

# THE SPECIFICS OF DEVELOPMENT AND MANAGEMENT OF INNOVATIVE INFRASTRUCTURE OF RUSSIAN INDUSTRY

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## Abstract

The goal of the paper is to determine and discuss issues related to development and management of innovative infrastructure of Russian industry. Achieving the goal of the paper is based on the results of the authors' research focused on obstacles and mechanisms of development and management of innovative infrastructure of Russian industrial businesses. The research was carried out in different regions in order to assess the current state of innovative infrastructure of Russian industry. The results show that main obstacles to successful development of innovative infrastructure of Russian industrial businesses include the lack of cooperation between organizations, the gap between scientific and business communities, the lack of communication among participants of the innovation process, the low level of motivation to development, the lack of financial resources, the underdeveloped mechanisms of commercialization of innovations or the unwillingness of businesses to finance innovation projects. The mechanisms of development and management of innovative infrastructure should include the support of research and development activities focused on the innovation needs of the Russian economy and the development of cooperation and communication among participants of the innovation process.

**Key words:** innovative infrastructure, industrial businesses, Russian Federation

**JEL Code:** L50, L60, O32

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## Introduction

The innovative infrastructure is the basis of the development of the industrial sector in many developed countries. It involves issues related to reducing the investors' risk of realization of innovation projects, increasing the efficiency of investors' investments or ensuring financing and consulting.

The experience from developed countries shows a clear correlation between the development of innovative infrastructure and the level of innovations in the economy (Jiřinová

& Scholleová, 2015). In this context, the inefficiency of the Russian innovative infrastructure seems to be a fundamental obstacle to the development of high-tech industries and building a modern competitive economy.

Main challenges related to the development of the innovative infrastructure include the formation of the innovative infrastructure in industrial businesses (Rosca-Sadurschi, 2014), the development of mechanisms of innovation management (Gryszkiewicz, Lykourantzou & Toivonen, 2016), the development and management of high-tech technologies in industrial businesses (Gorokhova, Šafránková & Sekerin, 2015) and the greater state involvement in the development of an effective innovative infrastructure (Sun, 2015).

## **1 Goal and method**

The goal of the paper is to determine and discuss issues related to development and management of innovative infrastructure of Russian industry. Achieving the goal of the paper is based on the results of the authors' research focused on obstacles and mechanisms of development and management of innovative infrastructure of Russian industrial businesses.

The importance of the research is underlined by the fact that currently the innovation management seems to be the weakest part of the organizational and economic mechanism of development and management of the Russian economic system. The current mechanism does not provide the innovation development of the economy, does not support rapid application of innovations, and does not contribute to customer satisfaction in terms of diverse and high-quality products and services. Regardless of the number of measures taken by state institutions, in a global comparison, the position of the Russian economy is still not very satisfactory and tends to decline in terms of efficiency and effectiveness of innovations as well as in terms of innovation cooperation between universities and industrial businesses. These facts lead to low competitiveness of products and services of Russian industrial enterprises. (Veselovsky et al., 2017a)

The authors' research focused on new approaches to the development of innovative infrastructure in industrial businesses is based on methods of scientific modelling and forecasting, empirical methods of scientific observation and measurement of socio-economic indicators and analysis of statistical data.

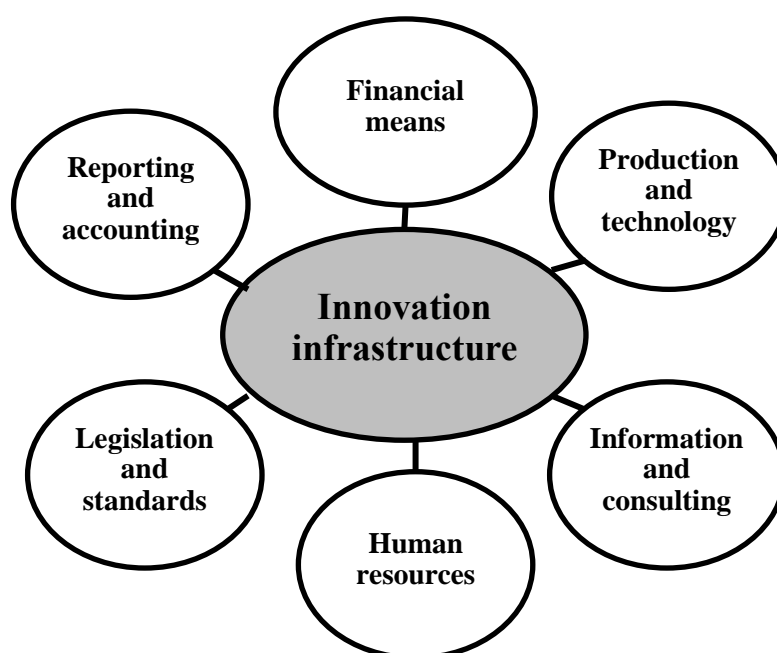
The current results of the authors' research are summarized in the monographs published in 2016-2017 (Veselovsky et al., 2016; Veselovsky et al., 2017a; Veselovsky et al., 2017b).

