

Digital tools to support innovations and businesses

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Abstract. The article deals with the creation and practical application of digital technologies to support the scientific, educational and entrepreneurial communities, as well as for decision-making at the state level in the regional economy management. Special attention is paid to the use of digital tools in the analysis of the current state of innovative, scientific and technological development of the Russian Federation and patent portfolios of Russian companies. Researchers consider big data when considering new markets, so the authors conduct a study on the example of emerging promising markets of the National Technology Initiative, in particular the Autonet market and the Foodnet market. The authors suggest a wide application of automation tools for intellectual property management at the regional level and in innovative companies. Specific examples of digital tools developed and used with the participation of the authors are given. The experience of using automated systems for innovation management in the Republic of Tatarstan can be useful for other regions of Russia and other countries.

Keywords: Digital Economy, Digital Tools, Big Data, Innovation, Intellectual Property, Intellectual Property Management, Management System, Automated System.

1 Introduction

Among the most important tasks for the Russian Federation development, formulated in 2018 by the President V. Putin in the Decree “On the National Goals and Strategic Objectives of the Russian Federation Development for the Period up to 2024” [1], we see: the country's entry into the five economically developed countries of the world and acceleration its technological development. The current state of affairs in the area of innovative development does not provide a technological breakthrough and, accordingly, a radical acceleration of the economic development of the regions and

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Russia. As R. Salimov and E. Koroleva note [2], until now the scientific and technical sphere does not provide the production sector with innovative developments, thus the Russian intellectual property market is not formed, and it is in the scientific and technical area that the results of intellectual activity are created. According to R. Salimov and G. Mingaleev [3], the key problem of the Russian economy remains, first of all, the low demand for innovations, as well as an excessive bias towards the purchase of technologies, equipment and goods abroad at the expense of creating our own new developments.

As for the breakthrough economic growth, an indispensable condition for its initial stage is a deep rethinking and a significant revision of the methodology for developing a system of measures for strategic management of the dynamics in economic development changes.

Digital transformation is becoming one of the key factors in this development, which requires a significant increase in solutions in the field of information technology.

2 Materials and methods

2.1 Big Data: The growth of the GDP and Innovations

The research methodology of the current state of scientific and technological development of the Russian Federation is based on its comprehensive analysis using marketing tools proposed in the research of R. Salimov, G. Mingaleev, A. Vinokurov, E. Koroleva in relation to the regional intellectual property market [4]. The further development of the methodology for studying the state of the scientific and technical sphere is based on the use of digital tools for analyzing intellectual property.

The Guidance for the Development of an Intellectual Property Strategy [5] records the fact that practically all national strategies for intellectual property and programs of scientific and technological development have a positive relationship between innovation, intellectual property and gross domestic product (GDP). This makes intellectual property policy an increasingly important tool for stimulating economic growth of any country in the face of global competition. Choi Donggyou confirms this position in the report on the Republic of Korea [6] and Koichi Matsushita in the report on Japan [7], too.

Of course, the growth of the GDP of developed high-tech countries is primarily influenced by innovations in commodity production, as for goods intended for the production of other goods, i.e. industrial goods of the metallurgical, fuel and energy, chemical industries, machine-building industry, and for consumer goods, i.e. goods for personal consumption and household use [8]. Jeremy de Beer, in his study [9], distinguished both patented and non-patented inventions in commodity production, highlighting innovation among them. These innovations come in the form of new technologies and products demanded by society. The number of new technologies and innovative products is not recorded by any registration authorities, so they cannot be calculated. However, there is intellectual property in these innovations, which is registered by the national patent offices. This information is publicly available and serves

as an indicator of the scientific and technological development of an enterprise, industry, region, country (Figure 1).

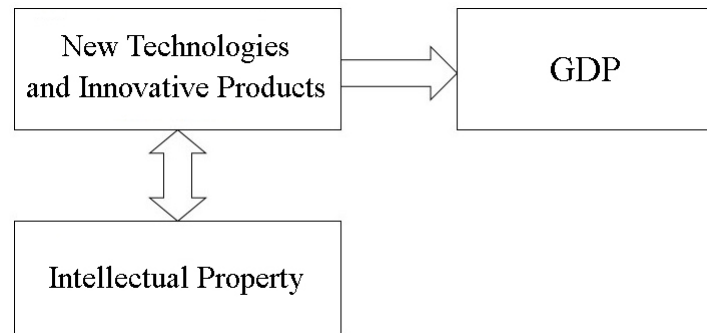


Fig. 1. Relationship between Innovation, Gross Domestic Product (GDP) and Intellectual Property.

