
Conceptual Basics and Mechanism of Innovation Project Management

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Abstract:

The work reveals basic conceptual provisions of managing projects that enable enterprises to start developing innovatively. On the basis of the stated theoretical provisions, goals and tasks required to solve the most important research and technical problems are defined. The goal of this article is to systemize conceptual provisions of the theory of managing innovation projects based on applying various methods to estimate them.

Innovation project management is based on such principles as selective management, target focus of projects, completeness of project management cycle, stage-by-stage approach and hierarchical nature of the innovation process and project management process, and multi-variance. In order to form conceptual basics and implement the process of innovation project management, it is necessary to solve the following tasks: to consider conceptual basics of innovation project management, to reveal the specificity of the mechanism related to managing innovation projects, and to develop the algorithm of applying the Gurwitz method to manage the innovation project.

Key Words: *concept, innovation project, innovations, innovation process, risk, management system, investment process, Gurwitz method.*

JEL Classification: *O10, O14, O31*

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Introduction

In the Russian practice the concept of innovation project management (Kretova and Odintsov, 2014; Bashmakov *et al.*, 2015; Akopova and Przhedetskaya, 2016; Epifanova *et al.*, 2015; Dzhukha *et al.*, 2017) is widely used both in the modern and former context of the special-purpose program of management (especially, planning). The latter provides the organization and formation of fulfilling target comprehensive programs and projects that are a complex of interrelation events aimed at achieving specific social and economic goals. The extensive system of projects and programs is implemented in the research and innovative areas. Innovation projects and programs to implement them make up a basic part of forming the economic mechanism in managing the research and technical development of the country (Alekseev, 2015). Over the recent ten years the main factor of improving the production efficiency has been the use of innovations. In the context of unstable economic environment and limitation of financial resources, the implementation of innovation projects allows solving tasks on developing and survival of enterprises.

Methods

The process of innovations implementation is an aggregate of research, technological, production, organizational, financial and commercial measures taken in a specific sequence and causing innovations. The innovation idea is a result of a long process. It can be a result of the collective expertise or an individual analysis. Methods of generating and forming innovation ideas include well-known methods of expert estimations, methods of revealed opinions (interview, questionnaire - sample interview, script writing, etc.), and creative methods (brainstorming, morphological analysis, Delphi method, etc.) (Volkov, 2010; Bashmakov *et al.*, 2015).

At the same time the innovation project is a set of technical, organizational and planning, and calculation and financial documents required to accomplish the project goals (in order to denote this aspect of the project, the Western science uses the term “design”) (Kretova and Mokretsova, 2012). In its turn, the implementation of innovation projects is a comprehensive system of events interconnected and inter-stipulated according to resources, terms and executors, and aimed at achieving specific goals and tasks in top priority areas of the science and technology development (Kormishkin *et al.*, 2016; Frank *et al.*, 2016).

Innovation projects set the requirements that must comply with tools to manage them in the long-term period. Herewith, innovation project management must be considered within three aspects, in particular, as a system of functions, as a process of taking a management decision, and as an organizational system in terms of the functional approach in the innovation project management.

Based on the above aspects, innovation project management is a process of implementing and taking management decisions that are related to defining goals, organizational structure, planning measures and controlling the process of taking them, and aimed at implementing an innovation idea (Nechaev and Antipina, 2015). To our mind, in terms of the innovation project management, the functional method is the most optimal one. It allows to fuller describing the most important elements of the management process according to works and operations.

It is necessary to base the innovation project management on the aggregate of the well-trying and scientifically and practically stipulated principles. It is necessary to refer the following to such principles:

- Principle of selective management. Its essence is in supporting projects on top priority areas of the science and technology development, including targeted support of innovators as authors of comprehensive projects.
- Principle of target focus of projects to accomplish the final goal. Such principle means the establishment of the interrelation between the opportunities of their fulfillment and needs to create innovations.
- Principle of completeness of the project management cycle. Such principle means the close orderliness of projects elements as systems. The full cycle of the management process anticipates the whole aggregate of decisions: from revealing needs to manage the transfer of the obtained results.
- Stage-by-stage approach to the innovation process and project management. This principle contains the description of the full cycle of every stage of the project formation and implementation.
- The principle of hierarchical organization of the innovation project and process of managing them intends to represent them with a different level of details that complies with a specific level of the hierarchy. All levels of the activity cohere with one another in such a manner that the lower level subordinates to the upper one, and the states (taken decisions, goals, intermediary and final results) of the process on the upper level are obligatory when defining states on the lower one.
- Principle of multi-variance when developing management solutions (Volkov, 2010). Such decisions have to be taken when selecting a variant of investing financial resources, a variant of technological method of production, a variant of management, etc. Such tasks may occur at various stages of works. Herewith, decisions are often taken without sufficient information, i.e. in the context of indefiniteness.

