

DEVELOPING TECHNOLOGICAL INNOVATIONS ON THE BASES OF THE WORLD PATENT INFORMATION

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Abstract

To ensure the innovative growth and progressive economic performance in high-technology industries, or at least to keep them at a fixed level it is necessary for the industrial enterprises to conduct scientific research and inventive activities through developing technological innovations and also through supporting, completing, replenishing, updating one of the most important intangible components of the business – patent resources: protective documents on inventions, industrial designs, utility models, trademarks, etc. Scientific-and-engineering information, contained in international patent funds, allows determining the world state of the art, registering and securing the company's exclusive patent rights to the innovations. This work presents the method of obtaining patent information in Russia by means of using various Russian and international databases and abstract journals that can help to investigate the world state of art in a given technological field.

Keywords: Innovative activity, Patent information, Scientific-and-engineering information, The world state of the art, Research and development organizations.

1. Introduction

Innovative activity involves transforming results of research and development into new products, services or manufacturing processes which become technological innovations after having been introduced into the market. The progress of innovational process is determined by the availability of the intellectual resources in the company's assets. These resources, including patents, licenses, brands and know-how, give the enterprises competitive advantages over their competitors.

Abbreviations	
ASI	Alphabetical Subject Index
EAPO	Eurasian Patent Organization
EPO	European Patent Office
FIPS	Federal Institute of Industrial Property (in Russian: Federal'nyj institut promyshlennoj sobstvennosti)
GDP	Gross domestic product
IPC	International Patent Classification

Today a key task of the Russian public policy is the transition of the Russian economy into innovative model. Russia's place in global innovation processes does not correspond to the national intellectual potential and educational opportunities. Unfortunately, at present, Russian companies produce no more than 0.8% of high-tech innovative products competing in the global market [1].

The Strategy of Innovative Development of the Russian Federation for the period up to 2020 "Innovative Russia – 2020" was adopted by the Russian government in December 2011. The purpose of this strategy is to provide the population with the high level of wealth and to strengthen the country's geopolitical role. The only way to achieve these goals is to transform the economic model into an innovative and socially - oriented one. According to this strategy quantitative economic indicators for 2020 are to be the following: the market share of high-tech products should reach 5-10%, a rise in the proportion of high-tech sector of GDP from 10.9 % to 17-20%, an increase of the innovative products in the manufacturing output by five – six times, the growth of the number of research and development organizations from 9.4 % to 40-50 % [2].

According to the statistical survey in the Reference Books "Russia in Figures 2008-2013", the total number of Russian research and development organizations, that are really developing technological innovations, is less than 10% [3, 4-9] (see Table 1).

2. Discussion

Analysis of the data presented reveals that innovations are carried out only less than 10% of the domestic enterprises, which deliver less than 0.8 % technologically new products on the world market (see Table 1). According to the experts' estimation in the structure of Russia's national wealth the tangible assets currently dominate; they are as high as 85%. Intangible resources, including human resources, account for only 15% [10].

Western experts' forecast for 2015 shows that in the economies of developed countries there has been a constant trend of increasing non-material components of the assets compared with the material components (see Table 2) [10].

In developed countries there has been a general trend toward a higher contribution of non-material components – intangible assets of business compared with the material components – tangible assets. Unfortunately, this upward trend is not typical for the Russian economy nowadays.

Table 1. The number of Russian organizations, implementing technological innovations in ratio with the total number of organizations and enterprises in Russia.

Year	1992	2007	2008	2009	2010	2011
The total number of organizations and enterprises	no info	4674900	4771900	4907800	4866600	4866400
The number of research and development organizations	4555	3 957	3 666	3 636	3492	3682
Research and development personnel (end of year; thou. persons)	1532.6	801.1	761.3	742.4	736.5	735.3

Table 2. Relative contribution of tangible and intangible components to the business in developed countries.

Year	1978	1998	2004	2009	2015 (forecast)
Intangible assets, %	5	70	85	90	95
Tangible assets, %	95	30	15	10	5

These data define the averaged indicators for various national manufacturing industries. For Russia, the differential consideration by industries shows that for the nuclear and space industries, and also for industries associated with the development and manufacture of conventional weapons these indicators are much higher than average ones. This phenomenon can be explained by the significant scientific potential, created in these industries during the Soviet period, when much attention was paid to the national defence complex [11].

3. Research and Results

To ensure the innovative growth and progressive economic performance in high-technology industries, or at least to keep them at a fixed level it is necessary for the industrial enterprises to conduct scientific research and inventive activities through developing technological innovations and also through supporting, completing, replenishing, updating one of the most important intangible components of the business – patent resources: protective documents on inventions, industrial designs, utility models, trademarks, etc.

