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## ORGANIZATIONAL AND ECONOMIC BASES OF INVESTMENT MANAGEMENT INDUSTRIAL ENTERPRISES

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*Дискіна А.А. Теоретико-методичний підхід до оцінки інвестиційного забезпечення промислових підприємств.*

У статті запропонована схема оцінки ефективності інвестиційного забезпечення підприємства, яка надає можливості безперервного контролю і виявлення негативних відхилень не за результатами інвестиційної діяльності, а вже в процесі їх досягнення. Також представлена модель стану інвестиційного забезпечення підприємства, яка уможливіє формалізацію побудови траєкторії зміни стану інвестиційного забезпечення у фазовому просторі.

*Ключові слова:* інвестиційне забезпечення, інвестиційна привабливість, метод багатомірного шкалювання, управління інвестиційним забезпеченням

*Дыскина А.А. Теоретико-методический подход к оценке инвестиционного обеспечения промышленных предприятий.*

В статье предложена схема оценки эффективности инвестиционного обеспечения предприятия, которая предоставляет возможность непрерывного контроля и нахождения негативных отклонений не по результатам инвестиционной деятельности, а уже в процессе их достижения. Также представлена модель состояния инвестиционного обеспечения предприятия, делает формализацию построения траектории изменения состояния инвестиционного обеспечения в фазовом пространстве.

*Ключевые слова:* инвестиционное обеспечение, инвестиционная привлекательность, метод многомерного шкалирования, управления инвестиционным обеспечением

*Dyskina A.A. Theoretical and methodological approach to the evaluation of investment security industry.*

The paper proposed a scheme for evaluating the effectiveness of investment support company that provides the possibility of continuous monitoring and identification of negative deviations are not the results of investment activities and is in the process of achieving them. Also presented model state investment security company that enables the formalization of constructing a trajectory change the state investment support in the phase space.

*Keywords:* investment software, investment attractiveness, multidimensional method scaling investment management software

Investment support is the most important prerequisite for the effective functioning of industrial enterprises, since it contributes to the formation of productive capacity for innovative scientific and technical basis and competitiveness in foreign markets. Investment support is achieved by increasing and the optimal use of the volume of current investment of resources in the investment attractive enterprises in the priority sectors of the economy.

### Analysis of recent researches and publications

State issues and evaluation of investment support for industrial enterprises are well represented in works of such scientists, in particular as: I.A. Blank, V. Heyets, V.M. Grineva, T.V. Mayorova, A. A. Peresada, V.M. Hobta, N.A. Khrushch, L.I. Fedulova, U.F. Sharp, A.D. Sheremet, A.M. Yastrzemska and others [1-6]. However, taking into consideration scientific developments on the assessment of investment provision, the specific problems of applied nature has not been adequately addressed and remain insufficiently researched and methodically secured, require further development in the scientific-theoretical and practical aspects. In particular, require further studies theorist-methodological guidelines on the assessment of the effectiveness of investment support for enterprises, the investment of enterprise in the phase space. The necessity of development of theoretical-methodological support of these scientific problems led to further consideration of these issues.

### The main part

According to the author, the evaluation of the effectiveness of managerial influence only on the end results, i.e. at the point position, somewhat restricts scientific-methodical use of this approach in practice, it is therefore proposed to add another structural element of the management process. This is represented in the diagram, modeling the desired trajectory changes of state investment support, the comparison of which with the actual trajectory of the control object in the phase space during the transition according to the results of monitoring and diagnosing the past would give the possibility of continuous monitoring and detection of adverse deviations in investment performance, and in the process of achieving them (fig. 1).

On the basis of information from the environment and from the control object and a given system

investment the subject of management is a definite model and, in particular, by means of a system of analytical indicators, defined the future desired state of the control object in the phase space in which he must in the end prove to be effective in the case of achieving the stated objectives, and is focused on the

impact on the object, and also taking into account internal and external opportunities and constraints, and other factors the impact of moving from an existing to a new state, which, in fact, is determined by the conditions listed.

