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METHODOLOGICAL APPROACHES ON THE SELECTION OF OPTIONS FOR INNOVATIONAL DEVELOPMENT OF REGIONAL INDUSTRIAL COMPLEX

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Introduction. In an unstable economic environment, the formation of a regional industrial complex under conditions of uncertainty and risk factors leads to the fact that the innovative processes of the creation of the final product significantly deviate in time and space from its planned development.

The sources of the formation of these factors and means of recording in the assessment of efficiency should be considered.

Aim and tasks. Consider approaches to choosing innovative development options for a regional industrial complex under conditions of uncertainty and risk.

Research results. Under the uncertainty one should understand the lack of data on the conditions in which economic activity will be thwarted, a low degree of predictability, increase of these conditions.

When assessing innovation and investment projects in the region, the most important are the following types of uncertainties and regional risks: uncertainty about the behavior of competitors; uncertainty about the political and socio-economic situation in the country and region; incompleteness / inaccuracy of information about the parameters of innovations; foreign economic risks; incompleteness of information on financial sustainability; unpredictability of the tax policy; other types of financial risks; some types of risks: the risk of falsification of financial statements, the risk of theft of certain types of assets; emission risk, etc.

Territorial peculiarities in innovative development the role of a significant factor is assigned: they can both accelerate and slow down the formation of the types of their economic activity, and in the broader sense - and the nature of strategic development.

However, the implementation of the chain becomes even more important «new creation - new-introduction – innovation» and the generation of new technologies in this territory, which ensures the uniqueness of industrial production, which causes the formation of a spatially-innovative monopoly in the area of innovation activity.

Conclusion. During the development of innovative processes at enterprises - innovators of the regional industrial complex it is necessary to take into account the specifics of such a complex object as the economic system of the region, factors of uncertainty and risk under the influence of the internal and external environment, especially the stages of the product life cycle/enterprise/industry.

Keywords: region, development, methodical provision, uncertainty, risk.

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МЕТОДИЧНІ ПІДХОДИ ЩОДО ВИБОРУ ВАРІАНТІВ ІННОВАЦІЙНОГО РОЗВИТКУ РЕГІОНАЛЬНОГО ПРОМИСЛОВОГО КОМПЛЕКСУ

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Проблема. При нестабільному економічному середовищі утворення регіонального промислового комплексу в умовах факторів невизначеності та ризику призводить до того, що інноваційні процеси створення кінцевої продукції суттєво відхиляються у часі та просторі від свого запланованого розвитку.

Слід розглядати джерела утворення цих факторів та засобів їх обліку при оцінці ефективності.

Мета та завдання. Розглянути підходи щодо вибору варіантів інноваційного розвитку регіонального промислового комплексу в умовах невизначеності та ризику.

Результати. Під невизначеністю слід розуміти «недостатність даних про умови, у яких буде протикати економічна діяльність, низький ступінь передбачуваності, підвищення цих умов.

Виявлено, що при оцінці інноваційно-інвестиційних проектів у регіоні найбільш важливими є такі види невизначеностей та регіональних ризиків: невизначеність поведінки конкурентів, їх цілей та поведінки на ринку; невизначеність політичної та соціально-економічної ситуації у країні та регіоні; неповнота/неточність інформації про параметри інновацій, їх техніко-економічних характеристик; зовнішньоекономічні ризики; неповнота інформації про фінансову стійкість; непередбачуваність податкової політики; непередбачуваність банківської системи; емісійний ризик.

Виявлено, що територіальним особливостям у інноваційному розвитку відводиться роль значимого фактору: вони можуть як прискорювати, так і гальмувати формування типів їх господарської діяльності, а в більш широкому розумінні – і характер стратегічного розвитку.

Запропоновано, що ще більшого значення набуває реалізація ланцюгу «новостворення – нововведення – інновація» та генерування нових технологій на даній території, що забезпечує унікальність промислового виробництва, яке визиває формування просторово-інноваційної монополії у зоні інноваційної діяльності.

Висновки. Під час розвитку інноваційних процесів на підприємствах – новаторах регіонального промислового комплексу необхідно враховувати специфіку такого складного об’єкту як економічна система регіону, фактори невизначеності та ризику під впливом внутрішнього та зовнішнього середовища, особливості основних етапів життєвого циклу продукції/ підприємства/галузі.

Ключові слова: регіон, розвиток, методичне забезпечення, невизначеність, ризик.

