

Mukhtarova K.S.,
Mylytkbayeva A.T., Asanova A.D.

**Foreign experience of state
regulation of innovative projects
at the regional level**

Мухтарова К.С.,
Мылтыкбаева А.Т.,
Асанова А.Д.

**Аймақтық деңгейдегі
инновациялық жобаларды
реттеудің шетелдік тәжірибесі**

Мухтарова К.С.,
Мылтыкбаева А.Т.,
Асанова А.Д.

**Зарубежный опыт
государственного
регулирувания инновационных
проектов на региональном
уровне**

In this article the foreign experience of state regulation of innovative projects at the regional level. Comparative analysis of the experience of developed countries shows that in many countries formed a counter-movement «from the center to the regions» and «from the regions to the center.» There is a spontaneous process of searching for innovative models of regional development, while the process of the search model of innovative development «from above», at the level of national governments. And if at the level of regions dominated by attempts to real action on the transfer of development economics with virtually no experience with the formation of a model to be emulated in other regions, the level of federal centers dominate the discussion, debate, construction of theoretical models with a significant lack of real action in relation to the region in the direction of helping them to change the structure of their economies.

Key words: innovation, region, state regulation, international experience, innovative project.

Бұл мақалада аймақтық деңгейдегі инновациялық жобаларды реттеудің шетелдік тәжірибесі жасалған. Дамыған елдердегі салыстырмалы сараптама нәтижесі көрсеткендей, көптеген елдерде «орталықтан аймаққа», «аймақтан орталыққа» қарама-қарсы жүрісі қалыптасады. Аймақтағы инновациялық даму үлгілерін кенеттен пайда болып, ұлттық билік деңгейінде «жоғарыдан» инновациялық даму үлгілері іздестіріліп жатыр. Егер аймақтар деңгейінде ешбір тәжірибесіз экономика дамуын қамтамасыз ететін басқа аймақтарға үлгі ретіндегі модельді қалыптастыру жұмыстары жүргізілетін болса, ал федералдық орталықтар деңгейінде экономика құрылымын өзгертуге ықпал ету бағытында аймақтарға қатысты іс-әрекеттердің аздығы жағдайындағы теориялық модельдерді құру, талқылау және пікірталастар жүргізілуі кеңінен кездеседі.

Түйін сөздер: инновация, аймақ, мемлекеттік реттеу, шетелдік тәжірибе, инновациялық жоба.

В данной статье проведен зарубежный опыт государственного регулирования инновационных проектов на региональном уровне. Сравнительный анализ опыта развитых стран говорит о том, что во многих странах формируется встречное движение «от центра к регионам» и «от регионов к центру». Происходит спонтанный процесс поиска модели инновационного развития регионов, и одновременно происходит процесс поиска модели инновационного развития «сверху», на уровне национальных правительств. И если на уровне регионов преобладают попытки реальных действий по переводу экономики развития при практически полном отсутствии опыта с формированием модели для подражания другим регионам, то на уровне федеральных центров преобладают дискуссии, обсуждения, построение теоретических моделей при значительном недостатке реальных действий по отношению к регионам в направлении оказания им содействия по изменению структуры их экономики.

Ключевые слова: инновация, регион, государственное регулирование, зарубежный опыт, инновационный проект.

**STUDYING
THE EXPERIENCE OF
THE STATE REGULATION
OF INNOVATIVE
PROJECTS IN ALMATY**

Expanding the borders of the European Union by the entry of new, less-developed countries has led to a problem that requires activation of research and technological activities - alignment problems between the level of development of individual countries and regions of the European Union. Accordingly, the implementation of Framework Programme special attention has been paid to regional innovation initiative and the EU's role became increasingly confined to the establishment of general management at a sufficiently substantial financial support and the creation of a unified information network «Innovative Regions». In 2001, the EU Commission recognized that industry and research should be considered as part of their particular regional context [1, p. 1].

Within the European Union, individual member countries, some regions are developing a completely different scenarios and react differently to the systemic economic problems put them at risk of crisis. One example - the Italian regions Montebellina and Maniago.

Montebellina is an example of a dynamic region, consistently developing towards technological improvement, in economic downturns have demonstrated the ability to implement the «leap frog» and the transition to a qualitatively new stage of development. Maniago is an example of static developing region, was held hostage by the traditional model of development and show an inability to give it up, even in a period of profound economic problems.