Source: compiled by R.I. Salimov.

Jeremy de Beer [9], Jeffrey D. Harty, John D. Goodhue [10] singled out the most valuable intellectual property in the composition of innovations as an indicator of scientific and technological development - an invention that has a significant impact on the economic growth of companies and countries. Therefore, let us further consider the role of innovations and inventions in the scientific and technological development of the Russian Federation on the basis of patent searches and patent research.

In relation to industrialized countries, the number of applications for inventions is more than 1,700,000 for China, more than 600,000 for the United States, more than 400,000 for Japan, and more than 200,000 for Korea. To operate with such numbers, new digital tools are needed, which we will discuss later in this article.

2.2 Future Markets of the National Technology Initiative

An example of the practical implementation of the scientific and technological development of the Russian Federation is *the National Technological Initiative (NTI)* [11], proposed by *the Agency for Strategic Initiatives* under the patronage of the President of the Russian Federation V. Putin. *The Agency for Strategic Initiatives* is betting on the future markets of the Russian and world economy, where Russian producers will be successful and competitive. Each of these future markets is expected to exceed \$ 100 billion by 2035. *The NTI* defines nine such markets [11].

Each of the NTI markets in the network information environment operates with a large amount of data, so market research also relies on the processing of big data using digital tools such as *Thomson Reuters, QuestelOrbit, GridLogic, PatSeer*, etc. These digital tools allow not only to conduct express analyses of patent situations, but also to build large-scale patent landscapes that identify trends in the development of specific technological areas [12-13].

An express analysis of the intellectual property area in only two fields of the Autonet and Foodnet markets showed an insignificant number of innovations by Russian companies protected by patents.

Autonet Market Patent Analysis. Let us consider the patent situation in the *Autonet* market. The main product of the Autonet market is an unmanned truck, and *PJSC KAMAZ* is the base enterprise. The patent search conducts by the authors of this study in the context of the development of an “*Unmanned Vehicle*” within the *Autonet* market.

The active growth in the number of patent applications on the topic “Unmanned Vehicle” by foreign companies began in the early 2000s, and in the Russian Federation with a delay, from the early 2010s. Therefore, for example, the number of intellectual property records (protection documents, i.e. applications and issued patents) corresponding to the Autonet market and owned by Russian applicants was about 100. None of the Russian companies has more than 10 protection documents for the claimed development “Unmanned Vehicle”. Here it is impossible to single out and call an enterprise a leader in patenting! At the same time, foreign companies are actively patenting in different countries of the world, and the number of records in the databases shows a number more than 50 thousand. Among the leading companies in patent activity in the development of unmanned vehicles and with more than 100 applications and patents are the following companies: Ford Global Technologies LLC, International Business Machines Corporation, Google Inc., Daimler AG, Toyota, Tesla Inc.

For example, Table 1 shows the patent portfolio of these companies.

Table 1. Patent portfolio of leading companies in the automotive industry (Updated on 05 December 2020).

Company	Number of the Russian Federation Patents ¹	Total Number of Company Patents ²
Ford Global Technologies LLC	2797	126311
International Business Machines Corporation	161	135828
Google Inc.	68	102040
Daimler AG	75	118628
Toyota	1160	135828
Tesla Inc.	0	2860

Note: ¹ Patents registered in the Russian Federation (according to the *Federal Institute of Industrial Property, FIIP*); ² *Espacenet* messages on request for company name.

Source: compiled by R.I. Salimov.

For clarity of the patent situation of Russian companies, let us consider an example of the formation of patent portfolios of those companies whose representatives are members of the Autonet working group (Table 2). The list of companies is given in the order presented in [11].

Table 2. Patent portfolio of Russian companies, representatives of which are included in the Autonet working group (Updated on 05 December 2020).