- Principle of systematicity meaning the development of an aggregate of measures required to implement the project (organizational and economic, legislative, administrative, technological, etc.), and the interrelation of the concept related to developing the country as a whole.
- Principle of complexity. It means that separately interconnected elements of the project structure that provide the achievement of sub-goals must be developed in accordance with the basic (general) goal of a project,
- Principle of provision (sustainability) meaning that all measures covered by the project are provided by various types of resources required to implement it: financial, informational, material, and labor (Alekseev, 2015).

The selection of the most sustainable variant of the innovation project is one of the important procedures of developing the project. It can be based on various methods of its efficiency development. For example, the estimation of the investments efficiency by using undiscounted methods of efficiency estimation assumes defining the payback period, and calculating the account rate of return. Undiscounted methods of investments efficiency estimation include methods of calculating the net present value, profitability index, and internal rate of return.

Research Results

We define conceptual provisions among the most important elements of the innovation project management system. Table 1 shows their essence.

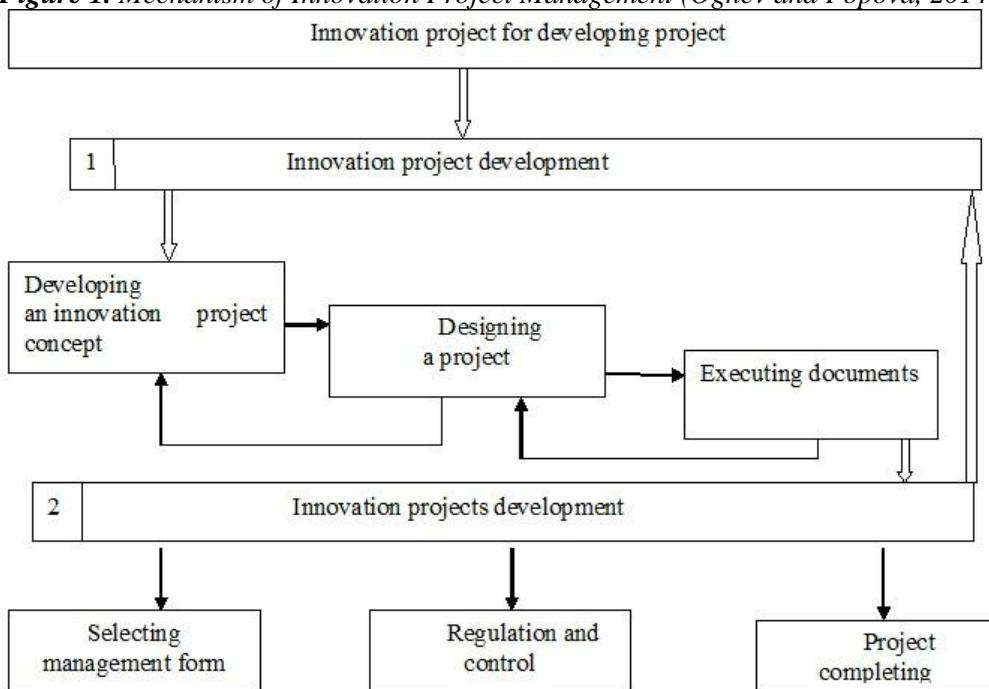
Table 1. *Conceptual Basics of Managing Innovation Projects*

Theoretical basis	Using in the system of management
1. Development of the enterprise is defined by the system of managing its stability and the most important factors and risks	Creating a general and functional strategy of development; defining a type of innovation project that is accessible for the current implementation and does not disturb the economic state of the enterprise,
2. Management when using innovation projects is related to applying a compromise between the dynamic and statistical stability of the enterprises	Selecting a model and form of implementing innovation projects, forming an investment profile and program of the innovation development. Interrelation of monetary flows of the innovation project in the profitability – liquidity – efficiency system
3. Innovation project management is related to selecting the best variant of using expenses to achieve the development goals	Selecting preventive methods, mechanisms to control risky situations and their consequences that prevent the development of the risk event when implementing innovation projects. The selection of indicators related to estimating the economic efficiency of innovation projects has an impact on choosing the best variant.

