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RISK MANAGEMENT OF STATE REGULATION PROJECTS FOR THE INNOVATION CLUSTERS DEVELOPMENT

Abstract. Clustering initiates innovative activity in all phases of reproduction by reducing barriers to market entry and transaction costs for information seeking, creating the conditions for attracting additional financial resources, and generating demand for highly qualified personnel. In this regard, it is particularly important to ensure the effective functioning and development of innovative clusters in the country through the development and implementation of projects for their state regulation. The theoretical aspects of realization of projects for state regulation of innovative clusters development are considered in the article. The model of risk management of government regulation projects for the innovative clusters development is schematically presented. An algorithm for selection of state regulation projects is proposed, which will facilitate the selection of optimal projects from the set of available projects for implementation, as well as the selection and determination of the most appropriate places for their application.

Keywords: risk, risk management, government regulation project, innovation cluster, algorithm, model.

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РИСК-МЕНЕДЖМЕНТ ПРОЕКТОВ ГОСУДАРСТВЕННОГО РЕГУЛИРОВАНИЯ РАЗВИТИЕМ ИННОВАЦИОННЫХ КЛАСТЕРОВ

Аннотация. Кластеризация инициирует инновационную активность на всех фазах воспроизводства путем снижения барьеров вступления на рынок и транзакционных издержек на поиск информации, создание условий для привлечения дополнительных финансовых ресурсов, формирование спроса на высококвалифицированные кадры. В связи с этим, особую актуальность приобретает обеспечение эффективного функционирования и развития инновационных кластеров в стране путем разработки и реализации проектов их государственного регулирования. В статье рассмотрены теоретические аспекты реализации проектов государственного регулирования развитием инновационных кластеров. Схематично отражена модель риск-менеджмента проектов государственного регулирования развитием инновационных кластеров. Предложен алгоритм отбора проектов государственного регулирования, который будет способствовать выбору оптимальных проектов из совокупности имеющихся проектов для реализации, а также подбору и определению наиболее подходящих мест их применения.

Ключевые слова: риск, управление рисками, проект государственного регулирования, инновационный кластер, алгоритм, модель

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РИЗИК-МЕНЕДЖМЕНТ ПРОЕКТІВ ДЕРЖАВНОГО РЕГУЛЮВАННЯ РОЗВИТКОМ ІННОВАЦІЙНИХ КЛАСТЕРІВ

Анотація. Кластеризація ініціює інноваційну активність на всіх фазах відтворення шляхом зниження бар'єрів вступу до ринку і транзакційних витрат на пошук інформації, створення умов для залучення додаткових фінансових ресурсів, формування попиту на висококваліфіковані кадри. У зв'язку з цим, особливої актуальності набуває забезпечення ефективного функціонування та розвитку інноваційних кластерів у країні шляхом розробки та реалізації проектів їх державного регулювання.

Метою дослідження є розробка алгоритму відбору проектів державного регулювання розвитком інноваційних кластерів з елементами ризик-менеджменту.

Результати. Досліджено теоретичні аспекти реалізації проектів державного регулювання розвитком інноваційних кластерів. Схематично відображено модель ризик-менеджменту проектів державного регулювання розвитком інноваційних кластерів. Встановлено, що модель ризик-менеджменту проектів державного регулювання розвитку інноваційних кластерів включає декілька етапів: збір та аналіз інформації; визначення основних цілей та стратегічних орієнтирів; вибір методів та інструментів для оцінки ризиків; ідентифікація та оцінка ризиків; розрахунок показників ризик-ефективності; оцінювання ефективності проекту; моніторинг і контроль за реалізацією проекту. Запропоновано алгоритм відбору оптимальних проектів державного регулювання, що ґрунтується на формуванні панелі індикаторів і розрахунку інтегрального показника, за яким здійснюється ранжування як самих проектів, так і місць їх застосування з точки зору територіального і галузевого аспектів.

Висновки. Встановлено, що інноваційні кластери у процесі свого функціонування, ефективність якого підвищується при реалізації проектів державного регулювання їх розвитком, відчувають на собі вплив факторів, що зумовлюють різні види ризиків. При цьому виникнення ризиків є системною ознакою господарювання в ринкових умовах і тому їх облік повинен проводитися на всіх етапах життєвого циклу проекту з урахуванням змін як у внутрішньому, так і у зовнішньому середовищі, і пов'язуватися з основними показниками діяльності певного інноваційного кластеру. Використання запропонованого у дослідженні алгоритму відбору проектів державного регулювання розвитком інноваційних кластерів сприятиме вибору оптимальних проектів із сукупності наявних проектів для реалізації, а також підбору і визначенню найбільш відповідних місць їх застосування.

