

A. Lesnik, Zh. Mingalyova

## THE DEVELOPMENT OF INNOVATION ACTIVITIES CLUSTERS IN RUSSIA AND IN THE CZECH REPUBLIC

*Innovative development becomes the main tendency of the modern world economy. The paper presents a comparative analysis of the development of Russian and Czech clusters engaged in innovation activities.*

*Innovative cluster is one of the most effective forms for reaching a high level of competitiveness. Development of the cluster as a new form of managing, economic interaction and connections allows to reach social and economic effect. The whole point of the innovative cluster is that the enterprises and the organizations merge with each other and create a new product or service and put means in development. Cooperation between companies allows to reduce costs for its development and researches with the commercialization of the new good or service in the future. The activity of the cluster has a constructive nature, which consists in the majority of participants of innovative cluster do not compete among themselves; they work for the common objective.*

*Innovative clusters exist not only in the developed countries, but also in the developing states. Innovative activity in the developed countries arose earlier and began to form rapidly. The innovative clusters have promoted the development of the European countries. Domination of the clusters in the economy is significant both for national, and for a regional economy, where high geographical concentration of the interconnected industries is observed. The cluster approach gives the effective tool for the achievement of main goals: increase of the level of profitability of the region and employment of the population, promotes strengthening of the competitive advantages of separate companies and all economy as a whole.*

Keywords: innovative activity, innovative clusters, cooperation between companies, researches and development

### I. Introduction

In the modern world innovations and innovative activity have a special significance for successful financial and economic activity of the countries and regions [8, 15-17]. Factors such, scientific and technological progress, increasing of competitor's quantity, creation of new goods and services, globalization urge countries, regions and organizations to adapt to a changing environment. One of the tools of successful development in the competitive environment is an innovative activity: adoption of innovations, formation of innovative strategy, creation of innovative clusters [13-14].

Innovative cluster is one of the most effective forms for achievement of high level of competitiveness [2-3, 10-11]. The whole point of the innovative cluster is that the enterprises and the organizations merge with each other and create a new product or service and put means in development [21-22].

Cooperation between companies allows to reduce costs for its development and researches with the commercialization of the new good or

service in the future. All these factors allow participants of the cluster stably to carry out an innovative activity during a long period of time. The most suitable niche for development of innovative clusters is the area of the high technologies [7, 9]. As an example of such innovative clusters we can note innovative center «Skolkovo» in Russia, the center of scientific and technical progress in India Bangalore, the «Silicon valley» in the USA, the Plastic valley in France, etc.

At the modern stage of world economic development countries and regions should set one of the main goals — development of innovative activity and formation of innovative clusters. It can improve the level of their competitiveness, increase economic strength and ensure effective work of old traditional branches and essentially new enterprises.

### II. Kinds of innovation activities clusters

In the one of the basic classifications of innovative clusters three kinds of clusters are singled out:

- Regional (regionally limited consolidations around scientific or industrial center);
- Vertical (consolidations in the one production process, for example, a chain «supplier – manufacturer – sales manager – client»);
- Horizontal (consolidation of various industries in the one mega cluster, for example, «chemical cluster» or «agro-industrial cluster») [1].

Also it is possible to identify four subgroups of innovative clusters which are often mentioned in the scientific literature:

- Type A – Connected clusters
- Type B – New industrial zones
- Type C – An innovative environment

#### **Type A – Connected clusters**

Connected clusters – the oldest type of clusters. Operational characteristics of this integration economy were mentioned by Weber and Marshall. Connected clusters represent groups of companies which initially were situated not far away from each other with a view of expenditure cut. Weber, and later Marshall, said that if the produced goods become complicated, a ratio of costs for payment and aggregate expenditures on production will be higher, thus, access to a labor market will become one more priority for businessmen. As soon as costs for payment will exceed transport charges, the rational businessman will make a decision about placing of the firm, being based on expenditure cut on payment.

The situation constantly changed, and in the process of production the important factors of general economic development continue to appear, such as creation of internal production communications; wholesale purchasing, increase of information flows between the companies and the environment.

Thus, the concept of connected clusters was arranged eventually. In the most cases, the companies highly were dependent from each other because of production connections, because the majority of the companies were the representatives of small and medium-sized businesses. Connected clusters often took place at the city suburbs and in the historical centers of cities, such as Jewelry District in Birmingham or Hekni in London.

