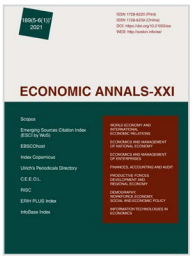

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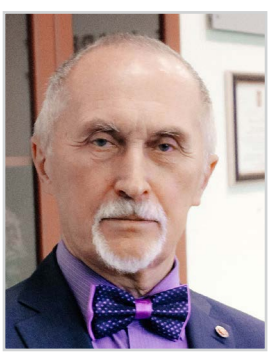

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Industry preferences for foreign patenting of Russian innovation enterprises

Abstract

Our paper is devoted to the science-research work carried out in the Russian State Academy of Intellectual Property (RSAIP) for revealing the role of foreign patenting for development of export of high-technology goods made by Russian manufacturers, first of all by small and medium-sized innovation enterprises. The results of study the patent documents indicating preferences of Russian innovation enterprises in foreign patenting of their new developments are presented in this paper. Preliminary conclusions on preferences in choice of countries for patenting and fields where innovations are made have been given.

It is well known that the development of a competitive economy depends on the innovative activity of enterprises in the market. Understanding of terminology of innovation and invention opens up their economic and legal essence. A special and basic characteristic of innovation is creativity. In the Japanese business and management system, creativity is a production slogan and an inspiring idea, since creativity generates a person's desire to improve in work through intelligence. A product that is new on a global level is recognized as an invention and is regulated by patent law. The state of the art for the invention includes all information that became publicly available in the world before the date of applying with the State Department of intellectual property.

The aim of our study is to analyze the economic aspect of patenting made by the innovative companies in the world with attention to Russia, taking into account the role of innovation infrastructure.

Modern concepts of innovative development of economic systems at various levels (state, region, industry, business entity) increasingly focus on the need for new forms of integration of scientific, industrial, commercial, and other resources to increase competitiveness. Domestic and foreign researchers, government, and business representatives pay attention to clusters as a promising form of integration and practical implementation of the idea of Public-Private Partnership for Innovative Industrial Development.

The cluster approach allows combining the advantages of specialization, integration, and cooperation in increasing the competitiveness of business entities in a higher-level organizational and economic system

(regional, industry cluster) by consolidating production, financial, intellectual, and managerial resources. Clustering of the innovation system in industry allows transition from supporting individual production enterprises or organizations that carry out scientific research to stimulating the development of relationships between them and other subjects of commercialization of scientific research.
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Галузеві преференції для іноземного патентування російських інноваційних підприємств

Анотація
Стаття ґрунтується на науково-дослідній роботі, що проводиться в Російській державній академії інтелектуальної власності щодо виявлення ролі іноземного патентування для розвитку експорту високотехнологічної продукції російських виробників, насамперед малих і середніх інноваційних підприємств. Наведено результати аналізу патентних документів, що свідчать про вибір країн серед російських інноваційних підприємств при патентуванні своїх винаходів. Зроблено попередні висновки щодо переваг у виборі країн для патентування та областей інновацій.
Загальновідомо, що розвиток конкурентоспроможної економіки залежить від інноваційної активності її суб'єктів. Важливо сформувати термінологію цього виду діяльності, оскільки її розуміння й правильне використання пов'язані з механізмом стимулювання інновацій, а отже, зміцнення конкурентних позицій підприємств на ринку. Особливою та основною характеристикою інновацій є креативність. У японській системі бізнесу та управління креативність є виробничим гаслом та ідеєю, що надихає, оскільки креативність породжує бажання людини вдосконалюватись у роботі за допомогою інтелекту. Продукт, який є новим на глобальному рівні, визнається винаходом і регулюється патентним законодавством. Рівень техніки для винаходу включає всю інформацію, яка стала загальнодоступною у світі до дати подання заявки до Державного департаменту інтелектуальної власності.
Мета цього дослідження – проаналізувати економічний аспект патентування інноваційних компаній у світі з акцентом на Росії, беручи до уваги роль інноваційної інфраструктури.
Сучасні концепції інноваційного розвитку економічних систем різного рівня (держави, регіону, галузі, суб'єкта господарювання) все більше акцентують увагу на необхідності нових форм інтеграції наукових, виробничих, комерційних й інших ресурсів для підвищення конкурентоспроможності. Вітчизняні та зарубіжні дослідники, представники влади та бізнесу приділяють увагу кластерам як перспективній формі інтеграції та практичної реалізації ідеї державно-приватного партнерства для інноваційного промислового розвитку.
Кластерний підхід дозволяє об'єднати переваги спеціалізації, інтеграції та кооперації у підвищенні конкурентоспроможності суб'єктів господарювання в організаційно-економічній системі вищого рівня (регіональний, галузевий кластер) шляхом консолідації виробничих, фінансових, інтелектуальних й управлінських ресурсів. Кластеризація інноваційної системи у промисловості полягає у переході від підтримки окремих виробничих підприємств чи організацій, які здійснюють наукові дослідження, до стимулювання розвитку зв'язків між ними та іншими суб'єктами комерціалізації наукових досліджень.
Ключові слова: іноземне патентування; інноваційні підприємства; економіка; економічна система; кластер.

