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IMPROVEMENT OF THE MODEL OF ORGANIZING INNOVATIVE ACTIVITY AT THE ENTERPRISE

УДОСКОНАЛЕННЯ МОДЕЛІ ОРГАНІЗАЦІЇ ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ НА ПІДПРИЄМСТВІ

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Abstract. The speed of changes in the external environment of the enterprise requires an adequate reaction and transformations of its internal environment. One of the key mechanisms of such a reaction is carrying out innovations. Innovative activity concerns the entire production system, determining the efficiency of the enterprise's development.
Purpose. The purpose of the work is to develop an algorithm and improve the model of organization of innovative activities at the enterprise.
Method. The methodological basis of the research is the systematic and complex approaches, which are based on the study of the stages of the organization of the innovative activity of the enterprise. To achieve the goal set in the work, the following research methods were used: comparative and situational analysis, structural and functional analysis, methods of generalization, induction and deduction, expert evaluations, etc. The use of the functional and heuristic potential of the specified methods, united by the general methodology and research algorithm, ensured the scientific validity and reliability of the results and conclusions of the work.
Results. In order to improve the model of organization of innovative activity at the enterprise, the work summarizes and describes in detail the stages of organization of innovative activity at the enterprise: definition of the mission, strategic goals, innovative tasks of the enterprise; assessment of innovation potential and determination of the degree of its compliance with the innovation climate or internal capabilities of the enterprise; determination of the innovative position of the enterprise; creation of a body responsible for conducting innovative activities; development of an innovative strategy; drawing up the enterprise's innovative budget; formation of an innovation portfolio, development of innovation projects, their integration into the general innovation program; implementation of organizational and structural changes; adjustment of innovative tasks and strategy when the external or internal conditions of the company's activity change.
Scientific novelty. The scientific novelty of the research lies in the improvement of the model of the organization of innovative activities at the enterprise, the implementation of which involves a number of certain stages combined into the developed algorithm.
Practical importance. The practical significance of the conducted research is that the obtained results, in particular the developed algorithm for the organization of innovative activities, can be used by enterprises for planning, organization and effective management of innovative activities of enterprises, which will ensure their development.
Key words: innovation; innovation activity; innovation potential; innovation portfolio; innovation project; innovation control.

Анотація. Швидкість змін у зовнішньому середовищі підприємства вимагає адекватної реакції та перетворень його внутрішнього середовища. Одним із ключових механізмів такої реакції є проведення інновацій. Інноваційна діяльність стосується всієї виробничої системи, визначаючи ефективність розвитку підприємства.
Мета. Мета роботи полягає у розробці алгоритму та удосконаленні моделі організації інноваційної діяльності на підприємстві.
Методика. Методичною основою дослідження є системний та комплексний підходи, на яких ґрунтується вивчення етапів організації інноваційної діяльності підприємства. Для досягнення поставленої у роботі мети застосовувалися такі методи дослідження: порівняльний та ситуаційний аналіз, структурно-функціональний аналіз, методи узагальнення, індукції та дедукції, експертних оцінок тощо. Використання функціонально-евристичного потенціалу зазначених методів, об'єднаних загальною методологією та алгоритмом дослідження, забезпечило наукову обґрунтованість та достовірність результатів і висновків роботи.
Результати. З метою удосконалення моделі організації інноваційної діяльності на підприємстві у роботі узагальнено та детально охарактеризовано етапи організації інноваційної діяльності на підприємстві: визначення місії, стратегічних цілей, інноваційних завдань підприємства; оцінка інноваційного потенціалу та визначення ступеня його відповідності інноваційному клімату або внутрішнім можливостям підприємства; визначення інноваційної позиції підприємства; створення органу, який відповідає за ведення інноваційної діяльності; розробка інноваційної стратегії; складання інноваційного бюджету підприємства; формування інноваційного портфеля, розробка інноваційних проектів, їх інтеграція у загальну інноваційну програму; проведення організаційно-структурних змін; коригування інноваційних завдань та стратегії при зміні зовнішніх або внутрішніх умов діяльності підприємства.
Наукова новизна. Наукова новизна дослідження полягає у вдосконаленні моделі організації інноваційної діяльності на підприємстві, реалізація якої передбачає низку певних етапів, об’єднаних у розроблений алгоритм.
Практична значимість. Практична значимість проведеного дослідження полягає в тому, що отримані результати, зокрема розроблений алгоритм організації інноваційної діяльності, можуть використовуватися підприємствами для планування, організації та ефективного управління інноваційною діяльністю підприємств, що забезпечить їх розвиток.
Ключові слова: інновації; інноваційна діяльність; інноваційний потенціал; інноваційний портфель; інноваційний проект; контролінг інновацій.

FORMULATION OF THE PROBLEM

At the current stage of economic development, almost every enterprise faces the problem of competition, one of the ways to solve it is active innovation. However, having decided to engage in innovative activities, the enterprise faces another problem, namely how to organize this process. To solve this issue, it is urgent to improve the model of organization of innovative activities of enterprises.

ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

Actual issues of organization and implementation of innovative activities are in the focus of attention of many domestic and foreign scientists. Since an enterprise needs innovative potential for effective innovative activity, S. Andros and Si Tso Chang consider the innovative potential of an enterprise as a factor of ensuring competitiveness [1]; I. Epifanova and D. Hladka investigated the essence, components of the enterprise's innovative potential and factors affecting it [2]. L. Haevska summarized the scientific approaches to the structuring and assessment of the innovative potential of the enterprise [3]. A. Catocella and M. Vivarelli determined the internal and external factors affecting the growth of the innovative potential of the enterprise [4]. Innovative strategies are aimed at the development and use of the company's potential. Thus, I. Baryshevska, Y. Malyshenko, and K. Skleva consider the enterprise's innovative strategy as a source of its competitive advantages [5]. O. Kovtun substantiated the theoretical and methodological principles of formation and implementation of innovative strategies of enterprises [6]. Before the implementation of the selected innovation strategy, special attention should be paid to the preparation of the innovation budget. C. Schaeffer developed recommendations that should be followed when forming an innovative budget [7]. The implementation of the enterprise's innovation strategy should begin with the formation of an innovation portfolio and further development of innovation projects. In the studies of I. Fedotova, the main methods of standardization and selection of the portfolio of innovative projects of the enterprise are considered [8]. In the scientific works of L. Smolyar and O. Lobodzynska, the principles of managing a portfolio of innovative projects are considered, the stages of forming a portfolio of projects are given, and the mechanism of forming a portfolio of innovative projects of an enterprise is defined [9]. The algorithm for determining the optimal ratio between innovative projects included in the innovative portfolio is given in the works of H. Markovits [10]. Optimization models of the investment portfolio are also considered in the scientific works of R. Zhovnovach, V. Vishnevska, M. Shevchuk [11], and J. Tobin [12].

V. Voloshina-Sidei developed the main criteria for evaluating the effectiveness of an innovative project with an emphasis on their integral value [13]. Controlling innovations operates at all stages of the organization of innovative activities. I. Pavlenko investigated the basics of controlling innovative projects and substantiated the fundamental features of this type of controlling through its management tasks, functions, directions and procedures [14]. And N. Mykhailyshyn and N. Melnyk define the controlling of innovative activity as a means of realizing the innovative potential of the enterprise [15]. V. Osetskyi considers the controlling of innovative activity as a method of managing the innovative model of enterprise development [16]. S. Piletska, T. Korytko, and O. Duksenko also elaborate on the role of controlling innovations in the enterprise management system [17].

SEPARATION OF PREVIOUSLY UNRESOLVED PARTS OF THE OVERALL PROBLEM

Despite the large number of publications, in our opinion, the issue of organization of innovative activities at the enterprise has not been sufficiently studied in the scientific economic literature. Therefore, it is urgent to improve the existing and search for new methodological approaches, models of organization of innovative activities at the enterprise, taking into account the state of the external and internal environment, the current situation and tasks of strategic development of the economy.

THE PURPOSE OF THE STUDY

The purpose of the study is to develop an algorithm and improve the model of organization of innovative activities at the enterprise.

METHODS, OBJECT AND SUBJECT OF RESEARCH

The complex nature of the investigated problem led to the variety of research methods used: comparative and situational analysis, structural-functional analysis, methods of generalization, induction and deduction, expert evaluations, etc.

The object of the research is the innovative activity of the enterprise as a key factor in its development.

The process of organization and implementation of innovative activities at the enterprise was chosen as the subject of the study.

BASIC MATERIAL

Imperfect organization of innovative activity or the absence of this organization will not increase the competitiveness of the enterprise and will not increase the efficiency of its activity. The solution to this issue, in our opinion, is the improvement of the model of organization of innovative activity at the enterprise, which includes: resource and legal support for the functioning of the model; participants of the innovation process; methodical support of the functioning of the model; model functioning regulators; external factors affecting the enterprise; stages of organization of innovative activity; controlling innovative activity; coordination and decision-making procedures (Fig. 1).

The implementation of this model of organization of innovative activities at the enterprise involves a number of stages, which are shown in Fig. 2.

The organization of innovative activities at the enterprise should begin with the development of innovative tasks, which is based on the mission and strategic goals of the enterprise. The mission of the enterprise determines the general purpose of its existence, and the goals of the enterprise become criteria for evaluating all its activities and making management decisions.

When determining innovative tasks, it is necessary to take into account the results obtained during the analysis of the enterprise, its external and internal environment, determination of the stage of its development, assessment of its overall potential and degree of risk acceptable to it.

