

# Innovation-Investment Activity in the Achievement of Enterprise Commercial and Innovative Success

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**Abstract**— The paper highlights the relationship between the efficiency of investments and innovations, emphasizes the scientific and methodological approaches to determining the amount of investments in the production of innovative products in the process of operational management of investment activity of industrial enterprises and the choice of investment-innovation project on the basis of its profitability assessment. The scientific-methodical approach to calculating the formation of the reserve and distribution of profit for the formation of own sources of financing of investment-innovation activity of industrial enterprises is offered; it gives an opportunity to provide high-tech development of the enterprise. The sequence of realization of investment-innovation strategy of the enterprise as a component of the general strategy of the enterprise is determined.

**Keywords**— *investments, innovations, investment-innovation activity, planning, investment modeling, investment-innovation strategy*

## I. INTRODUCTION

Integration of the national economy into the world of information space is one of the main factors of its competitiveness and dynamic growth. Under such conditions, transformational processes are important for industrial enterprises because they are associated with the development of investment-innovation activity, oriented on scientific high-tech production and infrastructure development for the formation of intellectualized information space. Therefore, the purpose of the paper is to study the interconnection of investments and innovations and to substantiate the role of organizational and economic processes of investment-innovation in achieving the company's commercial and innovative success, increasing its profitability.

The need to develop dynamic sustainable development of the country's economy, accelerated pace of implementation of scientific and technological progress lead to global changes, related to the development and dissemination of innovations, maximal use of new factors of economic growth. The activation of such transformations increasingly depends on the investment attractiveness of the country's social-economic environment, its opportunities for technological upgrading of production, increasing of the

production of innovative products, and further increasing of the rate of social-economic development of the economy through the innovation component. The amounts, structure and efficiency of investment use is a key factor, determining the results of management at the macro and micro levels of the national economy, its competitiveness and prospects for development. Changes in the structure of investments affect the development of various spheres and sectors of the national economy (that can be explained by their ability to provide realization of new projects and innovative production and management mechanisms).

Consequently, the directions of intensification of investment activity of industrial enterprises were and still remain the most urgent for finding ways of transition to an innovative type of development. Innovative development is aimed at developing a system of measures for the introduction of new types of products and services, new methods of their production based on the use of scientific, scientific-technical and intellectual potentials.

## II. UNRESOLVED ISSUE

In scientific works of scientists, the fundamental provisions are grounded that create the basis for the study of investment-innovation activity of enterprises [2; 3; 4]. However, the development of social-economic relations, the potential of technical modernization, and the strengthening of integration influences require new scientific developments in the areas of improving the management system of investment-innovation activity in order to ensure the integration and adaptation of enterprises to changes in the market environment and increase of their competitiveness both at the domestic and the foreign markets.

An innovative type of economic development is increasingly becoming the foundation that determines the social-economic level of enterprise development and its perspectives in the global economy [10]. Investments, in our opinion, serve as an instrument for the realization of innovations. The interaction of innovations and investments contributes to the achievement of certain results, which allows us to investigate the value of innovation and investment activity of enterprises to improve the efficiency of their functioning.

**III. RESULTS AND DISCUSSION**

In the process of functioning of social-economic systems, investments and innovations become closely interrelated, since the transition to an innovative model of economic development is impossible without attracting investment. The joint direction of the individual goals of investment-innovation activity is determined by economic interests, the achievement of high results and the efficiency of the reproductive processes at which they are directed. In particular, investing is an integral process of investment, during which a consistent change of different value forms occurs and a dynamic link between the interrelated elements of investment activity is realized: resources - expenses – income [3]. Innovations are the introduction of new forms of labor organization and management, as well as the use of the results of intellectual work, technological developments aimed at improving social-economic activity [2; 5]. Common and distinctive features of the investment-innovation processes of the enterprise are presented in Table. 1

TABLE 1. COMMON AND DISTINCTIVE FEATURES OF THE INVESTMENT AND INNOVATION PROCESSES OF THE ENTERPRISE

Investment processes	Innovative processes
Investments into an investment object	Use of investments
Continuity of implementation	Possible determined deadlines
Providing both traditional and innovative production and economic processes	Implementation of innovative production and economic processes.
Systematic planning and implementation during the whole period of the enterprise functioning; own strategy and policy to achieve the strategic goals of the enterprise are formed, achievement of maximum positive effect, increase of competitiveness and provision of the sustainable development of the enterprise	

Therefore, investment and innovation processes should not be considered separately, but in the complex, which leads to the necessity of building an investment-innovation model that will allow the determination of common criteria for the adoption of investment and innovation decisions for the implementation of the main goals of strategic development.