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Отраслевые преференции для иностранного патентования российских инновационных предприятий

Аннотация
Статья основывается на научно-исследовательской работе, проводимой в Российской государственной академии интеллектуальной собственности относительно выявления роли иностранного патентования для развития экспорта высокотехнологичной продукции российских производителей, в первую очередь малых и средних инновационных предприятий. Представлены результаты анализа патентных документов, свидетельствующих о предпочтениях российских инновационных предприятий в патентовании своих изобретений. Сделаны предварительные выводы о предпочтениях в выборе стран для патентования и областей, в которых производятся инновации.
Общеизвестно, что развитие конкурентоспособной экономики зависит от инновационной активности ее субъектов. Важно сформировать терминологию данного вида деятельности, поскольку ее понимание и правильное использование связано с механизмом стимулирования инноваций, а следовательно, укрепления конкурентных позиций предприятий на рынке. Особой и основной характеристикой инноваций является креативность. В японской системе бизнеса и управления креативность является производственным лозунгом и вдохновляющей идеей, поскольку креативность порождает желание человека совершенствоваться в работе с помощью интеллекта. Продукт, который является новым на глобальном уровне, признается изобретением и регулируется патентным законодательством. Уровень техники для изобретения включает в себя всю информацию, которая стала общедоступной в мире до даты подачи заявки в Государственный департамент интеллектуальной собственности.
Цель данного исследования – проанализировать экономический аспект патентования инновационных компаний в мире с акцентом на России, учитывая роль инновационной инфраструктуры.
Современные концепции инновационного развития экономических систем различного уровня (государства, региона, отрасли, хозяйствующего субъекта) все больше акцентируют внимание на необходимости новых форм интеграции научных, производственных, коммерческих и других ресурсов для повышения конкурентоспособности. Отечественные и зарубежные исследователи, представители власти и бизнеса уделяют внимание кластерам как перспективной форме интеграции и практической реализации идеи государственно-частного партнерства для инновационного промышленного развития.
Кластерный подход позволяет объединить преимущества специализации, интеграции и кооперации в повышении конкурентоспособности хозяйствующих субъектов в организационно-экономической системе более высокого уровня (региональный, отраслевой кластер) путем консолидации производственных, финансовых, интеллектуальных и управленческих ресурсов. Кластеризация инновационной системы в промышленности заключается в переходе от поддержки отдельных производственных предприятий или организаций, осуществляющих научные исследования, к стимулированию развития связей между ними и другими субъектами коммерциализации научных исследований.
Ключевые слова: иностранное патентование; инновационные предприятия; экономика; экономическая система; кластер.

1. Introduction

Our paper is devoted to the science-research work carried out in the Russian State Academy of Intellectual Property (RSAIP) for revealing the role of foreign patenting for development of export of high-technology goods made by Russian manufacturers, first of all by small and medium-sized innovation enterprises. The results of study the patent documents indicating preferences of Russian innovation enterprises in foreign patenting of their new developments are presented in this paper.

2. Brief Literature Review

It is well known that the development of a competitive economy depends on the innovative activity of its subjects (Arora, 2016). It is important to form the terminology of this type of activity since their understanding and correct use is associated with the mechanism of stimulating innovation, and therefore - strengthening the competitive position of enterprises in the market (Fischer, 2018).

Summarizing the approaches of domestic and foreign scientists to understanding the basic concepts of the innovation sphere, we can come to the following conclusions (Chang, 2017):

- first, new ideas and solutions are essential signs of innovation;
- secondly, innovation is the result of creative risky human activity, as a result of which new technologies, products, services, or organizational and technical solutions are created, applied, or improved, which significantly improve the structure, quality of production and (or) the social sphere;
- third, the creation of innovations occurs through innovation activities, which are based on innovation and the innovation process.

