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PROBLEMS OF FORMATION AND MANAGEMENT OF INNOVATION SYSTEM OF THE REGION

Abstract. In the condition of unstable economic situation on the international scene it is necessary to support the development of small and medium- sized businesses in the region, which will improve the stability of the regional economy, the innovation climate, ensure social and innovative development. The article examines the role of the information system in managing the region's innovation system. The problems of regulation of innovation activity are analyzed; recommendations on the management of the region's innovation system are given. The ways of the region's innovative development are considered, focused on achieving economic sustainability, only the orientation of science on solving urgent economic problems can provide the necessary results in the transition to sustainable development.

Key words: region, innovation, information infrastructure, indicators, innovation system, management, compatibility of system.

Abstract. In the condition of unstable economic situation on the international scene it is necessary to support the development of small and medium- sized businesses in the region, which will improve the stability of the regional economy, the innovation climate, ensure social and innovative development. The article examines the role of the information system in managing the region's innovation system. The problems of regulation of innovation activity are analyzed; recommendations on the management of the region's innovation system are given. The ways of the region's innovative development are considered, focused on achieving economic sustainability, only the orientation of science on solving urgent economic problems can provide the necessary results in the transition to sustainable development.

Key words: region, innovation, information infrastructure, indicators, innovation system, management, compatibility of system.

Introduction. Success in today's economy is increasingly associated with innovations- in the field of engineering, technology, labor organization and management based on the use of science and innovative experience. Accordingly, supporting and stimulating innovation has become an integral part of local economy development programs. The creation of regional innovation systems of interconnected groups of cluster enterprises focused on the generation and implementation of innovations is today the main line, the leitmotif of regional and municipal strategies and programs.

The term «innovation» is now one of the most commonly used concepts in economic policy. Kazakhstan, like developed countries, declares the goal of transition to innovative development. The importance of innovation for the economic development of the country today can already be considered an indisputable and empirically confirmed fact.

Among the institutions of the innovative economy it should be singled out in the first place the regional innovation system, clusters, as well as technology parks and technology transfer centers.

The scientific concept of a Regional Innovation System (RIS) began to take shape in the early 1990s. One of the authors of the RIS concept and the world's leading theorist in this field is Professor Philip Cook of Cardiff University [1].

The Regional Innovation System is a complex of organizations located in the region, initiating and producing new knowledge, their dissemination and use, contributing to the financial, economic, legal and information support of innovative process interconnected and with ever sustainable relationships [2].

Methods. The regional innovation system consists of three key subsystems:

1) Organizations and firms that directly generate knowledge: specialized research institutes, research centers, higher education institutions, enterprises and research organizations to improve competitiveness of their products;

2) Organizations that innovate, promote and implement new products: innovation-focused enterprises in the region and specialized organizations that help businesses in the region innovate and their promotion; organizations, businesses that use this knowledge;

3) Structure performing specialized mediation functions (infrastructure support, financing of innovative projects, their market expertise and organizational support): law firms, chambers of commerce, etc.

The following conditions are needed to create sustainable RIS in the region:

- the presence of universities and research institutes and organizations in the region;
- attracting and retaining highly qualified personnel staff in the region;
- creating the conditions to support innovations;
- working technology transfer mechanisms;
- the active position of the regional authorities on the formation of the RIS [3].

Regional authorities manage and coordinate the innovation system, define the goals, strategy and priorities of its development. The formation of the RIS is a complex and long- term process during of which state and local government policies should be implemented, defining the RIS strategy, stimulating private capital to participate in the innovative development of the region.

In order to ensure stable growth of Kazakhstan's economy, it is necessary to keep the course towards innovative development: increasing competitiveness in the international and interregional markets, modernizing the economy. The current state of the economy of our country is characterized by a lag in scientific and technical positions. In order to increase the scientific and technical potential, it is necessary to develop innovative regional policies.