Successful implementation of investment and innovation strategies is possible due to the provision of the following requirements: harmonization of the need for innovations and potential amounts of investment attraction; the optimal combination of the expected achievement of profitability from investing in innovation and preventing potential risks and uncertainties in the future; determination of the prerequisites for introducing innovations that promote the attraction of investors who are aware of the value of innovation, and expect a return on investment [11]. Expectation of profit is determined by the assessment of the conditions and factors for the implementation of investment projects using the investment model, which is understood by such a mathematical model, which allows to determine the efficiency and effectiveness of investment in relation to both the purpose of investment and the means to achieve it [3].

Models, criteria and indicators for assessing the effectiveness of investment projects are considered in many scientific works [3; 6; 8], which depend on the given purpose and depth of the grounding of the received results of the research, however, for the prompt management decision-

making on investing in innovation, it is expedient to use the main ones which do not require large volumes of complex calculations.

In particular, V.V. Kovalev, V.V. Ivanov, VA Lyalina define investment models for the perfect capital market [3], with the specified lifetime of the investment project, in which: net present value, final value of the property, internal interest rate are used as decision-making criteria. The model of estimation of net present value is described by the formula:

$$\sum_{n=1}^N k \cdot w_n \cdot z_n \rightarrow \max \quad (1.1)$$

$$\text{if: } \sum_{n=1}^N z_n \leq 1, z_n \in \{0,1\}, \quad (1.2)$$

where  $z_n$  is the boolean variable equal to one if the investment project is adopted and zero if the investment project is rejected (this is particularly true if the net present value of the project is less than zero),  $k$  is the net present value of the payment line ( $kw$ ) of the  $n$ -th investment project. The model can be used due to the conditions that the innovations as investment alternatives have the same period and amount of invested capital, and the final value of the property of the company (at the single interest rate calculation) should be maximal.

The model of the domestic interest rate [1; 3] is oriented at the maximum level of capital profitability, which is associated with the investment project, and takes such a form as:

$$\sum_{n=1}^N r_n \cdot z_n \rightarrow \max \quad (1.3)$$

$$\text{if: } \sum_{n=1}^N z_n \leq 1, z_n \in \{0,1\} \quad (1.4)$$

$$(r_n - i) \cdot z_n \geq 0 \quad (1.5)$$

where  $r_n$  is the internal interest rate,  $i$  is the calculated interest rate.

The fulfillment of the condition (1.5) indicates that the optimal investment alternative allows receiving a percentage of invested capital in innovation no less than in the market of invested capital in other areas (securities, financial instruments, etc.). Under this condition, indicators of maximization of net present value are used as a criterion for selecting investment projects in terms of innovation.

It should be noted that several specific goals can be simultaneously set before the enterprise (related to the profitable introduction of investment and innovation processes), each of them can be described as an economic and mathematical model. For example, profit achievement from the production of innovative products (under the condition of rational use of investment and other resources) corresponds to the objective function  $C(x)$ - total profit for a certain period  $T$ :

$$C(x) = \sum_{t=1}^T \sum_{j=1}^n p_{tj} \cdot y_{tj} \rightarrow \max \quad (1.6)$$

The requirement that the profit (loss) should be not less (not bigger) than the desired value  $\epsilon_t$ , will be reflected by the following expression:

$$\sum_{j=1}^n c_{tj} y_{tj} - \sum_{j=1}^n g_{tj} x_{tj} \geq \varepsilon_t \quad \forall t = 1, \dots, T \quad (1.7)$$

Restrictions on the use of investment and other core resources during each of the considered periods are as follows:

$$\sum_{j=1}^n a_{ijt} x_{ijt} \leq R_{it} \quad \forall i = 1, \dots, m, t = 1, \dots, T \quad (1.8)$$

It is quite logical that the amounts of realization of innovative products can not exceed the amounts of their production for all previous periods:

$$\sum_{\tau=1}^t x_{tj} + A_j \geq \sum_{\tau=1}^t y_{tj} \quad \forall j = 1, \dots, n, t = 1, \dots, T \quad (1.9)$$