Their methods of struggle against the risks connected with innovations, also were very effective: fast reaction to appearing innovations, thanks to capabilities of the highly skilled personnel. These companies basically specialized in such industries of production as clothes, furniture and printing editions – all these industries demand fast change of production.

The main economic advantages of such clusters are the reducing of «operational costs» and transport charges [1].

#### **Type B – New industrial zones**

New industrial zones are the second type of clusters, considered within the limits of the given classification. New industrial zones are usually formed in the sphere of high technologies, it means that the companies of new industrial zones often work in such lines of activity as production of computers, information technologies (IT) and microcells. Creating of new products, they basically rely on scientific researches. They take place at the city suburbs, or they can take place near the cities, as for example, a Silicon Valley in California and Line M4 in England.

New industrial zones consist of different firms from transnational corporations to representatives of small and medium-sized businesses. In spite of the fact that these clusters are called as the «new» industrial zones, many of them exist for a long time, more than 30 years, that is why the name «developed» is more suitable for them.

#### **Type C – The innovative environment**

The description of the third type of clusters considerably is based on research of the group of scientists GREMI (Group of the European research of the innovative environment) which underlines the importance of the public capital in the development of innovative activity. Such clusters are usually take place in the city territory where relations between firms and separate participants were generated for a long time.

Training occurs by various methods by information interchange between employees of the firms, or by transition of the separating employee from one firm in another. As examples of such clusters, the innovative environment can serve the Emilia-Romagnal and a part of the northeast of Milan. The companies in this type of cluster pursue the aims of realization of innovative projects, which include the possibility of risk [1].

Innovative clusters can be created in the form of technoparks, the innovation centers, business centers of business incubators, the centers of cooperation of the largest and innovative enterprises, strategic alliances etc.

### **III. The role of innovation activities clusters in economy**

The innovative cluster is the basic tool of the increase of competitiveness of the national economy [18-20]. Experience of developed and developing countries has shown that the cluster approach forms a basis for constructive dialogue between representatives of the enterprise sector and

the state. It has allowed to raise efficiency of interaction of a private sector, the state, sales associations, research and educational institutions in an innovative process.

Clusters cover important connections better than economic sectors, ensuring complementarity between them, promoting development of technologies, skills and distribution of the information, which is significant for business realization.

The activity of the cluster has a constructive nature, which consists in the majority of participants of innovative cluster don't compete among themselves, they work for the common objective.

Their creation is important for transferring of the economy into innovative way of development that requires constant contacts between participants of the innovative process, allowing to correct scientific researches, developments and production processes [4].

Domination of the clusters in the economy is important both for national, and for the regional economy, where high geographical concentration of the interconnected industries is observed. One of forming conditions of the cluster in the country or region is availability of specialization of economic sectors. The cluster approach gives the effective tool for the achievement of main goals: increase of the level of profitability of the region and employment of the population, promotes strengthening of the competitive advantages of separate companies and all economy as a whole.

Thus, development of the cluster as a new form of managing, economic interaction and connections allows to reach social and economic effect which is shown in following directions:

- improvement of the level of productivity and competitiveness of the companies and economic sectors. The companies working in more developed clusters, are more productive, than the companies in less developed clusters;

- increase of innovative potential. More developed clusters have the big innovative potential;

- stimulation of the new companies. Developed clusters promote formation and development of the new small and medium-sized companies;

- guaranteed employment in region, positive changes in its structure, high level of salary.

Nowadays many countries use cluster approach in creation and regulation of the national innovative programs more actively.

#### **IV. The development of innovation activities clusters in the Czech Republic**

There are 2 typical innovative clusters in the Czech Republic. There is an ENVICRACK cluster in region Ostrava-Vitkovice and a large «Energetic-

technological cluster — EAST» which can be identified as industrial-innovative cluster.

The ENVICRACK cluster was established in 2006 for the purpose of supporting innovation and improving the competitiveness of its members. Since its inception, ENVICRACK has been focused primarily on activities connected with the liquidation of waste and the resulting gases and substances based in the innovation technology. The scope of the cluster's activities includes the area of innovation activities in the use of renewable and alternative sources of energy.