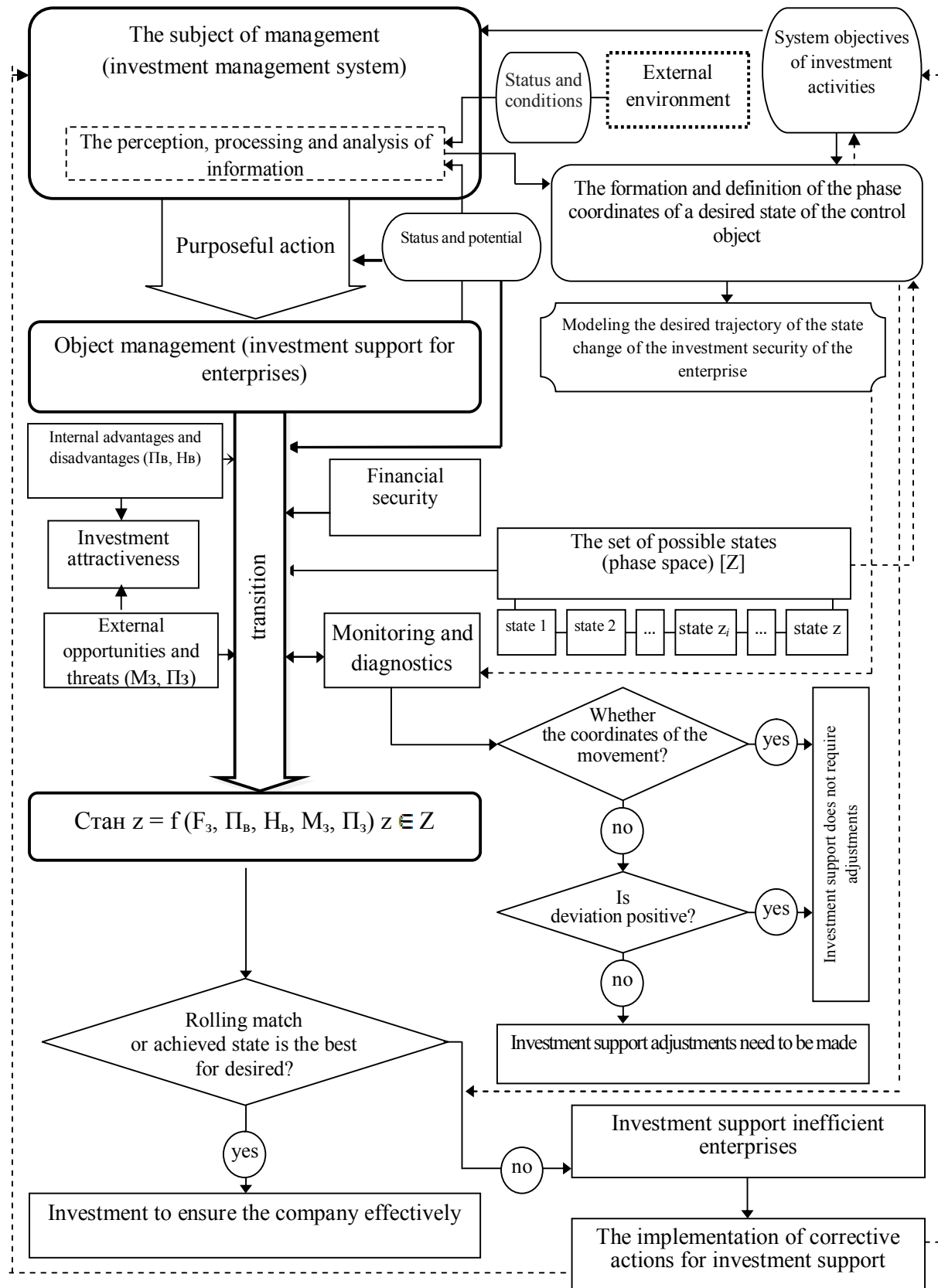


Fig. 1. The scheme of assessment of investment efficiency of enterprise

The results of comparing the achieved and desired state a conclusion about the effectiveness of investment support for enterprises. Although the modeling is basically inherent in strategic management, this element is required for current and investment maintenance of the company.