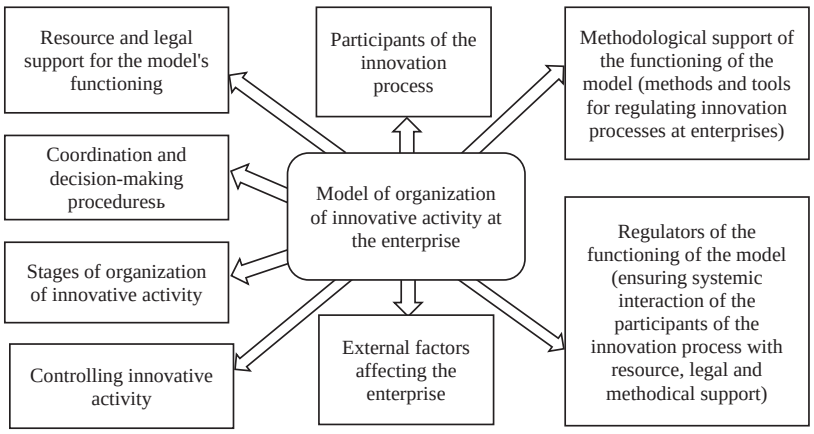

Fig. 1. Model of organization of innovative activity at the enterprise

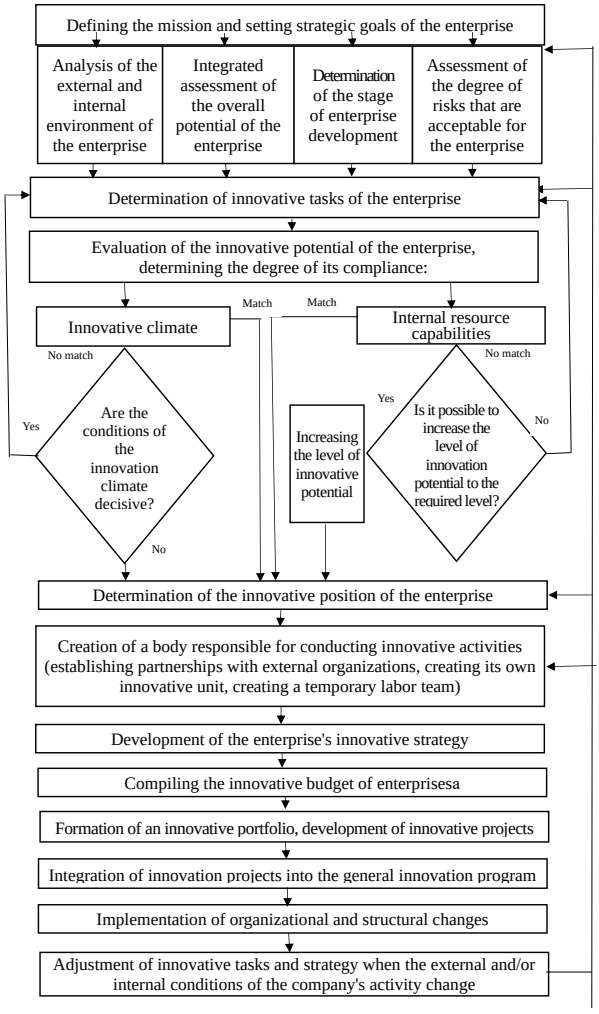

Fig. 2. Algorithm for the organization of innovative activities at the enterprise

Innovative tasks of the enterprise can be requirements for the creation of a new product, the preparation of a new service, the transition to a new technology, a new type of resource, a new management system, a new organizational structure, etc.

For effective innovative activity, the enterprise needs the presence of innovative potential, by which we understand the degree of readiness of the enterprise to achieve the set innovative tasks.

The innovative potential of enterprises is one of the main characteristics, which combines the set of fundamental properties of innovative activity and the ability to profitably use the influence of the external environment and the potential opportunities that exist in the internal environment. This allows you to use the innovative potential of enterprises as a powerful tool for making balanced management decisions in the process of implementing innovative activities [1, p. 154].

Also, the innovative potential of the enterprise is defined as the strategic ability of the enterprise to realize unused opportunities of innovative resources [3, p. 195].

The innovative potential of the enterprise is determined by a set of factors, which include the following:

– level of production development;

– state of the mechanism and control system;

– type and orientation of the organizational structure;

– trends in economic and innovation policy;

– understanding of the need for changes and staff readiness for them, etc.

The level of innovation potential is influenced not only by existing and prospective resources, opportunities and abilities, but also by the economic environment. The influence of the business environment on the innovation potential is divided into endogenous and exogenous factors. The endogenous component of innovative potential is a factor that ensures the effectiveness and efficiency of the functioning of its other elements. Endogenous factors have a direct effect on the innovation potential and determine it, therefore they require special attention from the management. These include the history and image of the enterprise; strategic priorities; management quality; marketing; production, financial condition; economic condition. Enterprises should focus not only on internal affairs, but also identify and take into account the influence of the external environment in their activities. When the innovation potential is revealed, there is a problem in overcoming external barriers, which can be defined as the innovation climate [2, p. 356].

The level of innovation potential largely depends on all the previous experience of carrying out innovative activities, the conditions of operation of R&D units, the level of production, marketing, etc. The decisive factor is how management experience is acquired.

Internal and external factors influence the development of the enterprise's innovative potential: if technological and organizational (fully), and financial and social (partially) elements of the innovative potential of the enterprise directly initiate, create and spend, then they only use the financial, social and legal components. Increasing the innovative potential of the enterprise is possible only through the creation of innovations and the use of innovations, as well as under the condition of a sufficient amount of investment resources [4].