The innovation strategy of ENVICRACK cluster is based on the analysis of trends. Attention is focused on solving problems associated with waste and on reducing the amount of emissions while also reducing costs associated with energy-consumption expenditures.

The joint projects of ENVICRACK cluster members are designed so that their implement leads to the creation of conditions for introducing new products and services in existing business entities.

A special area of innovation activities of ENVICRACK cluster is an innovation project in rail transport. The concept is based on the use of recuperated energy obtained when braking vehicles and on extending the life of traction batteries. The result of the project is a design of fuzzy logic for optimising the running of super-capacitors including traction substations, charging, control of return energy recuperation and use of energy from recuperation.

The «Energetic-technological cluster — EAST» was founded under the auspices of Czech chamber of commerce CSOK. About 30 companies are included in the group of «Energetic-technological cluster — EAST». Some of the companies from the working group take leading places on the market of Central and East Europe. It is the only form of cluster organization in economy of Czech Republic.

«Energetic-technological cluster — EAST» is the largest union of Czech companies suppliers, oriented to complex realization of innovation projects and supplies to markets of Russia and Eastern Europe in following areas.

##### **1. Nuclear power:**

- Utilities primary circuit.

- Purification systems radioactive carriers and contaminated wastewater.

- Alarm systems — active and passive.

- Preparation and dosing of chemical solutions.

- Storage of radioactive water.

- The final processing of liquid radioactive waste.

2. Classical electricity:  
 – Construction, reconstruction and modernization of power plants and an increase in energy  
 – Renovation and construction of energy networks

– Supply of new energy-saving technologies

3. Petrochemical industry:

– Crude oil refineries

– Technologies for Oil and Gas Transportation

– Installations and technology of petroleum and petroleum cleanup

– Systems and technology for the production of aluminum, ammonia, hydrogen, methanol, sulfur.

The water purification system of municipal and industrial wastewater

– Wastewater treatment

– Water treatment plants

5. Domestic waste:

– Sorting, landfill, incineration of waste

– Recycling Systems

The main aim of «Energetic-technological cluster – EAST» is the execution of orders from the Czech Republic, Russia, Belorussia, Slovenia in accordance with profile specialization of cluster and with market requirements.

«Energetic-technological cluster – EAST» organizes medium and long-term innovation projects financing by credits of Czech banks.

The «Energetic-technological cluster – EAST» provides:

– a preliminary draft;

– Design works;

– Engineering work;

– construction work;

– supply and installation of innovation technological systems;

– commissioning of the innovation project.

The group of cluster companies has reach experience in realization of large innovation projects as general contractor and subcontractor. One can mention such projects as:

– Delivery and construction of all nuclear units in the territory of the Czech and Slovak Republics (nuclear power plants Temelín, Jaslovské Bohunice, Dukovany, Mochovice);

– Construction of large power plants (Tušimice, Chvaletice);

– Wastewater treatment plants, water installations and the sewerage system in Praha, Brno, Plzeň, Ostrava, Olomouc, Hradec Králové, Opava, Příbram, Košice, Břeclav, Boskovice, Nitra and other cities;

– Industrial wastewater treatment stations for enterprises: Prague Airport; SKANSKA; paper mill «Jindřichov»; chemical plants Setuza and

Synthesia Semtín; metallurgical plant Třinecké železářny; glassworks Skloplast; pharmaceutical plant Slovakofarma and other big and middle plants;

– Supply and installation of technological complexes for petrochemical industry: air-base Náměšti nad Oslavou, RCTR Nelahozeves, Sloznaft Bratislava, LINDE, MAG Grimma, NOEL Hamburg, VOEST-ALPINE and other.

At present energetic companies of «Energetic-technological cluster – EAST» and JSC Kralovopolska Ria started working at building of gas-piston power station with the capacity of 260 MW in Vladimir (Russia). The general project cost is about 400 millions Euro. The first block of this gas-piston power station will be finished in 2015, the second in 2016.

In July 2012 «Energetic-technological cluster – EAST» signed a contract with a State Belorussia agency «Belenergo» for reconstruction and modernization of power station in Vitebsk. The project cost is 100 millions Euro.

Cluster enterprises will take an active part in building of gas-piston power station in Sochi with the capacity of 367 MW. This station will become the largest gas-piston power station in the world [20].