As the name of the axis, forming an n-dimensional phase system of coordinates, in which the trajectory of the system, change the state of investment security may be any of both quantitative and qualitative indicators, directly or indirectly characterizing the performance of investments, and the use of which, in the opinion of stakeholders in the investment process, in particular, such parameters may be the investment attractiveness of the enterprise and the present value of the investment project, the pace of socio-economic growth of the enterprise, profitability of investment activity, certain integral indicators, and so on [7].

Note that given one interpretation of the term mechanism as a set of intermediate states and processes that make up a certain phenomenon, the scheme in terms of events occurring between the subject and object of management and the external environment, with a certain simplification can be considered as the mechanism of the process of investment management software [8].

As the phase coordinates of the system, i.e. the components of the vector  $Z_i(t)$ , representing the state of investment security at a certain time  $t$ , it is proposed to use the indicators resulting from the implementation of the developed methodical approaches to the formation of optimal financial security of the enterprise and assess its attractiveness, namely: General indicator of the assessment of financial security and a comprehensive index for assessing the investment attractiveness of the enterprise. The second parameter for the adequate application requires persistence of the ranking list in each moment of time will be measured, actually achieved the status of investment provision of a particular company, which in practice can cause certain objective difficulties, however, the method of multidimensional scaling allows you to eliminate these difficulties, since the evaluation of this method shows the distance of the enterprise from the sample [7].

Methods of multidimensional scaling designed for the analysis of the structure of subjective data. They allow to identify the factors underlying the similarities and differences between options, and to build a model of decision making about the similarities. The main and important features of the method of multidimensional scaling as a tool for the combination of individual indicators in the group is as follow [9]:

1) Information about the similarities and differences of the competing companies is defined in n-dimensional space of the original features, simultaneously on all primary indicators broken down by each pair of competitors.

2) The task of combining individual estimates in generalized (determination of coordinates of objects the adjustment in the new space of lower dimension (the space of latent topics), is formed as

optimize problem which is solved with help of special methods of optimization. The optimization criterion is the minimum value of "stress", which provides the highest possible level of preservation of the degree of similarities and differences of the estimated objects in the new space of lower dimension.

3) Method of multidimensional scaling calculated on the basis of both interval and ordinal variables. The accounting nature of the primary indicators is determined in the optimization process by accounting for ordinal values only for the storage requirements of the order.

It should be noted that the methods of multidimensional scaling work only in the case when the similarity or the differences between all parameters of the studied sets are generated by one pattern. When comparing a single pair of parameters of the subject based on one system of factors, and when comparing other pair on the other, multidimensional scaling a satisfactory result cannot give. Moreover, the solution depends essentially on the proposed set of parameters. The same parameters that are included in different sets can be described by a variety of factors [10]. This circumstance is a consequence of the fact that the differences between one set of parameters may vary according to some factors, and the differences between parameters of different set-differences in other factors.

The resulting state model of investment support for enterprises in the phase space for a certain period of time  $T$  will look like this:

$$Z(t) = (Z_{F_3}(t), Z_{R_{imm}}(t)), t=1, T \quad (1)$$

where  $Z(t)$  is the state of the investment of the collateral at the time  $t$ ;

$F_3$  – evaluation of the financial security of the enterprise;

$R_{imm}$  – complex index of evaluation of investment attractiveness of the studied enterprises.

The presented model provides a formalization of the construction of the trajectory of change of state investment support in the phase space in the framework of the approach proposed above (fig. 2).

The goal of investment management is to reduce the deviation of the actual trajectory of investment components from desirable in the process of moving an object from one intermediate state to another in the phase space [8].

From a mathematical point of view the objective of management is the tendency to increase (decrease) of a certain criterion of efficiency, which is the analytical expression of the latter [11].