Ключові слова: ризик, управління ризиками, проект державного регулювання, інноваційний кластер, алгоритм, модель

Introduction. In the conditions of globalization of the world economic space, the goal of entrepreneurship development is to increase the level of competitiveness, which is reasonably interpreted as an objective prerequisite for ensuring the progressive dynamics of indicators of the level and quality of life of the population. However, the limitation of production traditional factors necessitates the use of the innovation clusters potential, within which a continuous process of knowledge generation and diffusion of innovations is ensured with the participation of subjects of large and small business, research and educational organizations, public authorities, etc.

Clustering initiates innovative activity in all phases of reproduction, as it reduces barriers to market entry and transaction costs for information seeking, creates the conditions for attracting additional financial resources, generates demand for highly qualified personnel and opportunities to meet it through the development of educational services. The specificity of an innovation cluster is to obtain a synergistic effect for its members, which is expressed in increasing the competitiveness of the whole system in comparison with individual business entities [1]. In this regard, it is particularly important to ensure the effective functioning and development of innovative clusters in the country through the development and implementation of projects for their state regulation. At the same time, adequate risk management of these projects allows to identify inefficient projects that carry potential risks for other participants in the innovation infrastructure from the outset. Such projects do not accomplish the tasks assigned to them, and do not allow them to obtain both commercial and social effects from their use.

Analysis of recent research and publications. Studies of innovation clusters are reflected in the scientific works of many scientists, namely [2-7]: R. Dorn, A. Roich, W. Hulsink, P. Drucker, O. Odintsov, S. Rosenfield, R. Kozhukhivska, N. Parubok, N. Petrenko, S. Podzihun, I. Udovenko, P. Rosa and other

scientists. Some aspects of the problem of project risk management are devoted to the research of J. Adam, I. Balabanov, V. Berens, I. Blanco, R. Carter, K. Redhead, M. Rogov, A. Hosking, N. Khokhlov, V. Cherkasov, and other scientists.

In paying tribute to the aforementioned scientific works, it is worth noting that there is insufficient research on the risk management system of state regulation projects for the development of innovation clusters.

The purpose of the article is to develop an algorithm for selecting state regulation projects for innovative clusters development with elements of risk management.

Presentation of the basic material and substantiation of the results of the research. The application of models of state regulation of the innovative clusters development allows to achieve a comprehensive modernization of industrial and organizational-managerial relations within the framework of the reproductive process of the regional system economy through the involvement of various sources of project financing [8]. Innovative development projects include structural processes of interaction between public authorities and economic entities regarding the development and realization of the region's innovation potential through the implementation of appropriate business activities. The basis for the implementation of projects in the innovation field is the implementation by the state of the basic functions of ensuring economic security, which in most cases is aimed at solving problems arising from market failures, in particular low innovation and investment activity of economic entities [9, p. 230].

These shortcomings of the market mechanism for providing innovative development of innovation clusters are most clearly manifested in the field of infrastructure development, which includes initiative business projects that satisfy the conditions of innovation orientation of the results of their activity, and also have sufficient resources for implementation. An indispensable condition for successful implementation of projects using the state regulation model of the development of innovation clusters is the elimination of institutional risk factors, which include:

- creation of an appropriate regulatory legal field, reflected in the adoption of legislation, which takes into account the specificity of the model of implementation of projects for innovative development of the innovative clusters;

- ensuring openness and transparency of the activities of project providers and direct companies participating in state-owned objects;

- development of clear regulations and instructions in the field of state regulation of the development of innovation clusters;

- support for overall political and macroeconomic stability in regional economic systems.

The management of external and internal risks of state regulation projects for the development of innovation clusters is based on a clear algorithm, which includes, at the first stage, identification of representative risks. External risks of these projects are divided into several homogeneous groups, identified on the basis of risk factor orientation: political, related to the work of public authorities; risks of public effects; business risks from participating in state regulation projects for the development of innovation clusters. The main manifestations of the political risks of projects include: the tendency to political conjuncture, the risks of contract revision, the high level of initial non-repayable investments. Among the internal risks of projects are the following ones: financial, credit and currency risks; technical risks (associated with the pre-investment stage of construction and operation); business risks (the main of which is the likely non-use of products, works or services). Private internal project risks are much broader and more diverse, however, in most cases, they were identified long ago. New risks arising from changes in the form and methods of management are identified at the beginning of project implementation.