The analysis of cluster working results makes it possible to refer it to technological type. Projects realization demonstrates interrelated activities of cluster companies. It starts with an active cooperation with in working out of design job, project documents and continues with equipment supply and its montage, putting into operation, participation in test equipment, commissioning of equipment.

All these proves the existence of intensive cooperation between Russian and Czech clusters in innovation activities.

## V. The development of innovation activities clusters in Russia

Innovative clusters exist not only in the developed countries, but also in the developing states. Innovative activity in the developed countries arose earlier and began to form rapider. The innovative clusters have promoted the development of the European countries. For example, the level of development rise in Austria where have started to work transboundary clusters with Germany, Italy, Switzerland, France, Hungary and Great Britain. Key factors of forming the clusters are a policy of stimulation of communications development between research institutes and industrial sector, decrease of barriers in innovative programs, forming competitiveness. The innovative-research

program TIP became the motive power. The purposes of this program were information gathering and handling, development of recommendations based on their influence on the national system of innovations [18]. Also, there are separate developed clusters, connected with the innovative activity, in France, Finland, German.

Within the limits of this question, it is necessary to mention such innovative cluster as «The Silicon Valley» in California in the USA. A Silicon Valley — one of the largest IT centers of the world in which objects of the electronic and computer industry, zones of high technologies and in which 2,5 million IT-specialists are concentrated. The salary of specialists is about 125 thousand dollars a year [6]. In a Silicon Valley, there is a big amount of the famous companies and their head centers of the large IT-companies, such as, Adobe Systems, eBay, Google, Intel, Yahoo! Xerox, Asus, etc. The Silicon Valley is one of the most successful clusters because of its active state stimulation of innovations, developed infrastructure, venture financing, and legal regulation.

In the developing countries, there are such innovative clusters like the center of scientific and technical progress in India Bangalore, the Bulgarian initiative of competitiveness based on the model of the cluster, Scientifically-industrial park Hsinchu in Taiwan.

There is a famous cluster, formed in Russia — an innovative center Skolkovo. Innovative center Skolkovo is an ultramodern scientifically-technological complex for the development and commercialization of new technologies, which building has begun in 2007. The largest center on development and commercialization of new technologies, branches and laboratories of leading universities and companies of Russia and other countries has taken place there. On the area which of 370 hectares, the academic research, training of post-graduate students have begun. There will be innovative companies, hi-tech production, habitation, theater, environment for informal dialogues. The project «Skolkovo» should transfer a part of the world market of high technologies to Russia; create channels of Russian high technology goods into the other states. Therefore, one of the important directions of modernization consists in the creation of new scientific business.

In the innovative center, there is an industrial park (Technopark). The operations of Technopark within the Skolkovo Project are based on one main purpose — to provide innovative companies, participating in the Skolkovo project, with all the necessary support so that they could successfully develop their technological assets and corporate

structure, and become leading players in global markets. The Technopark is implementing this task by involving the infrastructure, resources and other features of the Skolkovo project and its partners, then turning these into a set of effective services, which fully meet the needs of companies, participating in the project.

Technopark operates as a tool to enable the efficient interaction of innovative companies, Technology Parks, scientific and educational institutions, by providing all the resources, infrastructure and partners of the project Skolkovo, as well as through cooperation with Technopark Zurich and «Technopark-Alliance»:

- It manages special rooms, oriented to incubation activities;
- It provides access to the research equipment, available in Skolkovo structure and at external partners;
- It provides the possibility to use scientific and technological expertise of the Skolkovo Institute of Technology and other partner Academic and Research institutions;
- It organizes the interaction with Skolkovo venture funds, as well as with the Russian and international investment community;
- It provides a full range of services in the sphere of business incubation (consulting, coaching, assistance in organizing and maintaining major management procedures and business processes, etc.);
- It provides full legal support during registration, and support of property rights for intellectual products;
- It helps participating companies to establish and maintain investment relations at the international level;
- In some cases — it consults participating companies on the system of work organization to ensure access to the system of public orders and helps in preparing for such tenders;
- Through its membership in «Technopark-Alliance» and other international technology park associations, the Technopark provides participating companies integration into the global innovation environment (participation in technology chains, access to international expertise and foreign markets, and exchange of experience and ideas).