Company	Number of the Russian Federation Patents
JSC “AVTOVAZ”	2269
Ministry of Industry and Trade of the Russian Federation	2190
PJSC “KAMAZ”	1005
LLC “Yandex”	267
JSC “Russian Corporation of Rocket and Space Instrumentation and Information Systems” (JSC “Russian Space Systems”)	232
Research Institute “Voskhod”	159
Moscow Automobile and Road Construction State Technical University (MADI)	150
LLC “Rostselmash”	196
Zavolzhsy Motor Plant LLC (division of the SOLLERS group)	111
Ulyanovsk Automobile Plant LLC (division of the SOLLERS group)	94
GAZ Group	79
Baring Vostok Group	0
Moscow Department of Transport and Road Infrastructure Development	0
LLC “Bakulin Motors Group”	0
LLC “Locomotive Technologies”	0
LLC “2050”	0
Skolkovo Foundation	0

Source: compiled by R.I. Salimov.

Comparison of Russian companies with foreign ones on the Autonet market clearly shows the low innovative activity of Russian companies.

Foodnet Market Patent Analysis. The picture of the intellectual property area, i.e. innovations, in the *Foodnet* market looks no better, for example, an express analysis of the patent situation, carried out on the indicator “*Production of Dairy Products*”, has given the following results.

The inventive activity of the largest foreign companies represented on the world and Russian dairy market is shown in Tables 3 and 4, respectively.

Table 3. Patent Portfolio of the Largest World Companies – Manufacturers of Dairy Products
(Updated on 05 December 2020).

Company	Total number of Patents for Inventions
Kraft Foods LLC (USA)	9543
Nestle (Austria)	2360
Fonterra (New Zeland)	743
Compagnie Gervais Danone (France)	491
Valio Ltd (Finland)	484
Pepsico Inc. (USA)	179
Friesland Campina (Netherlands)	162
Arla Foods (Germany, Sweden)	103
Dean Foods (USA)	74
Hochland SE	48
Lactalis (France)	17
Dairy Farmers of America (USA)	0

Source: compiled by R.I. Salimov.

Table 4. Patent portfolio of foreign companies - manufacturers of dairy products on the market of the Russian Federation (Updated on 05 December 2020).

Company	Number of Patents for Inventions in the Russian Federation
Valio Ltd (Finland)	130
Pepsico Inc. (USA)	110
Wimm Bill Dann JSC (subsidiary of Pepsico Inc. (USA))	16
Compagnie Gervais Danone (France)	95
Kraft Foods LLC (USA)	56
Hochland SE (Germany)	12

Source: compiled by R.I. Salimov.

Against the background of the active conquest of the Russian market by foreign companies, the patent portfolio of the largest Russian dairy producers looks interesting (Table 5).

An even more interesting example of the formation of patent portfolios is given for companies whose representatives are members of the *Foodnet* working group (Table 6). The list of companies is given in the order presented in [11].

The picture of comparison of Russian and foreign companies again clearly shows the low innovative activity of Russian companies. The companies in the Table 6 have no foreign patents.

Table 5. Patent Portfolio of Largest Russian Companies – Manufacturers of Dairy Products on the Market of the Russian Federation (Updated on 05 December 2020).

Company	Number of Patents for Inventions in the Russian Federation
PJSC “Voronezh Dairy Plant”	20
JSC “Milkom” (with the group of companies PP “Kezsky cheese factory”, PP “Glazov-Moloko”, PP “Izhmoloko”, PP “Sarapul-Moloko”, PHC “Sozvezdie” and LLC “Kazan Dairy Plant”)	2 invalid patents belong to PP “Glazov-Milk”
EkoNiva Group of Companies	0
Agrocomplex Firm named after N.I. Tkacheva, JSC (Krasnodar Territory)	0
CJSC “Piskarevsky Dairy Plant” (Leningrad Region)	3
JSC “Krasny Vostok Agro” (Republic of Tatarstan)	0
JSC “HC “Ak Bars” (Republic of Tatarstan)	0
JSC “Agrosila” (Republic of Tatarstan)	0
LLC APK “Food Program” (Republic of Tatarstan)	0
LLC “MC “AgroInvest” (Republic of Tatarstan)	0

Source: compiled by R.I. Salimov.

First, foreign companies that have been operating in market conditions for a long time understand that it is possible to increase income (profit) only at the expense of consumers of their products - technologies and products. New products, technologies and products are innovations, they are delivered to consumers daily and hourly through advertising and project managers of companies, they should bring the companies the planned income.