A special and basic characteristic of innovation is creativity. In the Japanese business and management system, creativity is a production slogan and an inspiring idea, since creativity generates a person's desire to improve in work through intelligence (Cantu-Ortiz, 2017).

The second characteristic of innovation is novelty, the level of which is differentiated as follows:

1) world;
2) state / national;
3) local.

A product that is new on a global level is recognized as an invention and is regulated by patent law (Bos, 2015). The state of the art for the invention includes all information that became publicly available in the world before the date of applying with the State Department of intellectual property (Kim, 2018).

A separate characteristic of the innovation is non - obviousness-the inventive level. The product is characterized by this feature when for a specialist this innovation is not predictable, that is, it does not follow the state of the art. A specialist, in this case, is considered to be a mid-level practitioner who has well-known information in the field of technology (Jefferson, 2017).

Innovation is recognized as suitable for industrial use if it can be used in industry or in any other field of activity (the term industrial suitability is used in a broad sense). Therefore, it is not considered an innovation of a product that cannot be practically implemented in practice, for example, if the development of this product requires conditions that cannot be provided (Munari, 2015).

Public safety innovations define innovations that do not contradict the current public order in the state. It is important to distinguish between innovations that are inherently contrary to public order and innovations that can be used for purposes that contradict public order. For example, a moonshine distiller, a lock pick, or a device for rewinding electricity meter readings cannot be considered an innovation.

Innovation activity is implemented through innovation processes. The primary condition for the innovation process is a risk since any innovation involves a certain uncertainty.

Innovation activities are designed to be financed by venture (risk) funds. Domestic venture funds belong to the type of business that provides optimization of cost management due to exemption from income tax). At the same time, Russian venture funds are not at risk, they prefer investments in stable industries (traditional) and reliable projects, for example, construction, retail, and other types that provide a quick payback. However, world experience shows that most innovative projects begin to make a profit 5-10 years after implementation, and only a few provide significant revenues (Moutinho, 2016).

3. Purpose

To analyze the economic aspect of patenting made by the innovative companies in the world with attention to Russia, taking into account the role of innovation infrastructure.

4. Information Base and Methodology

During the first stage of the work, statistical data were collected on the foreign patenting of Russian MSIPS in these countries and the EPO. This data was collected using the Questel database, which provides significant opportunities to identify various dependencies, trends, patterns, etc.

The following Table 1 shows data on foreign patenting by Russian MSIPS in the period from 2013 to 2018. Data for 2019-2021 and even more so for 2022 at the time of accessing the Questel database continued to be updated, and therefore are not provided. In this table, the first row shows the corresponding number of patents obtained in Russia by all applicants. The following

line (WO) shows the number of publications of international applications submitted from Russia by all applicants. The data in the first two lines are provided solely for reference. Further, in each line related to a particular state, the number of publications (both applications for which patents have not been issued, and applications and patents issued under them) is given for applications filed from Russia, both directly to this country and through the procedure of the Patent Cooperation Treaty (PCT). It should be noted that applications filed under the PCT procedure never become patents, but facilitate the possibility of patenting in those countries or regional organizations that have signed this treaty, and there are already more than one and a half hundred of them today. In this case, only those applicants or patent holders who fall into the ISIP category were taken into account (Russo-Spena, 2017).

This category also included individuals who are individual entrepreneurs. The logic of this attribution is that the high costs of foreign patenting are unlikely to be available to those citizens who are not engaged in entrepreneurial activity. It is clear that in some cases this approach may be incorrect, but these cases, due to their small number, can not make noticeable distortions in the collected data.

5. Results

5.1. Patenting innovation market

Patenting by the developer of their innovations released to the market is almost the only way to prevent them from being replicated by other manufacturers without the knowledge of the developer. Patent protection grants the developer, who has become the patent owner, the exclusive right to use his innovation and prohibit any use of it by everyone else. In other words, a patent issued for a technical development grants the patent holder a kind of monopoly on the market use of the product embodying this development.

However, such a monopoly has limitations. First, these are the borders of the State (or group of States in the case of a regional patent) in which the patent was obtained. Secondly, any patent has a final validity period, after which the development protected by this patent enters the general domain. And third, a patent is granted subject to mandatory disclosure of how the patented result can be implemented so that all persons can use it at the end of the patent term.