Montebellina industrialized regions, whose core competence is the production of shoes, started at the end of the last century with the production of a single, non-standardized products using primitive techniques focused on the limited demand (shoes while mainly buy elite). In the structure of the regional economy at the time was dominated by small enterprises, the number of employees at the largest in the 1920s was no more than 20 people. A significant increase in the production of footwear was caused by military orders in the 1940s, but with the end of the second world war in the region experienced an economic downturn. Became clear that the restructuring of industry on the basis of accumulated technology and production experience, but according to the new, peaceful reality.

A new stage in the development of industry in the region began in the early 1960s, when the shoe has been the subject of mass consumption. Moreover, there has been a profound differentiation

in demand not only in connection with the differentiation of income, but also a functional purpose footwear. Clearly catching these trends, the region to deepen their specialization, making special emphasis on the production of ski boots (replacing shoes for mountain walks, first prevailed in the structure of production) and in the production of individual components of footwear (soles, upper and inner parts and so on.). The revolutionary impact on the development of footwear production in the region was the use of new technology, developed by an entrepreneur from Piedmont V. Brahman in 1939 and have found wide application in Montebelline. This technology consists in the production of whole soles in vulcanized rubber and bonded to the upper of the shoe. Application of this technology has led to further improve the division of labor and equipment that had an effect in reducing the average working time spent on the production of footwear, from 15 to 20%, and a significant increase in production from 300 thousand. 1963 pairs to 700 th. couples in 1969 (Vol. e. more than 2 times within 6 years).

Another technique, invented by W. Lang of Colorado, on the basis of which the production of ski boots was divided into two parts upper and inner with adipren (type poleuretana), led to a further increase in production, accompanied by a growing demand for this type of footwear (which was stimulated increasing revenues and growing popularity of skiing).

Correctly identify promising regional specialization and focusing on its constant technological improvement, regional policy received an unexpected effect in the form of expansion of business activity in other sectors of the economy. At the same time the dominance of the economy Montebelliny several major firms specializing in the production of ski boots and reached in this highly competitive position in the global market, began to appear, and small firms, to begin development of its market niche (eg, production of light walking shoes, boots after skiing and etc.). Development of small and medium-sized firms do not constitute a special expertise because of its competitive majors, largely made possible by the technological progress of large firms and the diffusion of technologies within the region. The simultaneous emergence of small and medium-sized companies - subcontractors and manufacturers of semi-finished products for large companies - contributed to a significant increase in the efficiency of their production. It is also important that the region has developed the most favorable business environment that encourages technological advancement and the overall partnership.

The gradual build-up of «competitive advantage» of the region in the production of footwear has allowed him to take a prominent position in the international division of labor. By the mid-1980s, the region has already produced about 3.5-4 mln. Pairs of ski boots a year, has become a world leader in this product in the world market, its share reached 70%. A large firms have taken advantage of the international division of labor and to make the production of the most labor-intensive operations to countries with lower labor costs.

Thus, after the crisis caused by the change of specialization in the late 1940s, flexibly responding to the new realities of post-war development, having gone the way of sophistication used in production technology, creating an internal regionally diversified economic structure and aggressive policy in foreign markets, the region is not only overcome economic difficulties, but also became one of the world leaders in the production niche.

Region Maniago is the opposite example. The technological basis of industrial production here has not undergone revolutionary changes, and even more did not become the basis for the internal diversification of the region. In Maniago is not clearly expressed specialization of production and there is no network of cooperation between the producers and the final product suppliers. Failing to improve the internal specialization on the basis of deepening in the regional division of labor, Maniago was unable to take advantage of the international division of labor. In the structure of regional production is still dominated by a number of small firms (and half of manufacturers is a family enterprise with number of employees 1-2 people), which can not compete with Korean and Brazilian firms in the parameters of price competitiveness, and with the French and German firms variety and quality parameters. This has resulted in a deep depression and strengthening economic and social problems in the region.

Another example is the dynamic development of the region of Baden-Wuerttemberg in Germany, which is considered one of the «four motors of Europe.» The leading industrial center of the region is Stuttgart, the main industrial specialization is determined by the dominance of the three traditional industrial sectors: automotive industry, mechanical engineering and electronics and electronic engineering. But of particular importance for the development of Stuttgart is the automotive industry: it is the largest and most influential, not only in Germany but throughout Europe automotive cluster. Began in Germany in 1992, the economic crisis has affected most of all Baden-Wuerttemberg, here the

process of stagnation was the most profound than in other regions of the country.