2.1 Competitive environment in the Russian intellectual property market

What are the reasons for the competitive advantages of foreign companies in the Russian market?

Secondly, the instrument of protection is a title of protection (patent or certificate) of the country in which a potentially new sales market is located and the foreign entrepreneur assumes that there is a civilized intellectual property market in this country, provided with the necessary legislative framework.

Thirdly, the best sales market is the country in which the competitiveness of this sector of the economy is negligible, and the low level of inventive activity is not provided with the appropriate conditions for scientific and technological development at the legislative and corporate level.

Table 6. Patent Portfolio of Russian Companies whose Representatives are Included in the *Foodnet* Working Group (Updated on 05 December 2020).

Company	Number of Patents for Inventions in the Russian Federation
Michurinsk State Agrarian University	205
Ministry of Agriculture of the Russian Federation (co-owner of patents)	157
Higher School of Economics	56 (0 patents on Foodnet)
Skolkovo Institute of Science and Technology	42 (2 patents on biotechnology)
Federal Research Center for Nutrition, Biotechnology and Food Safety	30
URALCHEM Holding P.L.C.	23 (3 patents on Foodnet)
LLC “Agrofizprodukt”	2
LLC “Ambika group”	0
LLC “IC Prombiotech”	0
LLC APK “Damate”	0

Source: compiled by R.I. Salimov.

3 Results

Digitalization has become an important tool for solving the problems of innovation and intellectual property management. The relationship between the development management of the country is based on automated digital systems.

We assign a special role to automating the management of innovative development and the regional intellectual property market, including the creation of digital tools to support innovation and business. Such digital tools have become widely used in the Republic of Tatarstan:

- automated information and analytical Web-interface system for accounting, storing and using the results of scientific and technical activities (*AS “RNTD”*). In 2010, for the first time at the regional level, by the decision of the Government of the Republic of Tatarstan, the Unified System of State Accounting of Tatarstan R&D results was created and implemented [14];
- integrated Web-based automated intellectual property management system for small and medium enterprises “*IPC System*” [15];
- information-analytical automated system “*TATPATENT*” (*AS “TATPATENT”*) [16]. *AS “TATPATENT”* is created in order to ensure the national security of the Republic of Tatarstan in the field of economic development and increase the investment attractiveness of the region;

- automated information analysing interactive instruction system for multiprofessional training of specialists [17]. Since 2013, the Republic of Tatarstan has been building a system of training highly qualified specialists on the basis of professional education.

3.1 Digital tool for analyzing R&D results

In its development, the Program for Intellectual Property Market Development in the Republic of Tatarstan relies on the first basic element of the regional intellectual property management system: the Unified System of State Accounting of Tatarstan R&D Results. This system is created in 2010.

The purpose of creating the system is to accumulate, systematize, and improve the efficiency of using research results R&D, as well as further optimization of the system of state regulation of the scientific and technical sphere in the Republic of Tatarstan.

The Unified System of State Accounting of R&D is an organizationally ordered set of interrelated elements of information exchange. Figure 2 shows a functional diagram of the Unified System of State Accounting of Tatarstan R&D Results. The system includes the following main components [18]:

- regulatory framework governing the functioning of the system;
- automated information and analytical system for accounting, storing and using the results of scientific and technical activities (*AS "RNTD"*) [14];
- participants of the system's information exchange with their automated workplaces (AWPs);
- information resources, including the Unified Register and the Data Base of R&D results.

The Unified System of State Accounting of R&D has become a powerful tool for analyzing the state of issues related to R&D in the Republic of Tatarstan. Topics of work, including priority spheres for the development of science and technology, the main state customers, performers of work, the amount of funding, the results of work, including issues of their use, are identified.

In the Unified System of State Accounting of R&D as of 30.12.2020 recorded 2135 of work for a total of 1 841 475 thousand rubles, of which 1 145 works in the amount of 1 526 494 thousand rubles made at the expense of the budget of the Republic of Tatarstan and 990 of work done at the expense of the Federal budget (grants *RGNF* and *RFFI Foundations*) totaling 314 980 thousand rubles.

Specifications: number of AWP: 42; computer language: C#, ASP.NET, SQL; OS: client-side: Microsoft Windows 2000/XP/7; server-side: Microsoft Windows 200x Server; scope of the programme: Windows-client 6,25 Mb, Web-client 5,66 Mb, third-party libraries 76,8 Mb.

