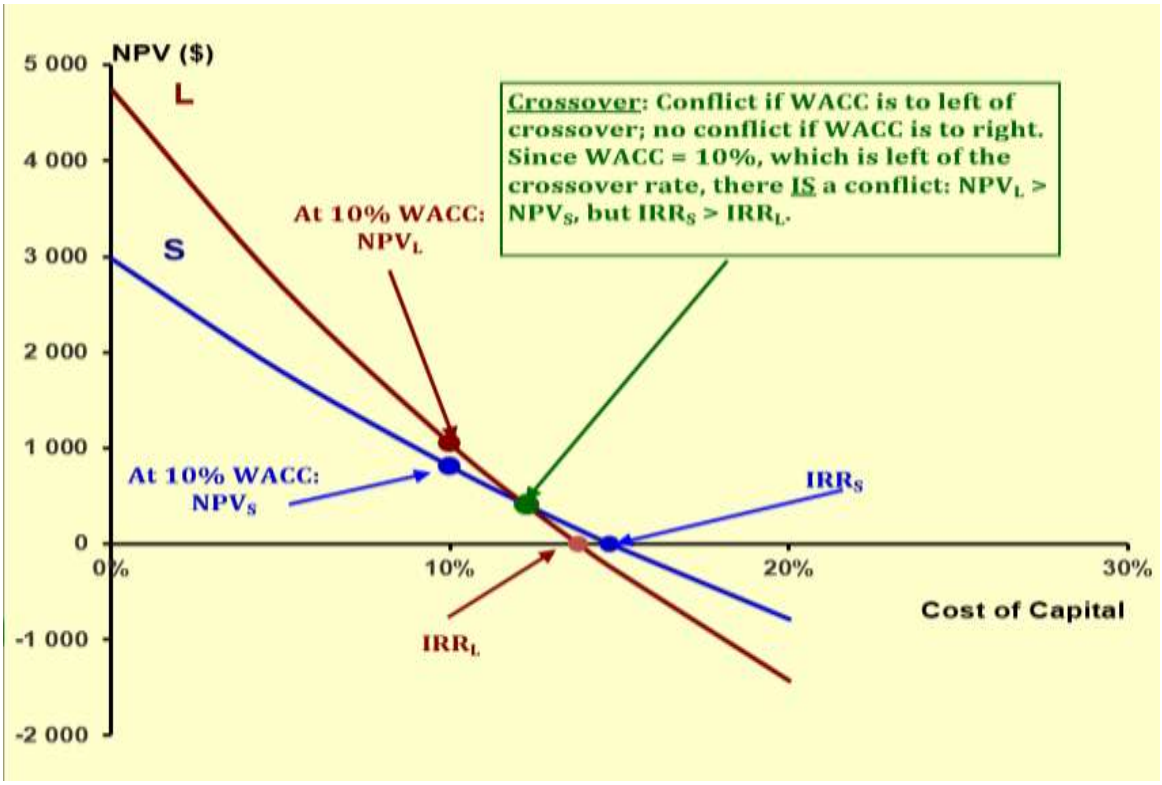


**Fig.1. NPV Profiles for Projects S and L (Millions of Dollars)**

When making two-stage investment decisions, the company focuses not only on choosing the optimal investment term, but also on the investment share of each stage. Taking into account the two-stage investment decisions, we analyze the amount of production at the cost and benefit of each stage and can create a model in conditions of uncertainty, including the optimal investment period and ratios. In some cases, the investment project will have a net maximum capacity, and the volume of this project will become the upper limit of subsequent production that cannot be repaired in the future[1]. The financial manager will be able to choose a project with the highest IRR due to mutually exclusive investments, while at the same time trying to expand the capabilities of the IRR rule, which determines the internal rate of return expected to be invested in the project. However, just because one has a high IRR, choosing one of the projects can lead to errors. In particular, it is difficult to obtain any results from a comparison of their IRRs if they are stratified by the amount of investment in the projects, the timing of the cash flows, or their risk levels. In the process of studying international financial management, the use of discounted methods in assessing the cost-effectiveness of investment projects can lead to a number of positive results, as well as some controversial situations in decision-making. Of course, the analysis of our statements on the example of joint-stock companies operating in our country could further illustrate the

[1] Yu-Hong Liu , I-Ming Jiang, Optimal proportion decision-making for two stages investment The North American Journal of Economics and Finance Volume 48 , April 2019, Pages 776-785, https://doi.org/10.1016/j.najef.2018.08.002

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problem, but we must admit that the indicators of economic efficiency of investment projects adopted by joint-stock companies in the real sector of the economy with state participation in most cases reviewed and approved by the head office.

## CONCLUSION

Analysis of existing methods of assessing investment activity shows the need to form a system of indicators that combines computational algorithms that describe the development of investment activity of enterprises. These indicators should be in line with international standards in science and investment, the experience of leading international organizations, methodological materials and organizational approaches used in international statistical practice in the analysis and evaluation of investment activities. Given the effectiveness of investment projects, entrepreneurial ability, risk-based and lack of full guarantees of the expected positive outcome in ensuring the investment activity of enterprises to increase profitability, it is advisable to apply the theory of uncertain sets in the implementation of analytical calculations. This allows not only to anticipate the risks and risks of investment projects, but also to assess the effectiveness of the expected investment project. It is also necessary to pay sufficient attention to the effectiveness of investment projects currently being implemented in the leading enterprises of the economy, and in particular to analyze the payback period and make strategic decisions accordingly. Second, taking into account the changing market conditions, especially the sharp change in the prices of manufactured products, the investment efficiency and profitability of the enterprise is lost. This indicates that the investment project will not be able to meet the projected payback period in a timely manner and that the project will be ineffective for the enterprise. Third, it is expedient to assess the effectiveness of the investment project, taking into account the fluctuations of the economic cycle, emergencies and sharp intersectoral competition, through world-recognized methods.

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