Within the region, the most difficult situation has become evident in Stuttgart, where specialization in several traditional forms of industrial production in terms of their decline has led to a serious crisis. Leaders of the region, however, the correct diagnosis «disease», determine the cause of the economic difficulties of the disparity between the economic structure of the region and the national nature of the global processes, and above all a change in the nature of competition in world markets. It was concluded that the region's economy, «slammed» several traditional industrial sectors and the need to overcome the situation through the development of fundamentally new areas such as biotechnology, the development of multimedia, business services and other more advanced activities.

Despite the relatively high risk of failure on the development of the region's traditional industrial expertise, it was recognized that only this way could allow the region to overcome the crisis and adapt to globalization. Perspective directions of innovative development of the region, the regional government started to form appropriate economic superstructure and above all contributed to a change in the

system of training of highly qualified personnel and the establishment of innovative institutional infrastructure to support innovative processes.

Thus, the major universities in the region have started to revise training programs and adapt them in the direction of training that meet the highest international standards, thereby overcoming the focus on compliance with the educational base of the narrow specificity of regional development (which at the same time was to promote the introduction in the region of new, advanced knowledge). At the same time we created various organizations that support the processes of regional technological development. So, in 1994, it was created by the Association of Regions of Stuttgart, as well as the center of technological advancement.

In order to support activities in the field of multimedia technologies was created Medien- und Filmgesellschaft Baden-Wuerttemberg, to support activities in the field of biotechnology was created by a special agency, and since 1997, the beginning of the administration of the region to assist the establishment and development of five biotech parks: in Heidelberg, Esslingen and Reuinge / Tübingen with annual funding of about 12.5 million euros (Figure 1).

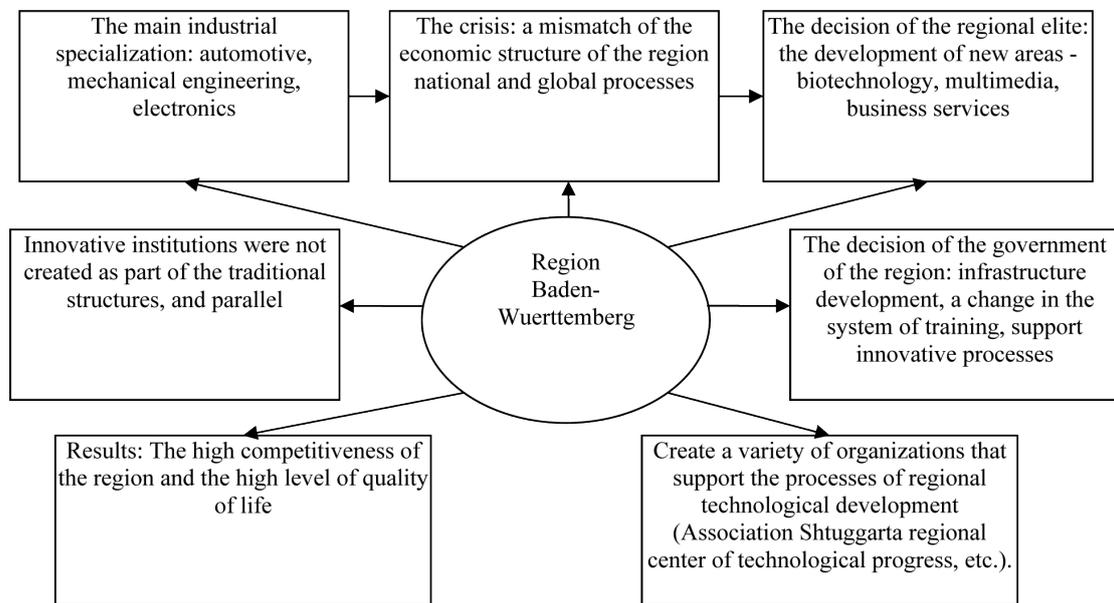


Figure 1 – Model development of innovative regions in Germany (on the example of Baden-Wuerttemberg) *

* Developed by the authors based on the source [1, p. 2]

Importantly, these institutions were not created within the existing traditional structures, and in parallel, had virtually no them active business

contacts and gradually led to their displacement and replacement. Thus it was overcome excessive competition between the structures, with particular

attention paid to the creation and development of new formations in the field of innovation support.