This requirement of mandatory disclosure of the development in the description of the patent, together with the territorial nature of the patent, leads to the fact that even during the validity of the patent, any person outside the country in which this patent is issued can completely freely put into circulation a product with the development embodied in it unless this person imports such a product into the country of issue of the patent. In this regard, the task of obtaining patent protection in other countries becomes very urgent if a product with a patent-registered development in this country is intended or at least intended for export.

But here there is another problem: foreign (outside of Russia) patenting is very expensive. Only at the first stage-filing an application with the Foreign patent office - you have to pay fees and other fees in the amount equivalent to several thousand dollars (approximately from three to eight, depending on the country of patenting). In the case of issuing a foreign patent, you will have to pay both for issuing and for maintaining the patent in force. Such payments are also necessary in Russia, but they are many times higher abroad. This circumstance can become a serious problem for small and even medium-sized Russian enterprises engaged in innovative developments.

The United States of America (USA), Japan, China, the European Patent Office (EPO), Germany, the United Kingdom, Korea, and Cyprus were selected as the preferred countries and jurisdictions for patenting. This choice of countries and jurisdictions is because almost all of them are world economic and technological leaders, and Cyprus provides certain benefits for foreign investors.

When selecting the published documents of those legal entities that fall into the ISIP category, all documents that directly indicated the ownership of the rights of the Russian Federation were excluded, as well as those in which the names of the applicants or patent holders contained the words «Federal», «State», «research institute», «scientific and production association», and all documents in which foreign firms were indicated among several applicants. In particular, the documents were excluded, in which the authors were listed only Russians, but the applicant (patent holder) was a company registered in Cyprus. In addition, it should be noted that it was in Cyprus

that domestic applicants did not receive a single patent during this period, and did not even submit a single application that would have been published.

At the same time, it would be incorrect to say that our applicants did not submit any applications in Cyprus at all because some applications for various reasons (refusal of examination or loss of interest from the applicant himself) terminate their life cycle even before publication, which in practice in all countries occurs one and a half years after the date of application submission.

In the second column, after the country names, their two-letter ST.3 value is indicated of the World Intellectual Property Organization.

The information provided in Table 1 indicates a low interest of domestic applicants in the international protection of their work. It is worth noting here that if the international application from Russia is submitted by Russian citizens, and not by legal entities, then the «dollar» part of the fees is 10% of the nominal value. This is because the average income of Russians does not reach the amount required under the PCT procedure, unlike all the countries listed in Table 1.

The same table clearly shows an increased interest in patenting Russian developments, primarily in the United States, as well as in the EPO and China, with China coming in second place in recent years. Japan, Korea, India, Canada, and Germany are consistently following this top three year-on-year. But the UK is far behind all these countries.

Table 1:
Number of foreign patent documents from Russian applicants

No.	Year Country	2013	2014	2015	2016	2017	2018	2019	2020
1	Russia (RU)	38795	34022	36819	32148	28291	27822	26594	26431
2	Publications PCT (WO)	692	718	690	805	816	775	714	693
3	USA (US)	301	383	328	360	231	146	155	132
4	EPO (EP)	190	181	194	226	163	48	94	66
5	China (CN)	147	150	156	197	180	60	51	32
6	Japan (JP)	67	76	75	96	51	14	9	18
7	Korea (KR)	68	78	63	84	84	26	31	7
8	India (IN)	66	61	75	77	52	1	2	4
9	Canada (CA)	67	60	49	56	72	22	18	25
10	Germany (DE)	47	46	30	69	24	24	27	31
11	United Kingdom (GB)	6	6	3	13	4	1	2	5

Source: World Bank (2021)

5.2. Areas of patenting technology

In addition to the distribution by country, it is important to understand in which areas the Russian MSIP technologies are trying to obtain patents. Table 2 shows, for the same years as in Table 1, data on the distribution of foreign patent documents belonging to Russian ISIPS in all the countries under consideration, according to the most common subclasses of the International Patent Classification (IPC). The contents of these subclasses are listed after Table 2 in alphabetical order.