Effective management of the innovative potential of the enterprise allows achieving the following results: maximizing the value of the innovative potential; to balance the composition of potential according to the degree of novelty, risk and expected profitability of investment projects, their duration; determine the strategic direction of projects and implement timely solutions to priority tasks; to optimize the number of projects taking into account the limited financial resources and the company's ability to implement them (availability of personnel, scientific and technical base, knowledge, experience) [1, p. 155].

Evaluating the innovative potential of the enterprise, the manager determines the possibilities of conducting innovative

activities. The higher the level of innovative potential of the enterprise, the more successful its functioning.

Since the choice and implementation of the company's innovation strategy depends on the state of innovation potential, its assessment is a necessary current operation.

We propose to evaluate innovative potential by experts using questionnaires of block evaluations, in which experts give their evaluations on a 5-point scale.

The assessment of innovation potential is carried out taking into account the degree of its compliance with the innovation climate and internal resource capabilities of the enterprise. If they make it possible to achieve the planned innovative tasks, you can proceed to the next stage – the evaluation of the innovation climate.

The innovative climate refers to external factors directly or indirectly affecting the enterprise (competitors, consumers, suppliers, political, economic factors, etc.).

The innovation climate (country, region, enterprise) can be considered as all factors of the external environment that affect the innovation potential of the enterprise [2, p. 356].

A necessary condition for the formation of the innovative climate of enterprises is the presence of determining factors and a system of information connections between participants in the process of innovative activity.

In the event of a discrepancy between the innovative potential and the innovative climate, it is necessary to determine whether the conditions of the innovative climate are decisive for the achievement of innovative tasks. For example, if it is impossible to achieve innovative tasks without financial support from the state, it is necessary to revise them. If, to achieve the goal, an alternative option is the use of the company's own funds, then in this case the management can proceed to the next stage.

If the current level of innovation potential does not correspond to the internal resource capabilities of the enterprise, it is necessary to decide whether it is possible to increase the level of innovation potential to the required level. If this cannot be done, the innovative tasks of the enterprise should be reconsidered. Otherwise, it is necessary to develop a set of measures to increase the level of innovation potential, implement it, and then reassess the current level of innovation potential and only then proceed to the next stage.

When considering the internal and external environment of the enterprise together, its innovative position is determined using various matrices. The SWOT analysis method – a matrix of opportunities and threats of the external environment, strengths and weaknesses of the enterprise – has become widespread.

The idea behind this analysis is that a successful strategy should be based on the principles of linking the company's internal capabilities and the external environment, presented in the form of opportunities and threats.

This method is a procedure for expert diagnostics of the environment, which allows to describe the main trends of its development, to formulate basic hypotheses about the prospects of the enterprise and to determine the field of alternative directions of its further development. Like any expert method, the SWOT analysis method gives good results in the case of sufficiently high completeness of the collected information, on the one hand, and a clear understanding by managers of the company's strategic development guidelines, on the other hand.

The understanding of possible situations is carried out according to the SWOT analysis matrix, which is built on two vectors: the state of the external environment (horizontal axis) and the state of the internal environment (vertical axis).

Each vector is divided into two sections (state levels): opportunities and threats arising from the state of the external environment; strength and weakness arising from the state of the internal environment. At their intersection, 4 fields (squares) are formed, describing the following groups of situations:

1. The «SO» field is «power-opportunities». This is the most favorable square for achieving innovative tasks, because there is no need to change anything and prepare for something.

2. Field «ST» – «force-threat». Those factors of the innovation climate that limit the use of the strengths of the innovation potential are fixed, and special measures are also provided for their preservation.

3. Field «WT» – «weakness-threats». This is the worst combination for an enterprise, because reducing threats requires radical changes in its operations.

4. «WO» field – «weakness-opportunities». At the same time, the external environment does not pose serious problems for the enterprise, the previously planned measures to strengthen the innovation potential should be implemented.

The next stage of the organization of innovative activities at the enterprise is the creation of a department responsible for conducting innovative activities. At the same time, enterprises should make an important strategic decision: to engage in the development of innovations independently or to buy them from other enterprises.

When deciding to independently develop and implement innovations, it is advisable to create your own innovation department. This approach allows:

– avoid large one-time costs, as investment amounts are stretched over time;

– to bring scientific research closer to the possibilities of initial production and the needs of the final consumer;

– attract highly qualified scientific personnel;

– to be more confident in the preservation of commercial secrets.

Depending on the branch of the enterprise, a new division can be created by reorganizing the service of the chief technologist or the design department.

However, an industrial enterprise is not able to independently develop all innovations and at the same time not harm its main activity, namely the production of products. Also, innovative activity requires considerable time spent on searching for the desired innovation, as well as on screening out deliberately unacceptable ideas from further consideration. In the future, the company will need significant investments in the development of innovations and their creation, which in the future may not give the desired result.