Introduction. In an unstable economic environment, the formation of a regional industrial complex under conditions of uncertainty and risk factors leads to the fact that the innovative processes of the creation of the final product significantly deviate in time and space from its planned development.

So, should consider the sources of these factors and their means of accounting for the evaluation of efficiency. On the basis of the analysis of scientific literature, three means of estimating uncertainty accounting were identified:

- determination of sustainability of innovation and investment projects;
- specification of innovation-investment projects' parameters and economic norms;
- formalization of uncertainty determination.

Analysis of recent research. A significant contribution to the theory and practice of regional innovation development, management of innovation processes in industry and strategic management of regional economy has been made by such domestic scientists as: B. Burkinsky [1; 2], I. Vakhovych [3], V. Dubnitsky [4], V. Zakharchenko [5-7], D. Isachenko [8], M. Merkulov [9], B. Kolisnyk [10], I. Gruznov [11], S. Suspitsyina [12], A. Egorshina [13], D. Solokha [14] and others.

Aim and tasks. In the works of domestic and foreign scientists considerable scientific-theoretical and methodological material has been developed, many practical recommendations for strategic development of regions, strategy of innovative activity of business entities have been proposed. At the same time, in today's conditions there are many new problems associated with the globalization of innovation space, an unstable environment, risks and safety of innovation development.

To consider approaches to choosing innovative development options for a regional industrial complex under conditions of uncertainty and risk.

Main results. Under the uncertainty one should understand he lack of data on the conditions in which economic activity will be thwarted, a low degree of predictability, increase of these conditions. Uncertainty faces the risk of planning, decision-making, and action at all levels of the system. This vocabulary definitions should be supplemented: also determined by incompleteness and inaccuracy of information on the conditions for the implementation of innovation and investment projects, including related conditions of cost creation and obtaining the final result. The uncertainty associated with the possibility of emerging in the course of implementing innovation and investment projects of unusual situations and consequences is characterized by the concept of regional risk. Regional risk is a risk that is related with a loan or investment in a given country.

When assessing innovation and investment projects in the region, the most important are the following types of uncertainties and regional risks:

- uncertainty about the behavior of competitors, their goals and behavior in the market;
- uncertainty about the political and socio-economic situation in the country and region;
- incompleteness/inaccuracy of information about the parameters of innovations, their technical and economic characteristics;
- foreign economic risks: the introduction of restrictive measures on trade, fluctuations of conjuncture in the world markets, the closure of borders;
- incompleteness of information on financial sustainability: imperfect capital structure and insolvency(low liquidity of assets of the enterprise)participating companies of innovative and investment projects;
- unpredictability of the tax policy: the risk of introducing new types of tax payments, the risk of increasing rates of current tax payments, the risk of changing conditions and terms of payment of tax payments, the risk of tax breaks;
- other types of financial risks: investment risk – investment, portfolio risk, risk of innovation investment; inflationary risk - ensuring the real value of capital; interest rate risk - unpredictable interest rate change on the financial market; currency risk – the risk of

choosing a currency, the risk of currency fluctuations;