Currently the status of Skolkovo Innovation Centre Participant has been to 83 companies. According to the decision of Skolkovo Investment Committee, 16 companies have received grants to implement their innovative projects. Since May, 2011 principles of financing of innovative projects are determined by an investment policy: Helix

Ventures LLC, OnkoMaks LLC, Hivex Technology LLC, T-smart LLC, Runapark LLC, Gas Isotopes for Medicine LLC, Innovative Company Metacon LLC, etc.

In an innovative center «Skolkovo» there are five priority directions of modernization: Biomedical Technologies, Nuclear Technology, Information Technologies, Energy Efficient Technologies and Space Technologies.

#### ***Nuclear Technology Cluster***

Innovative development of nuclear technologies is an essential condition for consolidating (and in some areas, achieving) a position of global technological leadership and maintaining Russia's defence capability. Today the key priorities for Russia's nuclear industry are the following:

- Raising the competitiveness of products and services on the nuclear power market by modernizing existing technologies and re-tooling production facilities

- Creating new breakthrough technologies and products for the energy markets, both in the traditional large-scale generation of nuclear power, and for the growing market segments of small reactors, transmission, and storage of electricity

- Promoting gradual technological diversification and diversification of products through transfer of industry operations to new players on the nuclear industry markets: nuclear medicine, inspection systems, new materials, etc.

Overall, the new markets for nuclear technology have higher growth potential than the traditional ones. The development of the latter is cyclical and depends upon the growth and prosperity of the population; competition is great. In addition, after the accident at the Fukushima-1 nuclear plant there has been growing public concern about radiation safety.

#### ***Information Technology Cluster***

The Information and Computer Technology Cluster is part of the Skolkovo Foundation. The main objectives in 2011 are of this cluster:

- To support approximately 30 new projects with grants;

- To establish a network of R & D Centers with the Key Partners (Intel, Microsoft, Cisco, Boeing, etc.) and Universities;

- To engage students, young scientists and engineers in innovation activities through participation in various programs (Smart People, Universities, incubators, etc.).

Priority areas of Skolkovo Foundation, Information Technology Cluster:

- New generation of multimedia search engines

- Recognition and processing of images, video and audio

- Analytical Software

- Mobile applications

- Embedded Control Systems

- WebX.0

- Complex engineering solutions

- New technology for data transfer and storage

- Cloud computing

- Green IT

- Software for the financial and banking sectors

- IT Security

- IT in medicine and health care

- Wireless sensor networks

- IT in education

#### ***The Energy Efficient Technologies Cluster***

The Energy Efficient Technologies Cluster is a functional unit of the Skolkovo Foundation. The main objective of the cluster is to create an environment to support innovation in areas related to the introduction of new, breakthrough technological solutions aimed at reducing energy consumption of industrial enterprises, housing and public utilities and municipal infrastructure.

The priority lines of development were established in close cooperation with business, academic institutions, government bodies and experts. The Foundation support of these lines is provided by means of the Energy Efficient Technologies Cluster.

In the first half of 2011, the cluster is looking for technological solutions in the following areas:

- Materials, technologies and engineering solutions to increase the energy efficiency of the housing and public utilities, municipal infrastructure.

- Innovative solutions in Heat Distribution Management.

- Technologies to elaborate high voltage electric power accumulators.

#### ***Space Technology Cluster***

The appearance of the «Space Technologies and Communications» cluster reflects the leading position of Russian industry in this sector: at the present time, only Russia and the US have their own global navigation satellite systems; furthermore, Russia ranks first in the world for launching services

The potential for development and commercialization of Russian space technologies in the global context remains very high. The rapidly growing world market for space technology is worth more than \$300 billion annually.

Based on the innovative nature of the direction on a global scale, successful commercializa-

tion of potential projects, and possible synergies with related sectors, including aerospace and telecommunications projects, the following priorities have been identified:

— Space projects: Space communications, Remote sensing of the Earth from space, Satellite navigation, search and rescue Experimental and commercial aerospace production, Space tourism and other commercial ventures in manned space-flight, Integrated applied aerospace projects of a universal nature, etc.

Projects in telecommunications: Terrestrial trunking communications, Mobile communications and data transmission, Space communications, Complex projects in communications technologies, including standards, protocols, software, Custom equipment, Projects to develop production of the means of communication and telecommunication, Integrated investment projects for institutional and corporate development, projects in education and information, etc. [19].