The amounts of production and realization of products during each of the considered periods gain a positive value:

$$x_{tj} \geq 0, y_{tj} \geq 0,$$

where  $y_{tj}$  - the number of realized  $j$ -th type of innovation products in the period  $t$ ;  $x_{tj}$  - the quantity of produced  $j$ -th type of innovative products in the period  $t$ ;  $p_{tj}$  - profit from the sale of unit of innovation product of  $j$ -th in the period  $t$ ;  $c_{tj}$  - unit price of  $j$ -th type of innovative products in the period  $t$ ;  $g_{tj}$  - costs for the production of unit of  $j$ -th type of innovative products in the period  $t$ ;  $\varepsilon_t$  - lower allowable limit of losses in the period  $t$ ;  $a_{ijt}$  - rate of expenditure of the  $i$ -th resource for the production of unit of  $j$ -th type of innovative products in period  $t$ ;  $R_{it}$  - presence of the  $i$ -th resource in the period  $t$ ;  $n$  - number of types of innovative finished products, transferred from production to the warehouse;  $m$  - number of investment and other major types of resources that determine the amount of production of innovative products;  $\tau$  - time interval;  $A_j$  - the balance of innovative products, not realized before the start of model calculation. All models presented above describe the specific objectives of innovation-investment activity and allow us to determine the direction of profit making by the enterprise.

Thus, for the reasonable making investment-innovative management decisions regarding their orientation to innovation, the assessment of individual investment projects in the areas of innovation becomes important, which gives an opportunity to provide the necessary information to the management of the enterprise about the expediency of investing in a particular project, taking into account the expected efficiency.

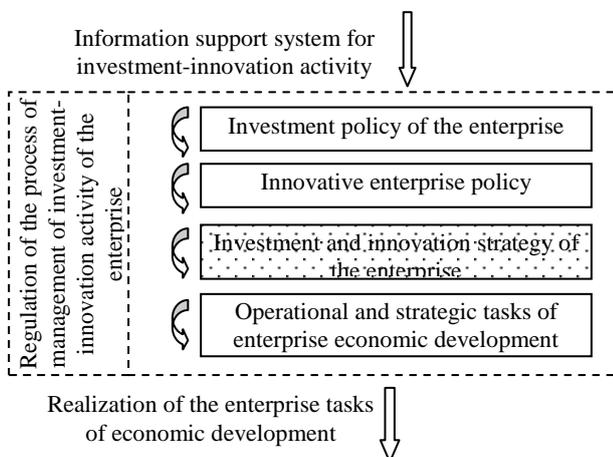


Fig. 1. Investment and innovation strategy in the enterprise management system

Information provision on the effectiveness of the projects is necessary in the formation of the investment and innovation policy of the enterprise, the development of its investment and innovation strategy, as well as in the process of certain practical actions and the substantiation of managerial decisions on coordination of measures for the realization of the tasks of economic development (Figure 1).

Thus, the sources of financing investment activity should be understood as the sources of the emergence and formation of values that are invested in investment objects, and can take on a monetary or material form. Market mechanisms for regulating the financial and economic activities of business entities significantly expand the types of their financing sources, however, the main of them were and remain their own sources of financing investments. Using own sources for financing all types of investments, the risk of bankruptcy of an enterprise is significantly reduced.

An important own source of financing the investment activity of enterprises, which is formed independently of the financial results of operations, is depreciation generated during the latent process of transferring the value of non-current assets to the value of finished products. Funds that display the amount of depreciation as a component of depreciation expenses in the cost of the enterprise sales, are credited to its current account and accumulated in the form of depreciation. Depreciation deductions have a double function: firstly, they are estimated expenses in the cost of production, and secondly, their amount in revenue from sales of products, works, services is a source of the enterprise's investments financing, including innovation-oriented. It should be borne in mind that these contributions are not actual, but estimated expenses that are returned to the company in the form of cash in the form of revenue from sales of products.

The initial capital is the authorized capital of the enterprise. At the time of the founding of the company at the expense of the authorized capital is the formation of current and non-current assets. At the next stages of the enterprise's functioning, the authorized capital acts as the basis for equity and own sources of enterprises financing, and their profit becomes the most attractive for financing investment activities of machine-building enterprises. The attractiveness of this source is due to accessibility, a simple mechanism for making investments in any investment process.

The next most important own source of financing business is profit. Profit in its quantitative measurement is part of the cash revenue (income), which is formed as the difference between the cost of sales and its total cost. After paying taxes and other obligatory payments to the budget, the net profit remains from the company's profit, it is shown in the balance sheet as retained earnings, part of which can be directed to investing innovations and needs of a production and social nature. Thus, financing of investment and innovation activities of many enterprises at the expense of their own financial resources provides them with the opportunity to receive a large amount of profit, which again can be invested in investment, financial and operational activities, and thus provide an increase in equity and increase efficiency. Therefore, we can assume that the ultimate goal of the enterprise in the form of profit is turning into the starting point of a new investment and innovation cycle.