If the enterprise has decided to buy an innovation from other enterprises, then, as a rule, it establishes a strategic partnership with an external organization (specialized scientific research, design, etc.). At the same time, it should be borne in mind that a one-time purchase of innovations will require the accumulation of significant financial funds in a fairly short period of time. For the most effective use of financial investments, a thorough study of the innovation market and a detailed analysis of the database of organizations specializing in innovative technologies are required.

However, both the first and second approaches have both positive and negative aspects. Therefore, for the continuous introduction of innovations, in our opinion, the third, comprehensive approach is optimal for an industrial enterprise, in which the enterprise develops part of the innovations independently, and acquires a part from the outside.

The relevance of using this approach is due to a number of reasons, in particular, more rational use of the company's own resources, increasing the efficiency of innovative activities, creating competitive products, etc.

Such a comprehensive approach involves the creation of its own innovative unit, the main purpose of which is to develop various innovative ideas to achieve the set innovative tasks. On the basis of such ideas, management decisions are developed and made, including decisions about which innovations to develop independently, and which are more expedient to buy from a third party.

Next, an innovation strategy is developed, which is understood as one of the means of achieving the enterprise's innovative tasks, which differs from other means by its novelty, primarily for this enterprise and, possibly, for the market, consumers.

Strategies in general and innovative strategies in particular are aimed at the development and use of the company's potential and are considered as a reaction to changes in the external or internal environment.

The innovative strategy of enterprise development is a set of goals and attitudes, decision-making rules, and methods of transition of the enterprise from the old (existing) state to the new (target) state based on the introduction of innovations – technological, product, organizational, managerial, economic, social, and positioning of the enterprise on competitive markets of goods and services. That is, the innovative strategy is always expressed in determining the type of target behavior of the enterprise in competitive markets [5, p. 14].

Innovation strategy includes decision-making processes regarding the direction of scientific research and design development, but this is only its single manifestation from a set of different interdependencies that connect the strategic goals of the enterprise, R&D (research and development works), innovation and its potential.

The innovation strategy defines directions, favorable conditions and opportunities for the innovation process and innovative activity at the enterprise in order to promote development and obtain an effective result. This strategy should set a vector and propose a regime under which innovations become an indispensable component of the management of all structural divisions of the enterprise (from the general corporate to separate business units and their functional and operational divisions for the organization of specific business processes) [6, p. 46–47].

Regarding the internal environment of the enterprise, the following special innovative strategies can be distinguished: product, functional, resource, organizational and managerial (Table 1).

Table 1. Types of special innovative strategies

Types of strategies	Characteristics of strategies
Product	Aimed at the creation and implementation of new products, technologies and services
Functional	Related to the application of new methods in R&D, production, marketing, management, etc
Resourceful	Associated with the use of new types of resources and new approaches to the use of traditional resources
Organizational and managerial	Related to the transition to new organizational structures due to changes in technology, structure, methods, management systems, etc.

The theory and practice of strategic and project management has developed a number of universal strategies that have become widespread. Such strategies are usually called basic or benchmark. They are aimed at developing the company's competitive advantages, which is why they are also called development strategies or growth strategies.

Each growth strategy in the process of its implementation forms one or another stream of strategic changes in both the internal and external environment of the enterprise. Many of these changes are new and unexpected for the enterprise and its target audience. This allows us to claim that the strategies have an innovative nature.

Basic development strategies include intensive development strategies, integrated development

strategies, diversification strategies, and reduction strategies.

With the strategy of intensive development (growth), there is an accelerated increase in the company's potential with the help of better use of internal and external opportunities.

There are three strategies for intensive growth. In the first, aimed at a deeper penetration of this market with this product, the innovative component is insignificant. The second strategy, aimed at market development, consists in finding a new market for a given product and securing it. It mainly contains marketing innovation. The third strategy, consisting in the development of the product, consists in the modernization or creation of a new product for its implementation in this market. All three strategies for intensive growth are related to product innovation.

Integration development (growth) strategies are a strategy of integration with suppliers and supply structures (downward vertical integration); integration strategy with industrial consumers and sales structures (upward vertical integration); integration strategy with industry organizations that develop and produce products (horizontal integration). All three strategies of integrative growth are related to organizational innovation.

The diversification strategy group includes the design diversification strategy, when the technology, industry and market do not change. It is aimed at finding and using additional opportunities for the production of constructively new products. It is a strategy of intra-industry and intra-market product innovation that uses the synergy effect.

Another strategy of diversification is conglomerate («pure» or complete) diversification, when the enterprise develops new types of activities that are not related to its traditional profile either technologically or commercially. The product portfolio is radically updated. This is a product and marketing innovation strategy.

Reduction strategies consist of identifying and reducing unnecessary costs. They can cause innovative measures: the use of new effective materials, technologies, management methods, organizational structures, etc.

With regard to directly innovative strategies, various classifications are given in the scientific literature.

According to the typology of innovation strategies by the nature of the direction of innovation, which was proposed by K. Freeman, enterprises should choose a certain logical model of general innovative behavior, as well as form, on the basis of the proposed options, balanced portfolios of innovation strategies, using traditional, imitative, offensive (aggressive), defensive (defensive), dependent and mixed innovative strategies [6, p. 50].