International Patent Classification explained:

- A61B - Diagnostics; surgery; identification;
- A61K - Medicines and medicines for therapeutic, dental, or hygiene purposes;
- A61P - Specific therapeutic activity of chemical compounds or drugs (including those already classified as such in subclasses A61K or C12N);
- B01D - Separation processes, for example, filtration;

Table 2:
International Patent Classification (IPC) classes which include Russian patent documents

No.	2013	2014	2015	2016	2017	2018	2019	2020
	IPC - N	IPC - N	IPC - N	IPC - N	IPC - N	IPC - N	IPC - N	IPC - N
1	G06F 136	G06F 192	G06F 202	G06F 177	G06F 157	G06F 152	G06F 144	G06F 138
2	A61K 89	A61K 65	A61K 77	H04L 64	A61K 83	A61K 69	A61K 72	A61K 66
3	H04L 65	A61P 55	A61P 65	A61K 61	A61P 73	A61P 57	A61P 59	A61P 53
4	A61P 64	H04L 54	H04L 57	G06K 56	G06K 46	G06N 53	G06N 55	G06N 51
5	G01N 43	G06K 47	G06T 40	A61P 53	H04L 44	H04L 47	H04L 42	H04L 37
6	G06K 37	A61B 38	G06K 35	G06Q 46	G06Q 43	G06K 44	G06K 41	G06K 35
7	G06T 34	G06T 35	G06Q 32	A61B 46	A61B 41	G06Q 42	G06Q 38	G06Q 31
8	H04W 29	B01D 35	G01N 29	G06T 36	G06N 38	G06T 33	G06T 31	G06T 27
9	H04N 27	B01J 33	A61B 29	F16H 35	G06T 33	E21B 30	E21B 27	E21B 25
10	A61B 24	G01N 32	C12N 27	G01N 32	B01J 33	C12N 29	C12N 23	C12N 20

Source: Compiled by the authors using IPC (2021)

- B01J - Chemical or physical processes, such as catalysis or colloidal chemistry; devices for conducting them;
- C12N - Microorganisms or enzymes; their compositions; reproduction, preservation or preservation of microorganisms; mutations or genetic engineering; nutrient media;
- E21B - Drilling of soil or rocks;
- F16H - Gears, for example, gear;
- G01N - Study or analysis of materials by determining their chemical or physical properties;
- G06F - Digital data processing using electrical devices;
- G06K - Data recognition; data representation; data reproduction; media manipulation; data storage media;
- G06N - Computer systems based on specific computational models (including training);
- G06Q - Data processing systems or methods specifically designed for administrative, commercial, financial, managerial, supervisory, or predictive purposes;
- G06T - Processing or generating image data;
- H04L - Transmission of digital information, such as telegraph communication;
- H04N - Image transmission, such as television;
- H04W - Wireless communication networks.

As can be seen from the data in Table 2, the greatest and constant interest among domestic developers is caused by foreign patenting of innovations related to digital data processing (G06F, G06N, G06Q, H04L). This also includes developments related to image processing and transmission (G06K, H04N). We also note the documents on developments in the field of machine learning (G06N) that have appeared in recent years.

The area of digital data is followed steadily by pharmaceuticals (A61K, A61P).

It is interesting to note that in 2018, a fairly large number of applications in the subclass «Drilling of soil or rocks» (E21B) appeared in the top ten.

As can be seen from Table 2, the leading positions from year to year are occupied by patent documents in the same areas. But the following lines are distributed between different industries from year to year. For example, since 2016, documents related to materials research (G01N) have left the top ten. In addition, according to a comparative assessment of all the collected data, the number of documents in such areas that were not included in the top ten in any year as «Surface technology, coating» (B24), «Engines, pumps, turbines» (F01-F04), «Chemical engineering» (F15-F17), «Electrical equipment, apparatuses, energy» (H01-H02) has sharply decreased.

The above data, valuable in itself, will be actively used in the subsequent stages of the ongoing research work.

5.3. Innovative infrastructure of modern companies

Innovation infrastructure is the entire range of state and non-state institutions that provide support for all stages and components of the innovation process. Innovative infrastructure in the industry is formed by the following components (Stefan, 2017):

1) production and technological objects;
2) scientific and educational institutions;
3) Information System objects;
4) financial institutions;
5) organizations that provide patenting, licensing, and consulting on intellectual property issues;
6) institutions that form a system of standardization, certification, and accreditation.

State statistical accounting of the number of innovative infrastructure facilities in Russia is carried out only concerning Science Parks, Technology Parks, and industrial parks.