Scientific-and-engineering information, contained in international patent funds, allows determining the world state of the art, to register and secure the company's exclusive patent rights to the innovations. Patent information is characterized with laconicism and brevity of the technical solution statement in the claim of the invention; informative completeness as a claim of the invention includes the necessary and sufficient signs for implementing technical solution; determinacy as the signs, entered into a claim of the invention, doesn't allow any other interpretation.

Only with the help of patent information the technical level of industrial goods and the novelty of developed products and technologies can be surely established. As the main source of information provision of innovations, 70% of patent resources contain unique and precise information, which is not published in other sources [12]. Figure 1 shows the scheme of obtaining patent information in Russia by means of using various Russian and international databases and abstract journals that can help the researchers to investigate the world state of art in a given technological field. IPC was established in 1971 to handle patent information. It provides for a hierarchical hand-built system of symbols to classify patents and utility models in a standardized international format according to the different areas of technology to which they pertain. Main resources of patent information are given in Table 3 [13].

IPC has been continuously revised and updated due to new technological areas appearance. IPC is a mean of obtaining timely and accurate information. Learning at least one patent analog and not knowing a particular foreign language it is almost possible to determine the content of the patent documents, the key word in any foreign language and to select patent analog samples.

The complexity of the world patent information is accounted for its huge amount, continuous renewability, the absence of unified world patent database, many sources of information collecting, language barriers, the diversity of patent resources structures and their search engines that result in problems of retrieving patent documents. All these factors stipulate high requirements for qualification of the specialists engaged in patent activity.

With the help of the IPC rubrics the data on the studied matter and on the countries of interests can be founded immediately. Patent research is the investigation of the state of art and possible trends in developing technical objects, their patentability, patents' validity, competitiveness, based on patent and other scientific or legal information. Search on the definition of the prior state of the art should determine the currently attained level of development in a particular technological activity to prevent groundless costs on research and development of the inventions that are already known and made. There are the following search types: thematic – by using keywords and the IPC indices, and nominal or corporate – with the help of the name and surname of the inventor, the applicant or patent owner; with the help of the name and surname of the inventor, the applicant or patent owner; numeric – by the registration numbers of the patent documents [13].

The Department of Rospatent – Federal Institute of Industrial Property or FIPS provides protection of legal rights to intellectual property objects, examines applications for patent rights, grants protective documents and keeps public registers of intellectual property rights and licensing agreements. When using the Rospatent information resources, any company is able to conduct their own patent search to determine the technical level in a given field of the technological innovations development [11].

Determining the required patent classification indices and symbols can be done with the help of ASI to the IPC and the IPC on the site of FIPS and WIPO. Thematic search on the selected keywords is conducted on the abstract of the invention, through selecting the relevant documents. The proposed method and

algorithm for integrated search and use of patent information by the company to determine the state of the art in the patent resources is illustrated in Fig. 1.

On the basis of principles of the IPC, we can conclude that it is an effective instrument for the orderly storage, quick search of patent documents and determination of the state of the art in the particular area of the technological innovations development.

The implementation of the algorithm comes to the following procedure (see Fig. 1):

1. Analysis of the external environment. Specification of requirements for technological innovation – new products, services, production processes and production methods, which should meet the criteria of novelty, focusing on the demand and potential profitability of the enterprise.
2. Establishing the subject of the search - the technical field, technical objects and special terms to define a particular technical field more broadly.
 - 2.1. For the selection of terms related to the technical object, use the ASI to the IPC. With the ASI we are to find the section and the class of the IPC. After selecting the class and subclass we are to find a suitable group, subgroup and as a result the full classification index of the invention.
 - 2.2. An alternative method of finding the right classification index is the search for full text and abstracts of patent documents using key words – selected technical terms. We can conduct a statistical analysis of classification indices of documents found, select the most common indices of the IPC and include them in the search of subclasses.
3. Retrieval of the patent documents through using the IPC indices and analysis of obtained documents.
4. Repeated search on related IPC rubrics in the links of patent documents, which have already been found, and obtaining search results.
5. Careful review of the description of the claims of patent documents.
6. Generalization of the results and assessment of the state of the art.

If a patent search on the database of registered industrial property does not yield any results, it is necessary to continue retrieving databases of patent applications. While investigating the technological activities of main competitors introducing new products, technology and services into the world market it is prerequisite to implement relevant patent search for industrial property objects in selected countries – developed countries and market leaders on the sites of their national patent offices, containing the largest number of inventions in appropriate languages.