Also an innovative — technological cluster of mechanical engineering and metal working exists in St.-Petersburg. Main objectives and goals of the cluster are:

— Allotment of complex technological services to diversified circle of commodity producers;

— Revelation and consolidation of a wide range of the enterprises in the cluster which possess technological competence of innovative mechanical engineering and metal working and are interested in increase of consumer quantity.

Consolidation in the cluster of the of St.-Petersburg enterprises-owners of innovative technologies;

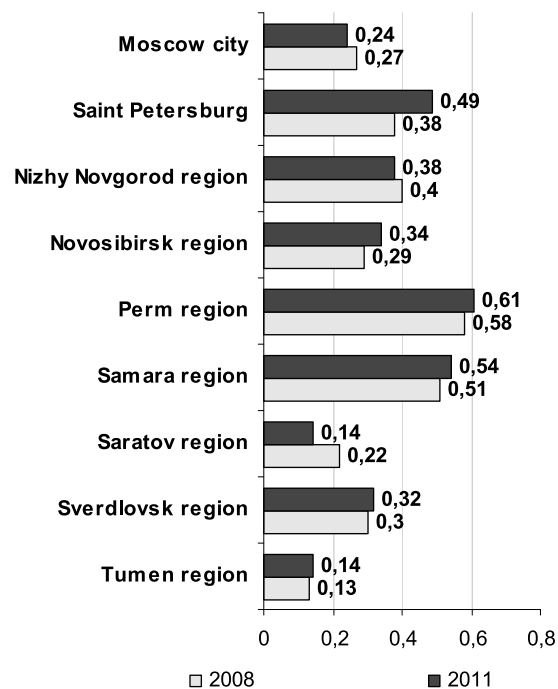
— — Forming within the limits of the cluster of a technological platform of St.-Petersburg mechanical engineering and metal working on the basis of the best world innovative technologies;

— — Forming of effective system of interaction between enterprises and consumers of the cluster;

— — Creation of conditions for a stable quantitative and qualitative growth of available technologies;

— — Joint planning of development of technological possibilities of enterprises-participants of the cluster.

Besides, in St.-Petersburg it is created a cluster of space techniques, technologies and services. The companies — participations specialize in development or production of space vehicles, devices, systems of telesupervision, management and navigation, on the preparation and release of specialists in the field of space-rocket techniques, information and automation. The cluster includes: the machine-building enterprise «Arsenal», a hold-



**Fig.** Reengineering number of region of Russia on the regional innovative competitiveness in 2008 and 2011

ing company «Leninec», a television scientific research institute, «RosPoliTeh the Software», the St.-Petersburg department of the Russian academy of astronautics, etc. Development, production and sales of innovative goods should become a specialization of the cluster, based on the commercialization of results of activity in the space industry [5].

In Perm Region, the progressive innovation protects “Innovation cluster” was worked out. The government of Perm Region in 2011 adopted it. The aim of the project is to create the favorable innovation field, to involve into innovation cooperation entrepreneurs, government structures and foreign partners. In 2011, the number of technological starts upraised to 25. 7 different types of organizations to serve innovative infrastructure were founded; 50 new innovation projects were created. All these allowed to increase regional innovative competitiveness from 0,58 in 2008 to 0,61 in 2011 (see Fig. 1).

If we compare this with the previous research results which were made in 2008 [12], we can conclude that Perm Region, Saint Petersburg and Samara region remained leaders in regional innovative competitiveness. The value of regional innovation competitiveness in the Nizhny Novgorod, Moscow city, Saratov region decreased.

## VI. Conclusion

The authors come to the following conclusions.

1. In the modern world, level of development of innovative sphere fixes the place of a country

or a region in the world economy and forms a basis of steady economic growth. World practice testifies that in the modern world progress is promoted, not with the separate isolated enterprises, but with their associations, groups, clusters and networks. Creation and development of innovative clusters can promote especially strong advantages for the national economy or a region.

2. Innovative cluster is a system of formation and distribution of new knowledge and technologies, which makes possible development of innovative activity, promotes the high level of com-

petitiveness, allows to reduce total costs and commercialize a new good in the future.

