Expert Models for the Evaluation of Innovative Entrepreneurial Projects

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Abstract

In times of crisis development of the economy, when there is less activity of economic entities, changes the structure of assets of organizations. There is a slowdown in innovation and entrepreneurship and innovations (products, processes) also change significantly. So the innovation risks increase dramatically. World experience shows that in periods of financial and economic crises, the most actively introduced innovations that further define the transition to economic growth. Innovative entrepreneurship in the Russian context has always been a highly risky activity. This necessitates the study and systematization of all its components and the final result - efficiency. The last crisis has identified a sharp increase in the risk of innovation development, reduced the probability of success at all stages of innovation, especially for small and medium businesses. However, by themselves these tough market conditions determine the impossibility not only of development, but even simple survival of the organization without innovations that create new business opportunities. Objectively, the growing scale of financial support of the development and commercialization of innovations leads to the fact that private financial support of the Russian entrepreneur becomes insufficient. The need to attract investments and borrowed funds determines the importance of the assessment of innovative entrepreneurial projects before-selling stage. Used in domestic practice, the normative methods for evaluating the effectiveness of innovative projects have drawbacks. In the current environment of uncertainty innovative entrepreneurial project should be considered as a complex system. Its evaluation requires consideration of a significant number of internal and external, quantitative and qualitative factors, and should be conducted by experts as an informal procedure. Expert model for the evaluation of innovative entrepreneurial projects allow us to determine their advantages and disadvantages. Being fairly objective, expert model contribute to the selection of the most effective projects to guide the development of new innovative economy.

Keywords: innovative entrepreneurship, innovative entrepreneurial projects, innovation risk, efficiency, expert model

1. Introduction

Crisis of 2008-2009 convincingly demonstrated that reducing business expenses on innovation slows the development of the Russian innovation system and the Russian economy as a whole. The key anti-crisis approach in the present period is investment in innovation. "Strategy of innovative development of the Russian Federation for the period up to 2020" provides a set of actions for the transition to an innovation economy socially oriented development model (Decree Government of the Russian Federation #2227, 2011).

Innovative entrepreneurship has aim to make a profit through the creation of innovation and diffusion of innovation in all areas of the economy. Unlike traditional business, it uses a new way of enterprise development, such as the creation of new organizational and managerial and production technologies, the creation of new or improved products and because of objective necessity creates innovative infrastructure. The tasks of innovative development differ significantly in the real economy and social sphere. The authors analyzed these tasks and processes in the sphere of activity of enterprises trading in the local market (Lesnikova & Chudakova, 2013).

Innovative entrepreneurship includes scientific, technological, organizational, financial and commercial activities. Scientific innovation activities formed research teams, research teams and laboratories, individual scientists, universities and gives to the market as a final product intellectual inventions and scientific discoveries.

Technological innovation activities implemented scientific and technical personnel research, production teams and aims to create new and improved products, satisfying formed and future needs of target consumers.

Organizational activity of managers of the companies - participants of the innovation project aimed at the implementation of basic management functions for the creation and effective implementation of the project, bringing the structural and organizational relationships in accordance with the principles of innovation and, ideally - the formation of organizational bases of intellectual self-developing organization (Santalova, 2013; Rodionov & Horeva, 2014).

Financial innovation activity is realized by investors at different levels and scales of activity, in various forms (public, banking, equity, venture capital, mixed financing, leasing, forfeiting, etc.), As well as the actual employers, and aims to support innovative projects attractive investment financial resources to all stages of the life cycle. Thus, financial support the introduction and implementation of an innovative project, reduces business risk and increases the efficiency of the project (Santalova, 2013).

Commercial innovation activities aimed at creating an innovation infrastructure, which includes a variety of institutions that ensure the success of innovation processes. This could include the purchase and sale of patents, licenses and know-how; organization supply innovative production; organization of marketing an innovative product etc (Santalova, 2014).

Level of implementation and the commercial effect of the introduction of innovations is determined by many factors, but, of course, crucial financial security state of enterprise innovation potential of the organization and innovative thinking of her top - managers. It depends on a choice of innovation strategy, its resource availability and success of implementation (Santalova, 2013).

