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S.A. Rakhimova

Russian University of Economicsnamed after Plekhanov, Moscow, RussianFederation
E-mail: Saulesha_rahimova@mail.ru

THE MANAGEMENT OF INNOVATIVE PROCESS IN MEDICINE

Abstract. This research paper devoted to identify the problems and to find the ways to develop innovations in medicine, at the same time to improve the performance of the subjects of the industry, to find the mechanisms for implementing innovation, which will make it possible to improve economic and social indicators.

The author considers medicine, which refers to a high-tech activity, as one of the priority sectors in the economic and social spheres. Additionallly, the writer presents classification of types of innovations in medicine. Definitions of concepts are given: medical innovations, food, process, marketing and organizational innovations in medicine. A joint model of the innovation process to obtain medical innovations is proposed.The main components of the innovation process are singled out: subprocesses (stages), subjects, factors and conditions. The essence and content of each of them are revealed. It is concluded that innovation can be obtained through the management of the innovation process. The definition of innovation management in medicine is given. Expected results from competent management of the innovation process in medicine are presented. The approach of consideration of innovative activity in medicine is offered. The factors preventing the obtaining and development of medical innovations are identified.

Key words: innovations in medicine, medical innovations, the management of innovation process.

Introduction

Prosperity and social well-being, the provision of sustainable development of the economy through accelerating diversification through industrialization, are among the key directions of Kazakhstan's strategic development until 2020.

The main goal of the Concept of long-term social and economic development of the Russian Federation until 2020 is a steady increase of the well-being of Russian citizens, and the dynamic development of the economy.

According to the scientific works of M.Porter, the competitiveness of a particular nation depends on the ability of its industry to innovate and modernize.

In 2017-2018, Kazakhstan took the 57th place out of 137 in the global competitiveness rating, Russia took the 38th place.

Since 2012, Kazakhstan and Russia are participating in the ranking as countries with economies in transition from the second stage (the stage based on productivity) to the third stage of development (the stage based on innovations).

For independent countries, in particular for Kazakhstan and Russia, the priority areas of the economic development are the formation and development of high-technology industries. Almost simultaneously, both countries have chosen the model of transition from a raw material to an innovative economy.

Despite the fact that strategies, programs and concepts were adopted, there are no significant changes at the technological level of the economies of the two countries. Many innovative indicators not only are not improving, but also are significantly worsening.

Based on the analysis of strategic documents, it can be concluded that it is necessary to develop high-tech types of industries that should improve innovation performance, give economic and social benefits. Speaking about the need to achieve sustainable development,it is important to take measures to improve

the indicators of the main components of sustainable development: economic, social and environmental. The growth and development of industrial giants has a positive effect on the economies of countries, but environmental problems are growing, which lead to a deterioration of social indicators, including an increase in the types and levels of diseases. In this regard, it is advisable to develop and adopt measures to develop innovative activities in medicine, since many drugs no longer have a valid therapeutic effect, many diseases require innovative ways of treatment, and innovative approaches to medicine are required. Hence, in our opinion, the formation and development of medical innovations is one of the priority directions.

Methods

To obtain innovations in medicine, it is necessary to form an innovative process and manage it. Only competent management of the innovation process, the formation of mechanisms and modern forms of cooperation will lead to positive changes in medicine, which should make a multiplier effect on economic and social indicators. For this, it is necessary to revise the models of the innovation process, take strengths from each of them and form a modern model of the innovation process for the development of medicine. It is also necessary to identify the main components and then form a control system for the innovation process in order to obtain innovations in medicine.

The study uses the following methods: analysis, synthesis, specification, modeling and systematization.

Results

There was almost complete absence of fundamental scientific research on specific innovations in medicine, that`s why this field needs to be scientifically researched.

In our opinion, research should be based on the theory of competitiveness (according to M.Porter) [12], on the concept of technological structures (according to S. Glazyev) [13], on the theory of innovation development (according to J. Schumpeter), and on the model of innovation processes (according to R.Rosvel) [14].

The innovation process is a continuous process of obtaining the result by each of the subprocesses individually and in general under the management of the subjects. It is the receipt of innovation by taking into account the conditions, opportunities and factors created for subprocesses with the aim of obtaining an economic and social effect on micro, mezo and macro levels. Proceeding from the above, we will single out the main components of the innovation process: subjects, subprocesses, conditions and factors.

By analyzing the models of the innovation process, we must consider advantages from each of them and unite them into one, which will be suitable for the development of innovations in the industry under consideration. Unequivocally, from the technological push model it is necessary to take a reference point for research and development (R & D), since innovations in medicine are related to high-tech production, which requires the involvement of a scientific component.The drawback of this model should be "covered up" by the fact that it is necessary to be able to explore and form the demand for the particular innovation. Here we can already see the synergy of the two models. Naturally, by using the technological push model, it would be easier to manage the whole process and keep everything under control, however it is important to remember that innovation is considered as realized if it is in demand, hence, it should be demand-oriented. It would seem that we have come to a conjugate model, but if we pay attention to it, we will note that the initial conditions for this model are demand and possibilities, and level of new technologies and production, but for us it is important that the initial condition will be scientific R & D in accordance with the level of demand (the level of morbidity, types of diseases, alternative methods and medications, etc.) for which preconditions, factors and opportunities will be created.From the next two models: the integrated and the system network model, we can take the fact that between the subprocesses we can form new links and use the system approach, which will ensure continuity and acceleration of the expected result. By combining and integrating all the best aspects of the models of the innovation process, we come to the conclusion that this is only the formation of the structure and approaches of the innovation process, but to obtain the result it is important to manage this formed process. Here we come to the fact that it is