The main objective of the RIS is to create the conditions for the permanent emergence and successful development of new innovative projects aimed at realizing the competitive advantages of the region. The competitiveness of the region in today's environment is heavily dependent on innovation. Regions compete for resources including intellectual capital and markets, but nowadays the nature of competition is changing. The importance of physical infrastructure is diminishing, giving away to a leading role in expanding the range of sustainable competitive advantages of collaboration between innovation participants, their joint development of new products and services, and the joint creation and the dissemination of new knowledge and technology.

The region's ability to build intellectual capacity can change the prevailing competitive environment.

The results of the study. The degree of innovation attractiveness of the regions can be described as: Gross Regional Product (GRP); Industrial Output (IO); Volume of Innovation Products (VIP); Domestic Research and Development Costs (DRDC); Enterprise Innovation Level (EIL); and Science and Technology Works (STW).

At the end of 2018, statistical observation of the innovation activities of 30501 enterprises of the republic were carried out. During the reporting period 3230 enterprises were innovating (in 2017-2974 enterprises). Compared with 2017, the number of enterprises having innovations increased by 256 enterprises.

Innovative activity of enterprises in product, process, organization and marketing innovations was 10.6 % including in product and process innovation- 6.6%. The highest activity in innovation of all the innovation types were observed among large enterprises and amounted to 41.7 % (out of 1,764 large enterprises reported by 735 innovative enterprises) [4].

The volume of innovative products in 2018 compared to 2017 increased by 39.6% and amounted to 1179150.2 million tenge. Innovative products were sold at a cost of 1134952.6 million tenge.

During the analyzed period, the cost of product and process innovation decreased by 4, 8% compared to the previous year and amounted to 856449,5 million tenge (in 2017- 899681,8 million tenge). At the same time, the costs of product and process innovations from the own funds of enterprises amounted to 392,226.1 million tenge, which is 45.5% of the total costs of product and process innovations. According to the survey, the largest number of enterprises with all four types of innovations operates in the city Nur-Sultan (32.4%), Almaty (21.6), East Kazakhstan (18.9), Karaganda and Pavlodar regions (5.4).

Table 1 - Indicators of innovation activity by the dimension of enterprises of regions

	Small			Average			Large		
	Number of businesses, units	of them	Innovation activity rate,%	Number of businesses, units	of them	Innovation activity rate,%	Number of businesses, units	of them	Innovation activity rate,%
		Innovation			Innovation			Innovation	
The Republic of Kazakhstan	26 128	1 877	7,2	2 609	618	23,7	1 764	735	41,7
Akmola	982	46	4,7	143	17	11,9	82	30	36,6
Aktobe	960	41	4,3	112	33	29,5	102	52	50,0
Almaty	1 563	87	5,6	176	29	16,5	91	35	38,5
Atyrau	959	55	5,7	108	16	14,8	94	25	26,6
West Kazakhstan	779	25	3,2	94	9	9,6	79	16	20,3
Zhambyl	708	35	4,9	70	26	37,1	63	35	55,6
Karagandy	1 914	205	10,7	220	56	20,5	155	75	48,4
Kostanay	1 049	71	6,8	188	45	23,9	105	47	44,8
Kyzylorda	608	41	6,7	77	21	27,3	71	30	42,3
Mangystau	958	21	2,2	102	12	11,8	68	12	17,6
Pavlodar	1 061	54	5,1	117	21	17,9	94	41	43,6
North Kazakhstan	814	52	6,4	145	39	26,9	54	28	51,9
Turkistan	805	24	3,0	62	13	21,0	60	23	38,3
East Kazakhstan	1 707	170	10,0	208	68	32,7	135	79	58,5
Nur-Sultan city	3 611	439	12,2	219	71	32,4	145	73	50,3
Almaty city	6 263	445	7,1	452	117	25,9	282	108	38,3
Shymkent city	1 387	66	4,8	116	25	21,6	84	27	32,1

Thus, the analysis of the statistics has identified three groups by the level of activity in innovation.

