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STATE SUPPORT FOR RESEARCH IN PHARMACOLOGY: AN ANALYSIS OF FOREIGN AND DOMESTIC EXPERIENCE

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Abstract

Introduction: The goal of research was to analyze the management of innovative activities for innovative medicines market launch in Russia and abroad.

Materials and methods: In the study there were used methods of cognition, including methods of empirical (observation, comparison) and theoretical studies (analysis, synthesis, aggregation), scientific assessment, SWOT-analysis.

Results and discussion: The analysis of domestic and foreign experience in the planning and management of research in pharmacology was carried out. Despite the fact that at the present time in the Russian Federation a powerful ramified state apparatus for regulating scientific research and development in the field of medicine has been formed, the pharmacological science remains divided. This leads to a reduction of efficiency of innovative drugs development studies. At the same time, in developed countries, interdepartmental coordination and advisory bodies (councils, commissions) are active, often at the highest level. This testifies to the high attention given in these countries to interdepartmental interaction and intersectoral projects in the field of research and development.

Conclusion: Foreign R & D support systems are characterized by a number of differences from domestic mechanisms. A number of recommendations based on the experience of foreign colleagues for future measures to modernize existing and introduce new mechanisms for state support of research in the field of pharmacology in Russia were proposed.

Keywords: pharmacology, research and development, forecasting, strategic planning document, innovative territorial cluster, small and medium-sized enterprise.

Introduction

Innovative transformation of the Russian economy is a system tool by which the government can provide in the long term national competitiveness, successfully to solve the accumulated problems in the socio-economic domain.

Pharmaceuticals is the most high-tech and knowledge-based industry in the world economy with research and development rate in total sales amount of more than 14%, that in monetary terms in 2015 amounted to 150 billion dollars, and in 2022 it is expected that they will rise to 182 billion dollars [1].

The effectiveness of investment in research and development is confirmed the information voiced by the Minister of industry and trade of the Russian Federation Manturov D. V., at the meeting of the Government Commission for import substitution 8 July 2016: "...last year the sales volumes of 17 drugs, created with the participation of the state, were in 28 times higher than their budgetary development cost. Russian

drugs also allow to save money and ordinary consumers, and the state" [2].

However, at the present time in Russia there is no continuous value chain of an innovative product at all stages of its implementation (from the research and innovation order to their manufacturing application and creation of innovative companies).

As a result, the manufacturing application of R & D and commercialization of innovative ideas are the exception rather than the rule in the long-established administration system of innovation [3].

The President of the Russian Federation V. V. Putin in his address to the Federal Assembly in 2017, said: "...We need to transform research projects into successful commercial products; by the way, we have always suffered from it, from development to implementation the huge time goes by... It is true not only of our time, and not even the Soviet, and even in the Russian Empire everything was the same. We need to reverse this trend – we can do it..." [3].

In this regard, the stated goal of the study the management of innovation in bringing to market innovative drugs in Russia and abroad is relevant and will help to formulate recommendations on future actions for the modernization of existing and introduction of the new mechanisms of state support of scientific research in the field of pharmaceuticals in the Russian Federation.

Materials and methods

In the study there were used the methods of cognition, including methods of empirical (observation, comparison) and theoretical studies (analysis, synthesis, aggregation), scientific assessment, SWOT-analysis. Each of these methods is applied adequately on the functionality. Targeted application of these methods ensured the reliability of the estimates and conclusions obtained in the study.

The study subject was the state policy in the field of strategic planning in the Russian Federation, and in economically developed countries. Matrix regulation of state strategic planning in the Russian Federation in the field of pharmaceutics unifying key concepts: forecasting, goal setting and planning is presented in figure 1.

From the matrix it follows that the President of the Russian Federation and the government of the Russian Federation determine the goals, objectives and priorities strategic planning and the Federal Executive authorities carry out a direct development of the strategic planning documents, monitoring and control of their implementation. However, a promotion of coherence, balance and agreement of the strategic planning documents and determination of sequence of their development are a function of the Government of the Russian Federation.

With the aim of developing recommendations and new mechanisms for more effective management in the field of pharmaceutical science it was necessary to study the experience of foreign countries.

