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**ЗБІРНИК ПРАЦЬ
МІЖНАРОДНОЇ
НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ
«ІНТЕЛЕКТУАЛЬНІ
ІНФОРМАЦІЙНІ СИСТЕМИ
В УПРАВЛІННІ ПРОЄКТАМИ
ТА ПРОГРАМАМИ»**



Харків–Коблево, 2023

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Міжнародна науково-практична конференція «Інтелектуальні інформаційні системи в управлінні проєктами та програмами», Коблево, 12–15 вересня 2023 р. Збірник праць. – Харків: ХНУРЕ, 2023. – 226 с.

Подано матеріали пленарних та секційних доповідей міжнародної науково-практичної конференції «Інтелектуальні інформаційні системи в управлінні проєктами та програмами». Протягом виступів було обговорено основні напрями та перспективи науково-технічних дослідів, досвіду впровадження сучасних методів економіко-математичного моделювання та інформаційних технологій в управління бізнесом, проєктами та програмами. Висвітлено сучасний рівень розвитку теорії та практики інноваційного менеджменту, управління проєктами і економічної безпеки.

Для спеціалістів, викладачів, аспірантів і студентів.

*Статті відтворені з авторських оригіналів, поданих оргкомітету,
в авторській редакції.*

*Рекомендовано до друку
вченою радою Харківського національного університету радіоелектроніки
(протокол № 10 від 06.10.2023 р.).*

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EXPLANATORY MODEL FOR THE EVALUATION OF INVESTMENT PROJECTS

Theoretical and practical issues of constructing an explicative model for assessing investment resources in the process of supporting investment decision-making at modern enterprises, which are based on both classical economic and expert assessment methods using a neural network as a modern technology of artificial intelligence, have been studied.

Support for investment decision-making begins with solving the problem of evaluating investment projects in terms of what resources an investor has and what exactly he wants to receive based on the existence of certain alternatives for investing these resources. The solution to this problem is possible due to the construction of an explicative model, which includes a circuit with classical methods, a circuit of expert evaluation and a circuit using a neural network, which complement each other and provide a certain set of investment decisions at the output, each of which has an integral estimate and rank, which makes it possible to implement their selection and selection.

Familiarization of the investor with investment options begins, as a rule, with the study of investment documents, such as: investment project, feasibility study, investment memorandum, business plan, investment proposal, investment project passport, securities issue prospectus.

When deciding on the financing and implementation of a specific investment project, one should take into account, firstly, the availability of all types of resources (human, material, financial, land, water), and secondly, its compliance with certain parameters. In addition, it is necessary: to find out if there are alternative ways to achieve the corresponding economic results at a lower cost; determine how rational is the use of available resources within the investment project; check the possibility of increasing profitability by changing the scale of the project, technology, location, method of implementation, etc. [1].

In addition, in order to make an investment decision, one should understand the areas of investment that have the greatest investment attractiveness in terms of competitiveness, analyze the assessment methods that will be used in the investment decision assessment model, supplement these methods with expert assessments, and use neural networks as the main support tool. making investment decisions.

As you know, in the project-investment analysis they act in three main areas, that is, they evaluate: firstly, the attractiveness of the investment project; secondly, its efficiency; thirdly, the risks associated with the implementation of the project. The assessment of financial and economic efficiency is based on certain standard methods, such as the net present value (NPV) method, the determination of the payback period of investments (PP), the assessment of the internal rate of return of investments (IRR), the assessment of the profitability index (ROI) and the investment efficiency ratio (ARR).) etc. The net present value method is very popular in the evaluation and modeling of investment projects. Net present value or present value of future cash flows (NPV) is the present value of future cash flows from the project (income) minus the present value of the investment in the project (expenses). The net present value method allows you to determine the net balance of discount (reduced to present value) receipts (revenues) and expenses for a certain period of time [2].

In addition, modeling based on it allows the selection of investment projects. For example, in order to compare investment projects according to the factors of influence of changes in the situation on the product market, you can use the response sensitivity (RS) indicator calculated by formula (1):

$$RS_{r_1, r_2} = \frac{\sum_{t=0}^n \frac{CF_t}{(1+r_1)^t} - CI}{\sum_{t=0}^n \frac{CF_t}{(1+r_2)^t} - CI} - 1, \quad (1)$$

where CF_t – cash inflow (cash flow) for period t ;

CI – initial investment (capital investment);

r_1, r_2 – discounted rates reflecting changes in market conditions;

n – project life cycle time. [1]

Consequently, the project that is more sensitive to changes in discount rates, that is, to changes in the situation on the product market, will be less attractive, and vice versa.

It can be noted that the standard investment appraisal methods have proven themselves well, but have both positive and negative features. Disadvantages of the NPV method:

1. It does not allow assessing the relative measure of the growth in the value of the enterprise as a result of the project.