As criterion of efficiency of investment provision is proposed to choose the difference between the desired and actually achieved the status of the investment of the collateral at the time  $t$ :

$$K_E = Z_{\text{баж}}(t) - Z_{\text{факт}}(t) = (Z_{F_3}^{\text{баж}}(t), Z_{R_{imm}}^{\text{баж}}(t)) - (Z_{F_3}^{\text{факт}}(t), Z_{R_{imm}}^{\text{факт}}(t)) \rightarrow \min, \quad (2)$$

where  $Z_{\text{баж}}(t)$ ,  $Z_{\text{факт}}(t)$  are respectively the desired and actual state of investment security in time;

$F_{\text{баж}}(t)$ ,  $F_{\text{факт}}(t)$  are respectively the desired and the actual evaluation of the financial security of the enterprise;

$R_{\text{иннбаж}}(t)$ ,  $R_{\text{иннфакт}}(t)$  are respectively the desired and actual comprehensive evaluation of investment attractiveness of the studied enterprises.

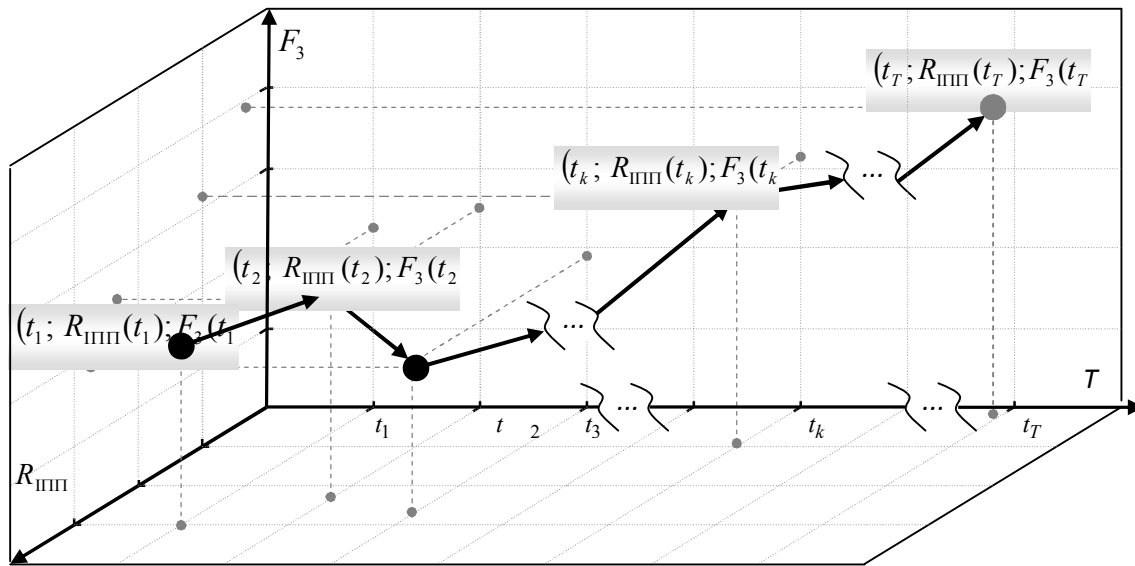


Fig. 2. The model of state investment support

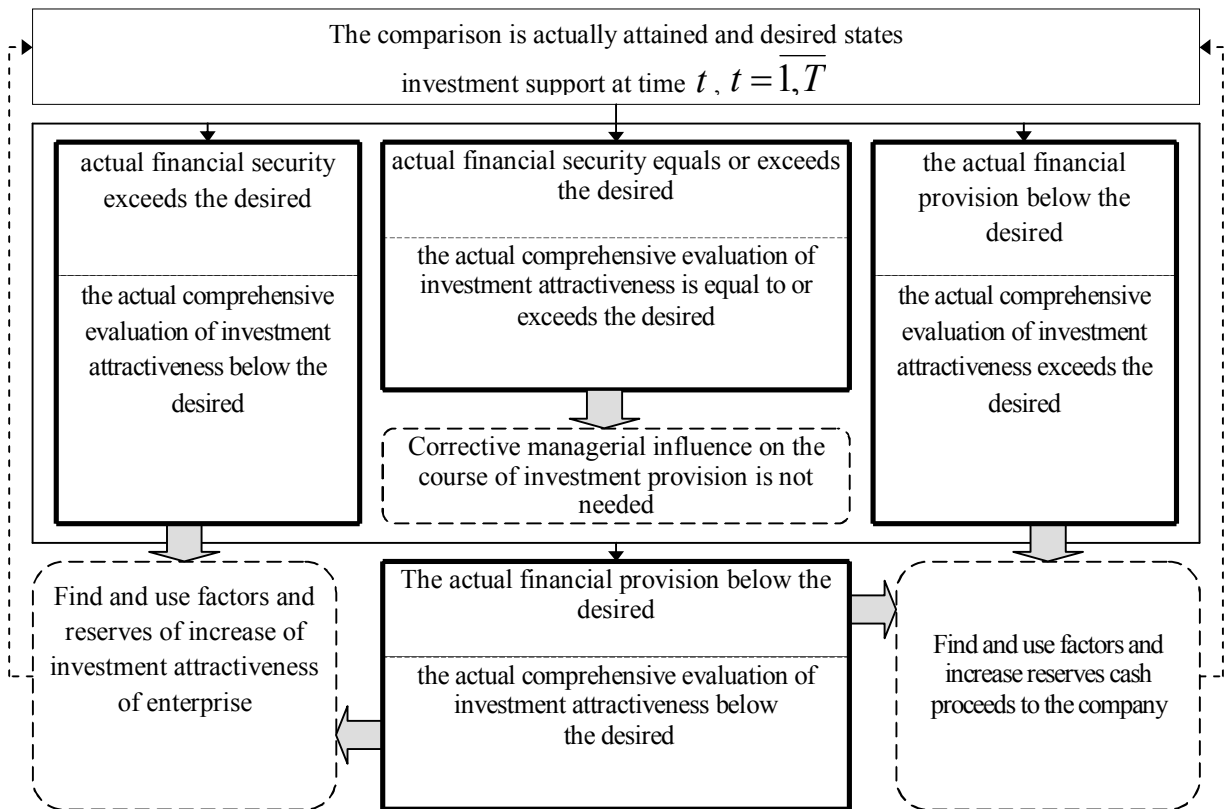


Fig. 3. The mechanism of formation and mutual coordination of corrective actions on the state of investment provision

Logical analysis of the above expressions shows that the direction of optimizing the value of the proposed performance criterion is the reduction.

On the comparison of the trajectories at each time point may arise in four situations:

- 1)  $F_3^{\text{баж}} \geq F_3^{\text{факт}}$  та  $R_{\text{инн}}^{\text{баж}} \geq R_{\text{инн}}^{\text{факт}}$ ,