The target parameters of the project are a basis of forming the list of project measures on achieving the target goal of the project. In order to define the composition of the required measures, target goals are priority divided into components. The practice shows that in the structure of the project it is necessary to distinguish two varieties: problematic and functional components. The innovation development is referred to the highest level of the development and can provide the stability of the project management system. It is necessary to represent the cycle of innovation project management by two stages: the development of the innovation project and management of the innovation project implementation (Figure 1).

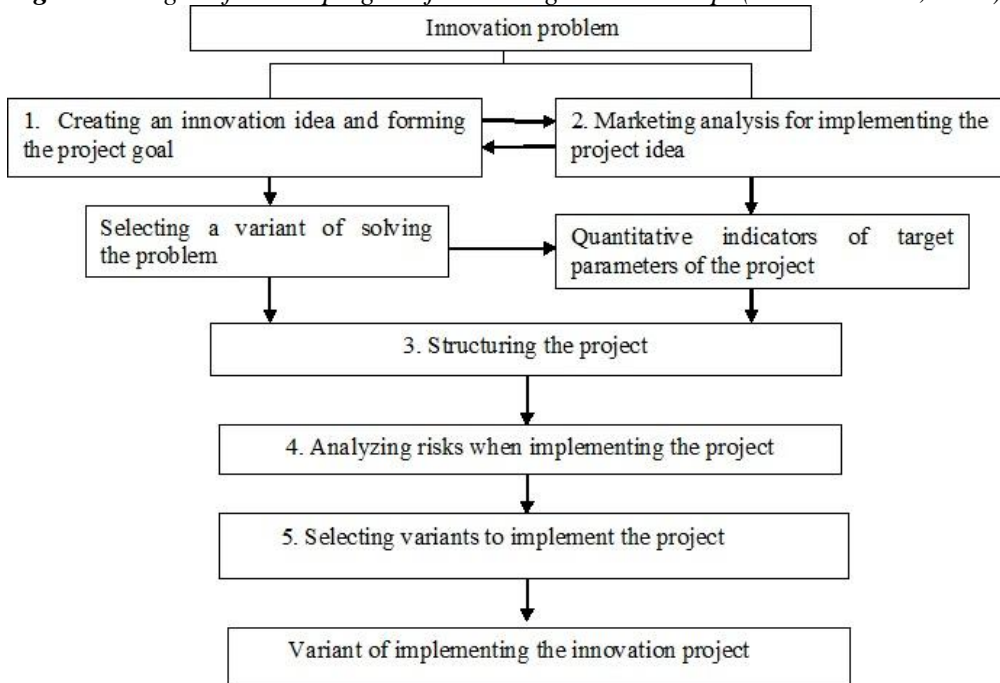
At the first stage the project goals and the expected target result are formed, the prospects of the project results are defined, the competitive ability and possible economic effect are estimated, tasks and a complex of the project measures are formed, and the project is planned and modeled. Estimation of the project excitability is the most important at this stage. At the second stage the organizational form of management is selected, tasks on measuring, forecasting, and estimating the formed operative situation on achieving results, expenditure of time, finances and resources, analyzing and eliminating the reasons of deviating from the developed plan, plan correction are fulfilled. Figure 1 shows the general mechanism of the innovation project management.

Figure 1. Mechanism of Innovation Project Management (Ognev and Popova, 2014)



The above mechanism of the innovation project management is implemented in several stages whose algorithm is shown in Figure 2. The creation of the innovation idea and the development of the project goal are the initial “point” of the innovation project. The innovation project can be considered in terms of two positions. Firstly, the innovation idea contains the basis, namely the essence of the project that is reflected in the development of the general target goal of the project. Secondly, the creation of the innovation intention is interpreted as a selected plan of actions that includes ways and methods of achieving the goal of the innovation project. At this stage all possible variants of solving the problem are already created.

Figure 2. Stages of Developing Project Management Concept (Nechaev et al., 2014)



Collaterally with the creation of the innovation idea of the project, it is necessary to carry out a marketing research. The goal of this stage will be to form the area of the project impact on further economic development, and as a consequence, quantitative clarification of the project goal and tasks for certain periods. The target goal of the innovation project sometimes cannot be set as a specific quantitative indicator at the stage of selecting and stipulating the problem of the innovation idea. The analysis of the innovation project and rational mechanism of financing can but not guarantee successful implementation of the project, because innovation projects always have an increased degree of risk and may cause a deterioration of the financial state of enterprises. That is why estimating the impact of risks on the implementation and efficiency of an innovation project is an important stage in the project management concept. Results of the risks analysis when implementing the

innovation project are expressed in forming a probability of alternative variants implementation.