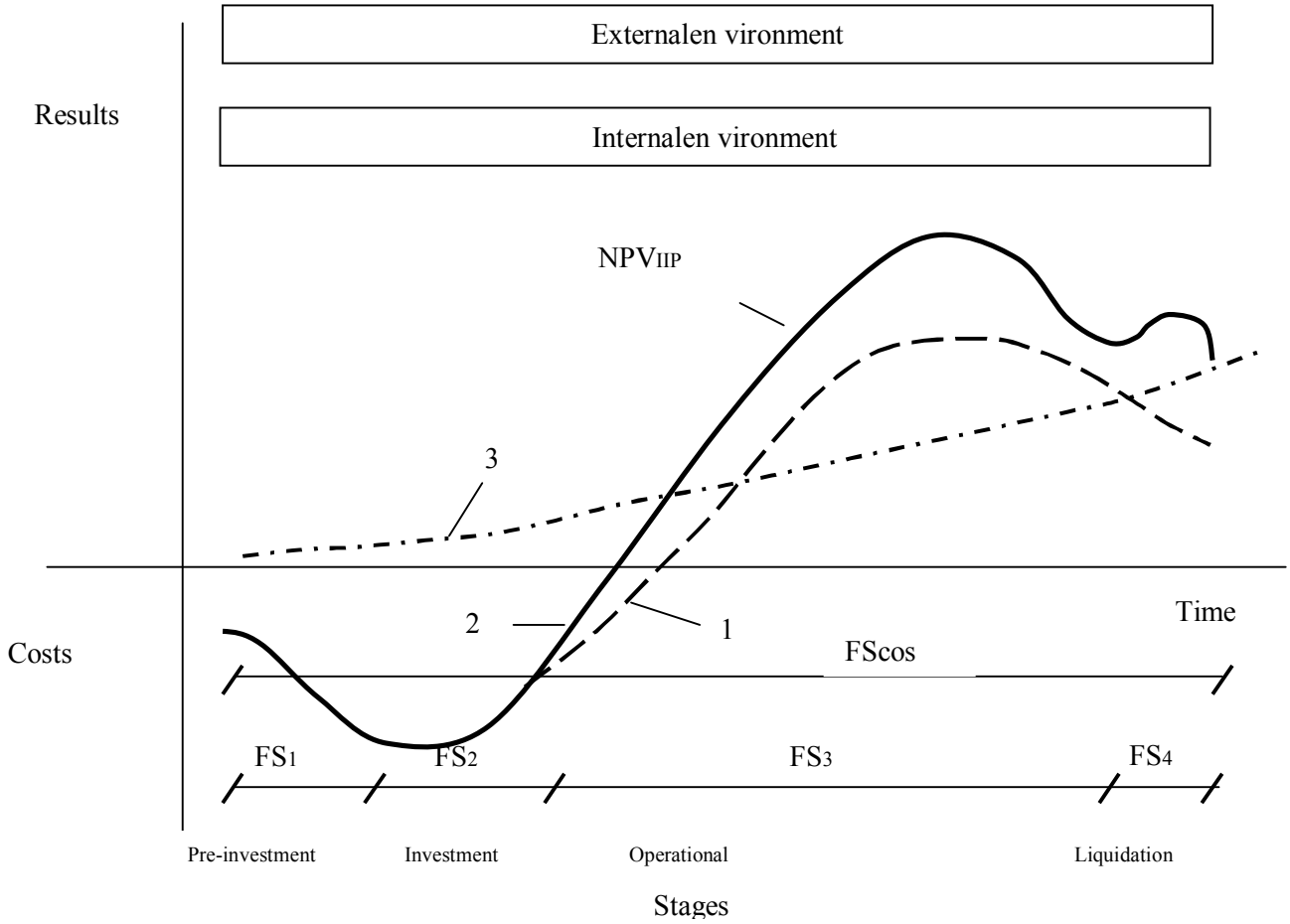
- some types of risks: the risk of falsification of financial statements, the risk of theft of certain types of assets; emission risk, etc.

The regional economic system must to this set of uncertainties and risks, and regional economic entities are obliged to take them into account when implementing innovation and investment projects (IIP) (table 1) [14].

Table 1. Classification of risks in the implementation of innovation and investment projects

Stage of the life cycle of the IIP	Type of risk	Degree of risk	Risk factors	Influence on the final results of the IIP
I. Pre-investment stage	1.1. Scientific and technological risk (not conducting pre-planned research, the risk of false applied research, risk of failure to achiev project performance)	Low	1. Unprofessional approach to the task of the project 2. Errors in the input information 3. Errors in calculations	1. Need for additional investments 2. The need for an additional period of project implementation 3. Refusal to carry out IIP 4. Expenditure
	1.2. Marketing risk (not conducting properly trial marketing, losing the calculated profit)	Below average	1. Errors in the assessment of the required investments 2. Underestimation of demand for innovative products 3. Excessive price of the product 4. The risk of changing market conjuncture	1. The need for additional investments 2. Reduced revenue from the sale of innovative products and profits 3. Refusal to continue investing
II. Investment stage	2.1. Investment risk (related to the investor's financial condition)	Below average	1. Insufficient funding IIP or improper use of borrowed funds 2. Bankruptcy of the investor in the process of implementation of IIP 3. Refusal of IIP due to invest or reorganization	1. The need to raise funds 2. Reducing the efficiency of IIP due to changes in the price and amount of the loan 3. Change of the term of execution of the second stage 4. Reduction of competitiveness IIP
	2.2. Commercial risk	High	1. Changes in the external market environment 2. Changes in the tax legislation and monetary policy of the state	1. Additional investments in IIP 2. Negative changes in the receipt of income / profit from the implementation of IIP
III. Operational stage	3.1. The risk reduction in sales of innovative products	Above average	1. Ungrounded marketing strategy for these projects 2. Possibility of early completion of IIP 3. Decrease brand quality	1. Possibility of early completion of IIP 2. Decrease brand quality 3. The possibility of bankruptcy
	3.2. The risk of debt growth of different kinds	Average	1. The state of the consumer market 2. Changes in terms of supply logistics	
	3.2. The risk of debt growth of different kinds	Average	1. The state of the consumer market 2. Changes in terms of supply logistics	
	3.3. The risk of falling prices for innovative products	Below average	1. Competition policy in the market 2. Change the market objectives of the enterprise - the supplier of innovative products 3. Changes in product quality	
	3.4. Risk of declineincome /profits	Below average	1. Growth of production costs 2. Reduced sales volumes	
IV. Liquidation stage	4.1. Risk of of expenses' growth for utilization of IIP	Low	1. Additional expenses for liquidation 2. Change in service life	1. Reduce the image of the manufacturer of products 2. Refusal to execute the contract for utilized equipment
	4.2. The risk of additional costs due to changes in standards	Low	Completion of the technical system	