The variety of possible state regulation projects for the development of innovative clusters that differ in terms of implementation, volume of financial investments, goals set require them to be divided into stages in order to identify important control points, during the passage of which additional information is needed about the possible directions of project development, taking into account the influence of the external and internal environment factors. At each stage of implementation, the project must go through a series of performance analysis procedures aimed at identifying the factors that affect its end result. Therefore, in modern conditions, effective risk management of government regulation projects implies the need to use not only the analysis of the effectiveness of the implemented measures, but also scientifically proved management mechanisms that ensure the maximum consideration of existing factors for making optimal

decisions. But even complete and scientifically grounded information does not exclude the risk of an accidental event, that is, it does not completely remove the uncertainty of the environment. Therefore, it is necessary to apply different risk management mechanisms for projects that can compensate for the potential loss. At the same time, the risk reduction actions should be carried out in the following directions: reducing the impact of risk on the results of industrial and economic activities of the innovation cluster; maintaining a tolerable level of risk; transferring a portion of the risk to another entity. Thus, risk analysis is the element that links the process of justifying the feasibility of a particular project and managing its implementation. It should include several areas: general methodological problems of risk analysis; qualitative and quantitative risk analysis; practically oriented recommendations on the use of risk assessment methods. In our opinion, a perspective way of risk assessment is the combination of several methods of risk assessment, depending on the objectives of the analysis, the specifics of the state regulation project for the development of innovative clusters and the type of risk assessed.

Taking into account the abovementioned, in the general form the model of risk management of the state regulation projects for the development of innovative clusters is shown in Fig. 1. These projects are general in nature, in their structure all projects are divided into initiative business projects, complex investment plans and infrastructure projects. The basic definition of the project type, as well as the models and forms of its implementation, lay down the restrictive conditions for the implementation of management actions for the project during its creation and operation. Taking into account that these parameters are already laid down as initial conditions, the risk management model of state regulation projects for development of innovation clusters includes several stages: collection and analysis of information; defining the main goals and strategic guidelines; selection of methods and tools for risk assessment; identification and assessment of risks; calculation of risk-effectiveness indicators; evaluation of project effectiveness; monitoring and control over the project implementation.