Results and discussion

The analysis of activity of Federal Executive authorities of the Russian Federation for the planning and management of research in the field of pharmaceuticals

It is obvious that research and development in pharmaceuticals are becoming more difficult to separate from other fields of science, and as a result, inter-industry and/or interdisciplinary projects take on greater and greater economic and social importance. A number of sectoral strategies (the Strategy for medications supply to the population of the Russian Federation for the period until 2025, the development Strategy of the pharmaceutical industry of the Russian Federation for the period until 2020) approved at the departmental level, which cannot be conducive to effective cooperation between the interested public authorities [5, 6].

At the same time, it is necessary to create a unified system of priorities and research planning, which will allow to eliminate duplication of scientific topics, to concentrate available financial and other resources in the most "critical" points, not to break the innovation chain and to coordinate all its stages from research to implementation.

Strategic planning documents have repeatedly emphasized the importance of organization priority lines of development of science and technology.

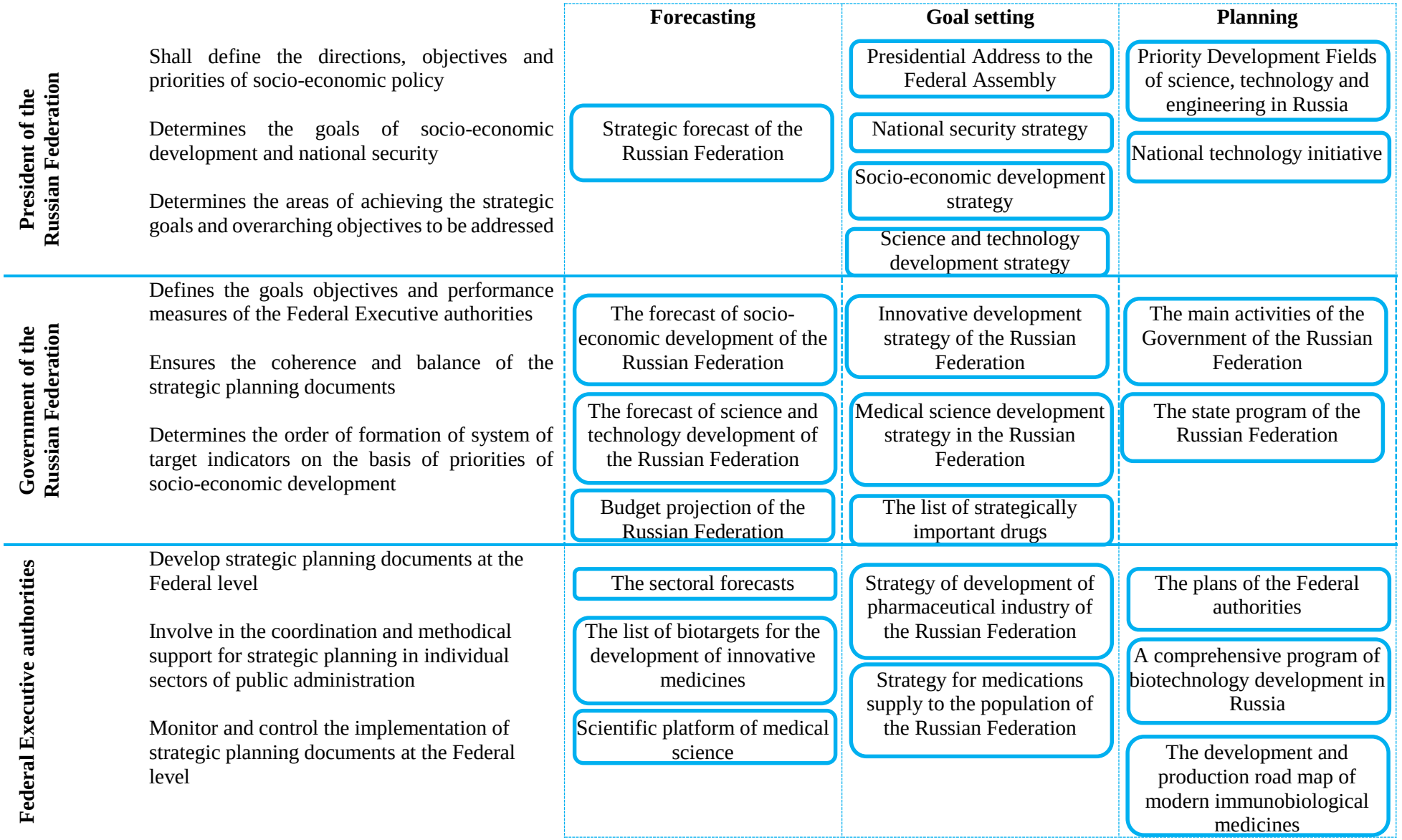

Fig. 1. The matrix of strategic planning in the Russian Federation in the field of pharmaceuticals