- High level: East Kazakhstan (leads in 2 positions), West Kazakhstan (leads in 3 positions), Atyrau (2 positions), Astana (2 positions), North Kazakhstan (2 positions);

- Average level: Kostanay (5 positions, but less active), Kyzylorda (3 positions), Mangystau (3 positions), South Kazakhstan (2 positions), Aktobe (3 positions), Karaganda (1 position), North Kazakhstan (1 position) and Zhambyl (1 position);

- Low level: Pavlodar, Almaty, Akmola, Zhsaambyl and Karaganda.

In our opinion, the key problems in the regulation of innovation are:

- non-compliance and lag in standards from market needs;
- lack of organized government forecasting in innovation policy;
- an undeveloped system of intellectual property protection is a serious barrier to innovation;
- a high degree of bureaucracy in the innovation sector;
- low qualifications of civil servants, lack of real expertise of projects on novelty and «innovation»;

- ineffective information support [5].

A strategy of the region's development is needed for effective innovation. Figure 1 shows the strategy of innovative development for the region. We study each task in more detail.

Solving the problem of creating effective regulatory support aimed at supporting the region will allow us to conclude that there are legislatively established grounds for combining activities with the functioning of competitive market mechanisms in the region. To solve the second problem, it is necessary to create conditions for the education of specialists in the innovation sphere, namely, training in leading universities in the region, as well as in foreign ones, to practice the training of specialists for research work.

The third problem is to create an effective demand for innovation and innovative products. The key to innovation development is the successful development of demand for innovation, search and niche in the market. The fourth task is to develop the innovative culture of the region's residents; it is worth noting that the innovative economy requires «innovative» personnel who are able to take full advantage of the achievements of science and technology, focused on creating innovations, their introduction into all areas of life.

