Innovative development of Irkutsk region

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Abstract. The article discusses the current state of innovation development of Irkutsk region, including single-industry towns, main innovation activities, problems and prospects. The main constraints of the innovative development of Irkutsk region are as follows: dependence of the regional economy on the political and administrative control of the federal authorities; excessive control of the government over economic processes and lack of protection from economic risks of innovative entrepreneurship; strategic uncertainty. There are three groups of agents of innovation development: large companies, the government, and universities. Cooperation trends are typical of the region. Interaction of the subjects of innovation activities is efficient: the subjects select the best practices, determine organizational formats of interaction, develop and formalize traditional forms of cooperation. The article developed a set of practical measures to stimulate innovative development of the region.

1 Introduction

Irkutsk region has resources for innovation development: the region produces aviation, aluminum, chemical, pulp and paper, textile and food products, fuel and energy resources. The region has scientific, educational and material resources for developing the R&D sector.

There are favorable external conditions: developed woodworking industries, electrical equipment production, energy production; high demand in the international market; simultaneous penetration of a large volume of the Russian market. Irkutsk National Research Technical University, which trains specialists
for various industries (chemical, energy, machine building, metalworking, digital economy, etc.) can help achieve these goals and objectives.

2 Materials and Methods

However, there are a number of negative trends and obstacles to the innovative development of the region. These are a low level of innovation development of enterprises, the lack of R&D departments, and a low level of investment in technological, marketing and organizational innovations. The enterprises spend their money on machinery and equipment related to technological innovation. However, investing in the R&D sector is not sufficient.

There are objective staff and infrastructure problems: low salaries, a small number of employees in the R&D sector, low innovative resources of organizations and a shortage of qualified staff.

The negative impact is due to the institutional factors: uncertainty of federal policies and dependence of the region on federal economic policies; structural and institutional constraints of the Russian economy (excessive government intervention, inhibition of the dynamics of the private sector and an increase in the cost of investment; non-tariff barriers increasing trading costs; bureaucratic obstacles, regulation inconsistency; the lack of competition and rising prices and tariffs; low transparency of budget expenses; a low level of protection of economic interests and intellectual property of investors, a corruption component). [1] [2] [3]

Thus, the main limitations of the innovative development of Irkutsk region are as follows: dependence of the regional economy on the federal center; excessive regulation of economic processes, economic risks of innovative entrepreneurship; strategic uncertainty of the region. These features entail complex economic factors expressed in the innovative behavior of companies (unwillingness to make “long-term” investment, low innovation activity of enterprises, low expenditures on R&D; a decrease in the staff innovation potential of the region due to aging, low salaries, a small number of employees in the R&D sector. There is “vicious circle" as the innovative industry with a low quality of human capital meets regional needs in innovative products while the inflow of new skilled workers is not possible due to low economic attractiveness of the sector for young and highly qualified personnel.

Today, Irkutsk region uses an outdated R&D infrastructure which does not constitute an integral system of innovative behavior and development of the regional economy. Most of the parameters related to the essential criteria for the innovative development of a region show a downward trend. The innovative
technologies applied in the region are largely focused on short-term and medium-term implementation, and the R&D sector is funded by federal and municipal bodies. Attention is drawn to the problem of depreciation of fixed assets of organizations engaged in R&D.

Among the most significant areas of uncertainty that generate risks for the regional innovative development are strategic federal policies in the region; the volume and structure of Russian and international market demand for innovative products and services.

3 Results

The main subjects of innovation activities in the region identified a number of key features of the regional innovation development. These include:

- territories of competitive products with high added value and low costs;
- technological modernization based on high-tech technologies and products;
- improvement of the quality of human capital (training of highly qualified staff);
- capitalization of high-tech producers (positive aspects influencing the economy are jobs and tax deductions). It is necessary to meet each person, each employer and understand what they need, whom they are willing to cooperate with, in what way.
- development of training practices in specialized enterprises. The university should cooperate with the professional staff, invite economists, marketers, lawyers, innovators, etc. to deliver lectures. Conferences on development of the regional economy should be held.

Geographic factors are crucial: the favorable position of Irkutsk region, combined with a network of institutional frameworks and economic ties will allow the region to become an open space for implementation of European technologies, an exporter of high-tech products, a center of business and scientific tourism, an international platform for scientific and technical cooperation. The region possesses large export and innovative resources for developing high value-added production. University technoparks funded by private companies contribute to research commercialization, employment of highly qualified staff, development of competitive innovative products. They could be “anchors” in the innovative development of the territory. Today, RUSAL is a platform of this type.

The shortage of qualified employees is one of the most serious problems hindering innovative development of the region. According to the business
community, universities are not ready to train highly qualified staff for the regional economy and innovative enterprises of Irkutsk region.

There are no clearly defined and sustainable priorities for the regional development which increases the risks of investing in innovation.

The logistics and customs problems are less acute in the innovation sector of the economy since the intellectual product itself does not require the import of tangible assets and the use of customs capacities.

On the other hand, large industrial companies which are main consumers of innovative products, will inevitably face the repeal of customs and tax benefits.

There are different hardware and technical bases in universities and enterprises. Significant financial investment in modernization of technical universities significantly increased their technical resources. However, many companies lack modern complex equipment. University graduates trained to work using modern equipment and technologies have to use outdated equipment of the company. To solve this problem, it is necessary to develop the innovative and technological base of enterprises by encouraging the purchase of innovative equipment. The purchase of innovative products is a traditional form of innovation activities in the region. It is necessary to support this trend.