To analyze or diagnose an innovation-investment project at a regional level, it is expedient to adopt an instrument for evaluating the investment efficiency in the UNIDO methodology and to determine the NPV, PV, IRR, and PDP indices for an innovation-investment project at various stages of its implementation in the region. At the same time, a revaluation is carried out (feasibility study - FS) of the entire life cycle of the project/product/enterprise (Fig. 1).



Symbols: 1 - cost curve when creating the final innovation product; 2 - cost curve taking into account operating costs for innovative products; 3 - the curve of medium-scale investment efficiency

Fig. 1. Effectiveness of management of innovation and investment projects in the stages of the life cycle

Source: compiled by the author on the basis of [8; 12]

Modern innovative enterprise operates in an ever-changing environment and, accordingly, changes itself, adapts to external changes. At the same time, there are constant sources of new market opportunities and threats that create circumstances that are difficult to predict. It is in these conditions that the need arises to find new approaches to solving innovation development problems [11, p. 29].

The author supports the opinion of I. Vakhovych and I. Gruznov that the formation of organizational and economic mechanism of regional development and management of innovative activity of enterprises of regional industrial complex promotes increase of their quality control and financial and economic stability, promotes development of technological preconditions inside the whole complex. [9, p. 130; 6, p. 104-110].

When choosing options of the innovation process' management must take into account the various territorial aspects [16, p. 122]. Territorial peculiarities in innovative development the role of a significant factor is assigned: they can both accelerate and slow down the formation of the types of their economic activity, and in the broader sense - and the nature of strategic development. And in this respect, there are changes in the chain of promotion of the innovative product: the place of implementation changes, the price level is implemented, the level of utilization of the updated resources (for example: JSC «Odescabel» makes the transition to raw materials from Japan), the potential effect is changing. In turn, through the level of profitability of innovation in industrial enterprises of the territory influences on the pace of the innovation infrastructure's formation of the territory, its scale, changes the size of the effective area of activity, etc. [14]. The innovative potential of the territory changes, which promotes the attraction or repulsion of both consumers and enterprises. The mutual influence of these factors, by analogy with the diamond of the competitive advantages of M. Porter, can be represented as a dynamically changing spatial regional production system (Fig. 2) [14, p. 81].