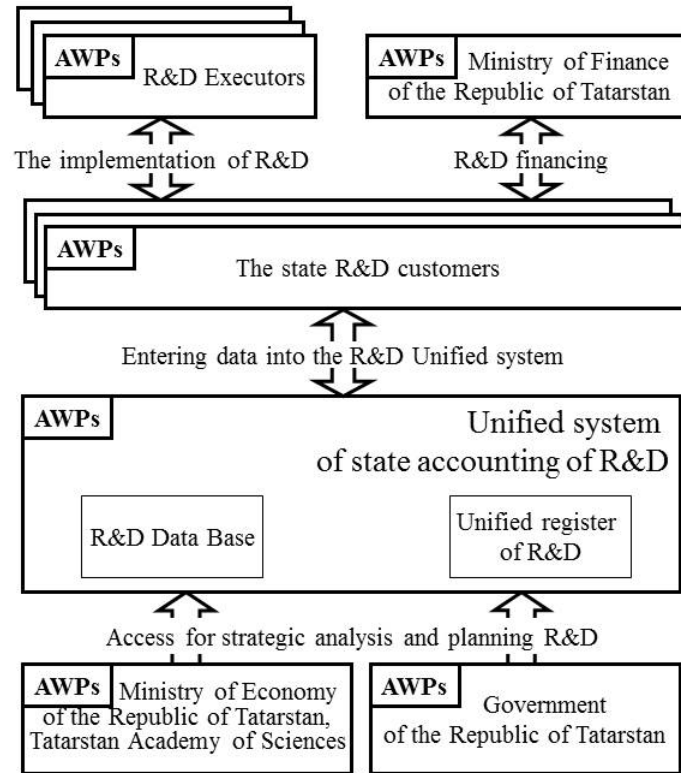


Fig. 2. Functional diagram of interaction of participants of the Unified System of State Accounting of Tatarstan R&D.

Source: compiled by R.I. Salimov.

3.2 Managing the Intellectual Property Rights of Enterprises

The creation of new technologies and products requires significant efforts to introduce new methods of production management in Russian companies, including the automation of intellectual property management in *ERP II systems* [19]. Russian companies are just beginning to create strategies for innovative development and build models for managing intellectual property. The use of *ERP systems*, including for intellectual property management, is becoming a corporate requirement for large enterprises. However, the experience of working with small and medium-sized enterprises has shown that these enterprises do not pay due attention to the management of intellectual property. For small and medium-sized enterprises, the development of automated systems for managing the results of scientific and technical activities is problematic due to their high cost and focus on large corporations.

The purpose of creating an intellectual property management system is to ensure effective planning and management of business processes in this area. A special

feature of the proposed system is the adaptation of its functionality to the needs of a particular enterprise using cloud technologies.

The Program for Intellectual Property Market Development in the Republic of Tatarstan is focused primarily on small and medium business.

The company's intellectual property management system includes the following main components:

- local regulatory framework governing the system's activities;
- participants of the system's information exchange;
- automated information and analytical system (as “*IPC System*”) [15];
- information resources of the system, including, inter alia, databases of intellectual activity results.

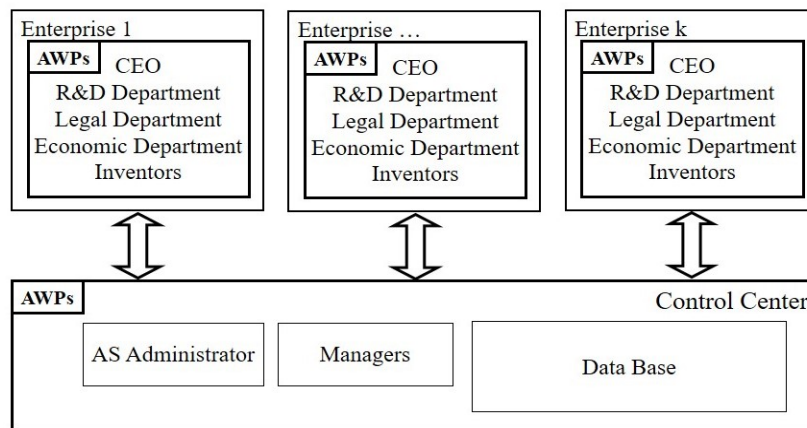


Fig. 3. Diagram of Managing the Intellectual Property Rights of Enterprises.