The US example is interesting because it is the regions that are in geographically remote from government institutions show a high dynamism and growth of competitiveness compared with regions that are close to the government departments (regions - former leaders).

The process of changing the position of the leaders in the national economy has been analyzed on the example of the two regions, the former and current leaders in the national economic development of the United States - San Francisco area situated therein technology Silicon Valley and Boston to the location where the technological area «Route 128».

Region «Route 128» played a leading role in the technological development of the United States before the end of the 1970s, when the region was in a deep economic crisis. Development of the region was mainly due to the execution of military orders, due to which in the period from 1940 to 1950, the region's leading companies, such as General Electric, Westhouse, RCA, BellLabs, increased its sales to \$ 3 million. To 173 mln. and increased employment from 1,400 to 16,000 people. The largest university in the region – Massachusetts Institute of Technology - began to play the role of a leading national research center, carrying the largest amount of military research among amerikanskix universities. Thus, in the period from 1940 to 1950, MIT Laboratory received from the US Department of Defense contracts for military research in the amount of 110 mln. USD., Other universities in the region, for example, Harvard University, also received significant contracts to perform research in the field of radar plants, improving navigation systems, the production of nuclear warheads and other controlled.

Particularly high rates of economic growth in the region have been associated with the Korean war in the early 1950s, the «cold war» and the arms race in space. This has allowed the region to get huge military contracts. Thus, during the 1950s, MIT-company received from the Ministry of Defense of the United States military contracts worth \$ 6 billion, And during the 1960s it amounted annually more than \$ 1 billion.

By the 1970s, the region of «Route 128» took the position of the nation's leading center for the development of new technologies in the field of electronics. But with the end of the Vietnam War and the slowdown space arms race in the region's economic development slowed down and gradually

entered into crisis. Only in the period from 1970 to 1972. That is for two years, there was a reduction of more than 30 thousand. Jobs in industries related to military production. The unemployment rate in the high-tech sector of economic region reached 20%, and many firms have traditionally focused on military orders, which will ensure minimum risk and the highest level of income, have found their inability to adapt quickly to the new conditions, the need to compete in the market of civil production.

Start the process of another region - Silicon Valley - refers to 1937, when the company was founded Hewlett-Packard. During the 1950s, around Stanford became a thriving industry cluster, which was partly related to military orders. Despite the fact that throughout the 1950s, the region's industrial base was weaker compared to the east coast, it has developed quite dynamically. Thus, during the 1960s, the region was established 31 company for the production of semiconductors, and, as it required the creation of its own production base of equipment, both in the region began to develop this area of industrial production. By 1975 at the Silicon Valley technology companies it has employed more than 100 thousand. Man, but by the end of 1970 the number of companies producing electronics, control and measuring equipment, telecommunication equipment, medical electronics, military and aerospace equipment, and other goods made 3 thousand. By the early 1990s in Silicon Valley has about one-third of the 100 largest technology companies established in the United States since 1965. Their market value for the period from 1986 to 1994 increased by \$ 25 billion. By the beginning of 1990 of companies located in the Silicon Valley electronics exported products worth more than \$ 11 billion. That was about 1/3 of the total national exports of these products (for comparison, the figure for «Route 128» amounted to only \$ 4.6 billion). At this point, Silicon Valley has already surpassed its rival «Route 128» in many aspects of high-tech development and began to play the role of a leading technology center in the United States, especially in the field of electronics.

Region «Route 128» was formed as an industrial leader of the country for a long period of time. Special opportunities associated with the implementation of military orders, led to the formation of certain economic, technological and organizational structure of the region. The economy began to dominate the company focused on the production of large-scale production in a high state of demand and related to each other within the framework of vertical specialization. «New entry» in