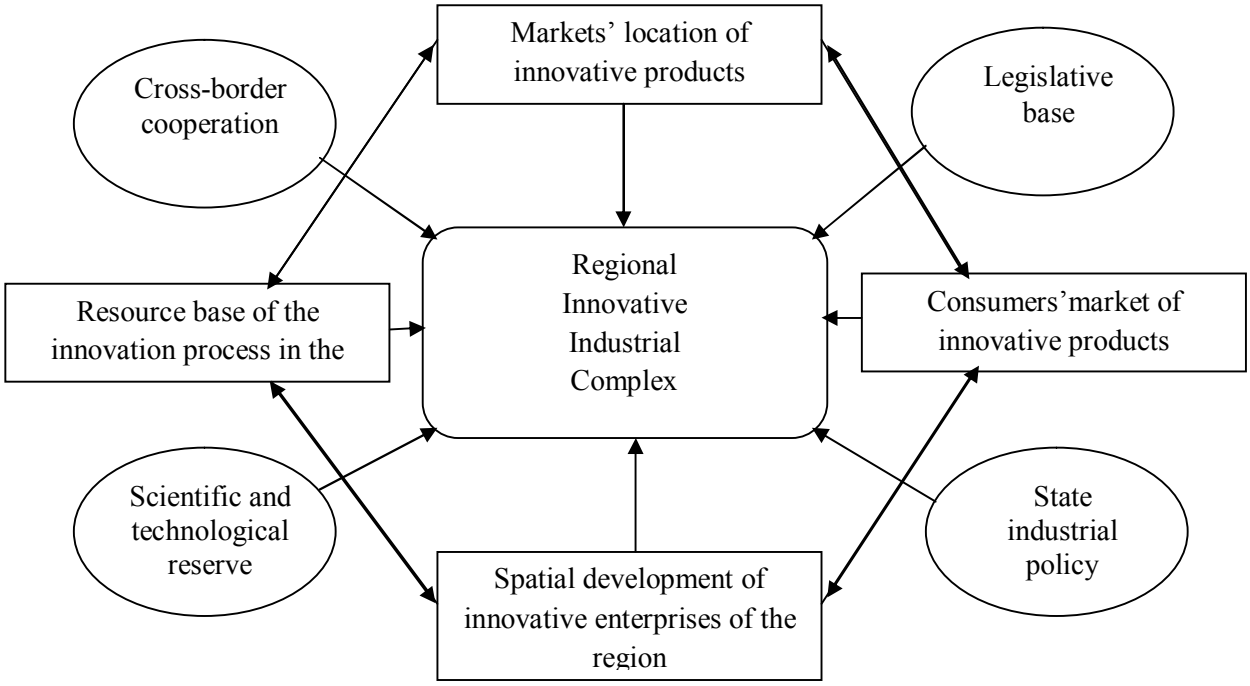


Fig. 2. Resource flows of the regional innovation industrial complex

Source: compiled by the author on the basis of [14, p. 81]

The interconnection of the forces of influence in this diamond at the present stage is very variable, due to the high dynamics of the global innovation market. This is inevitably necessary higher flexibility from small and medium-sized industrial enterprises, to adapt faster to changing conditions. At the same time, cost minimization and the speed of change are of great significance above all in the production of innovative products, which focuses on cross-border cooperation and output, first of all, on the European market.

However, the implementation of the chain becomes even more important «new creation - new-introduction – innovation» and the generation of new technologies in this territory, which ensures the uniqueness of industrial production, which causes the formation of a spatially-innovative monopoly in the area of innovation activity [9, p. 104].

According to the author, the area of innovative activity of the enterprise of the regional industrial complex is limited to the territory, which is characterized by the

appropriate level of scientific and technological development of industry and specific enterprises that ensure the rational use of resources that are necessary for optimal production of final innovative products with competitive technical and economic characteristics in due time in the context of a specific situation.

Taking into account the features of the relative spatial binding consumers of innovative products, a variety of cooperative ties, remoteness resource-base of support, economic systems of the regional industrial complex should provide the placement of innovative enterprises closer to the places of concentration of consumers.

Another important issue for regional industrial complex that needs solved, is a lack of sufficient investment resources that are necessary for high-tech development and solving socio-economic problems. This determines the risk of investing and creates a number of negative processes: narrowing the markets for innovation products; volatility of production, sales, market infrastructure, deferred consumer demand.

The same problems cause uneven development not only of the entire region, but also of certain types of economic activity, its separate regions, enterprises. The experience of the development of domestic regions allows for the best understanding of the modern innovative development of the industrial complex of the region as a regional economic system to consider it in two coordinates: vertical and horizontal (Fig. 3) [11; 13].