## 2. Results and discussion

### 2.1 Characteristics of the Russian innovative infrastructure

The current Russian innovative infrastructure of industrial businesses includes various organizations, institutions and associations that provide activities focused on maintaining and promoting innovation processes and activities. Various components of the innovative infrastructure are summarized in Fig. 1.

**Fig. 1: Various components of the innovative infrastructure**



Source: authors

Such an innovative infrastructure orientated on acceleration of the transfer of knowledge and technologies should be a bridge between the science and research and the market of innovation products as well as between state institutions and industrial businesses. At the same time, the innovative infrastructure of each sector and each business has its own characteristics, which is quite natural, given the differences in levels of development of individual sectors and businesses.

Practical experience shows that large industrial businesses are leaders in innovation activities and that they are interested in their intensification (Jiřinová & Scholleová, 2015). Since the modern technologies have become the driving force that determines the development of industrial businesses (Sun, 2015), they actually face a big challenge (Popkova et al., 2013):

obtain innovations from the outside or seek to develop innovations on their own. In other words, use basic institutions of the innovative infrastructure (scientific institutions, business incubators, technology parks, clusters, etc.) or create their own infrastructure of the development of innovations from research to implementation.

Many Russian industrial businesses (particularly energetic businesses) applied the experience of foreign companies and created their own innovative infrastructure based on research and development departments. This allows them to align research and development activities with their capabilities and customer needs as well as to recruit the most qualified workers (Kucharčíková, Tokarčíková & Ďurišová, 2015).

The Russian economy is developing in accordance with world trends. However, the current situation that is worsened by economic sanctions does not allow even large businesses to invest in the development and introduction of innovation ideas (Gorokhova, Šafránková & Sekerin, 2015). In this context international experience clearly shows a direct relation between the level of development of innovative infrastructure and speed of the application of innovations in industrial businesses (Kiseleva et al., 2016).

In Russia, the innovative infrastructure in the form of technology parks and business incubators began to develop in the early 1990s. Around the mid-1990s there were created public and regional technology parks orientated on development of high-tech industry. These parks had their own infrastructure, state financial support and quite successfully develop many small innovation businesses in their territory. A special form of technology parks have become the technological development zones created for the development and introduction of innovation products as well as for the development of information technologies and their services. Four such zones are in Dubna, Tomsk, Zelenograd and St. Petersburg. Since the late 1990s and early 2000s there have been created innovation and technology centres within production and scientific complexes. These centres are orientated on greater involvement of small businesses in the industry. Since 2003 there have been developed technology transfer centres, which aim is to provide the consulting support to small innovation businesses and accelerate the commercialization of scientific and technical results.

In recent years, the regional innovative infrastructure is increasingly developed using venture capital funds. The leading regions in the effective use of venture capital funds are Perm, Tatarstan and St. Petersburg. In these regions, there is considerable experience in financing innovation projects. The problem is that the number of transactions in industrial technologies is still relatively small, although there was a significant increase in 2015: from 10 to 15 transactions and investments increased by 65% and reached USD 8.6 million compared with USD 5.2 million in 2014.

## 2.2 The effectiveness of the current Russian innovative infrastructure

The measures taken have strengthened Russia's position in the Global Innovation Index. The weaknesses of the Russian innovation system include: innovation relationships, cluster development, intensity of internal competition, innovation effectiveness and cooperation between universities and businesses (tab. 1).

**Tab. 1: Positions of Russia in the Global Innovation Index**

Year	GI	Innovation resources	Innovation results	Innovation effectiveness	Cluster development	Innovation relationships	Intensity of internal competition	Cooperation between universities and businesses
2016	43	44	47	69	101	112	74	67
2015	48	52	49	60	118	118	106	62
2014	49	56	45	49	117	126	60	126
2013	62	-	-	-	108	109	52	109
2012	51	-	-	-	93	118	43	118
2011	56	-	-	-	82	83	37	83

Source: Rossiya v zerkale mezhdunarodnykh rejtingov, 2015; Nauka. Tekhnologii. Innovacii, 2016

In recent years, the amount of innovations produced by industrial businesses is constantly decreasing (tab. 2). It is fair to note that innovation activity of industrial businesses cannot be realized "on order". The solution is not only to increase the financial means. It is necessary to improve basic conditions for development and promotion of innovations, enlarge strategic planning horizon of innovation activities and involve stakeholders of the national innovation system to international networks.

**Tab. 2: Innovation activity of Russian industrial businesses**

Indicator	Year			
	2012	2013	2014	2015
The share of businesses that introduced product innovation (%)	6.2	6.0	6.3	5.9
The share of businesses that introduced technological innovation (%)	9.5	9.7	9.6	9.2
The share of businesses that introduced process innovation (%)	5.2	5.4	5.2	5.3

Source: authors based on data from Veselovsky et al., 2017a

In view of the level of innovation activity, the Russian economy continues to lag behind most European countries. It lags behind not only the industrially most advanced countries (Germany - 61.5%, Belgium - 52.8%, Finland - 50%, France, Austria - 41-43%) but also most countries in Central and Eastern Europe.