In accordance with the decree of the President of the Russian Federation of 07.07.2011 No. 899 "Life sciences" related to priority lines of development of science, technology and engineering in Russia. The list of critical technologies of the Russian Federation included biomedical technology, genomics, proteome, post-genomic, cellular technologies, technologies of loss enhancement from socially significant diseases, which are direct products of scientific research and development in pharmaceutics.

However, the question arises, how narrow should be the line and to what extent should specify the priorities of the state in the field of science.

The decree of the President of the Russian Federation of 01.12.2016 No. 642 adopted the Strategy for scientific and technological development of the Russian Federation, which envisages the transformation of science and technology in a key factor of the development of Russia and ensure the country's ability to respond effectively to big challenges[1].

One of the most important from the point of view of scientific and technological development of the Russian Federation the great challenge is "...rising threat of global pandemics, increasing the risk of new and return of extinct infections."

In the Strategy of scientific and technological development of the Russian Federation there are stated that, in the next 10 to 15 years, the priorities of scientific and technological development of the Russian Federation should be considered to be those areas that will allow to obtain scientific and technical results and to create technologies which are the basis for innovative development of the domestic market of products and services, a stable position of Russia on the foreign markets, and provide, including "the transition to personalized medicine, high-tech health care, and technology of health care, including through the rational administration of drugs (especially antibacterial)".Financial support for the implementation of that Strategy effected on account of federal budget allocations, including those allocated for realization of state programs of the Russian Federation.

In the approved state programs of the Russian Federation concerning the development of pharmaceutical science ("Health Development", "Development of pharmaceutical and medical industry" for 2013-2020, "Development of science and technologies" for 2013-2020) there is a pronounced emphasis on the technological aspect of production, market development, improving the competitiveness of domestic products. In addition, a lot of attention from the state is paid to the effective implementation of the results of scientific research and development in industry, their commercialization and the development of mechanisms of state-private partnership [7, 8, 9].

In addition, when comparing the activities of these state programs, there is a high proportion of inter-sectoral activities requiring effective interagency cooperation.

Analysis of indicators of efficiency of realization of the state programs of the Russian Federation allows to highlight 4 of the most used groups of indicators:

indicators of publication activity;

indicators of scientific and innovative activity;

the indicators characterizing financial and economic efficiency of implemented actions;

indicators of changes of scientific and innovative infrastructure.

However, at the present stage of development of the span of control of scientific research and development, it seems advisable to move to more complex relative indicators that will characterize the efficiency performance of R & D and their practical significance.

For example, to the present day the demographic indicators and the indicators characterizing the health status of the population are not used as indicators of the effectiveness of the implementation of measures for development of pharmaceutical science. Also, such indicators could serve indexes of the effectiveness of individual methods of diagnosis and treatment.

Thus, there is a flagrant necessity for a substantial modification and improvement of the system of indicators of efficiency of realization of measures on development of scientific researches and developments area in the field of pharmaceuticals. The reason for this is not only a need to gather more informative performance indicators, but also the insufficiency of basic data

for planning of concrete lines of development of the pharmaceutical science.

Reviewing strategic documents stem from a common understanding of the key systemic problems prevailing in many knowledge-intensive industries of Russia's economy. These issues include:

technological backwardness and product obsolescence caused by a development gap of industries, infrastructure and markets;

dissociation of participants of innovative activity caused by the lack of development of the environment within the country;

fragile integration in international markets, caused by low competitiveness.

These problems mutually cause each other and have their own peculiarities in every industry, but most of the objectives formulated in the strategies aimed at overcoming these problems.

For general characteristics of the system of strategic documents it should be noted that their developers among the possible approaches to the regulation of innovative activity chose a combined strategy based on coordination of efforts of the state, large corporations, research organizations and market insiders, a high value set on attracting international participants.