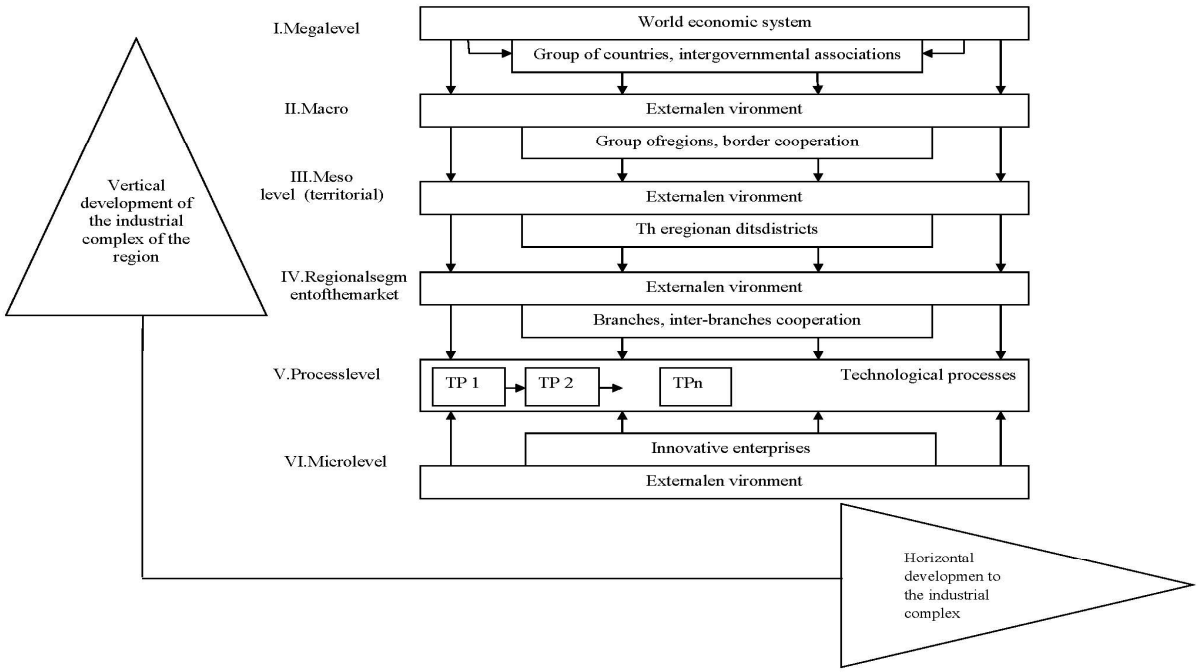


Fig. 3. Vertical and horizontal development of the regional industrial complex

Source: compiled by the author.

The regional industrial complex has a vertical development with different levels of management: territorial, sectoral, process, etc.

Horizontal development of the regional industrial complex is determined by the following chain: resource providers - developers of innovations - enterprises - product promotion - utilization (liquidation).

The end result of productions and innovations is formed at the micro level, so all levels of higher level management should be considered as an external environment, where

the probability of occurrence of risks is rather large as a result of imbalance between them.

In this case, different situations are formed, which are divided into scientific and technological, production organizational-supply, managerial, and economic, which ultimately determine the investment attractiveness for the investor in each specific regional industrial complex.

Thus, the main directions of the innovation strategy of the regional industrial complex in solving its specific problems are:

- development of scientifically grounded strategy of planning of technological measures for the regional industrial complex;
- accounting and evaluation of uncertainty and risk factors at the stages of the innovation process;
- increasing the mobility of enterprises - innovators;
- development of marketing support of enterprises and branches of high-tech sector;
- development of transfer facilities and diffusion of innovations;
- use rational forms of organization, management, improving innovation processes;
- adaptation of organizational and functional management structures to the environment.

The rejection of these processes from the planned level of the region will mark the direction of changing the strategy of development of the regional industrial complex (branches, enterprises). The imbalance of the indicators, which characterize the movement on each axis of the coordinates (Figure 3) determine the directions of interaction of enterprises - the innovator with the authorities in the implementation of state and regional innovation and investment programs and projects.

Conclusions and further research. During the development of innovative processes at enterprises - innovators of the regional industrial complex it is necessary to take into account the specifics of such a complex object as the economic system of the region, uncertainty and risk factors under the influence of the internal and external environment, features of the main stages of the product/enterprise/industry life cycle. The classification of risks of the innovation-investment project has been further improved in accordance with the stages of its life cycle. It is proved that the risk management system during the implementation of the innovation-investment project is a necessary element of the management system of innovation processes in the regional industrial complex.

The definition of the zone of innovation activity of the enterprises of the regional industrial complex is given and outlined the problems of its gradual development in the coordinate system - the vertical and horizontal directions of development.

It is proved that the efficiency of innovation activity of the enterprises of the regional industrial complex and the formation of the corresponding zones of activity is ensured by the use of organizational and economic mechanisms for attracting modern resources, means of high-tech production and promotion of innovative products to the market.

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