the industrial system was difficult, at the same time that the focus on military orders deprived enterprises of the region opportunity to gain experience and knowledge necessary to compete in the market conditions. The main factor of financial stability was not improving the competitive position on the market, and lobbying in state institutions for access to budgetary resources. Enterprises in the region mostly adapted their production strategies to fulfill government orders that «deployed» them away from the «region» to the «center» and did not allow time to switch to a revision of the strategy towards the use of internal regional resources for the production of fundamentally new products and the formation of a new system in regional cooperation. High security technology development and ownership to the Ministry of Defense (t. E. State) limited the process of technological diffusion in the region, which not only hampered the application of new technologies in other sectors of the regional economy, but also for their further improvement, the formation of alliances between entrepreneurs, scientists and the regional government in the direction of their development, or radical change. The existence of a rigid hierarchy in a vertically integrated industrial system leaves little room for initiative and entrepreneurship, and technological changes were mostly «improving» nature, that is, the region has developed in a direction depending on the traditional model. Thus, the systemic problems in the economy of the region, despite some short-term economic recovery in the late 1970s, associated with the production of minicomputers, caused his prolonged stagnation

and the inability to adapt to the new realities of the domestic and global market, including surpass new regional competitors first of all Silicon Valley.

Region - the «young leader» - «Silicon Valley» has formed its industrial structure substantially in the absence of deep industrial traditions. Its rapid economic rise in the second half of the twentieth century. made possible by the initiative and innovation of young professionals, mainly technical engineers, demonstrated organizational and managerial talent and interoperability, particularly in the field of electronics manufacturing.

Due to the significant distance from the traditional industrial centers, the lack of influential lobbyists in government departments, limited opportunities to receive significant financial support from the government of the region was forced to focus on the most efficient use of its internal resources, competent determining technology strategy and the formation of a regional alliance between businessmen, scientists and engineers, representatives of the regional authorities towards its successful implementation.

Elite of the Silicon Valley was forced to shape their industrial and technological system is not around the individual, large firms (often supported by resources from outside the region, as is the case with «Route 128»), and in the direction of accumulation of innovative capabilities of the region, «engineers and entrepreneurs Silicon Valley created a mobile industrial system included in the region and around it formed by professional and technological core, rather than around individual private firms «[2, p. 61] (Figure 2):

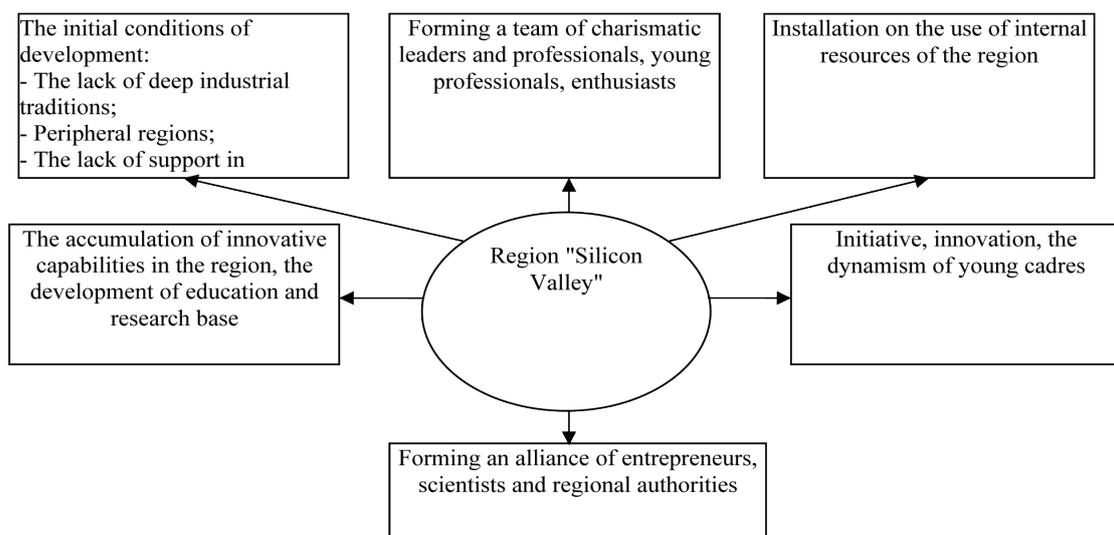


Figure 2 – Model of Regional Development US «Silicon Valley» *

* - Developed by the authors based on the source [1, p. 3]

Comparison of these two regions of the United States is important for the understanding of what caused the increase in the gap in their economic development, provided that delivers its leadership the region has developed a system of training of highly qualified personnel and a strong research base, supported by considerable public resources, while region - a «young leader» - was virtually devoid of support at the same stage of its «infancy», he was forced to create and develop educational and research base and build its strong position in the national economy on a «lack of benefits.»