In Russia, three categories of parks can be conditionally attributed to innovative ones: industrial, technological, and scientific projects. The functioning of each category is regulated by a separate law.

An industrial park is defined in the law of Russia «on industrial parks» as a territory that has the necessary infrastructure for activities in the processing industry, as well as for conducting scientific research and activities in the field of information and telecommunications (Tang, 2019). It can be argued that an industrial park is an area where industrial production should be located for the most part. State regulation of industrial parks is carried out by the Ministry of economic development, trade, and agriculture.

Technology parks (technoparks) are no longer defined as a territory but as a legal entity or group of legal entities that carry out projects for the production implementation of high-tech developments, high technologies, and ensuring the industrial production of competitive products.

Science parks are created only on the initiative of higher educational institutions and (or) scientific institutions and provide for the implementation of «economically and socially determined scientific, scientific-technical and innovative areas of activity» (Thompson, 2015). Science parks and technology parks tend more to concentrate knowledge and scientific resources to produce innovations, so they are closely linked to universities, research institutes, and so on.

The International Association of Science Parks and Areas of Innovation assumes the identity of the concepts of «Technology Park», «Science Park», and «Research Park». According to the Association, two-thirds of all technology parks in the world were created after 1980. Currently, more than 500 technology parks are operating in the world. There are more than 160 technology park structures located in the United States, more than 100 in Germany and China, and more than 50 in Japan, France, Russia, and Poland. So in 2018, there were 65 technology parks in Russia and 80 in Poland.

State support for the creation and operation of industrial parks provides for (Zobel, 2016):

1) allocation of funds from the State Regional Development Fund to finance projects to create infrastructure for industrial parks (provided that co-financing from local budgets is at the level of 10% of their estimated cost);
2) exemption from equity participation in the development of local infrastructure;
3) exemption from import duties.

Local governments provide the following types of support:

1) provision by decision of local self-government bodies of land tax and real estate tax benefits for sole proprietors who take into account the public interests reflected in the program documents of economic and social development;
2) establishment by state bodies and local self-government bodies of the minimum rental rate for renting land of state and municipal ownership;
3) assistance at the local level in processing all permits and other documents necessary for the implementation of projects;
4) allocation of funds from the local budget to finance work on providing engineering infrastructure for certain land plots or creating conditions for access to these plots;
5) organizational and financial participation in the recruitment and organization of training of potential and existing employees of individual entrepreneur companies.

According to experts, management companies do not yet invest and are not ready to invest in the construction of buildings in industrial parks, without having guarantees and a vision of returning the invested funds. At the same time, representatives of the Ministry of Economy believe that the issues of state support for industrial parks are now fully resolved. In particular, the ministry notes that local governments can set preferential rates of payment for land (including land lease) and real estate tax, as well as provide financial support for participants in industrial parks from the local budget.

The complexity of the processes of innovation activity of industrial enterprises determines the need to use a set of criteria and indicators in the management of these processes. Another requirement, in addition to consistency, is the availability of high–quality and regular information for making decisions at various levels of management and supporting innovation activities. One of the tools that are actively used in modern management systems, taking into account the above requirements, is the introduction of a monitoring system.

In general terms, monitoring is a set of software and methodological, organizational, technological, and other tools that provide regular monitoring of the state of a particular object according to a pre-developed methodology and system of indicators. The author of the manual on monitoring regional development programs defines monitoring as «a managerial function that provides for the continuous provision of stakeholders with data confirming or refuting the presence of progress in achieving the expected results of the program» (Zobel, 2016). The main purpose of monitoring is to create a database for evaluating, analyzing, and controlling the object or monitoring object under study. An example of the implementation of the above tasks in Russia is the procedure and methodology for monitoring and evaluating the effectiveness of the implementation of state regional policy (Png, 2017).

In the innovation management system of industrial enterprises in Russia, there is a wide range of statistical and administrative types of data on the state and development of innovation activities. Existing statistics of innovation activity, as well as administrative data, do not have a systematic basis and an appropriate methodology for their analysis for innovation management.

The effectiveness of innovation implementation depends on the potential: research, financial and economic, human, environmental. When it comes to research potential, in our opinion, it is characterized primarily by applications and patents for inventions and utility models. It is important to analyze what share of applications and patents for inventions and utility models is reflected in innovative products. For example, in 2018, 90% of inventions and utility models did not have a practical implementation in the production sector (Tang, 2019).