3. An innovative activity in Russia develops, but has many problems, such as absence of state regulation, of finance support, of creation of a legal base of innovative processes; developing orientation only on the block of fundamental research.

4. The research proves the existence of intensive cooperation between Russian and Czech clusters in innovation activities.

*This paper is based on the results of the research made by Zhanna Mingaleva as a team leader of research project of Russian Public Science Foundation (Grant № 11-32-00207a1) "The national and regional specific of formation of innovation's activities clusters".*

### References

- Bondarenko V. Foreign experience of the state support of the innovative small and medium-size enterprises. Retrieved from <http://www.innovbusiness.ru>.
- Gaifutdinova O. (2007). Innovative competitiveness of territories as a reflection of the innovative activity of enterprises. In: Company in the new economy (pp. 137-147). Perm: PSU.
- Gaifutdinova O. (2008). The problems of management of regional innovative competitiveness. In: Innovative economy and regional industrial policy (pp. 296-300). Saint Petersburg.
- Gorsheneva O. (2006). Clusters: essence, kinds, principles of the organization and creation in regions. The Econom. Messenger, 4, 2.
- Heart D. Innovations clusters: the basic ideas. Working out school on planning. Great Britain: University Ridginga. Retrieved from <http://www.innosys.spb.ru>.
- Methodical recommendations about realization of the cluster policy in northern subjects of the Russian Federation. Retrieved from <http://www.tpprf.ru>.
- Mingaleva Zh. (1998). Big innovation cycles in economic development. Vestnik of Perm State University. Economics, 1, 49-59.
- Mingaleva Zh. (2000). Clusters and foundation of regional structure. MEIMO, 5, 97-102.
- Mingaleva Zh. (2006). The development of scientific-technical and innovation potential of the region. Perm.
- Mingaleva Zh. (2007). The estimation of innovation and scientific-technical potential and innovation competitiveness of regions. In The region in a new paradigm of space organization in Russia (pp. 556-576). Moscow.
- Mingaleva Zh., Gaifutdinova O. (2008). The main methodological approaches to the level of innovation competitiveness of economic systems. In Methodology of innovation development planning of economic systems (pp. 648-681). St. Petersburg.
- Mingaleva Zh., Gayfutdinova O., Podgornova E. (2009). Forming of Institutional Mechanism of Region's Innovative Development. World Academy of Science, Engineering and Technology, 58, 1041-1051.
- Mingaleva Zh., Mirskikh I. (2009). The Problems of Legal Regulation of Intellectual Property Rights in innovation activities in Russia (Institutional approach). World Academy of Science, Engineering and Technology, 29, 464-476.
- Mingaleva Zh., Mirskikh I. (2010). On innovation and knowledge economy in Russia. World Academy of Science, Engineering and Technology, 66, 1032-1041.
- Moleva O. (2005). Effective using of region resources on a basis clusters. Region Economy, 7.
- Monasturnyi E.A. (2006). Innovative cluster. Innovations, 2, 38-43.
- Rudneva P. (2007). Experience of creation structural clusters in the developed countries. Region Economy, 18, 2.
- Site of An Innovative-Technological Cluster of Mechanical engineering and Metal working of St.-Petersburg. Retrieved from <http://www.itkmm.ru/>.
- Site of Fund of development of innovative center Skolkovo. Retrieved from <http://www.i-gorod.com>.
- Site of Kudepstinskay gas-piston power station in Sochi. Retrieved from [http://www.mashportal.ru/machinery\\_news-21804.aspx](http://www.mashportal.ru/machinery_news-21804.aspx).
- Smirnova J. Clusters as the factor of innovative development. Retrieved from <http://subcontract.ru>.
- Tsihan T. (2003). The cluster theory of economic development. The Theory and management practice, 5.

### Information about the authors

Alexey Lesnik (Prague, Czech Republic) — Vice-rector, University of Economics and Management (Národní 2600/9a, 158 00 Praha 5, e-mail: [lesnik@vsem.cz](mailto:lesnik@vsem.cz)).

Zhanna Mingaleva (Perm, Russia) — Professor, the Department of Economics and Business Operation, Perm National Research Polytechnic University (614000, Russia, Perm, 29 Komsomolskii Prospect, e-mail: [mingal1@pstu.ru](mailto:mingal1@pstu.ru)).