Source: compiled by R.I. Salimov.

“*IPC System*” is an ERP system built on the principles of centralized management and includes:

- a server subsystem whose main functions are analytical processing and storage of information entered into a single database, provision of printed forms, database administration, and maintenance of system directories;
- web-based interface subsystem for remote information input and viewing;
- online portal for providing open information.

Thirteen small businesses are already connected to this system.

Specifications: number of AWP: 54; computer language: C#, JavaScript, client-side: Google Chrome 56, IE 10, Firefox 49, Opera 12; server-side: MariaDB, IIS 10, ASP.NET MVC 5; OS: Windows 7/8/10; RAM: 4Gb, HDD: 100Gb; the scope of the programme: 280 Mb.

3.3 Automated System “TATPATENT”

The purpose of creating the automated system “TATPATENT” (AS “TATPATENT”) is to ensure the national security of the Republic of Tatarstan in the field of economic development and increase the investment attractiveness of the region. AS “TATPATENT” organizing a single incentive platform for accumulating and exchanging information on the results of intellectual activity, as well as using situational analysis by regional public authorities to manage priority areas of economic development and increase the efficiency of using budget funds.

The system is designed to assist innovators, as well as large and small businesses, in creating and launching innovative solutions and promising projects.

AS “TATPATENT” implements the following functionality [16]:

- maintaining a database of engineering, technical, scientific and other significant achievements;
- online consulting and preparation of application documents for registration of intellectual property results in Rospatent and other registration authorities;
- investment incubator;
- technological cooperation;
- implementation of investment instruments;
- rubricator by types and directions of achievements with the possibility of introducing multi-factor classification and tagging of information resources;
- ability to perform a hyper-search using the rubricator;
- interface for one-way or two-way communication with external information systems;
- calendar of scientific events (technology events, hackathons, exhibitions, conferences, etc.);
- maintaining a statistical and analytical database.

The system is implemented on a microservice architecture with the ability to add services that extend the functionality and performance of the ecosystem as a whole. The system is implemented using advanced digital technologies for organizing world-class information portals:

- smart search engines;
- blockchain technologies;
- cloud solutions;
- scalable microservice architecture;
- opportunities to use Token (digital equivalent of securities);
- use of best practices for data protection.

The generalized structure of the AS "TATPATENT" is shown in Figure 4.

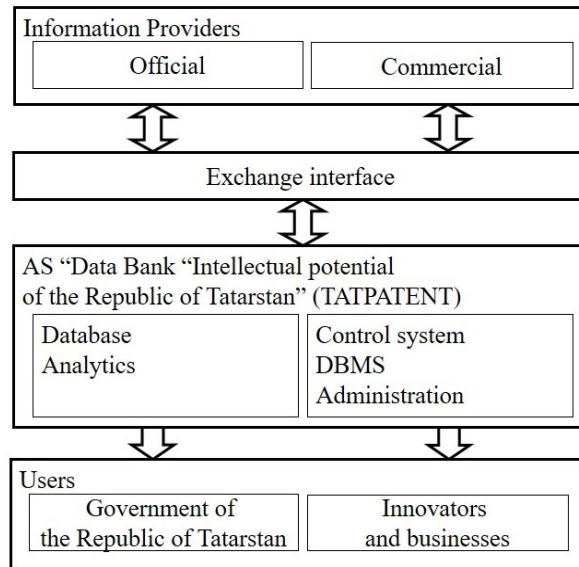


Fig. 4. Diagram of the automated system “TATPATENT”.

Source: compiled by R.I. Salimov.

The system is based on a Project Office, where innovators learn to generate unique solutions, focus and bring innovative ideas to grants, successful implementation and first sales. The project office includes the following functionality:

- the focus of the project on innovation;
- competent project managers of the project office work with the project team in online communication and face-to-face meetings, as well as educational events, tracking the project's “traction” and directing the project to active actions;
- work with scientific supervisors (search for the knowledge intensity of the project);
- consultation of the project team for the possibility of independent patentability analysis (search for global novelty) and marketing analysis of the market, determining the volume and capacity of the market;
- work with public authorities, search for opportunities for interaction.