In the development scenarios of industries there is also commonality. The initial stages of the strategies implementation give pride of place to creating a stimulating innovation, information and analytical infrastructure, reforming the system of scientific organizations. Further stages of integration are meant to be integrative when systemic effect from the provided resources and infrastructure, organized and stimulated interactions between process actors begins to appear. In other words, the initial stages can be characterized as an investment, and subsequent stages are as innovative.

All documents separately consider a problem of staffing system of training, retraining and retention of personnel. Given problem is accentuated by the gap between generations of professionals. The decision of the personnel problem lies in the interaction of the most competitive educational institutions and scientific organizations and enterprises, as well as through invitation of high-level specialists from abroad.

An obligatory element of these strategies is the use of a model of scientific-educational-industrial clusters as groups of enterprises, suppliers of equipment and components, specialized production and services, research and educational organizations, linked by relations of territorial proximity and functional dependence in the production and sale of goods and services. It provides for the formation and promoting the activities of a few dozens of these associations in different regions of the Russian Federation.

So, now the following innovative territorial clusters in the field of pharmaceuticals created and developed:

Biotechnological innovation territorial cluster Pushchino;

Kaluga pharmaceutical cluster;

Cluster "Phystech XXI" (Dolgoprudny);

The cluster of medical and ecological instrument engineering and biotechnologies of St. Petersburg;

Altai biopharmaceutical cluster "ALTAIBIO";

Pharmaceutics, medical equipment and information technology of Tomsk region;

Innovative cluster of information and biopharmaceutical technologies of Novosibirsk region.

Similar approaches are used in management strategies. To coordinate the efforts of the implementing strategies there are created interagency councils, funds of an intellectual property, expert board.

Based on the above information and documents we can conclude that in the Russian Federation an extensive system of state regulation of the scientific researches and developments area in the field of pharmaceuticals has formed. The most influential actors in this process are the Ministry of education and science of the Russian Federation, the Ministry of health of the Russian Federation and the Ministry of industry and trade of the Russian Federation.

However, other Federal Executive authorities also appropriate significant budget funds for research and development for further application of their results in the field of health, including those ministries and agencies that do not have real powers in the development of pharmaceutical science.

Thus, despite the fact that currently in the Russian Federation an extensive state apparatus for the regulation of scientific research and

development in medicine has formed, pharmaceutical science remains fragmented. One-level activities and work can be carried out in institutions of the Ministry of health of Russia (including the Federal Medical and Biological Agency of Russia and Federal Service for Supervision in Healthcare), and Ministry of education and science, Ministry of industry and trade, Federal Agency for Scientific Organizations of Russia, whose activities in the field of pharmaceutical research is not coordinated. It leads to a reduction of the efficiency of research works in the field of pharmaceuticals.

The creation of a supra-departmental agency for the most effective regulation of scientific research and development in the field of pharmaceuticals and ensure the necessary level of coordination is obvious.

It emerges full blown in connection with a simultaneous increase in the Russian Federation the number and significance of intersectoral and/or interdisciplinary research and development projects in the field of pharmaceuticals.

The analysis of the foreign experience of planning and managing scientific research in the field of medicine

Even with the recognition of the high importance of development of science and innovation for social and economic welfare of the country and national security, no state may conduct scientific research and development at a modern level in the all lines. In this regard, it is necessary to select priority lines to focus the main efforts of the government and where funds should be invested primarily.

Thus, the most important task of science policy is to develop tools for identifying scientific and technological priorities, and mechanisms for their implementation.

In the course of analysis of experience in application a systematic approach in forecasting research activities in the field of medicine in foreign countries at the state level there was found:

relevant agencies determine, in the first place, the priority lines of development of health in general, in some cases, the list of the priority lines of development of medical science was compiled, but the principles and methodology of formation of the specified lists in the official resources are not given;

the circle of "critical technologies" for medical science identified through a comprehensive study on formation of the list of critical technologies at the state level;

the most progressive at the moment forecasting method "foresight" is also used to determine the priority lines of development of medical science in integrated studies.

The choice as a priority line the pharmaceutical science, in one degree or another, reflected in scientific and technical policy of such countries as the USA, the UK, France, Japan, Germany and Finland.