The pharmaceutical industry is an innovative leader in economic activities. In recent years, the volume of innovative products sold by enterprises engaged in the production of rubber and plastic products, other non-metallic and Mineral Products has been increasing.

Since the financing of innovation activities of industrial enterprises in Russia is mainly at the expense of enterprises' funds, and the indicators of their innovation activity are quite low, it can be argued that the economic mechanism of its state support in Russia is at the stage of formation. In our opinion, one of the ways to solve the problem of attracting additional funds to innovation activities, in particular investments of foreign investors, is:

1) building clusters for promising areas of innovation activity;
2) restoration of some of the benefits for technology parks that were canceled in 2006;
3) formation of venture funds.

The analysis of methodological recommendations for assessing innovation potential presented in scientific sources made it possible to conclude that they are extremely contradictory and have some shortcomings that hinder their practical use:

- there is a substitution of concepts by identifying innovative potential with other types of potentials (intellectual, labor, scientific and technical, financial) (Huang, 2014), which leads to the bias of such an assessment;
- since there are different approaches to determining the structure of the innovative potential of an enterprise, different systems of indicators are used to characterize individual components that differ both in the number of indicators and in their content, which can lead to results that contradict each other (Gong, 2018);
- to calculate some indicators, an additional information base is needed (Arora, 2016);
- the use of expert assessments in the process of evaluating the innovative potential of an enterprise leads to extremely high subjectivity of evaluation results (Fischer, 2018); expert procedures are quite expensive; there is no possibility to mathematically verify the reliability of the results obtained;
- the use of the method of adding individual indicators included in the system to determine the integral indicator of the innovative potential of an enterprise leads to the fact that the resulting indicator does not make economic sense (Piening, 2015);
- many methods for assessing the innovative potential of enterprises are extremely cumbersome, overloaded with a large number of indicators (Stefan, 2017).

The value of the indicator of the growth rate of innovation potential is determined by an expert method using the formula:

$$\Delta IP_t = \sum_{i=1}^{n} \frac{O_i^d}{O_i^B} \times B_i \ , \qquad (1)$$

where:

ΔIP_t is an indicator of the growth rate of IPP over the time period t;
O^d is estimate of the i-th cluster factor IPP (in points or in the corresponding dimension);
O^B is evaluation of the i-th cluster factor of the IP of the comparison base (in points or in the corresponding dimension);
B_i is weighting coefficient of the i-th cluster factor.

We also identify three approaches to assessing the innovative potential of an enterprise:

- predictive (to assess the state of the IPP, it is necessary to compare the actual state of the IPP of the analyzed object with the conceptual model of the IPP to identify untapped opportunities

and reasons that cause the discrepancy between the desired and actual state of the innovative potential of the enterprise);
- diagnostic (the main feature is the identification of the relationship «cause-effect», «partial - whole»; considers the object in static and spatial-element section; examines the synergistic effect of measures implemented in the innovation potential management system);
- the inter-farm comparative approach is of great importance in assessing the innovation potential at comparable enterprises, as well as in comparing the innovation potential with the standard.

Effective implementation of strategies for innovative development of industries implies the presence of internal economic incentives at the enterprise level. Appropriate management decisions on the choice of innovative development strategies at the micro level should be based on taking into account factors that are related to the peculiarities of the internal and external environment of the enterprise, indicators of its investment attractiveness. Such decisions require the use of broader information and analytical base, which is based on financial and other types of reporting of the business entity. In this regard, we suggest modeling the choice of an innovative development strategy and stimulating its implementation at the micro-level, taking into account two criteria: investment attractiveness (X); innovation potential (Y).

6. Conclusion

Modern concepts of innovative development of economic systems at various levels (state, region, industry, business entity) increasingly focus on the need for new forms of integration of scientific, industrial, commercial, and other resources to increase competitiveness. Domestic and foreign researchers, government, and business representatives pay attention to clusters as a promising form of integration and practical implementation of the idea of Public-Private Partnership for Innovative Industrial Development.

The cluster approach allows combining the advantages of specialization, integration, and cooperation in increasing the competitiveness of business entities in a higher-level organizational and economic system (regional, industry cluster) by consolidating production, financial, intellectual, and managerial resources. Clustering of the innovation system in industry consists in the transition from supporting individual production enterprises or organizations that carry out scientific research, to stimulating the development of relationships between them and other subjects of commercialization of scientific research.

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