Unfortunately, one of the main priorities of the Russian state policy, which lies in the transformation of the Russian economy to an innovation way of development, is not adequately supported by spending on research and development (tab. 3). In 2015-2016, the share of spending on research and development (R&D) to Russia's gross domestic product (GDP) was only 1.5%, which is 1.5 to 2.6 times less than in most developed countries. Taking into account the different volumes of GDP, the reality is even more depressing: spending on R&D in countries such as USA or China exceeds spending on R&D in Russia almost 8-10 times, which allows these countries to hold the leading position on the world market of high-tech products.

**Tab. 3: The share of spending on R&D to GDP in different countries**

Country	The share of spending on R&D to GDP (%)		Spending on R & D (in million USD)	
	2015	2016	2015	2016
USA	2.76	2.77	496.8	514.0
China	1.98	1.98	372.8	396.3
Japan	3.39	3.39	169.6	166.6
Germany	2.92	2.92	107.4	109.2
South Korea	4.04	4.04	74.5	77.1
India	0.85	0.85	66.5	71.5
France	2.26	2.26	59.2	60.0
Russia	1.5	1.5	51.5	50.9

Source: Global R&D Funding Forecast. Winter 2016, p. 5.

### **2.3 Problems of development of the Russian innovative infrastructure**

One of the critical problems that affect the efficiency of the innovative infrastructure is the lack of effective communication between stakeholders of the innovation process, especially between scientific and business communities. Other problems include a lack of information, a low motivation for change and development, a lack of financial means and mechanisms of commercialization of innovations, a low demand for innovations from Russian businesses or an unwillingness of businesses to invest in innovative projects.

A serious problem is the lack of finance means on the development and introduction of innovations. This is largely due to the fact that during the financial crisis bank loans become more expensive than they were previously. The situation is aggravated by the fact that local banks are not willing to provide long-term loans, but these loans are necessary for realization of most innovation projects.

The whole group of problems is associated with the absence of an integrated system for promotion of innovations. The current system does not provide functionality that would promote successful realization of innovation projects (insurance, stimulate of demand for innovations, optimization of government contracts for high-tech products etc.).

The introduction of sanctions against Russia has also affected the financing of innovation projects both from private investors, including foreign investors, as well as from the state. Russian businesses are experiencing problems with investments (Merzlova & Sharkova, 2013). The innovation potential of the Russian economy has worsened since the introduction of sanctions. The investments from private investors decreased by USD 50 million and from the state by almost 30%. The amount of the financing of venture businesses in 2015 compared to 2014 decreased by 55.3% or USD 153 million (Veselovsky et al., 2017b).

In the Strategy of innovation development of the Russian Federation in 2020, the achievement of self-sufficiency of subjects of innovative infrastructure was defined as a fundamental problem. This problem persists despite the fact that from 2007 to 2014 the investments in the development of innovative infrastructure from budgets of all levels reached RUB 684.4 billion (about USD 11.4 billion).

Unfortunately, the government investments in innovative infrastructure had little positive impact on the state's economic situation. The situation is also complicated by the fact that government investments are not supported by extra budgetary resources. Private businesses are not interested in investing in risky innovation projects because of the uncertain return on investment and the unstable political and economic situation.

In Russia, there is a lack of experts on creating innovation systems. This to some extent explains that in Russia there are no proven models of national and regional innovation systems. And when it comes to the western experience, financial institutions are only interested in the commercialization of the innovation systems.

## **Conclusion**

According to the authors' results, the further development of the Russian innovative infrastructure requires introduction of tax incentives for private investors, similar to those in Germany, the UK, France or some other countries. It is also desirable to provide tax incentives to private investors in small innovation businesses and reduce taxes on imported high-tech devices and materials for the realization of innovation projects.

Due to the problem with qualified workers and specialists it is necessary to introduce special education programs for all participants of innovative activities. The opportunity is to create special centres for training of entrepreneurs, similar to those which operate in the UK and are supported by the Science Enterprise Challenge program.

The authors believe that management of innovation activities should have an active influence on the process of development of patentable technology solutions. The innovative infrastructure of industrial businesses should include available patent and licensing services connected with services of external institutions. It is necessary to ensure legal protection of intellectual capital of innovation businesses.

At the state level it is necessary to solve many problems related to activities on the stock market, because, as international experiences show, initial public offering on the stock market allows new innovation businesses to obtain the necessary financial means for further development. Unlike most western countries, the entry of new businesses on the stock market in Russia is very difficult. The state should try to remove all existing barriers.

At the regional level, the development of innovative infrastructure should take into account specifics of the Russian Federation. A regional innovative infrastructure should meet the needs of the region and innovative infrastructures of individual regions should be interconnected.

Finally, it should be emphasized that the effectiveness of innovation processes depends on mutual cooperation and communication of their participants. It is necessary to develop an innovative infrastructure that would focus scientific research on development and introduction of innovations in accordance with market needs and that would ensure effective communication



between all participants of innovation processes. This, together with necessary financing, should lead to the development and introduction of competitive industrial innovations.

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