According to O. Kovtun, taking into account such a classical typology, innovative strategies should also be divided according to the nature of the behavior model chosen by enterprises (passive or active):

1) active technological:

– product – related to the introduction of new or improved products and services in terms of their properties or methods of use;

– process – related to the introduction of new or improved methods of production, as well as product delivery;

2) passive non-technological:

– marketing – related to the introduction of new sales methods, including those that involve changing product characteristics, market promotion, pricing policy – with the aim of better satisfying consumer needs, capturing market positions or new markets;

– organizational – relate to the implementation of new methods of organizing activities and managing both the enterprise and its individual functional, operational and business units [6, p. 50].

In our opinion, all existing types of innovative strategies can be divided into large groups: offensive and defensive innovative strategies.

The company's achievement of a leading position on the market is directly related to the implementation of various offensive-type strategies aimed at the implementation of basic product and/or technological innovations.

Offensive strategies are supported by significant investments in marketing research, development and implementation of innovations. They are characterized by a high level of risk and a high level of income in case of success of the innovation in the market.

The use of defensive strategies allows enterprises to consolidate (stabilize) their position on the market. Such strategies involve lagging behind the leaders in the time of entering the market with a new product and thus provide an opportunity to avoid high costs associated with increased risk. Defensive strategies are also aimed at the company's search for its niches in the market and provide for the implementation of improving innovations in accordance with the interests of consumers.

Immediately before the implementation of the selected innovation strategy, special attention should be paid to the preparation of the innovation budget. It is thanks to the innovative budget that innovative activity is connected with other aspects of the enterprise's activity; the volumes of material, technical, personnel, financial and informational resources necessary for the implementation of the developed innovative strategy are agreed upon; separate types of activities are coordinated in such a way that these structural divisions of the enterprise work in harmony to achieve a common innovative goal.

IBM CRM and ERP go-to-market leader Chuck Schaeffer notes that the size of innovation budgets varies by industry, but even more so by the type of innovation investment. Companies with the highest payback allocate most of their budget to transformative innovations [7].

When forming an innovative budget, Ch. Schaeffer recommends:

– coordinate innovative investments with income goals;

– calculate the gap in growth before drawing up an innovative budget (that is, it is necessary to accumulate additional income that exceeds the expected);

– compare innovation budgets and results with average indicators by industry and type;

– diversify costs by type of innovation (that is, separate costs directed at existing products, as well as those related to the development of new ones);

– coordinate the drawing up of the innovation budget with patents.

After developing an innovation strategy and drawing up an innovation budget within the general budgeting system, it is necessary to start implementing the enterprise's innovation strategy, which begins with the formation of an innovation portfolio and further development of innovation projects.

From the point of view of the long-term perspective, the most productive investments are in the sector of new technologies. The objects of these investments give the greatest «cumulative return». However, due to the increased risk, investments in growing and mature technologies are often the best.

The most effective and less risky solution is the creation of an innovative portfolio consisting of a certain set of innovative projects for the creation of leader products and follower products.

An innovation portfolio can consist of a variety of innovative projects: large and small, long-term and short-term, close to completion and initial, different in purpose and principles of implementation, etc. The number of projects in the portfolio in a specific period of time depends on the size of the projects, which are measured by the total amount of resources required for their development and the costs of implementing one project.

Therefore, it is necessary to decide how many innovation projects the enterprise will be able to manage and which projects to include in the innovation portfolio.

The main goal of forming the innovative portfolio of the enterprise should be the creation of such a set of innovative projects, under which the enterprise will receive the maximum economic effect from the development and implementation of innovations. To achieve the goal of innovative activity of the enterprise, it is often not enough to develop and implement one project, and at the same time there is a possibility that one project will turn out to be unsustainable. For the purposes of diversification, as well as if it is necessary to develop projects in different areas for the implementation of the strategy, project portfolios are compiled. An innovation portfolio is a comprehensively substantiated list of innovations that must be developed independently in the organization or purchased for further implementation [8, p. 92].

It must be said that a portfolio consisting mainly of large innovation projects is, as a rule, more prone to risk compared to a portfolio where resources are distributed among small innovation projects. Since the probability of effective completion of each project in the portfolio is too small, as the number of projects increases, the probability that at least a few of them will be successful increases.

In order to minimize the risk, it is necessary to find the optimal ratio between innovative projects included in the innovative portfolio.

This can be done using the optimization model of H. Markowitz. The theory of H. Markowitz is based on the fact that the profitability indicators of various investment instruments are interrelated with the growth of profitability of other investment objects. In order to reduce the risk of the portfolio while maintaining the required level of profitability, the portfolio is formed at the expense of assets whose profitability has a lower positive correlation. This effect is also called the «miracle of diversification» [10].

The optimal ratio between innovative projects can be found using the Taylor-Black investment portfolio optimization model. This model is an analogue of the Markowitz model, its actual continuation, in which there is no non-negativity condition for part of the portfolio assets, and which is mainly used for the analysis of investment instruments that rotate on the market with a high degree of efficiency [11].