In these foreign countries (except the USA), in the structure of Federal Executive authorities there is defined the agency responsible for the integrated development of science and innovation in the country. And not always the relevant agency plays a significant role in the regulation of scientific research and development in the field of medicine. Fundamental researches is usually planned and financed by the agency responsible for scientific and technical state policy implementation.

The tasks of ensuring the interaction of science and industry, successful commercialization of scientific development and the coordination of industrial R & D in general, as a rule, are also provided by the agency responsible for scientific and technical state policy implementation, or organizations, subordinated to it. The presence in developed countries, special institutions (agencies) responsible for commercialization of scientific developments and technology transfer reflects the recognition of the special importance of these tasks for the interests of the state.

In all listed above countries the interagency coordination and consultative organizations (councils, commissions) actively operate, often at the highest level. It testifies to the high attention in developed countries, interagency cooperation and joint industry projects in the field of scientific research and development.

The allocation of the funds on priority lines of the science and technology development, as a rule, is through special state funds.

The foreign R & D support systems are characterized by a number of differences from the domestic mechanisms:

the implementation of the personal grant support of specialists in various fields to support the research of young people from college to heads of laboratories;

a presence in many countries of Europe, BRICS, the USA, in addition to the general natural-science funds and support programs, specialized funds for specific fields of science (e.g., biological, biomedical researches, etc.);

wider involvement of "corporate" science to the solution of public problems and coordination of the efforts with the University and Federal science.

A possible solution of a number of the scientific tasks in the field of pharmaceuticals, could be the introduction in Russia of the financing instruments of the international scientific consortia.

So, in the USA there is a few years of successfully operating a support program for internal research teams from the EU countries. The EU, in turn, through the Horizon 2020 program actively involves in-house development of participants from around the world.

All European funding for Russian scientists since 2014 amounted to 1.38 million euros (in this case, funds are mainly personal grants, for example, as part of the MSCA (Marie-Sklodowska-Curie Action)).

It should be noted that the analysis of instruments of international cooperation, Western partners have allocated considerable funds for the promotion of the private science, research and policy. For example, Partnership Instrument 2015 Annual Action Programme covered by the 2014-2017 Multi-annual Indicative Programme intend specifically related to "public diplomacy".

Planned within the program activities fit into the strategy of the public diplomacy of the EU, which covers four areas: work with the scientific community; joint policy research and discussions having a mutual interest; cooperation with representatives of civil society on issues of common interest, using culture as a vector for the public diplomacy. Grants as a part of one of the program sections (the "EU Policy and explanatory partnership" – "Cultural diplomacy") apply to Russia, Japan, China, the USA, Central America, South America, the Asia-Pacific region with a budget of 15.5 million euros.

However, one of the major goals of state regulation in the area of scientific research and development, including in the field of the medicine, is to encourage the continuous transfer of knowledge and technology from science to the economy, because the market independently, without special incentives, is unable to provide the necessary economic development level of funding for science.

In developed countries, there was accumulated a vast experience in the integration of research results into practice industries. In this aspect, the involvement of the private sector plays an important role, as the volume of the budget of any state is limited. The analysis of foreign experience revealed common mechanisms for attracting commercial organizations for financing of scientific activities, namely:

1) Economical motivation for research cooperation in the private sector and research cooperation of the private sector with the state and university sectors, including tax incentives of the cooperation, concessional lending of the common projects, cost sharing major science and technology projects by the state.

It should be noted that if before the tax benefits acted only in respect of companies conducting research and development on their own, currently in most countries these benefits apply to companies conducting research and development by outsourcing.

Of course, tax benefits are not considered by governments of developed countries as the only effective method of stimulation of the research and innovation, but they have some advantages, for example, in comparison with government programs providing subsidies or grants.

In particular, tax incentives do not reduce the autonomy of companies in relation to the state, in contrast to programs providing subsidies or grants, realizing which the state retains significant control functions. Therefore, when choosing of research areas, the companies in this case follow by real market needs and not demand from the state. In addition, tax incentives require less paperwork, that facilitates the operation and the companies themselves, and government bodies [10].