As the experience of foreign countries, the formation of a new path of development, the implementation of «leap frog» and the transition to the establishment of an innovative system in a concomitant significant risk becomes possible thanks to the emergence of charismatic leaders and self-motivated professional team building enthusiasts. A. Saxenian notes that the founding team of Silicon Valley has been presented «predominantly white men, most of them were about 20 years [2, p. 162]. Many studied engineering science at Stanford and at MIT, and most of them had no experience in industry. None of them came from the region, many of them grew up in a small Midwestern cities and expressed their distrust of the rules and regulations of the establishment of the East Coast of the country. They are always expressed their opposition to the «Setup» or «old line of conduct» industry standards «eastern establishment». [3] The lack of dependence on traditional views and attitudes will allow young professionals in Silicon Valley demonstrate innovation in all matters related not only to the establishment, but also with the introduction of the production and the commercialization of new technologies. They were free not only for experimenting with new technologies, but also in the creation of institutions that support the development of innovative processes in the region. In addition, the high mobility of professionals within the region has allowed to accelerate the spread of new ideas, to create conditions for the emergence of new breakthrough technologies, contributed to the process of competition between companies in the region. Would not it be just as effective policies to attract young graduates of Minsk universities in remote regions of Kazakhstan to form innovation centers there? Regional leaders of Kazakhstan also should think about it and perhaps now begin to form a team of young enthusiasts.

Comparative analysis of the economic development of the two regions of the United States allows us to conclude that not all cases of «central»

stands for «progressive» and «peripheral» means «retarded.» Moreover, the lack of traditional sources of income makes remote regions to focus on the use of domestic intellectual, technological, organizational capacity, and build communication between representatives of the regional elite in various fields, pursuing at the same time aggressive economic policy outside the region, aimed at promoting the new products to the national and foreign markets and the displacement competitors. On the contrary, the central region, traditionally relied on busy once the leading position in the national economy, have access to funds from the federal budget and successfully lobbying their interests in government departments who give priority to the support of large, region-companies, rather than the formation of new alliances that could to give «new impetus» the development of the region, are an obstacle to national economic development.

Along with the definition of a model of regional innovation development, some countries are in search of a model of effective division of labor between the federal center and the regions.

The most interesting theoretical and practical experience of regional innovation development in the context of a federal state is Canada. As the authors of the study «Regional innovation system in a federation: whether the same influence national policies on the regions?» [4] «... in a federal national innovation system is a more complex system compared with the unitary, since in these systems the process of formation Institutions at the level of the province / state is parallel to a similar process at the national level, and it involves the separation of political influence, power and control between the provinces and the federal center. Canada is an example of one of the most common states with economic and social (and political) federal structure «[5]. However, in studies of regional innovation activity in the country, as well as in the practice of decision-making and dominates the monetarist approach, «in the absence of clarity in the division of constitutional responsibility of the central government is able to use its» redistributive effect «(ie, the ability to spend the money and build the program in any political sphere) to mark its presence in almost all spheres, and this creates a sense of Canadian identity and community of the entire territory from one coast to the other, «which clearly limits, in our opinion, the full realization of the benefits that a federation.

Despite the significant role of the federal government in support of innovation activities in the Canadian regions, uneven nature of its distribution,

the emphasis on the provision of financial assistance, rather than to establish network communication throughout the supply chain from the creation of new technologies to commercial applications, the priority of the federal policy to support already formed research activities, as well as limited opportunities for «new entry» (Support the implementation of the new universities, new innovative companies, innovative new projects, a new initiative specialists) leads to increased criticism of federal policies in the regions. According to experts, «Canadian science, technology and innovation policy pursued by the federal government, is» a continuation of the existing traditions, «has not changed in recent years is not transformed by neutralist model based on the European influence, model, largely based on the strengthening the role of the regions in economic development, the importance of which is becoming increasingly evident, both in Europe and in other regions of the world. « Obvious need for reform of the relationship between the federal government and the provinces of Canada, not only in the financing of research and development, but also in the formation of the entire system of economic and technological relationship that could strengthen the innovative potential of the region and use it to solve specific economic problems and increase economic growth. And it is becoming increasingly important for sustainable economic development of the country and strengthening its internal economic space.