However, it is practically impossible to introduce modern production and management technologies into the activities of many enterprises and ensure their dynamic development only through their own sources of financing. Therefore, to solve the tasks it is necessary to use attracted and borrowed sources of investment and innovation. In addition, profit ensures the further development of the enterprise, and is extremely important for increasing its competitiveness and market value. With the growth of profit generation, its need to attract additional investment resources from other sources decreases.

An analysis of the types of investment-innovation activity of many enterprises has shown that even profitable enterprises do not pay enough attention to the introduction of the latest advances in science and technology in the development of production processes [7]. As a result, the demand for products in foreign markets is not ensured, the range of buyers of products is limited, and it does not allow to expand the range of production and increase its competitiveness.

In our opinion, the objective prerequisite for managing investment resources and the further development of innovation activity is the definition of mandatory provisions regarding the creation of the reserve for the investment-innovation activity of industrial enterprises and the distribution of their profits. It is expedient to form the reserve for providing investment and innovation activity by applying fixed-rate deductions (in percents): to net income of the enterprise; to the income derived from the sale of non-current assets; to the income derived from the sale of innovative products; to the net profit of the enterprise. It is expedient to calculate the reserve using the formula:

$$R_{iid} = D \times 0,01\% + D_{na} \times 0,1\% + D_{ip} \times 0,1\% + P \times 30\%, \quad (1.10)$$

where  $R_{iid}$  - the reserve for innovation and investment activity of the enterprise;  $D$  - net income;  $D_{na}$  - revenue from the sale of non-current assets;  $D_{ip}$  - revenue from the sale of innovative products;  $P$  - profit of the enterprise. When calculating the reserve, it is necessary to take into account the following feature of the mechanism for determining its components: net income, revenue from the realization of innovative products and the income from the realization of non-current assets serve only as a basis for the calculation of the reserve, and the amount of the accrued reserve will be included in the expenses of the reporting period of the enterprise.

The practical realization of the proposed scientific methodological approach to modeling investment-innovation processes took place at the enterprises of small and medium business of light industry of the Khmelnytskyi region during 2015-2018, the results of which showed the accelerated pace of technological upgrading of enterprises, improvement of quality and expansion of product assortment, as well as the growth profits by 15-27%. Creation of the reserve for investment and innovation activity of the industrial enterprise should be mandatory, which will allow to create requirements for the development of their investment policy with the mandatory technological direction of innovation development, the introduction of the latest advances in science and technology.

We also offer (taking into account the foreign experience of the successful activity of many industrial enterprises), 20% of the profit is directed towards the development of the latest technologies by the employees of the enterprise, their training, advanced training and promotion of the activity. It is expedient to direct 30% of profit to the development of scientific research in the field of advanced technologies and environmental safety of production, the formation of appropriate information support. All participants of the innovation and investment process are also interested in this. And the rest, 10% of the profit will remain at the disposal of the company in the form of retained earnings, or directed to pay dividends to owners (shareholders) by their decision.

Creation of the reserve for investment and innovation activity of the industrial enterprise should be mandatory, which will allow to create requirements for the development of their investment policy with the mandatory technological direction of innovation development, the introduction of the latest advances in science and technology. Such measures will ensure the transition of the enterprise to the introduction of innovation-investment model of development, which will enable to systematically solve problems systematically that arise when changing methods and approaches to investment support of innovation processes, rationalization of management mechanisms of investment attraction, etc.

Thus, the provision of the favourable investment and innovation climate for the development of high-tech production remains a matter of strategic importance (Figure 2), the implementation of which depends on the success of the enterprise.