In the USA there are over hundreds of benefits which are got not an advance but as an incentive for real activity. The main difference between the Western system benefits from the Russian is that they are provided not scientific organizations, but investors. Thus regular review of benefits allows the government to purposefully stimulate innovation in priority sectors, to influence the strength and structure of scientific and innovation organizations [11].

However, direct financing of research and development from the state budget remains the main economic instrument of the state scientific and technical policy. In developed countries the share of public funding can reach 40% of national research expenditures. In addition, for basic research, it is much higher: from 50 to 70% in different countries [10].

2) Donation or grant on preferential terms in the permanent or temporary use of state property for conducting research and development to private sector companies.

One of the main forms of transfer of Federal property for temporary use to private companies in the US is the agreements on joint research and development. The company conducts research on the subject, given by the Federal Agencies.

Also in developed countries there is used the organization of common use centers (CUC), which allows companies to use equipment to conduct research (on a paid basis or free of charge). This mechanism is an effective incentive for companies with high research potential, but lack of funds to purchase expensive equipment. When using the equipment of the CUC, the organization determines its own theme independently, the problem is only that whether the CUC with the necessary equipment.

3) Creation of demand from the state to the results of research and development through the mechanisms of a state order.

In fact, government procurement of the high-tech products is the creation of a new market for domestic manufacturers.

Example of practical implementation of this mechanism is launched in 2004 in the USA, the project "Biological shield" under which the state guarantees the demand for vaccines and medicines of new generation, able to protect Americans from threats of bioterrorism. The project assumed that within 10 years, the Department of homeland security will spend of $5.6 billion for the purchase of anti-anthrax, smallpox and other biological and chemical poisons [12].

However, without in-depth development of the issue the public procurement can easily become inefficient spending of the budget funds. It is true both for the procurement mechanisms and mechanisms for the selection of objects for purchase. It is obvious that even the most prosperous state is not able to procure the entire range of the high-tech products (even very promising), produced in the country. First of all, an attention should be paid to the departments, products purchase of that simultaneously contributes to solving other national problems (in particular, enhancing the country's defense, improve the health of the nation, etc.).

4) The development of public-private partnership.

In many countries of the Organization for Economic Co-operation and Development (OECD), the share of state budget allocated through public-private partnership (PPP) is constantly growing [13]. For example, in Germany the PPP programme in the research field began to be implemented back in the 1970-ies, so the share of the public funding of R & D has currently dropped from 70 to 30% [14].

It should be noted that the instrument of PPP can be seen not only as a way of dividing the costs of implementation of any initiatives in research and innovation area, but also as a method of regulating relations between subjects of scientific and innovative activities. In most developed countries, PPPs are used as co-financing, and regulation. As a tool of co-financing PPP prevails in most the EU countries, but as an instrument of regulation it is in the United States and Japan [15].

The most common forms of PPP are co-financing of research projects on pre-competitive stage (and then the incentive for industry participation is the transfer of rights to the results of research and development for their further commercialization); co-financing of the early stages of commercialization ("seed", venture financing); organization of joint research centers in the areas that are traditionally in the state area of responsibility (including health service); acceleration of the development of technical standards necessary to regulate research and

innovation activities, the development of clusters and innovation infrastructure, support of small innovative enterprises and stimulate the creation of new small firms.

5) The creation and support of technology platforms

Under the "Seventh framework programme for the development of scientific research and technological development" (FP7), which served as the main instrument of the EU to support scientific research and development and to attract private financing in the period from 2007 to 2013, there were established the European Technology Platform (ETP).

Through the work of the ETP, the representatives of European industry, universities and research institutions affect the policy of the European Commission in the field of science and technology. In particular, the topics of the research unit of Cooperation in the last FP7 program were formed on the basis of programs of strategic researches of the technological platforms. It ensures a relevance for the industry of sponsored research topics.

6) The use of potential of small firms as sources of innovation

Initiatives in relation to small and medium innovative entrepreneurship are realized in most developed countries. Sufficiently developed forms of such support are in the USA, the UK, France, Germany, Finland.

Various schemes and programmes of state support for entrepreneurship, especially innovative, are formed taking into account dynamics of development of the respective projects and the level of their private investments. The typical model of development of innovative project and its financial support is presented in figure 2.