The project office uses tools such as the AS “TATPATENT” and implements the following services:

- assistance in creating applications for grants from different foundations;
- providing information on current measures of regional and Federal business support;

- services of the patent department, including the provision of services for the implementation of patent strategies of enterprises in the framework of product promotion of enterprises of the Republic of Tatarstan outside the Russian Federation.

The system registered 530 users, recorded 1278 requests and conducted 16 online events using the system's capabilities.

Specifications: computer language: Ruby on Rails; OS: Windows 7/8/10; RAM: 4Gb, HDD: 100Gb; the scope of the programme: 1.08 Gb.

3.4 Digitalization of education and network information technologies

Since 2013, the Republic has been building a system of training highly qualified specialists on the basis of professional and additional professional education.

More than 100 business professionals trains in the Program for Intellectual Property Market Development in the Republic of Tatarstan annually. Several thousand students undergraduate and graduate, enrolled in technical and socio-humanities in higher education study of discipline “The Theory of inventive problem solving”, “The Theory of solving research problems”, “Intellectual property management”, “Intellectual property protection”, “Patenting procedure in the Russian Federation”. These disciplines provide for the widespread using of such digital tools as the formation of patent landscapes and digital filing of applications to Rospatent.

The most effective solution for training personnel is based on the principles of the project approach. The experience of implementing the project approach in the Tupolev Kazan National Research Technical University (KNRTU-KAI) shows the need for broad dissemination in educational establishments and at enterprises of the methodology of new educational technology, which the authors of [17] called “Multiprofessional project training (MPT)”. In 2020, the project of implementing the educational technology “Multiprofessional Project Training of Specialists for Industry 4.0” was supported by the Vladimir Potanin Charitable Foundation.

The main goal of implementing the technology MPT is the creation and operation of a regional system of selection, training and retraining of personnel based on a project-based approach to the formation of professional competencies of both specialists of enterprises and University graduates.

The concept of the MPT training is successfully integrated into the general concept of digitalization of the educational process based on network information technologies and the mastery of related competencies by specialists [20]. The idea of digitalization is embodied in the creation of an automated information and analytical interactive training system for multi-professional project training of specialists, for which the patent for the invention of the Russian Federation no. 2,404,456 was obtained [17]. The implementation of the system is based on interconnected autonomous functional modules with automated workstations of the enterprise and University departments.

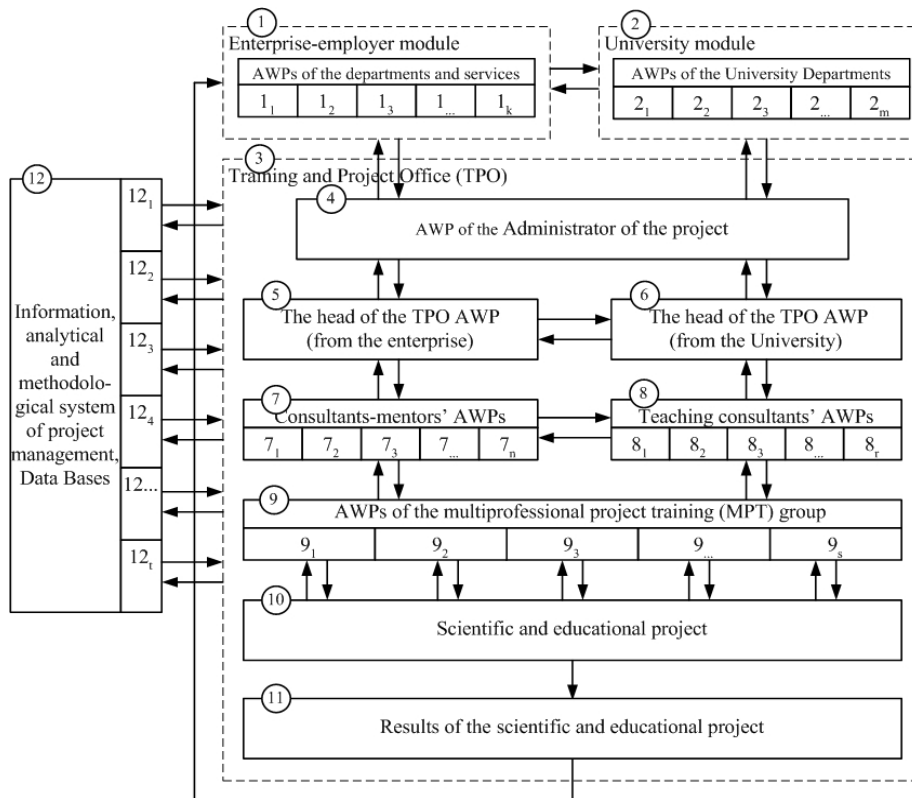


Fig. 6. Functional diagram of the automated information and analytical interactive training system of the MPT project.