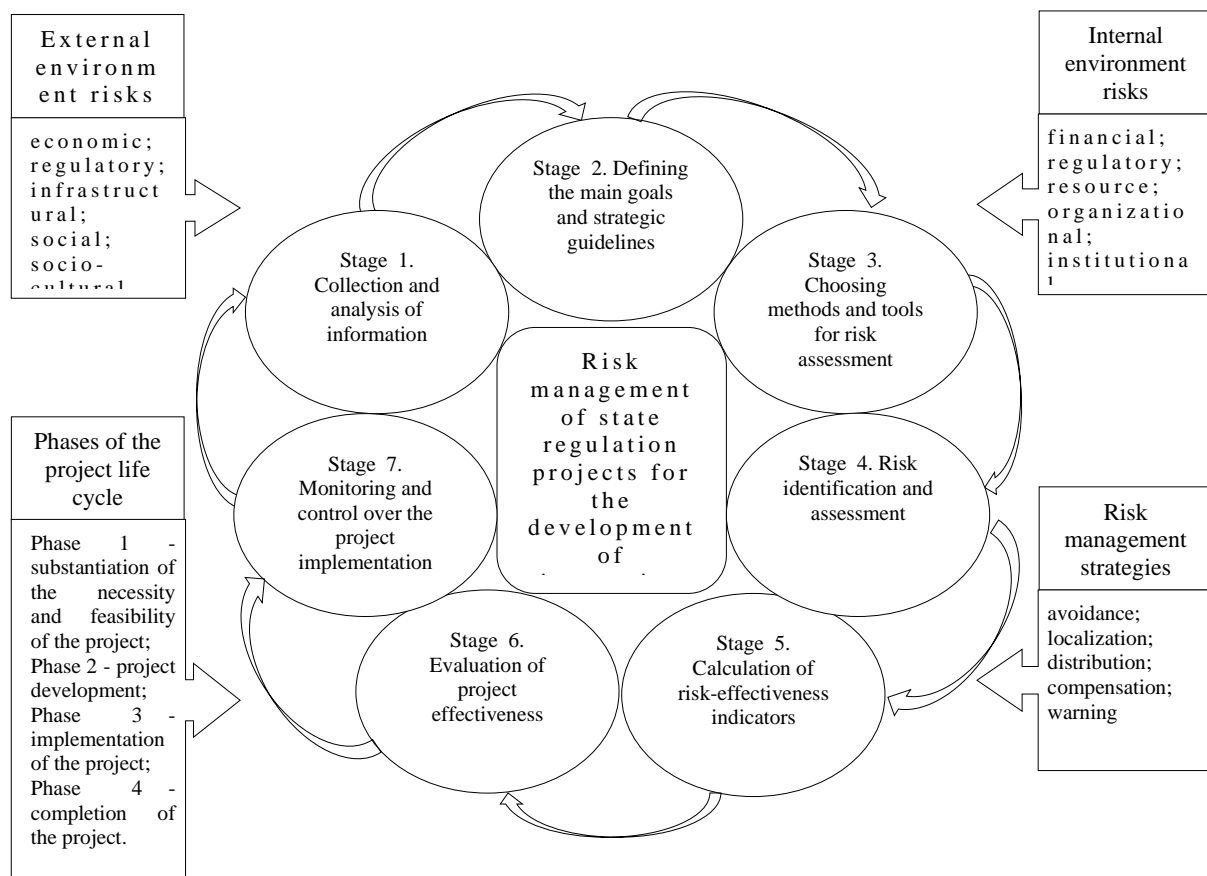


Fig. 1. Model of risk-management of state regulation projects for the development of innovation clusters

Source: created by the authors using [10]

The project risk management model describes the process of identifying the most significant risks and mechanisms for responding to them without anticipation of a risk event. Using a risk management model with a set of tools and techniques for influencing risks allows to use an integrated approach to managing the whole project as a whole.

In our opinion, effective implementation of state regulation projects for the development of innovation clusters, regardless of the scale and activities of the latter, is based on the optimal approach to the selection of rational projects from the set of available projects for implementation, as well as the selection and identification of the most appropriate places for their application. This approach to the procedure of the selection of the mentioned projects is adaptive in that it covers different areas and integrates them into a single universal complex. Based on the above approach, an algorithm for selecting projects for state regulation of the development of innovation clusters will be proposed, which would take into account the multi-levelledness of this procedure, as well as the various regional aspects of project implementation characteristic for it (Fig. 2).