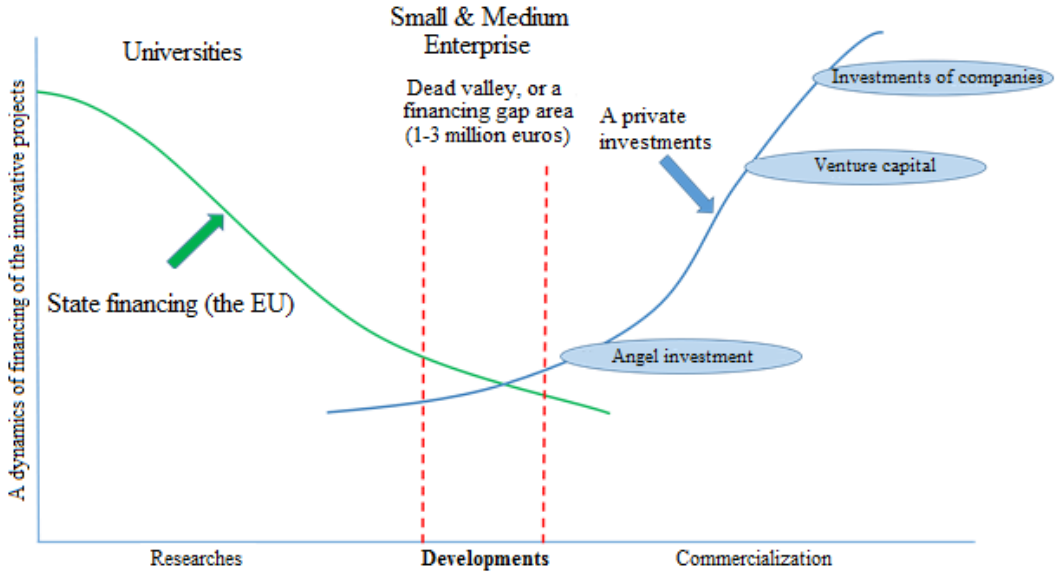

Fig. 2. Scheme of financial support for innovative projects by the EU and individual EU members

Herewith they use various mechanisms, including financial support in various forms, activities in the field of training and retraining of specialists, access to information, technology and markets, provision of tax preferences, such as the benefits for small firms or tax credit for investors, funding a small business [16].

In the United States to encourage the cooperation between state organizations and the private sector there was enacted a law on cooperative research and development between Federal research institutions and commercial companies [17]. The law provided access to all interested USA companies to the scientific and technical resources of the Federal laboratories at the account of restrictions related to national security. In this case we are talking about research and development, customer of that is the Federal Executive authority and that was reckoned on an achievement of results that have a commercial value. The Federal laboratories are permitted to transfer the rights of ownership of the results of scientific and technological activities to the private enterprise. Small and medium-sized innovative firms are granted advantages in the form of exclusive licenses.

Another example is the support program for cooperative research centers operated by the National Science Foundation of the United States. The cooperative research centers are the pools, concentrated around the universities and involving at least six partners from industry. They are to promote the results of research conducted in the universities or the government laboratories, to industry.

Also the most well-known, having more than 30 years of history, and therefore well-studied the US programs: Small Business Innovation Research and Small Business Technology Transfer can be the example of a mechanism to provide financial assistance for the development of small innovative enterprises [18].

Innovative research program in the small enterprise has become a kind of model for other countries, which also began to support small innovative entrepreneurship as an important component of the national innovation system. It is meant to be start-up capital for the small enterprise and help them to participate in R & D funded by the government.

In the EU within the program Horizon 2020 for the first time there is being implemented the initiative (program) aimed at creating a special system of state co-financing and other forms of support for the innovative micro, small and medium enterprises. This program is called Horizon's 2020 SME Instrument – SMEI [19]. The SMEI program has a solid budget, which is about 3 billion euros for the period 2014-2020, that is slightly less than 30% of the amount allocated within the Horizon 2020 program on the research and development of the small and medium-sized enterprises [20].

SMEI largely copies successfully used in the USA Small Business Innovation Research and Small Business Technology Transfer programs.

SMEI unlike other programs allows for the possibility to be a member of one private small and medium enterprise (SME), while other similar programs require that the innovative project was implemented by a consortium of two, three or more partners.