Innovative activities aimed at the implementation of innovative projects, as well as the creation of innovative infrastructure and its activities (Федеральный закон РФ от 21 июля 2011 г. #254-ФЗ). In the current competitive market conditions, only an innovation-oriented company is able to survive and develop (Knyphausen-Aufsesszu, 2006).

2. Materials and Methods

Innovative project as a set of measures for the implementation of innovations aimed at achieving economic effects [2]. Calculation of efficiency (W) is carried out according to the formulas (1) and (2):

$$W = \frac{E}{C}, \tag{1}$$

$$W(2) = \frac{E}{C}, \tag{2}$$

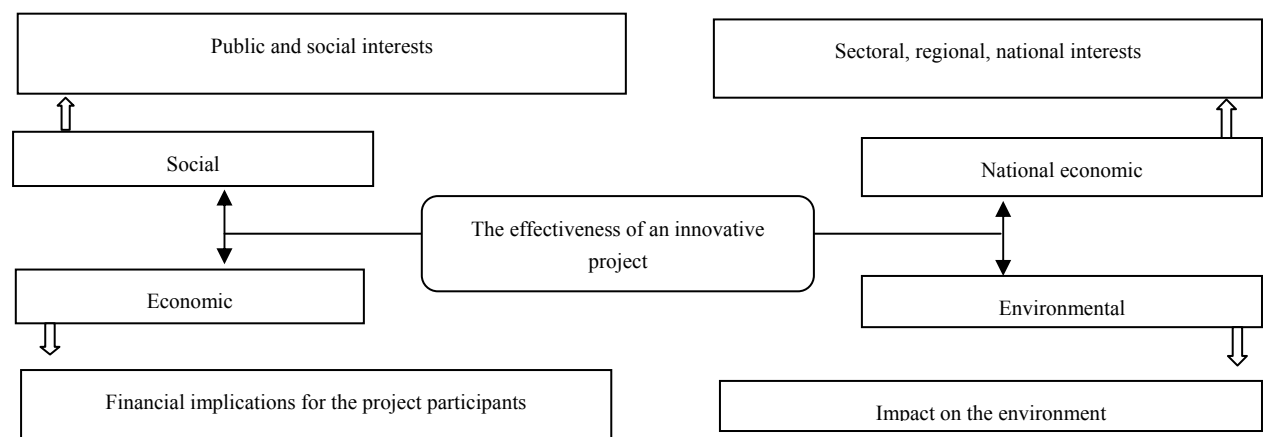where E - the effect (result) of the project; C - costs associated with the project.

Figure 1. Components of the effectiveness of an innovative project

Today, large innovative projects are implemented at the regional or national level with the system of measures of state or regional support, with the involvement of the budget, and aimed at achieving national economic, fiscal

and socio-economic effects. Medium and small business sells local innovative projects on their own, borrowed and borrowed funds and focuses primarily on the economic effect (Figure 1).

National economic (general economic) effect is the financial results of an innovative project for the national economy or region and is characterized by such indicators as revenues from sales of innovative products and services, from the sale of licenses, patents, know-how, attracting foreign investments and others.

The social effect of the introduction of the innovative project can be expressed in the growth of personal income, optimizing the cost structure of the population, the growth of patriotism and national identity, and generally improve the quality of life of the population.

Commercial (economic) effect reflects the financial results of an innovative project for its direct participants and is calculated as the difference between financial performance and costs. Environmental effects - an important component of any innovation project.

Already in the planning phase of the innovation project entrepreneur is considering ways to solve the problem of attracting financial resources for its implementation. Innovative business is ready to assume the risks associated with the financial activities of the enterprise. However, the growing scale of the financial support for the development and implementation of innovations leads to the fact that the entrepreneur's own financial security is increasingly becoming inadequate.

Implementation of Innovative always requires a significant investment in the selection of personnel, research and development, acquisition of new equipment, new channels of inbound and outbound logistics, marketing support and other new products. No planning and forecasting can not give 100% confidence in the commercialization of the project and future customer loyalty. All this defines an increased risk of innovative entrepreneurship, lack of financial resources and the need for external involvement.