2. The complexity of determining the discount rate, on which the results of the assessment significantly depend.

3. Keeping the discount rate unchanged when calculating NPV is a fairly large assumption.

4. Does not allow assessing the degree (reserve) of project sustainability [2].

To level the above shortcomings, the authors propose to use these methods in combination with expert evaluation and the use of neural networks based on an explicative model for evaluating investment decisions. Explication in general (lat. explicatio - explanation, deployment). Explicative methods are a group of techniques and research methods that are analytical in nature and are distinguished by accuracy and specificity.

So, using [3], it can be noted that on the basis of the existing concept of explication, which is understood as the manifestation of hidden phenomena through many others, it is assumed that the level of utility and adaptability of investment projects to internal and external conditions are revealed through the functional characteristics of certain subsystems. This allows you to build an explicative model for evaluating investment decisions based on a methodical approach to evaluating an investment project, which is based on the principle of the triad of the following subsystems: assessment positions from the point of view of the head of the enterprise; assessment of positions based on the integral assessment of external experts; assessment of positions from the point of view of a potential investor.

Successive stages of explication in the model proposed by the authors:

1) allocation at the initial stage of economic characteristics and features, according to which the properties of the explicated investment project are transferred and replaced by properties that can evaluate it, that is, by standard methods of evaluation;

2) search for indicators that have selected criteria and are formed by attracting external experts;

3) expression, that is, the explication of the selected criteria of the investment project through the found features using neural networks.

Schematically, the methodological approach to the evaluation of investment projects based on the triad is shown in Fig. 1.

Thus, a modern approach to the construction of an explicative model for the evaluation and selection of investment decisions is proposed, which, unlike the existing ones, has the following advantages:

- explicative presentation of the investment project through the selection of evaluation criteria, which creates points of dialogue between the investor, the head of the enterprise, external experts based on the created software product;
- calculation of the value of evaluation criteria and their ranking using a neural network that learns both from the historical data of successful investment projects and in the absence of data and will be able to form an appropriate decision;

– interpretation of the integral assessment with the definition of decisions that can be made.

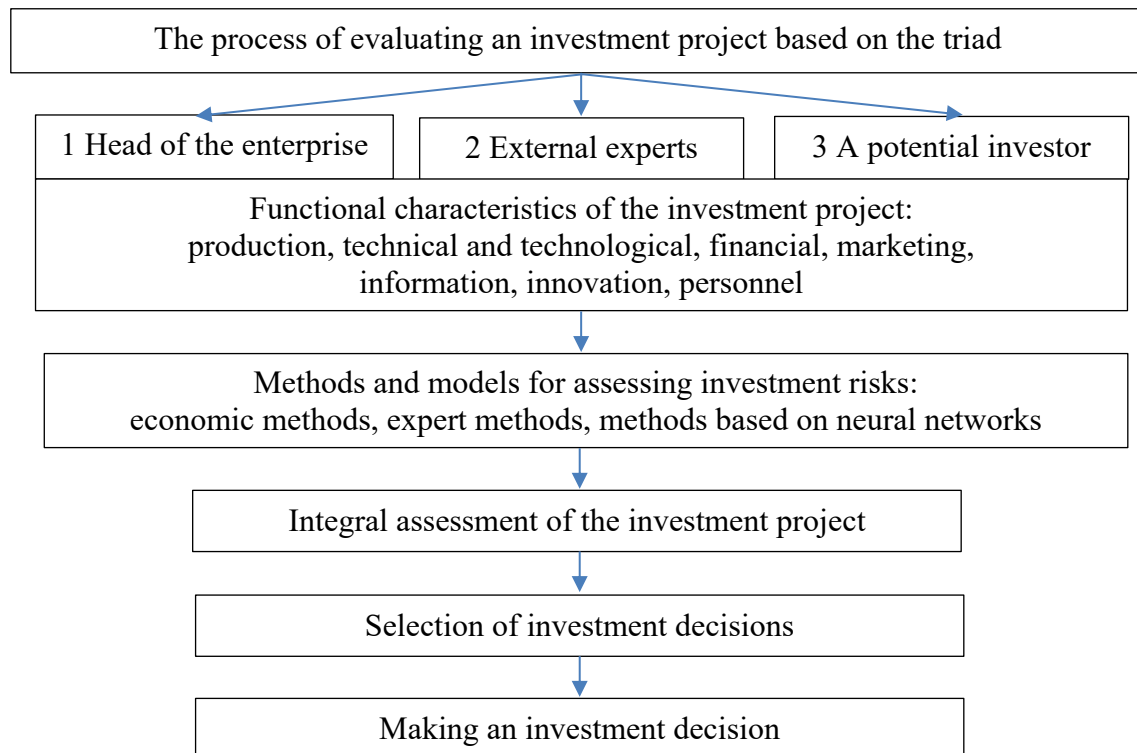


Fig. 1. Methodical approach to the assessment of investment projects based on the triad
(development of the authors)

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Підп. до друку 06.10.2023. Формат 60x84 1/16. Спосіб друку – ризографія.
Умов. друк. арк. 13,2. Тираж 300 прим. Ціна договірна.

Віддруковано в типографії ФОП Андреев К.В.
61166, Харків, вул. Богомольця, 9, кв. 50.
Свідоцтво про державну реєстрацію №24800170000045020 від 30.05.2003 р.
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