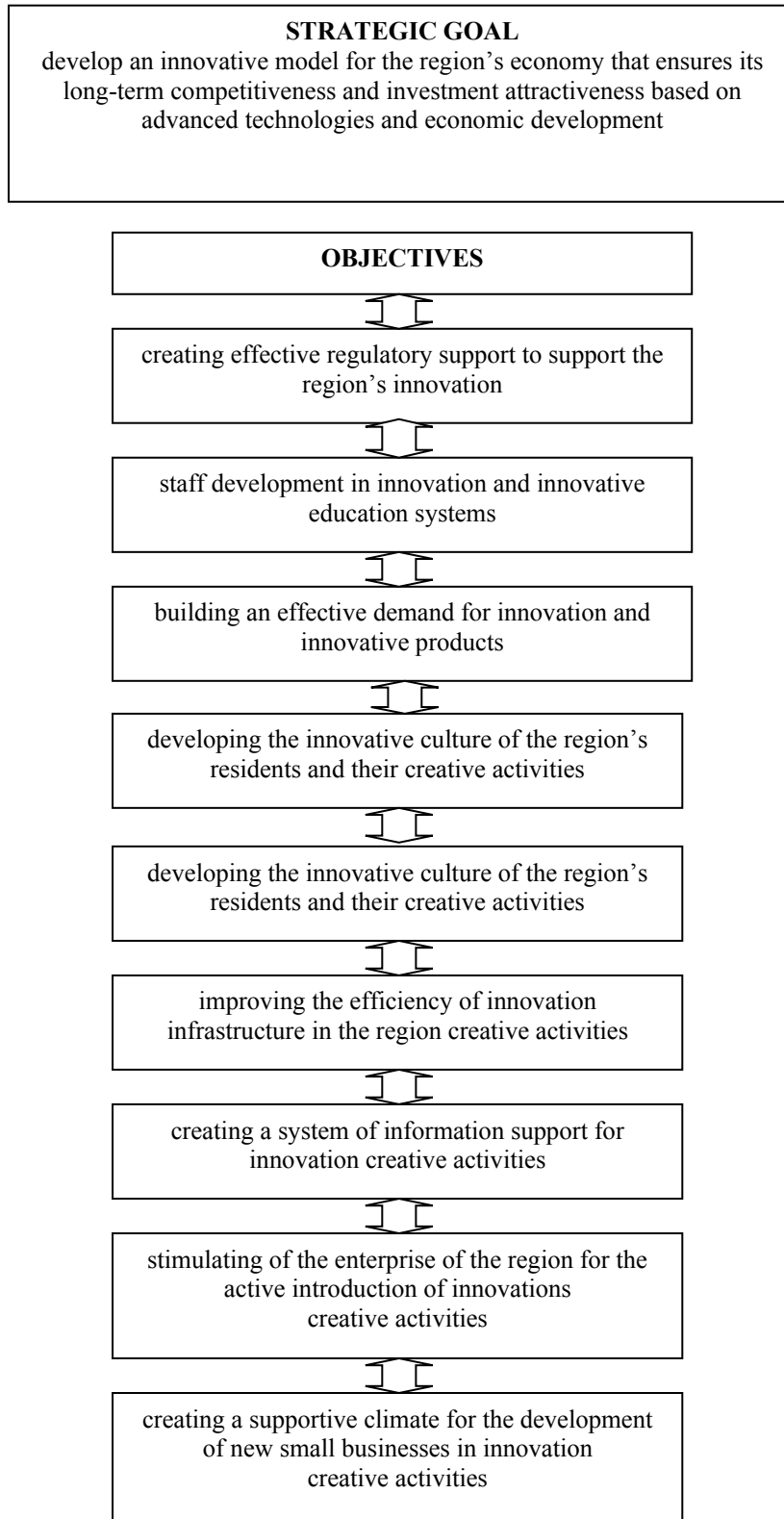


Figure 1 - Strategy of innovative development for the region

Note – compiled by authors

The group of scientific and technical factors includes the creation of information bases, the use of modern forms of information exchange, the unification and standardization of databases and information flows. These factors are necessary with the information support of innovation. In the process of

implementing innovative projects, managers and professionals need to plan and make a variety of decisions, for which timely and accurate information is very important [6].

In order to obtain the most accurate and timely information, it is necessary to ensure:

- the ability to accumulate information about scientific developments;
- gaining access to a variety sources of information;
- availability of information about potential partners in the innovation process.

In the absence of the necessary information in the databases, not only negative results, but also «intellectual» information is given to the participant of the innovation process:

- a list of objects based on individual parameters that partially correspond to the request;
- scientific and technical forecasting.

The information system, which is designed to manage the region's innovation system, should be built as a hierarchical, territorially- distributed structure that should contain information that is integrated into subject areas and functional uses. Based on the organizational principles of the innovation system, which are coordinated at the level of software and hardware and information and linguistic compatibility.

The region's databases should interact on the following functions:

- predicting development;
- planning development;
- monitoring the state of the region.

The region's innovation system should be managed through interconnected functions:

- forecasting – to forecast the development of the region's innovation system based on its capabilities and the needs of society for different periods;

- planning – setting goals, objectives, mechanisms, ways, timing of achievement of target indicators;

- regulation- regulatory consolidation of the action plan, regulation of interaction between performers and participants in the innovation process;

- incentives- directing the necessary resources to support the development of innovation in the region;

- coordination- to bring information to the performers and participants through software.

Manage processes and make decisions to implement activities;

- control-timely receipt of information about the results of projects, use of resources;

- monitoring and evaluating the results – to assess the effectiveness of the activities carried out using software [7].

Meanwhile, in Kazakhstan and its regions, public policy in both sustainable and innovative development is not yet unified, integrated but is carried out in a fragmented and unrelated way- including in the case of inconsistencies between the actions of the republican and regional authorities.