Thus, Canada is one of the few countries where the problems of national economic development is not only «laid out» on the regional components and communicate with the deepening of differences in development between regions, but where is the search to overcome these problems is directed to the use of the innovation potential of the regions and the formation of a supportive Federal regional policy. For complex heterogeneous economy that alone is an undoubted achievement of Canadian professional and government elite.

Comparative analysis of the experience of developed countries shows that in many countries formed a counter-movement «from the center to the regions» and «from the regions to the center.» There is a spontaneous process of searching for innovative models of regional development, while the process of the search model of innovative development «from above», at the level of national governments. And if at the level of regions dominated by attempts to real action on the transfer of development economics with virtually no experience with the formation of a model to be emulated in other regions, the level of federal centers dominate the discussion, debate,

construction of theoretical models with a significant lack of real action in relation to the region in the direction of helping them to change the structure of their economies. Much of the experience of developed countries to build a model of innovative development of the region could be used in the regions of Kazakhstan.

According to scientists from the University of Utrecht (Netherlands), the key functions of the innovation system include: entrepreneurial activity; the generation of new knowledge; dissemination of knowledge; setting priorities; the creation of new markets; resource mobilization; reduction «resistance level» environment. Consider these functions in more detail.

1. Entrepreneurial Activity. Perhaps the owners are the most important for the innovation system: without innovation does not occur, and an innovative system does not exist. Entrepreneurship turns the potential of new knowledge, technologies, and markets innovative products and services of value to consumers and ensuring the competitiveness of companies. Specific actions of entrepreneurs create and take advantage of new opportunities for business creation and development.

2. Creation of knowledge. Quoting B. Lundvala [6], «the most fundamental resource in modern economy is knowledge and, accordingly, the most important process – learning» Production of new knowledge and training – the necessary conditions for the existence of the innovation system. Education is the perception and the development of new knowledge and involves many processes, starting with the scientific research and to the development of know-how and skills of workers in production and distribution.

3. Dissemination of knowledge. Most researchers noted an increase in the role of a variety of network interaction in the process of diffusion of knowledge. Of particular significance in the network acquire knowledge transfer between different levels of the innovation system and between its different actors. The effectiveness of the network organization of the activity is that the result is increased nonlinearly with an increase in the scale of the network. Each node in the network receives the additional effect of increasing the number of nodes.

Most successful technology innovation today is created by combining the knowledge and capabilities of specialists in various disciplines. Brilliant singles exist; but to the discovery has become a commodity, you need to control the interaction and organization of the joint work of such groups.

4. Determination of priorities and direction of research. This function is carried out through

a variety of actions within the innovation system, which helps participants to develop a vision of promising trends, the needs of users of technology, long-term priorities of technological development, etc. In particular, the formulation of long-term goals of development, creating lists of promising technologies, identification of government priorities and other activities to help participants in the system to store the information for decision-making and to some extent reduce the overall level of uncertainty and risk associated with the implementation of innovative projects. For example, in Kazakhstan, including those declared priorities - the development of nanotechnology in the US - the technology of renewable energy.

5. Creating markets. As a rule, new technologies compete with already existing, so the important function of the system - is the creation of «special favored nation» for new technologies. In particular, many countries used temporary «niche markets» for the application of new technologies. For example, for companies to introduce new technologies, provided preferential tax regimes, customs exemption, these companies provide a temporary competitive advantage. Among the most recent examples - US anti-crisis «Paulson Plan» (Law on urgent measures to stabilize the economy, Emergency Economic Stabilization Act of 2008). The plan included a system of measures aimed at supporting companies - producers

and consumers of technologies related to renewable energy. This system measures include various benefits to producers and consumers of energy from renewable sources, as well as incentives to improve energy efficiency.

6. Resource mobilization. For all kinds of innovation requires resources - financial, human, material, and other information. Mobilizing resources (both general and specialized) promote innovative market infrastructure institutions that reduce transaction costs, which is associated with the search, recruitment and use of various types of resources. An important feature of the system is its ability to mobilize resources from different sources - national, international, private, public - and the formation of combinations best suited to the needs of specific innovation processes and projects.

7. Creating conditions for reducing resistance to change. New technologies, products and services typically enter into competition with existing technologies and products. Accordingly, there are often a variety of coalitions and groups of participants who resist innovation in various forms and prevent the emergence and spread of new technologies. The functions of the innovation system include creating incentives for legitimate educational groups supporting innovations that can reduce resistance to change. Such incentives are much easier in the areas covered by government or industry regulations.

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