When estimating the economic efficiency of innovation projects, the Russian practice usually uses a system of indicators determined by methodological recommendations on estimating the efficiency of investment projects and their selection for financing (Popovan, 2014). If we know the probability of various conditions of the project implementation, the expected integral effect (net present value) is calculated by using the mathematical expectation formula:

$$E_{\text{exp}} = \sum E_i \times P_i, \quad (1)$$

where E_{exp} is an expected integral effect of the project,
 E is an integral effect under the i condition of the implementation, and
 P_i is a probability of this project implementation.

Herewith, to a great degree the forecast of the monetary flow of the innovation project depends on marketing researches in relation to the market environment. However, the problem is not limited to it. In this case it is important to rationally select the calculation of the most monetary flow. It is reasonable to agree with the opinion of Yu. Brigham and G. Huston (Brigham and Huston, 2016) who offer to use the following monetary flow of the project:

$$\text{CIF} = \text{EBIT} (1-T) + D + \Delta\text{NWC} + L + \text{Claims}, \quad (2)$$

where EBIT is earnings before interest and taxes (operational income),
 T is a rate of income tax,
 D is amortization deductions,
 ΔNWC is a change of the net working capital (the change of the credit debt deducted),
 L is the liquidation cost of the project, and
Claims are financial claims to counter-agents.

The indicator of earnings before interests, taxes and amortization – EBITA – is used as a component of the monetary flow. A lot of large Russian companies that make up their financial reports according to the IFRS use such method. The investment analysis of the innovation project and rationally planned financing do not guarantee the achievement of the goal related to successful development of business.

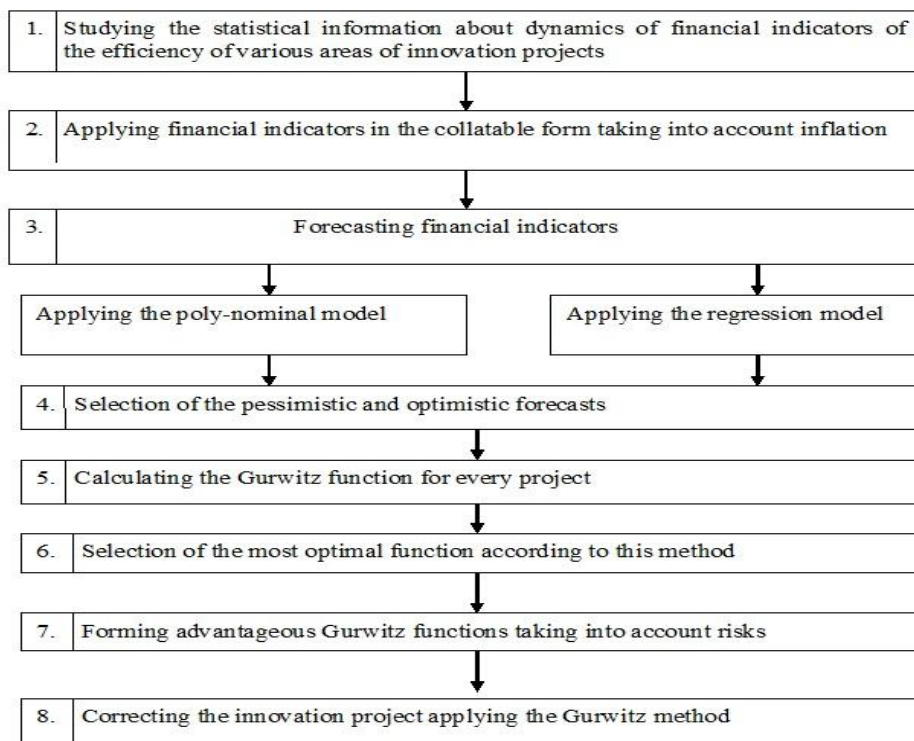
The company owners must rationally use the motivation of top managers. In this case it is recommended to apply the economic value added (EVA) as an indicator to estimate long-term perspectives. It is possible to calculate such value by using the following formula:

$$\text{EVA} = \text{NOPAT} - \text{WACC} \times \text{IC} = \text{EBIT} (1 - T) - \text{WACC} \times \text{IC}, \quad (3)$$

where $\text{NOPAT} = \text{EBIT} (1 - T)$ is a net operating income of the enterprise, IC are private assets of the enterprise that include investments.