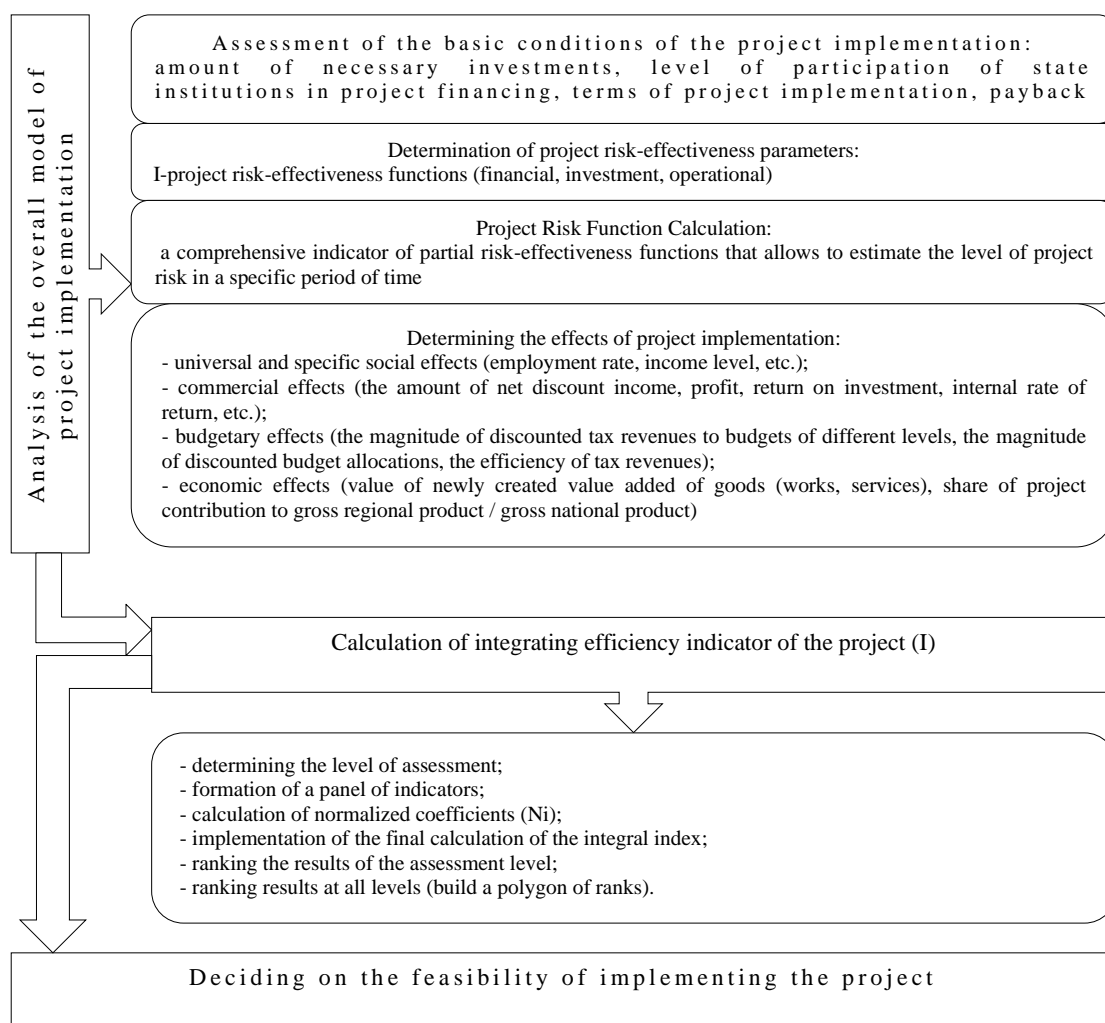


Fig. 2. The algorithm of selection of state regulation projects for the development of innovation clusters
Source: created by the authors

Each direction is evaluated and analyzed in the first stage separately from each other, only after conducting a complete analysis, within the second stage, these directions are evaluated in a complex.

Adaptive approach to the procedure of selection of state regulation projects for the development of innovation clusters is based on the formation of a panel of indicators and calculation of an integral indicator,

which rank both the projects themselves and their application places in terms of territorial and sectoral aspects.

It is advisable to use indicators that adequately reflect the project implementation conditions to form the indicator panel. Various factors are taken into account that can have a significant impact on the final calculation of the integral index. To calculate the integral indicator of the effectiveness of the project implementation, the following actions should be taken: to determine the level of evaluation; to form a panel of indicators; to calculate of normalized coefficients; to conduct the final calculation of the integral index; to rank the results of the assessment level; to rank the results of all levels (build a polygon of ranks).

To calculate the normalized coefficients for each indicator in the indicator panel, it is advisable to use the following formula (1):

$$N_i = \frac{1}{\max_i - \min_i}, \quad (1)$$

where: N_i is the normalized coefficient of the i -indicator;
 \max_i – maximum value of i -indicator;
 \min_i – minimum value of the i -indicator.

The calculation of the integral index as a whole for the selected level should be made according to the formula (2):

$$I_j = \sum_{i=1}^n F_i * N_i, \quad (2)$$

where: I_j is the integral index of the j -level of evaluation;
 F_i is the actual value of the i -indicator;
 N_i is the normalized coefficient of the i -indicator.

The proposed algorithm for selection of state regulation projects for the development of innovative clusters allows to conduct independent evaluation of indicators from that point of view that the indicators do not set weights, each indicator is evaluated separately from the others, but the integral indicator takes into account equally the changes of each indicator.

Conclusions. Thus, in the course of the conducted research it was found that innovative clusters, in the course of their functioning, whose efficiency, in turn, increases in the implementation of state regulation projects for their development, feel the influence of factors that cause different types of risks. At the same time, at each stage of the project for state regulation, the factors of the external and internal environment have different influence on its effectiveness. That is, the emergence of risks is a systemic feature of market economy management and therefore their accounting should be carried out at all stages of the project life cycle, taking into account changes in both the internal and external environment, and be linked to the main performance of a particular innovation cluster. The use of the proposed algorithm for the selection of state regulation projects for the development of innovative clusters will facilitate the selection of optimal projects from the set of existing projects for implementation, as well as the selection and identification of the most appropriate places for their application. In turn, the application of models of state regulation of the development of innovative clusters through the involvement of various sources of project financing will contribute to a comprehensive modernization of industrial and organizational-managerial relations within the framework of the reproductive process of the economy of the regional system, as well as to increase the level of competitiveness of the national economy as a whole.

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