However, modern socio-economic interaction in every country of the world in any region is such that it requires harmonization of interaction in the system of «man-society (economy)» on the basis of the pre-emptive promotion of innovation. There is a need for clearer a stricter regulation of rules, principles of regulations, adequate stimulation of innovatively active economic entities:

1) organizational and economic – the presence or possibility of forming in the region industries (or ways of organizing them), industries or sectors of the economy that could ensure the functioning of the region on the principles of sustainability and innovation (those organizational forms - technology parks, business incubators, innovation funds, innovatively active entrepreneurial and social structures, etc. – that can contribute to the development, implementation, promotion of innovation);

2) resource prerequisites are the availability of appropriate economic, scientific, technological, natural and resource capacity in the region, as well as the labor force (economically active population), on which the transition strategy should be based on sustainable and innovative development. It is necessary to maintain human capital at the appropriate level, which implies improvement of social policies in the regions of Kazakhstan (increasing funding for education and health care, improvement of working conditions, as well as increased environmental quality). At the same time, the existing natural and human capital should be re-evaluated annually, taking into account the intensity of their consumption and the recovery-time based on the existing assimilation capabilities of the regional system [8].

Conclusion. In our view, these are the most important conditions for the transition of regions and countries as a whole to sustainable and innovative development. Thus, certain measures are required that should be taken by the relevant authorities in relation to the regional socio-economic system in order to ensure the sustainability and innovativeness of its functioning and development. However, when

developing and implementing these measures, it should be taken into account that the regional system is affected by negative and favorable factors that must be taken into account. Obviously, the balance of the regional economy from the point of view of the concept of sustainable development can be achieved by overcoming the influence of negative factors and strengthening the action of positive factors that can accelerate and harmonize the process of formation of a sustainable, stable and innovative economy in the region [9].

As for the factors impeding the sustainable and innovative development of the region, they include:

1) high cost innovation, high economic risk and uncertainty over the timing of the innovation process. All this, obviously increases the potential for losses due to innovation, as a result of which economic entities seek to shift costs to other entities of the economy (consumers, the state), avoiding responsibility for reducing the region's resource capacity and maximizing profits;

2) lack of funding for innovative enterprise activity (which is obviously linked to the first factor). In the current transitional conditions of Kazakhstan there is a transition not only from the administrative-command economy to market relations, but also from industrial society to post-industrial. At the same time, many enterprises are severely under funded even to carry out the current production and economic activities (especially in the global crisis), and even more so are unable to carry out innovative projects, while regional governments are often short of budget and unable to allocate more funds for new technologies;

3) lack of legislative and regulatory instruments that stabilize and stimulate innovation, and the lack of legal support for the entire cycle of innovation;

4) lack of awareness of regional economic entities (from civil servants to legal and individuals) about the need and importance, principles, objectives, goals and conditions for the formation of a sustainable economy in the region. Thus, in turn, entails the lack of appropriate consideration of external effects and the risk of their occurrence at both the macro and micro levels, and insufficient innovation activity in the region;

5) immunity of economic entities to innovation in general and to innovation in particular which is connected not only with the financial features of the innovation process (factors 1,2), but also with stereotyping, lopsidedness (utilitarianism) and conservatism economic thinking and behavior of people, which are aimed primarily at satisfying their own interests (which is certainly natural, but short-sighted and irrational in today's conditions);

6) lack of developed market system in the field of innovation (cooperation of research and development projects, feasibility zones and business environment, sales market and ways, product promotion, as well as strong consumer demand for this very specific-innovative product, testing results, marketing and advertising etc.);

7) personnel problem is the lack of specially trained employees who have not only theoretical knowledge in the field of innovative management but also practical techniques and skills of innovation.

To solve these problems it is necessary to develop and implement in the region a model of innovative development, focused not just on improving the competitiveness of the region in the context of the formation of a knowledge economy in the global community, but above all on the achieving economic sustainability and equilibrium by creating a single innovation space in the region. Making appropriate changes in the nature and direction of research and engineering work: only science's focus on pressing economic challenges can deliver the necessary results in the transition to sustainable development.