Descriptions of the inventions and their brief pointer are contained in the database "Inventions of the World Countries" on DVD-ROM and other electronic storage media. The databases, created by Rospatent with the help of these resources, contain more than six million patent documents. Search engine of Russian Internet segment esp@cenet provides access from Rospatent site to sixty million European Patent Office documents from 76 countries worldwide [14]. The state of the art can also be obtained through examining printed scientific and

technical literature. With the help of IPC one can quickly find the patent materials on the topic and the country of someone's interest. Using Rospatent information search engine on the site <http://www1.fips.ru> it is possible to retrieve and review the abstracts and the full-text patent documents in the Russian and the English languages. The databases and search engine structures stipulates the search on text fields, numbers and dates.

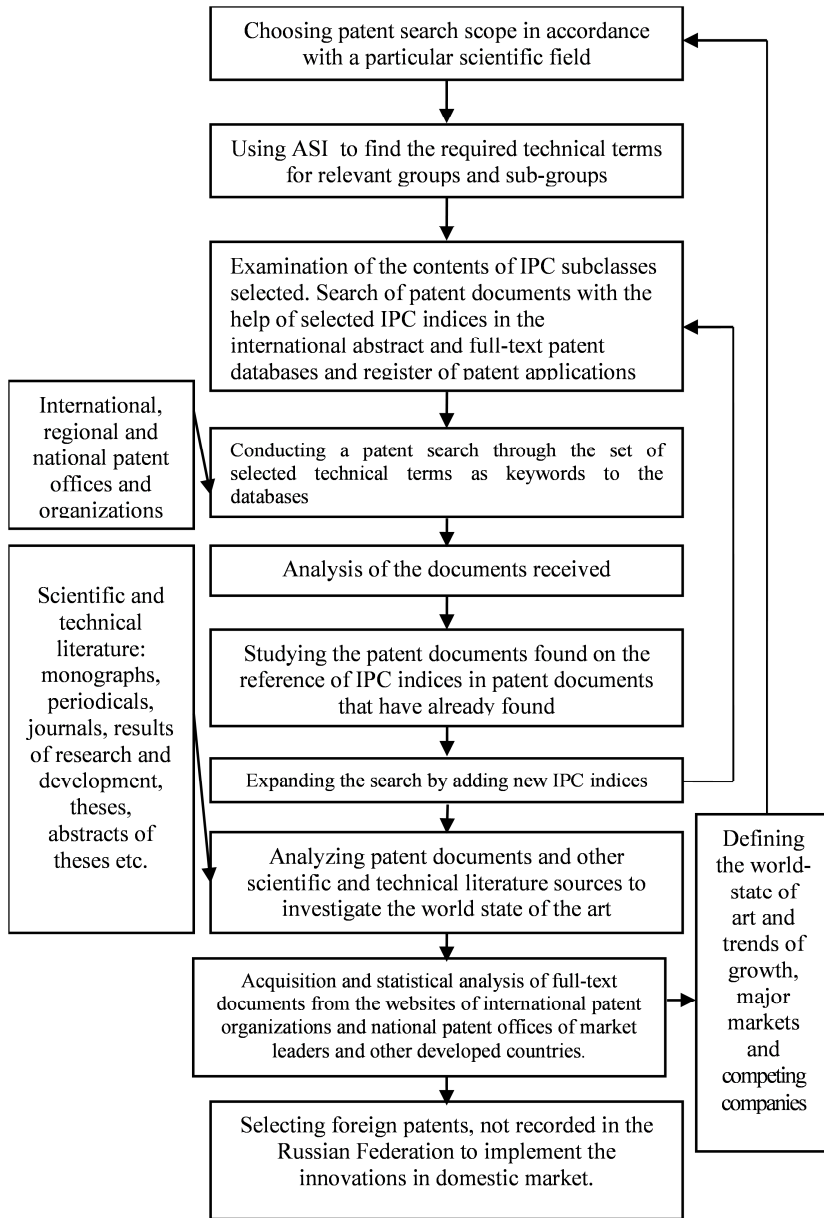


Fig. 1. The method of complex search and use of patent information.

Table 3. Main resources of patent information.

National patent databases of the Rospatent Department - Federal Institute of Industrial Property, the Russian Federation	Patent databases of international and foreign organizations with free access to Internet sites
<p>1. On-line resources: http://www1.fips.ru/wps/wcm/connect/content_ru/ru/inform_resources/</p> <p>2. Databases of Russian Patent Information:</p> <ul style="list-style-type: none"> • Open registers • Electronic bulletins • Patents on CD-ROM and other electronic storage media <p>3. Publications and periodicals in hard copies and on electronic storage medium: library funds, periodicals monographs, unpublished sources, scientific-and-engineering information</p> <p>4. EPO Databases available on Russian segment of Rospatent server esp@cenet service: http://ru.espacenet.com/</p>	<p>1. European Patent Office databases: http://worldwide.espacenet.com/</p> <p>2. The World Intellectual Property Organization databases: http://www.wipo.int/portal/en/</p> <p>3. Patent databases of national patent offices</p> <p>4. Eurasian Patent Organization databases: http://www.eapo.org/en/</p>

4. Conclusions

Drop in oil prices and decline in revenue from hydrocarbon exports should open up new opportunities for the development of non-oil sector of the Russian economy and stimulate the development of technological innovations. But at present the level of innovative development in Russia falls behind not only developed countries but also developing ones. It is well-known fact, that the innovative development of Russia is hindered by high oil prices.