Financial institutions and private investors are well aware of the high level of risk and innovation, at the same time, a high yield of innovation in the growth stage in the product life cycle. These specific features of innovative entrepreneurship determine the need for the involvement of experts and / or use of proven domestic business - practice methodologies to assess the effectiveness of innovative projects. Normative documents on the evaluation of investment projects are the "Guidelines for the evaluation of investment projects and their selection for financing" (Kossov et al., 2000).

Russian authors describe the main methods of evaluating the effectiveness of innovative projects: dynamic (in terms of NPV - Net Present Value, IRR - IRR, MIRR - Modified IRR, PI - profitability index, DPP - discounted payback period of investment) and static (at indicator PP - payback period without discounting, ARR - by a simple rate of return) (Proskurin, 2011).

Stage preliminary assessment is a necessary component of innovation and significantly reduces its risk. Examination of entrepreneurial innovation project on economic efficiency is carried out at a stage when the market is not yet known and has a high degree of uncertainty, not identified promising technologies, poor raw material supply, insufficient information and its reliability is low. Therefore, an innovative entrepreneurial project must be regarded as a complex system in the face of uncertainty. Evaluation of an innovative project requires the simultaneous consideration of many external and internal, quantitative and qualitative factors, so conducted as an informal procedure, based on expert assessments nealgoritmizuemyh (Kossov et al., 2000).

Modern systems support management decisions are focused on the active use of expert information. The most simple and accessible method of receipt - the voices of one expert. However, in this case, increases dramatically the subjectivity of the final result of expert evaluation. Engaging a group of experts allows us to go from the individual point of view of some experts to a common agreed objective group decision.

To assessment we need to involve experts with experience in the study field and in the expert evaluation, with business intuition and strategic foresight of the industry. A peer reviews should use scenario forecasting methodology and be interval: for optimistic, base and pessimistic forecast.

In the economic literature describes various expert models, but for the assessment of innovative business projects often use multi-factor model expert on the principle of "1-0" on a points basis and integrated assessment of the viability of the project. When using multi-factor assessment model on a "1-0" members of the competition committee by team decision-making are essential to define the test innovative project factors and the optimum number of experts. As evaluated factors often use the project complies with the goals and objectives of the field of activity and resource potential of the enterprise; the claimed payback period and interest rate requested financial possibilities of creditors; ensure compliance with the borrower's requested level of funding et al. Evaluation Form Traditional (Table 1).

Table 1. Evaluation form an innovative project using a multifactor model on a "1-0"

Name factor (criterion)	factor assessment (1 - if the project meets the criterion, 0 - if the project does not meet the criteria)
Criterion 1	1 or 0
…	…
Criterion №	1 or 0
…	the sum of the column

The advantage of the model - its simplicity, as experts assess all factors answered "yes / no", but it also determines the advantage of the lack of a model - not very accurate assessment results (sum of the positive responses to the column "Factor Assessment").

In this model, an innovative project is deemed effective (suitable for commercialization), if the amount on the column "Factor score" exceeds a predetermined threshold. Multifactor pricing model of innovation project on a points basis provides a more accurate and correct results, as assessed using the gradation of quality factors. Pre-formed point system assessment of each factor is under consideration, preferably 5 and 10-point system (Table 2).

Table 2. Evaluation form an innovative project using a multivariate model based on a 5-point system

Point	The degree of compliance of the project i-th criterion
5	Very good
4	Good
3	Satisfactorily
4	Poorly
5	Very bad

For each factor, develop a scale assessment so as to include all possible qualitative or quantitative "intervals of compliance." Intervals of conformity must be such that a randomly selected project with equal probability could get in each of the specified intervals. Preferably use of intervals in one point. The evaluation result will be expressed by the sum of points.