The advantage of this method is in the fact that it takes into account not only the profit but also the capital invested in the enterprise. The enterprise capital must provide profitability as compared with the analogous investments. EVA is peculiar of the fact that it takes into account the lost profit and in case of the positive value of the capital profitability it can be negative (Methodological Recommendations on Estimating Efficiency of Investment Projects). The practice shows that at the stage of designing the innovation project like any investment project, first of all, sources and schemes of financing are defined. Today they are rather widely described in economic references. However, along with this, a little attention is paid to selecting the financing direction, more exactly, selecting the business development that makes up the general concept of the system related to managing innovation projects taking into account risks. Due to this, the implementation of the innovation project management taking into account risks can be based on applying the Gurwitz method. In order to solve such problem, it is possible to apply the Gurwitz method (Lyaskovskaya, 2012; Breckova, 2016; Hani El-Chaarani, 2014; Papanastasiou and Furlas, 2016; Stroeva *et al.*, 2015) graphically described in Figure 3.

Figure 3. Algorithm of Applying the Gurwitz Method in the Concept of Innovation Project Management (Lyaskovskaya, 2012)



Thus, it is necessary to start the project implementation from the quantitative specification of the target goal of the project and establishing intermediary tasks of its implementation for a specific time period for various variants of the implementation. The mechanisms of the innovation project management assumes the selection and comparison of the basic goal and the final result taking into account the competitive ability, perspectives of the project implementation, as well as the size of the economic effect.

The process of implementing the offered mechanism of the innovation project management includes creating of the innovation idea and defining the project goal, marketing analysis of the project idea, project structuring, analysis of the risk during the project implementation, and selecting variants of innovation project implementation (Khokhlova and Okladnikova, 2014).

When implementing innovation projects, it is important not only to select the optimal combination of the financing mechanism but also to select areas of investing that as a whole make up the general concept of the innovation project management system. In order to decrease the degree of indefiniteness of the innovation projects implementation, it is necessary to use multi-variance solutions on selecting the composition of the projects target goals, alternative ways to achieve them, variants of comprehensive provision of works that include various compositions of executors, duration and cost of works, material and technical resources and conditions to stimulate executors.

Results Discussion

The economic references single out various methods to manage innovation projects, including active and passive expectation, and stimulation of the required changes and preparing for them. Such strategy is used by applying the principle of compliance between such levels as behavior aggression and level of the environment instability. This strategy was offered by I. Ansoff (2014). He stated that the more active the environment is, the brisker the position of the enterprise has to be.

Considering innovation enterprises that implement novelties taking into account adaptations, it is necessary to note that at the present time the efficiency of the enterprise is defined by the benchmark to active use of the potential to change external processes but not only to adjust to it. Among all processes it is primarily necessary to single out active adaptation. Innovation and adaptation processes assume the stimulus for changing the environment. Using technological and product innovations, enterprises create competitive advantages (Nechaev and Antipina, 2014).

The analysis of innovation projects efficiency has its own peculiarities. Analysts justly state that the calculation of the monetary flow rather than the selection of the average weighed cost of the invested capital is the most important element in the

concept of innovation project management when defining their efficiency. Along with this, to a great degree forecasting of the net monetary flow of the innovation project depends on marketing researches of the market environment. When estimating the monetary flow, many large companies that make up their financial reports according to IFRS use the index of earnings before interest and taxes, and amortization (EBITA).

When managing the innovation project, it is important not only to select resources and schemes of its financing, but also investments areas. In order to solve such a task, it is possible to use the Gurwitz method. It is reasonable to use such approach when implementing innovation projects because it estimates the possibility of obtaining a specific standard of the return by owners for the taken possible risk related to the innovation activity (Hohlova and Okladnikova, 2013).

Conclusion

The article offered by the authors considers the methodology of managing innovation projects. On the basis of applying various methods to estimate their efficiency, it allows making the investment analysis and will contribute to their successful implementing. It acquires a special importance because innovation projects always feature an increased degree of risk.

The authors gave recommendations on the practical use of various methods to estimate the efficiency of innovation projects, and made stipulated conclusions on conceptual basics of managing them. Due to this, such aspects as setting the problem and stipulating its solving within the innovation project, goals, tasks, stages and terms of implementing the project, necessary measures of the project implementation, provision of financial resources at the expense of various sources, estimation of the economic efficiency, as well as mechanism of the project implementation are important. According to the authors, the results of analyzing the innovation project risks are expressed in selecting the most sustainable variant and preparing the project documents whose set in every case is defined by the initial task.

The work shows the results of the research in the form of developing conceptual provisions of managing innovation projects, and forming a mechanism to manage innovation projects. As a conclusion, it is possible to note that the use of the algorithm to apply the Gurwitz method is an efficient tool in the concept of the innovation project management.

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