According to the regional community, the main threat to the innovative development of Irkutsk region is due to the fact that the regional economy (institutions, resources and staff) is not ready to finance and implement R&D and innovative products.

4 Discussion

Interaction of the regional subjects of innovation activities is currently at the stage of institutionalization: the subjects select the best practices, determine organizational formats of interaction, develop and formalize traditional forms of cooperation. There are a lot of sustainable forms for regulating interaction of universities and authorities in the innovative sector of the economy.

These can be conclusion of agreements or creation of advisory bodies under the government organizing interaction with representatives of the regional community. For example:

- conclusion of an agreement between the university and the government of Irkutsk region on cooperation in developing and implementing research projects aimed at the economic development of the region.

- creation of a specialized advisory councils consisting of experts from scientific and educational institutions.
Both areas are developing: equipment is being purchased, specialists are being trained, relevant research departments are being created, and scientists from leading Russian universities are being invited. Further research in this area will have positive effects on living standards of the population of the region and serve as a basis for development of medical tourism.

5 Conclusion

To conclude, the following measures should be taken to create favorable conditions for the development of the regional innovative potential:

1. Setting the goals of sustainable socio-economic development of the region, identification of priority sectors, development of support programs.

2. Creation of an institutional base of regulators of innovation activities of businesses: grants and tax benefits for enterprises financing and participating in R&D which will encourage businesses to develop innovative products.

3. Development of organizational forms (business incubators, technology parks, data centers) for communication and cooperation in the innovation sphere.

4. Implementation of the best innovation practices in universities, businesses and governments.

Practical measures contributing to the innovative development of the region are as follows:

1. Encouragement of the growth of regional high-tech industries; the government policy should be aimed at increasing investment attractiveness, supporting Russian producers of high-tech products and services, promoting these products to regional, domestic and international markets, and developing intellectual potential in the field of high technologies.

2. Development of research activities of universities, closer integration of university research and educational departments, participation of regional companies in the research activities of universities;

3. Development of international scientific and educational cooperation between Russian and foreign universities, for example: cooperation of Irkutsk National Research Technical University with the University of Trento (Italy) as part of the international educational program "Erasmus Mundus: A Window to European Cooperation". The program is aimed at the development of mutual understanding and mutually beneficial cooperation in the field of higher education. One of the objectives of the program is to expand the potential for joint international work of universities of the European Union and Russia through academic mobility of students.
The teachers of the University of Trento are delivering lectures on international marketing and small business organization for students of the Economics and Management Institute of Irkutsk National Research Technical University, while the teachers of the Russian University are delivering lectures on economics of Russia and Eastern Siberia for Italian students.

In 2018, the cooperation agreement between the Shandong overseas international training service (China) and Irkutsk National Research Technical University was concluded.

4. With the growth of the research and development sector, it is necessary to develop organizational forms which are a bridge between private and public entities (private independent consulting companies that develop and sell applied knowledge and technology services to private companies and government bodies).

Most of the current business activities in the European and Russian markets are related to the natural specialization of traditional industries, which are major employers and developers of these industries (e.g., timber, pulp, mining, metallurgy, and food industries).

These sectors should be taken into account when developing innovation policies and prioritizing investment directions, since the innovative development of these sectors can have a huge impact on the development of the high-tech market. Additional attention should be paid to the transport industry (especially maritime transport), financial and business sectors.

However, although the region can increase labor productivity by adapting existing technologies or improving those sectors that are at the innovation stage of development, it is not enough to improve competitiveness. Substantial investing in R&D, creation of research institutions, cooperation between universities and industries, and effective protection of intellectual property are required.

To transform the institutional environment of innovation development, it is necessary to regulate various aspects of innovation activities, invest in innovation production at each stage of the life cycle; provide tax benefits for venture projects and programs, government contracts and purchase of the most promising products on a competitive basis, provide information support for innovation activities, develop innovative projects, train staff for innovation and technology management, form an expert community providing a variety of technology and management services, create an innovative culture in society.

In addition to economic and institutional changes, a number of technical and infrastructural measures should be taken:
- repairing fixed assets and replacing obsolete equipment;
- increasing the share of organizations using innovative technologies;
- increasing the total cost of innovative products.
The key technologies which can be used for the innovative development of Irkutsk region in the medium and long term are as follows:

1. Food technologies (development, technical re-equipment, implementation of innovative products and entry into new markets).
2. Woodworking technologies (technological modernization of equipment and use of new technologies - deep woodworking, efficiency and environmental friendliness of pulp and paper production, implementation of new housing construction technologies, development of appropriate software and information technologies, production of innovative finishing materials, new methods of sawn waste recycling).
3. Electrical equipment production technologies of (production of electronic data processing systems and telecommunication equipment, power equipment, medical equipment).
4. Machine building technologies (tool production, production of optical systems and devices, development of new metal processing technologies, including nanotechnologies).
5. Information technologies (development of special software).

In our opinion, implementation of these measures will make it possible to reduce strategic risks of innovative development of the region; to enhance investment attractiveness of innovation products at the institutional level; to implement cooperation mechanisms in the field of R&D; to reduce communication, organizational, time and financial costs and risks; to increase demand for university graduates in the regional labor market and economic and social benefits of the innovation development of the region.

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