Multifactor expert model for assessing the viability of an innovative project uses experts strictly defined algorithm (Figure 2).
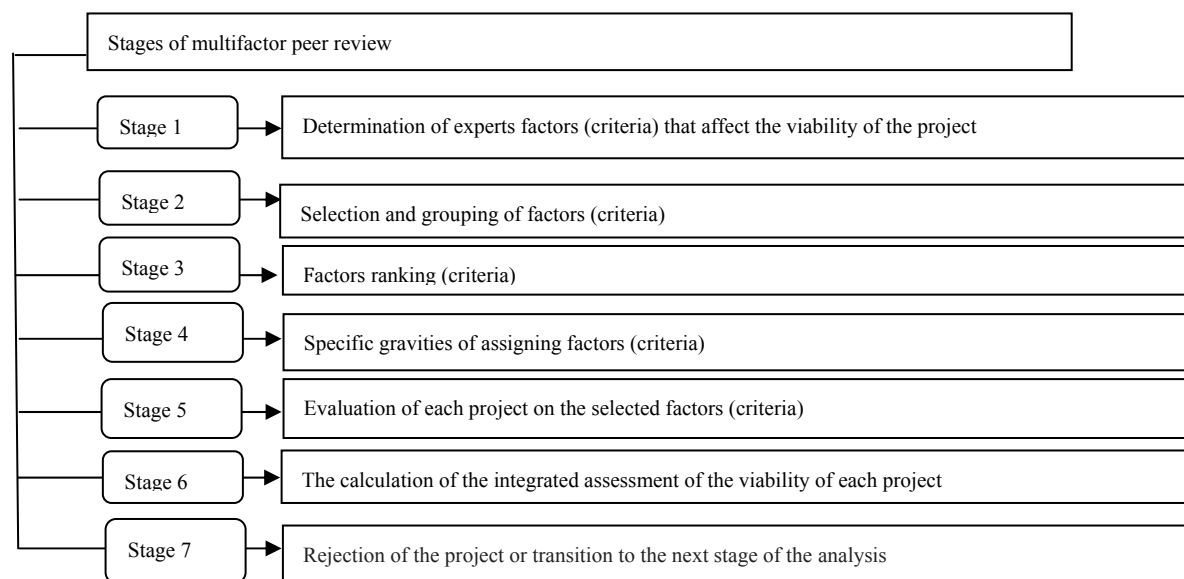

Figure 2. Algorithm for multi-expert model evaluation

To calculate the integral evaluation of the viability of an innovative project using the formula (3):

$$I = \sum_{i=1}^{m} C_i \cdot w_i , \tag{3}$$

where I - integral indicator of the viability of the project;

w_i - w i-th factor, wherein the total weight of all the factors is 1;

C_i - evaluation of the project by the i-th factor;

m - number of evaluated factors.

If C_i ranges from 1 to 10; w_i - ranging from 0 to 1, then I will vary from 0 to 10.

Using a multi-expert model allows us to consider the characteristics of assessment of viability of the innovative project in quantitative terms, but experts can accurately express their opinion on each i-th factor.

Quite often, potential investors see exactly comparable projects. In such cases, the use of multi-factor models in a comparative analysis of two or more projects usually includes an assessment of the following factors: the average annual profitability, payback period, return on investment over the life of the project as a whole and taking into account the discount, the cost of insurance against inflation losses, the carrying capacity target market, marketing costs to attract the buyer and the formation of a loyal segment of consumers, a unique innovation, speed of implementation of the project, the level of commercial risk and others.

3. Results

It is important for companies implementing innovative projects to form a model of evaluation of the innovation process, which allows us to consider the state of the innovation of its activities as a vector in three-dimensional space factors (Santalova, 2014). Along the axes of the model laid respectively enterprise innovation projects, innovation underpinning the project innovation and the environment of the project. Surface defined in this three-dimensional space is a function of state enterprises in the innovation process, every point of which characterizes the state of innovation enterprise at a given time. Accordingly, for each point on the surface there is a risk of its value innovation and function of the state of the innovation process, given in coordinates "innovative project", "novelty", "environment" risk determines the dynamics of innovation enterprises.

The "novelty of innovation" is an indicator of innovation in three classification criteria: type of novelty, degree of radicalism and depth of the changes. It is obvious that, depending on the depth of insertion of innovative changes innovative uncertainty grows, and consequently the risk of innovation.

The "environment" is the space of an innovative project, which can be either within the company, and at the level of the state or states. Under the environment in this case refers to the level of innovative activity of the enterprise. In this case, it is a broader concept than the "market" as "market" covers only part of the relationship, characterized by the ratio of sale. That is, for example, internal innovation to change the structure of the enterprise cover the concept of "market" indirectly but nonetheless, can be carried out in enterprises, both national and international level. Medium risk increases with increasing levels of difficulty (from a small company to a multinational company).