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ӨНІРДІҢ ИННОВАЦИЯЛЫҚ ЖҮЙЕСІН ҚАЛЫПТАСТЫРУ ЖӘНЕ БАСҚАРУ МӘСЕЛЕЛЕРІ

Аннотация. Халықаралық аренадағы тұрақсыз экономикалық ахуал жағдайында өңірде шағын және орта кәсіпкерлікті дамытуды қолдау қажет, себебі бұл, өңірлік экономиканың тұрақтылығын арттыруға, инновациялық климат құруға, әлеуметтік және инновациялық дамуды қамтамасыз етуге мүмкіндік береді. Мақалада өңірдің инновациялық жүйесін басқарудағы ақпараттық жүйенің рөлі қарастырылады. Инновациялық қызметті реттеу мәселелері талданды, өңірдің инновациялық жүйесін басқару бойынша ұсынымдар

берілді. Экономикалық тұрақтылыққа қол жеткізуге бағытталған өңірдің инновациялық даму жолдары қарастырылды, тек ғылымның өзекті экономикалық проблемаларды шешуге бағытталуы ғана тұрақты дамуға көшу кезінде қажетті нәтижелерді қамтамасыз етуі мүмкін.

Қазіргі экономикадағы табыс ғылыми және инновациялық тәжірибені пайдалану негізінде техника, технология, еңбекті ұйымдастыру және басқару саласында инновациялармен тығыз байланысты. Яғни, инновацияларды қолдау және ынталандыру өңірлік экономиканы дамыту бағдарламаларының ажырамас бөлігіне айналды. Бүгінгі күні басты бағыт инновацияларды генерациялау мен іске асыруға бағдарланған кластерлік кәсіпорындардың өзара байланысты топтарымен бірлесіп, өңірлік инновациялық жүйелерді құрудағы өңірлік және жергілікті стратегиялар мен бағдарламалардың локомотиві болып табылады.

Өңірлік инновациялық жүйенің негізгі мақсаты өңірдің бәсекелестік артықшылықтарын іске асыруға бағытталған жаңа инновациялық жобалардың тұрақты пайда болуы және табысты дамуы үшін жағдайлар жасау болып табылады. Қазіргі жағдайда өңірдің бәсекеге қабілеттілігі инновациямен байланысты. Өңірлер зияткерлік капитал рыноктар мен ресурстар үшін бәсекеге түседі, дегенмен, қазіргі уақытта бәсекелестік сипаты өзгеріп отыр. Физикалық инфрақұрылымның маңызы төмендеп келеді, инновациялық қызметке қатысушылардың өзара іс-қимылының тұрақты бәсекелестік артықшылықтарының спектрін кеңейтуде, олардың жаңа өнімдер мен қызметтерді бірлесіп әзірлеуде, жаңа білімдер мен технологияларды бірлесіп жасау мен таратуда жетекші рөлге ие болуда.

Өңірлік инновациялық жүйе негізгі кіші жүйелерден тұрады: білімді тікелей генерациялайтын ұйымдар мен фирмалар; өз өнімінің бәсекеге қабілеттілігін арттыру үшін мамандандырылған ғылыми-зерттеу институттары, ғылыми-зерттеу орталықтары, жоғары оқу орындары, кәсіпорындар мен ғылыми-зерттеу ұйымдары; өңірдің кәсіпорындарына инновациялар енгізуге және оларды ілгерілетуге көмектесетін өңірдің инновациялық-бағдарланған кәсіпорындары мен мамандандырылған ұйымдары; осы білімді пайдаланатын ұйымдар, кәсіпорындар; мамандандырылған делдалдық функцияларды орындайтын құрылымдар және т. б.