- 2)  $F_3^{\text{баж}} \geq F_3^{\text{факт}}$  та  $R_{\text{инн}}^{\text{баж}} < R_{\text{инн}}^{\text{факт}}$ ,
- 3)  $F_3^{\text{баж}} < F_3^{\text{факт}}$  та  $R_{\text{инн}}^{\text{баж}} \geq R_{\text{инн}}^{\text{факт}}$ ,
- 4)  $F_3^{\text{баж}} \leq F_3^{\text{факт}}$  та  $R_{\text{инн}}^{\text{баж}} \leq R_{\text{инн}}^{\text{факт}}$

It is clear that the situation 4, where the actual trajectory of change in status of investment provision coincides with or deviates positively from desirable is evidence of effective investment management in the enterprise, while the occurrence of negative deviations (corresponding to situations 1, 2, 3) requires adequate management interventions in the flow of investment security, that is, regulation that should contain the definition and implementation of measures aimed or adjustments to the financial and economic parameters of the individual investment projects or enterprises, in general, to eliminate those factors that caused the deviation.

## Conclusions

A mechanism to ensure mutual linking corrective actions to return the control object on the planned trajectory presented in fig. 3.

Also, the application of the theorist-methodological approach to evaluating the effectiveness of investment support for industrial enterprises will identify changes in the level of investment ensure to make timely adjustments in the functioning of the enterprise and to ensure the effectiveness of management actions.

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