When using the Tobin model, the existence of a risk-free asset is assumed, the profitability of which does not depend on the state of the market and always has a constant value. The main task of the model is the optimal distribution of capital between risk-free and risky assets [12].

The formation of the innovation portfolio is carried out taking into account the achievement of the main goal – the creation of the largest number of innovations with maximum effectiveness and includes the following basic procedures:

– determination of technical and economic indicators of innovative projects and conditions for their implementation;

– justification of criteria and assessment of their relative share, i.e. establishment of a system of priorities for further ranking of innovative projects;

– calculation of a complex criterion and further ranking of innovative projects.

The process of managing the innovative portfolio of projects can be conditionally divided into four parts or stages: determination of the entire list of projects; project analysis; optimization of the project portfolio; implementation of a portfolio of projects. The process of managing an innovative portfolio of projects is a cyclical process of selecting and managing an optimal set of project-oriented investments that provide maximum utility [9, p. 186].

Since the innovative portfolio consists of a certain number of innovative projects, the next step of the

algorithm for organizing innovative activities at the enterprise is the development of innovative projects.

According to the Law of Ukraine «On Innovative Activities», an innovative project is a set of measures and procedures necessary for the development, creation and implementation of an innovative product and (or) innovative products, which are reflected in a set of documents drawn up in accordance with the requirements of the law [18].

An innovative project is the final result of the innovation implementation, embodied in the form of a new or improved product introduced on the market, a new or improved technological process, which is used in practical activities [19].

Innovative projects are characterized as the driving force of the development of the economy and the business environment, through the introduction of the latest products, goods, services, technologies, etc. [13].

An innovation project is a set of activities that are aimed at achieving a clearly formulated innovation goal and lead to innovation.

These measures should be appropriately organized (i.e. linked by resources, deadlines and performers), designed with a set of project documentation and should provide an effective solution to a specific task (problem).

Innovative projects, which constitute the innovation process, can successively change each other within the technological chain of creation and dissemination of innovations, can be independent, parallel and in some cases duplicate each other.

According to the level of coverage of the stages of the innovation process, innovative projects are divided into two types: complete and incomplete.

A complete innovation project includes all stages of the innovation process, while incomplete innovation projects can be of two types: 1) include the first stages of the innovation process; 2) include the final stages of the innovation process.

A complete innovation project and an incomplete innovation project of the first type are exclusively related to the creation and distribution of innovations. Incomplete innovation projects of the second type include innovation projects that do not embody new scientific knowledge and projects that use new scientific knowledge created as part of other innovation projects.

When developing innovative projects, the correct assessment of efficiency (profitability) is of great importance. The goal of this evaluation is the optimal allocation of investment resources. The company, as a rule, invests in the most profitable and promising innovative projects and reduces investments in ineffective ones. However, in some cases, innovative projects requiring significant capital resources may be rejected in favor of less efficient projects, but requiring lower capital costs, because the financial resources are needed for other innovative projects of the enterprise.

Evaluation of the effectiveness of innovative projects is the main tool for the correct selection of the most effective among several projects. The methods used to evaluate the effectiveness of the innovation project are based on discounted and accounting estimates. The choice of method is determined by the timing of the project, the size of investments, the availability of alternative projects and other factors [15, p. 103].

We have proposed to use an integration approach in the management of innovative projects, which involves: consistency of goals and logical structure of the entire project; integration of planning with resources and costs in terms of results; integration of planning with the organizational structure of the project executor; integration of work planning and monitoring; unification and coordination of all information systems of the project into a single system and connection of all components of the development and implementation of the project with the personnel management system. The integration approach makes it possible to guarantee efficiency, productivity and sustainable results at all stages of the project cycle [20, p. 94].

Innovative projects should be considered as a whole because they all need funding. It is not always advisable to concentrate all the company's financial resources on the development of one project, as it is very risky. In the case of the formation of an innovative portfolio, the occurrence of failures during the implementation of one of the projects will be compensated by the success of the implementation of another.

After solving investment issues, all innovation projects are reduced to a general innovation program, which is a plan for the implementation of a set of innovation projects with their terms, executors and investments.

The optimal should be considered such an innovative program that best ensures the achievement of the innovative goals of the enterprise while observing the existing restrictions on time and other resources.

For the effective implementation of innovative projects, it is necessary to create a special structure that would ensure the stability of connections and reliable functioning of the enterprise as a whole. To implement the task, it is necessary to determine the conformity of the existing organizational structure with the innovative projects accepted for implementation and to carry out the necessary organizational and structural changes (transformation). The most radical transformations are carried out using the reengineering method, which allows to improve the main performance indicators of the team and balance business processes at the enterprise.

The stage of organizational and structural changes is the final stage of the organization of innovative activities for the enterprise.

Adjustment of innovative tasks and strategy is necessary in case of changes in the external or internal conditions of the enterprise.