According to the survey of the Russian Chamber of Commerce, the relative volume of Russian investments in research and development is five times lower than in developed countries. Nowadays, Russia spends on research and development less than US \$ 100 per capita a year, while developed countries invest up to US \$ 500 [15].

If in the former Soviet Union the total number of research and development organizations reached 50%, in today's Russia technological innovations are developed only by 8.9% of modern enterprises. As indicated in the survey of the High School of Economics and Rosstat, in 2013 in Eastern Europe, this figure stands at 25-30% of organizations, which deals with technological innovation development, in Western Europe – more than 40-50 % enterprises. The market share of innovative goods and services in Russia in 2011 was only 0.8 %, whereas in Poland – 4.5 %, in Germany – 3.3%, in Portugal – 8.6 % [15].

As it was declared at the forum "Open Innovation 2013", the Russian government is currently planning, that since 2015 innovations will have contributed about 1 % to the national economic growth. Large investments were made in the necessary infrastructure promoting the projects at all stages of the innovation cycle: from the appearance of the original plan to release of innovative products, services, technologies and their commercial use. It was also mentioned, that the specialized courts on intellectual property rights litigations are introduced in attempt to alleviate the system of proceedings lawsuits on patent rights and the rights of intellectual property objects [15].

References

1. Gokhberg, L.M.; Kevesh, A.L.; and Kuzminov, Y.I. (2009). *Indicators of innovation*. Statistical Yearbook. Moscow: High School of Economics, 458.
2. Strategy of Innovative Development of the Russian Federation for the period up to 2020 "Innovative Russia – 2020" (adopted 8th December 2011 by the Russian government Regulation No. 2227-p). Retrieved January 6, 2015, from <http://innovation.jinr.ru/imgs-docs/stratinnorf.pdf>
3. Sokolin, V.L. (2008). *Russia in figures*. Statistical Handbook/ Rosstat. Moscow: Rosstat, 197-199.
4. Sokolin, V.L. (2009). *Russia in figures*. Statistical Handbook/ Rosstat. Moscow: Rosstat, 195-197.
5. Baranov, E.F.; Gelvanovsky, M.I.; and Gokhberg, L.M. (2010). *Russia in figures*. Statistical Handbook/ Rosstat. Moscow: Rosstat, 180.
6. Baranov, E.F.; Gelvanovsky, M.I.; and Gokhberg, L.M. (2011). *Russia in figures*. Statistical Handbook/ Rosstat. Moscow: Rosstat, 182.
7. Baranov, E.F.; Gelvanovsky, M.I.; and Gokhberg, L.M. (2012). *Russia in figures*. Statistical Handbook/ Rosstat. Moscow: Rosstat, 192.
8. Baranov, E.F.; Gelvanovsky, M.I.; and Gokhberg, L.M. (2013). *Russia in figures*. Statistical Handbook/ Rosstat. Moscow: Rosstat, 202.
9. Zhitkov, V.B.; and Ivanov, J.A. (2013). *Russia*. Statistical Pocketbook / Rosstat. – Moscow: Rosstat, 212, 377.
10. Milner, B.Z. (2013). *Innovative development: economy, intellectual resources, knowledge management*. Moscow: INFRA-M.
11. Kameneva, N.A. (2009). Informatsionnye resursy innovatsionnoy deyatelnosti [Information provision of innovative activity]. *RISK: resursy, informatsia, snabzhenie, konkurentsia* [*RISK: Resources, information, supply, competition*]. 2, 118-122.
12. European Patent Office. Retrieved January 6, 2015, from <http://worldwide.espacenet.com/>
13. Kameneva, N.A. (2012). *Use of patent information in innovation activity. Technique of patent research*. Saarbrücken: LAP LAMBERT Academic Publishing GmbH & Co. KG.
14. Rospatent server esp@cenet.ru <http://ru.espacenet.com/>
15. Medvedev, D.A. (2013) Innovations will accelerate the growth of the Russian economy by 1%. Retrieved January 6, 2015, from <http://top.rbc.ru/economics/31/10/2013/886125.shtml>