The algorithm of forming the strategy of innovative and investment development of the enterprise, shown in the figure, reflects the process of innovation-investment strategy development, its logical sequence and the formation of the optimal variant of making managerial decisions. The algorithm shows that the strategy is an open system and its effectiveness depends on the sequence and the substantiality of the implementation of all foreseen stages. The important condition for the successful implementation of the investment and innovation strategy is the consistency of the investment and innovation policy of the enterprise, taking into account the main factors of the external and internal environment. In our opinion, the most important factors of the innovation and investment strategy of the industrial enterprise are: production factors that determine the state of the material and technical base, and level of its capacity; marketing conditions that take into account price policy, sales, the impact of investments on the market environment of the enterprise, the life cycle of products, the need for innovation activity and other factors that need to be taken into account when making investment decisions; financial condition of the enterprise, its internal investment resources and attractiveness of external sources of investment capital; inflation rate, legislative changes and economic policy of the state, interest on loans, which determine the content of innovation and investment policy of the enterprise; provision of highly skilled personnel, social and living conditions of work. These specified factors affect the direction of investment and innovation policy significantly and provide an opportunity to argue that the process of innovation and investment decision making should be aimed at increasing the efficiency of the enterprise and, first of all, innovation-

investment activity. The analysis of factors of influence on the state of innovations and investments provides the opportunity to form the determinant principles of the enterprise's innovation and investment policy taking into account the needs and possibilities of the management apparatus: compliance with the strategic goal of the enterprise; orientation to the end result; clarity and clearness of information provision of enterprise management; interconnection of innovations and investments; the substantiality of the purpose of innovation-investment policy, taking into account the objective economic laws [9]. These principles provide the objective information for operational control and assessment of the level of effectiveness of the management decisions made. In addition, in the process of development of investment and investment policy, one must take into account the priorities in achieving the ultimate goal of the enterprise.

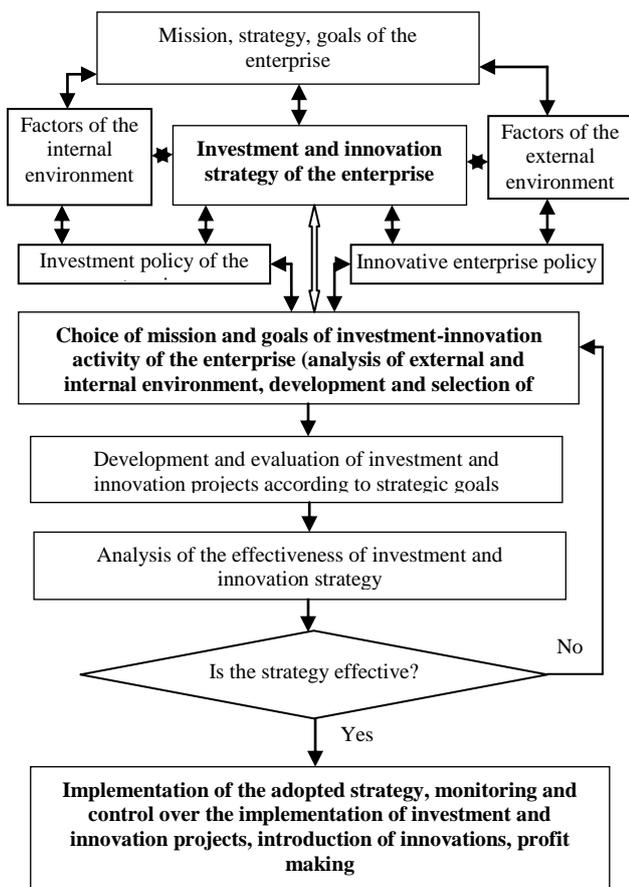


Fig. 2. The sequence of implementation of investment and innovation strategy of the enterprise

The choice of the mission and objectives of the strategy of innovation-investment development of the region and the development and evaluation of innovation-investment projects in accordance with the strategic objectives are the next stages of the strategy, which require a careful study and analysis of strategic alternatives. In the case of obtaining positive results of the strategy assessment, its implementation is carried out, with further monitoring and control over the implementation of investment-innovation projects, the introduction of innovations and the profits receiving.

#### IV. CONCLUSIONS

The conducted research showed that investment-innovation activity is an objectively conditioned, systematic, purposeful set of measures related to the economic substantiation of the need for investment, the search and the choice of investment resources aimed at the use of scientific developments, the introduction of innovations, new types of products, technics and technology in order to get profit or achieve another social effect. Therefore, the innovation-investment activity of the enterprise should be considered as a complex dynamic system consisting of different processes in its nature and contains: the innovation process; processes of organizational and economic, investment and social-cultural provision of innovations. The authors state that, for the formation and implementation of the effective investment policy of industrial enterprises, it is necessary to take into account the latest achievements in the field of scientific research and development, aimed at improving the quality of products in accordance with world standards, environmental friendliness of production, as well as the introduction of advanced technologies in all areas of operation of enterprises. The strategy of innovation-investment development of the enterprise is necessary for attracting investments, introducing innovations, restoration of competitive profitable production, growth of human capital.

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