Also, from January 2015 within the Horizon 2020 program a new SME support program “Fast Track to Innovation pilot – FTI” has started in a pilot mode [21]. In the EU appeared first program aimed at the direct financial support of the innovative projects in advanced stages that precedes the entry of innovations into market, i.e. their commercialization. This period corresponds to technology readiness levels TRL 6 – TRL 9.

Also the experience of support for small firms in France by the National Agency for improving the innovative attractiveness of scientific research (ANVAR) is of some interest. The Agency has the industrial and commercial status and operates as an independent concern, but its mission is defined by the government, and it also provides the essential tools [22].

The Agency may provide interest-free loans for up to 5-6 years, covering up to 50% of the total costs associated with the implementation of the innovative project or a project on technology transfer which are repayable in case of successful completion of the project. In addition, grant-making is possible for the preparation and completion of innovative programs, floating innovative companies, increasing the technological level of small and medium-sized enterprises (through the involvement of researchers, formulation and use of scientific and technical information, etc.), as well as encouraging greater participation by small and medium-sized enterprises in the European projects of a technological cooperation.

Figure 3 shows the three sources for financial support to SMEs in the EU, which operate through financial intermediaries, using a wide range of instruments: loans; guarantee for loans; counter-guarantees; mezzanine financing, or, as it is called bridge financing; venture capital investments; joint-stock investment etc.

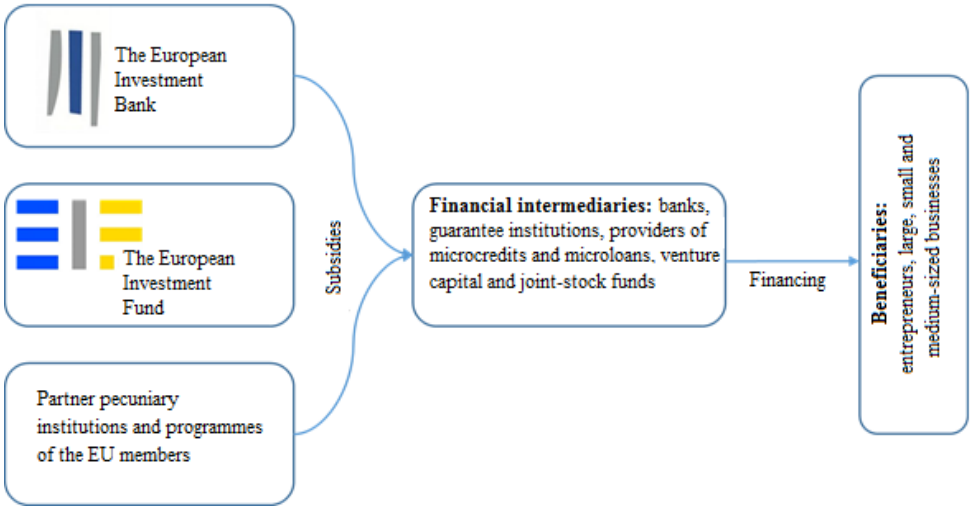

Fig. 3. Scheme of financial support for SMEs and larger companies by the EU and individual EU members

The EU supports entrepreneurship through numerous financial institutions on the ground. Such institutions throughout the EU there are more than 1 thousand Annually, support is provided to over 200 thousand enterprises of different size and degree of development, since the starting and ending expanding enterprises [23]. It is important that the EU aims to make financial support to SMEs the most convenient and quickly. In particular, there was created a specialized portal that makes it easy to find the appropriate financial institution in any EU country.

Thus, based on the experience of foreign colleagues, we can outline a number of recommendations regarding future measures on modernization of existing and introduction of new mechanisms of state support of scientific research in the field of pharmaceutics:

the development of narrow strategic development plans of specific areas of the science;

support of certain direction projects included in the development strategy of the priority industries;

creation of the specialized fund of the projects focused support in the field of pharmaceuticals.

orientation of activities aimed at international cooperation in the field of pharmaceuticals, on the advanced countries for specific scientific tasks (creation of new lines) and neighboring countries (developing and maintaining a well-established cooperatives);

development and adoption of measures aimed at popularization of the Russian science (support popular science publications, conferences and exhibitions for pupils and students, etc.);

individual support of young scientists within the science organizations, designed to stimulate the development of domestic competencies.

Conflicts of interest

The authors have no conflict of interest to declare.

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