Source: compiled by R.I. Salimov.

Part of the training and project teams include experts from the relevant specialties involved in the development of scientific-educational or scientific-technical project: designers, production engineers, instrument engineers, electrical engineering, radio engineers, economists, lawyers, ecologists, systems engineering, programmers, marketing professionals and PR managers, psychology, etc., Practical mastering of related technical and humanitarian communications technology allows them to develop and implement system solutions to their private and professional tasks in the development and implementation of innovative large-scale industrial projects for the company. In 2017-2020, the Program for Intellectual Property Market Development in the Republic of Tatarstan provides joint training for technical specialists, lawyers, and industrial economists.

The project focuses the scientific and educational process on the scientific and technological development of the Russian Federation for industry 4.0 and, in particular, KNRTU-KAI ten years (2009 to 2018) supported the action of the patent no. 2,404,456 [17], however, by the decision of the inventors, this patent in 2018 trans-

ferred to the category “Public domain”, and the authors grant the right to use the technology “MPT” without limitations.

Specifications: number of AWP: 28; computer language: C#; client-side: Microsoft Windows 2000/XP/7, server-side: Microsoft Windows 200x Server; the scope of the programme: 88,71 Mb.

4 Discussion

Results of development of proposed digital tools for innovation and business has found application in the Republic of Tatarstan and regions of Russia, including the Sakha Republic (Yakutia), and the Republic of Bashkortostan.

The use of digital tools for the development of the regions of the Russian Federation was widely discussed at many scientific forums, such as the Russian-Mongolian-Chinese Conference of the Fourth Convocation of Intellectual Property Departments (Ulaanbaatar, Mongolia, 6 September 2016); at the International Network Conference “Interdisciplinarity in Engineering Education: Global Trends and Management Concepts-Synergy” (St. Petersburg, Moscow, Kazan, Tomsk, Irkutsk, May-July 2016); at the II International Forum “Intellectual Property and the Economy of the Regions of Russia”, IP&ERR'2017, (Kazan, 8-10 February 2017); the XI St. Petersburg International Innovation Forum PMIF-2018 (St. Petersburg, 28 November 2018); the XVIII International Scientific Conference “Modernization of Russia: Priorities, Problems, Solutions” (Moscow, Russian University of Economics, Russian Academy of Sciences, 20-21 December 2018); Conference “Digital Industry of Industrial Russia-2019” (Innopolis, May 22-24, 2019); VIII Kazan Eurasian Scientific and Practical Forum “Integration and Modernization Potential of Eurasia: status, projects and implementation formats” (10-11 June 2019, Kazan); Vladimir Potanin Charitable Foundation (08 October 2020), XXIV International Conference of Rospatent “Transformation of the Sphere of Intellectual Property in Modern Conditions” (Moscow, 21 October 2020); Information Technologies and Intelligent Decision Making Systems ITIDMS 2021 (Moscow, 20 January 2021), and others.

Assessments and conclusions, applied groundwork and recommendations of the authors on the principles, ways and mechanisms of intensification of investment, innovation, scientific and technical activity in Russia, based on the proposed methodology, are used by the Federal Service for Intellectual Property (Rospatent), the Government of the Republic of Tatarstan, universities and enterprises of Russia in the implementation of regional innovation policy.

5 Conclusion

A complex of digital tools has been created with the participation of the authors and with the support of the Government of the Republic of Tatarstan. These tools covers a wide range of tasks of managing the regional intellectual property market.

The use of digital tools allows you to make decisions most quickly and effectively when promoting innovations of universities and enterprises to international markets.

The experience of implementing the Program for the Development of the Intellectual Property Market in the Republic of Tatarstan is the basis for replicating positive practices in other regions of Russia and other countries.

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