One of the most important parts of the considered model is controlling innovations, which operates at all stages of the organization of innovative activities. It allows you to optimize the innovation process through the effective use of available resources and other capabilities of the enterprise.

Controlling innovative activity is considered as a method of managing the innovative model of enterprise development, which is aimed at studying the development trends of the enterprise's micro– and macro-environment, identifying reserves and improving the coordination of the innovative activity management system using new information technologies and modern decision-making methods to ensure the realization of the enterprise's innovative potential [16, p. 114–117].

Controlling innovations should implement the following general tasks: management of innovation processes; selection, assessment and implementation of innovative solutions; management of innovation cycles; managing the sale of new products; managing the process of reducing costs for the innovation cycle; management of the development time reduction process, etc.

General tasks determine special tasks: management of the process of increasing the efficiency of strategic and operational planning of R&D; assortment policy management; introduction of new products; reduction of development time; planning and control of the R&D budget; compilation and control of indicators characterizing the innovation cycle; assessment and control of R&D orders; cost management, etc.

In the strategic aspect, controlling supports the decision-making process regarding the direction of innovative activity, based on the tools of strategic analysis. Based on the results of the risk analysis, as well as the company's strengths and weaknesses, controlling helps managers weed out strategically unpromising innovative ideas. Operational controlling is mostly aimed at supporting the processes of planning, control and regulation of the current course of implementation of innovative projects [14, p. 13].

Controlling innovations is a functionally and organizationally separate direction of financial and production work at the enterprise, which is related to the implementation of its innovative activities. The content of controlling innovations is informational, analytical and methodical support of the processes of planning, accounting, control and analysis of the parameters of innovative projects, as well as consulting the management in developing strategies for the innovative development of the enterprise [17, p. 80].

The implementation of controlling innovations at the enterprise covers the construction or change of the organizational structure of management, the formation of functional subsystems. The economic system undergoes constant changes, becomes more dynamic, complex, the influence of accelerated STP (scientific and technical progress) and many other new factors increases [21, p. 76].

Since controlling is aimed at reducing the time of development of innovations, therefore, the use of in-depth analysis of this process is assumed. Such an analysis consists of several stages, which include demand analysis, determination of enterprise potential and R&D development, concept formation, strategy selection, and implementation.

As a result of demand analysis, it is expedient to determine competitive positions, forecast revenue, development time, quality and costs. When determining the potential of an enterprise and developing R&D, it is important to shorten the time and improve the quality of development. The emerging concept should cover a wide range of issues related to technology, production, products, projects, organizational structures (cooperation, alliance), management, financial resources, fixed assets, planning, control and regulation.

With the right choice of strategy, the possibility of reducing costs is quite high, while the terms of application of developments can be significantly shortened.

As an example of choosing a strategy and implementation, we can cite a strategy for reducing R&D time, which contains rules related to the product, controlling developments, resources and fixed assets, management and organization of R&D:

– for the product, it is advisable to carry out partial innovation independently, or, by joining forces with partners, to carry out global innovation;

– when controlling developments, it is advisable to manage time, quality, costs; establish the priority of control time over control costs;

– it is necessary to identify bottlenecks and problem areas in terms of resources and basic means;

– in the field of personnel management, it is advisable to focus special attention on improving the qualifications and increasing the rotation of employees;

– it is important to pay attention to the improvement of project management methods;

– in the field of R&D organization, it is necessary to link marketing and development itself.

Discussion of the obtained results. In the conditions of modern competition, shortening of the life cycle of products, development of new technologies, one of the main conditions for the further development of the enterprise, increasing the level of profitability and competitiveness of manufactured goods, its innovative activity is becoming more and more important.

Enterprises that form strategic behavior based on an innovative approach, i.e. the main goal of the strategic plan is to determine the development and implementation of innovations, have the opportunity to gain leadership positions in the market, maintain high rates of development, reduce the level of costs, achieve high performance indicators, etc.

The effectiveness of innovative work, including the choice and implementation of an enterprise's innovative

strategy, depends on the state of its innovative potential, which is based on material and technical, financial, personnel, information and other types of resources.

CONCLUSIONS

For the constant introduction of innovations, the optimal approach for the enterprise is a complex approach, which consists in the fact that part of the innovations should be developed by it independently, and part will be purchased from a third party. The relevance of using this approach is due to a number of reasons, including more rational use of enterprise resources, increasing the efficiency of innovative activities, and creating competitive products.

All the accelerating rates of changes in the external environment of the functioning of enterprises increase the risk of entrepreneurial activity in general and innovation in particular. In order to distribute the risk, it is necessary to form an innovation portfolio, for which it is expedient to create an innovation program of the enterprise and constantly redistribute funds from completed innovation projects to those that are being developed.

It is possible to optimize the innovation process with the help of controlling tools, the purpose of which is to reduce the time of development of innovations while maintaining an unchanged or higher level of quality of the development itself. Therefore, the prospect of further research is an in-depth analysis of the innovation process at enterprises, which consists of certain stages: demand analysis, determination of the enterprise's potential and R&D development, concept formation, strategy selection and its implementation.

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