Өңірдің зияткерлік әлеуетін арттыру қабілеті қалыптасқан бәсекелестік ортаны өзгерте алады. Өңірлік инновациялық стратегия макростратегияны (әлемдік бәсекеге қабілеттілік, экономиканы дамыту, әлеуметтік мақсаттарға қол жеткізу саласында ұлттық басымдықтарды іске асыратын) және өңірлік ресурстар рыноктарына бәсекелес кәсіпорындардың шаруашылық жүргізуші субъектілерінің инновациялық стратегияларын және өнімді өткізуді біріктіруге мүмкіндік береді.

Түйін сөздер: өңір, инновациялар, ақпараттық инфрақұрылым, индикаторлар, инновациялық жүйе, басқару, жүйенің үйлесімділігі.

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ПРОБЛЕМЫ ФОРМИРОВАНИЯ И УПРАВЛЕНИЯ ИННОВАЦИОННОЙ СИСТЕМОЙ РЕГИОНА

Аннотация. В условиях нестабильной экономической ситуации на международной арене необходимо поддерживать развитие малого и среднего бизнеса в регионе, что позволит повысить устойчивость региональной экономики, улучшить инновационный климат, обеспечить социальное и инновационное развитие. Рассматривается роль информационной системы в управлении инновационной системой региона. Проанализированы проблемы регулирования инновационной деятельности, даны рекомендации по управлению инновационной системой региона. Рассмотрены пути инновационного развития региона, ориентированная на достижение экономической устойчивости, когда только ориентация науки на решение неотложных экономических задач способна обеспечить необходимые результаты в процессе перехода к устойчивому развитию.

Успех в современной экономике все чаще ассоциируется с инновациями - в области техники, технологии, организации труда и управления на основе использования научного и инновационного опыта. Соответственно, поддержка и стимулирование инноваций стали неотъемлемой частью программ развития региональной экономики. Создание региональных инновационных систем из взаимосвязанных групп кластерных предприятий, ориентированных на генерацию и реализацию инноваций, является сегодня главным направлением, локомотивом региональных и местных стратегий и программ.

Основной целью региональной инновационной системы является создание условий для постоянного возникновения и успешного развития новых инновационных проектов, направленных на реализацию конкурентных преимуществ региона. Конкурентоспособность региона в современных условиях во многом зависит от инноваций. Регионы конкурируют за ресурсы, включая интеллектуальный капитал и рынки, но в настоящее время характер конкуренции меняется. Значение физической инфраструктуры уменьшается, уступая лидирующую роль в расширении спектра устойчивых конкурентных преимуществ взаимодействию

участников инновационной деятельности, совместной разработке ими новых продуктов и услуг, совместному созданию и распространению новых знаний и технологий.

Способность региона наращивать интеллектуальный потенциал может изменить сложившуюся конкурентную среду. Региональная инновационная стратегия позволяет связывать воедино макростратегию (реализующую национальные приоритеты в области мировой конкурентоспособности, развития экономики, достижения социальных целей) и инновационные стратегии хозяйствующих субъектов предприятий, конкурирующих за региональные рынки ресурсов, и сбыта продукции.

Региональная инновационная система состоит из трех ключевых подсистем: организации и фирмы, непосредственно генерирующие знания: специализированные научно-исследовательские институты, научно-исследовательские центры, высшие учебные заведения, предприятия и научно-исследовательские организации для повышения конкурентоспособности своей продукции; организации, осуществляющие инновации, продвижение и внедрение новой продукции: инновационно-ориентированные предприятия региона и специализированные организации, помогающие предприятиям региона внедрять инновации и их продвижение; организации, предприятия, использующие эти знания; структуры, выполняющие специализированные посреднические функции (инфраструктурное обеспечение, финансирование инновационных проектов, их рыночная экспертиза и организационное сопровождение): юридические фирмы, торгово-промышленные палаты и т. д.

Ключевые слова: регион, инновации, информационная инфраструктура, индикаторы, инновационная система, управление, совместимость систем.

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