At the time of formation of market conditions require an innovative portfolio of innovative enterprise as complex projects, activities that ensures its competitive advantage and a steady income. The portfolio can be formed using a matrix by means of which it is convenient to rank innovative projects according to their priority for the company.

Assume that on the basis of analysis we build an innovative matrix and obtained a list of innovative projects leading to the achievement of specific objectives of the enterprise. The challenge is to determine which of the proposed projects include a plan and implement, i.e. in the formation of a portfolio of innovative projects. In this case, the assessment procedure may consist of the following steps: 1. Ranking of innovative projects and their profitability, the importance of goals that can be achieved with their help. The term "coefficient problem" goal, which is calculated as the ratio of the importance of this goal for a common purpose of the enterprise (numerical coefficient) to the attainability of this goal realization of specific innovation project. 2. Determination of the time required for the implementation of each of the considered innovative projects. 3. Determination of the cost of the project or expert judgment. 4. Construction of a diagram of innovative projects and achieved with the help of their goals (Santalova, 2013).

If we make a ranking of innovative projects under this scheme, one can immediately conclude that the implementation of innovative projects to be 1.2 priorities. Risk assessment can be carried out at the same time, based on priority, by calculating the integral index and the cost. The structure of the integral index of innovation risk can be represented as follows (Table 3).

Table 3. Structure of the integral index of innovative enterprise risk

Investment portfolio	Novelty of innovation	Environment (level of investment activeness)
Risks of innovation project: - Negative results of R & D; - Not achieving planned, the technical parameters in the course of technological development innovation; - Advancing innovation and technological level of technological capabilities of production; - Advancing innovation and technological level of technological capabilities consumption (operation); - Errors in the planning of the project; - Wrong choice of economic objectives of the project; - Not full support of the project financing; - Enforcement of property rights for the project; - Not in time-to-market; - Marketing mistakes marketing the project; - Occurrence of unexpected costs and cost overruns of the project; - Marketing mistakes; - Conflict with the law and the public; - The emergence of the use of new technologies and products or by-deferred over time manifestations of problems and risks; - Violation of the terms of the project.	- New to the industry, the world; New for this project; - Basic improvers, system, grow, psevdoinnovations; - Changes in the properties of the original product, quantitative changes, adaptive changes, the new version, the new generation, a new species, a new genus (range).	Within the enterprise; - regional national; - transnational

$$R_i = \prod_{t=i}^{T} r_t \; ; \qquad R_{novelty} = \prod_{k=1}^{K} n_i - \qquad R_{environment} = \prod_{z=1}^{Z} s_z$$

an indicator of the overall risk of novelty

an indicator of the overall environment risk

$$R_{portfolio} = \prod_{i=1}^{I} R_i -$$

an indicator of the overall risk of the portfolio of innovative projects

$$R_{indicator} = a_1 R_{portfolio} + a_2 R_{novelty} + a_3 R_{environment}$$ - Integral indicator of innovation risk

4. Discussion

As noted above, the success of the innovation project are greatly affected by prevailing in the organization of innovative entrepreneurial potential. The use of expert assessment models of innovative projects constituting potential improves the objective results. Such factors include the need to experience and professional competence of top managers, their personal characteristics (risk appetite, ambition, enthusiasm, hard work)

(Ghoshal & Bartlett, 1997; McGrath, 2014) and business skills (business ability, organizational skills, strategic vision and business development of the industry).

It should be noted that in the last decade has increased dramatically the complexity of the evaluation of innovative projects (Kretova, 2008; Taydaev 2014). This is due to the increased technological complexity of innovative objects, turbulence of the environment, increasing the intensity of competition for markets, increasing levels of intellectual component in the production, treatment and management.

5. Conclusion

The methods of formation of a group of experts based on the decision of order averaging operators (Startsev, 2004). They allow you to align the individual expert assessments on the basis of fuzzy majority, take into account the quantitative and qualitative information in the formation of the generalized evaluation by a large number of factors in the conditions of uncertainty. The use of software in the process of concerted group of panel decisions can significantly improve the effectiveness and validity of the examination taken on the basis of its decisions on the effectiveness of innovative projects.

Acknowledgement

Thus, the use of expert models for selection of innovative entrepreneurial projects provides the assessment of their investment attractiveness and feasibility.

References

Doyle, P. (2008). *Value-Based Marketing: Marketing Strategies for Corporate Growth and Shareholder Value* (pp. 125-127). John Wiley & Sons, Ltd.

Federal Law "On Amendments to the Federal Law" On Science and State Science and Science-technical Policy in the red. From July 21, 2011 # 254-FZ.

Ghoshal, S., & Bartlett, C. A. (1997). *The Individualized Corporation: A Fundamentally New Approach to Management* (pp. 307-308). New York: Harper Business.

Knyphausen-Aufsesszu, D., Bickhoff, N., & Bieger, T. (2006). *Understanding and breaking the rules of business: Toward a systematic four-step process* (pp. 369-377). Business Horizons, Kelley School of Business, Indiana University, September-October.

Kretova, N. N. (2008). *The relationship between information and innovation economy* (pp. 65-66). Bulletin: Voronezh: VSTU.

Lesnikova, E. P., & Chudakova, E. A. (2013). Actual problems of development of the consumer market of Voronezh. *Bulletin of the Altai Academy of Economics and Law, 32*(3), 44-47.

McGrath, R. (2014). *The End of competitive advantage* (pp. 61-63, 75-77). Lane. from English. C. N. Egorova. - M.: BINOM. Knowledge laboratory.

Proskurin, V. K. (2011). In I. Lukasiewicz (Ed.), *Analysis and financing of innovative projects* (pp. 57-64). INFRA-M.

Rodionov, E. V. (2014). Process of transition to innovative - structural type of economic growth of agricultural enterprises. In E. V. Rodionov, & M. G. Horeva (Eds.), *mat. Int. Conference "Society and Economic Thought in the 21st Century: the development and innovation"* (pp. 234-236). Scientific book.

Santalova, M. S. Nechaeva, S. N., & Nikolaeva, J. R. (2013). Innovative projects and conditions of their implementation. *The second fundamental and applied studies of America, Europe, Asia and Africa* (p. 464). USA / New York.

Santalova, M. S., Nekrilova, O. A., & Nikolaeva J. R. (2014). *Strategic development of the personnel: monography.* Germany: LAMBERT.

Santalova, M. S., Rodionov, E. V., & Nikolaeva, J. R. (2014). The main objectives and principals of innovative policy. *French Journal of Science and Education, 2*, 145. Paris.

Santalova, M. S., Rodionov, E. V., & Voskonyan, A. N. (2013). *Evaluation of the innovative policy of the enterprises: monography.* Germany: LAMBERT.

Santalova, M. S., Rodionov, E. V., Sibiryatkina, I. V., & Popov, E. V. (2013). Condition of Formation of new quality of growth of economic systems. *World Applied Sciences Journal, 27*(6), 785-789.

Startsev, A. C. (2004). *Models matching expert assessments in the procedures of group choice: abstract of Diss.*

on   special.   HAC   05.13.01,   candidate   of   technical   sciences.   Voronezh.   Retrieved   from
http://www.dissercat.com/content/modeli-soglasovaniya-ekspertnykh-otsenok-v-protsedurakh-gruppovogo-
vybora

Taydaev, R. M. (2014). The process of creating a system of risk management in modern Russian enterprises. In
mat. Int. Conference "Society and Economic Thought in the 21st Century: the development and innovation"
(pp. 132-135). Scientific book.

The strategy of innovative development of the Russian Federation for the period up to 2020 (approved. Decree of
the Government of the Russian Federation of December 8, 2011 # 2227-r).

Vladimir, K., Livshits, B., & Shahnazarov, A. G. (2000). *Guidelines for evaluating the effectiveness of
investment projects VC # 477 from 21.06.99, approved by the Ministry of Economy, Ministry of Finance of
the Russian Federation, Russian State Committee for Construction, Architecture and Housing Policy* (pp.
56-57). Economics.

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