necessary to form and manage the innovation process in order to obtain innovation in medicine. We have received a new model of the innovation process, where R &D is consumer oriented, and can be obtained as a result of the use of a systems approach and by the formation of networks of interaction. However, this model will work only under the condition of management of the selected components of the innovation process.

By linking innovation and medicine, we can consider two components: production and services.

Production (industry) of high-tech economic activities includes the production of new drugs, new medical equipment and medical products.

Whereas, the service includes new medical services, but unfortunately, organizations that provide such services do not examine the level of innovations of these services.

Medical innovations or innovations in medicine are the result of innovative activity of subjects of the innovation process, embodied in the form of new drugs, new medical devices and equipment, new methods of diagnosis, prevention and treatment of diseases, a new organizational structure, a new marketing approach and a new style management in medicine.

Based on the definition, we can identify the main types of medical innovations:

- technological innovations. New ways and methods of prevention, diagnosis and treatment of diseases;
- organizational innovations. New organizational management structure, new organizational and legal forms, and effective restructuring of the health system;
- economic innovations. Modern methods of planning, financing, stimulating and analyzing the activities of the health care system and medical institutions;
- information and technological innovations aimed to automate the process of collecting, processing and analyzing information flows in the industry;
- pharmaceutical innovations - new medicines and medical products.

All these classifications can be combined into product, process, marketing, organizational and managerial medical innovations.

The product innovations in the healthcare system include: the creation of fundamentally new drugs, new medical equipment and devices, innovative technologies for diagnosis and treatment of diseases, and new medical products.

Process innovation includes new information, accounting and management benefits that contribute to improving the quality of medical services, allowing improving the process of providing medical services.

Organizational and managerial innovations include a new style of management and decision-making in health care, a new organizational structure and management process, new forms of cooperation and public-private partnership.

Marketing innovations include new forms of delivery of medical services, new marketing channels, new packaging of medicines, and ways and means of distribution of these drugs and funds, etc.

In the Republic of Kazakhstan, basically today innovative technologies of diagnostics and treatment have been developed among product innovations. Over the period of 2010-2016, more than 380 new advanced diagnostic, treatment, rehabilitation and prophylaxis methods were introduced in the leading clinics of the "University Medical Center" Corporate Foundation, Research Institute, and Scientific Centers of the Republic of Kazakhstan in the main clinical directions of surgery, transplantology, rehabilitation, cardiac surgery, cardiology, radiation diagnostics, neurosurgery, nursing, and oncology.

All kinds of medical innovations attracts scientific interest, all of them individually and together taken to make a breakthrough in the development of domestic medicine.

If we are talking about the fact that medical innovations will give an economic and social effect, then we should think about how to get these innovations.

Innovative process in medicine is a set of actions of science representatives, practical medicine, authorities, medical education and medical business in the production of medical innovations based on creating conditions, identifying opportunities and forming factors at each level of management by each subject.

By having considered such a component as subprocesses or stages, it is important to take into account the fact that the innovation process in medicine, though formulated based on generally accepted concepts, theories, concepts and definitions, but should be adapted to medicine and should take into account the

industry specificity and key directions of innovative development in medicine. For example, the main stages of the innovation process in health care are research and development works, pre-clinical and clinical research, and its introduction into production and medical practice.Since we cannot immediately receive innovations, we must pass on to innovation by process approach, and the process approach will allow us to manage and obtain the desired result.Also, it is not always possible for the subjects to carry out the whole process at one medical enterprise, in this case, the enterprises can serve as producers of certain subprocesses and the results of which can be claimed by other enterprises that have the opportunity and conditions to bring them to a certain production level. However, if there are no opportunities to implement the final subprocesses, they should seek help from those who have such an opportunity, etc. During the certain subproccesses, some intermediate results can be obtained, which are the starting points for other enterprises.

From the point of view of subprocesses, by the innovative process we mean process development, where the outputs of some subprocesses are the input for subsequent, regardless of the time interval and subjects, as a result of which intermediate and final results can be obtained, that can be claimed not only by internal subjects, but also can find consumers from the external environment.Also, the results of individual sub-processes will have an impact on the respective industries individually and on the entire economy as a whole.

We will distinguish factors and conditions from the point of view that the former is considered from the point of view of the opportunities provided by the subjects and the external environment for the formation and implementation of the innovation process. Factors will be classified and subdivided into internal and external. Whereas, the conditions will be understood as the requirements which are necessary to comply with the ability to implement a particular subprocess and the innovation process as a whole. For example, the input data will be considered as a condition, and the measures, that are being implemented and taken to facilitate the innovation process and the subprocesses separately, will be regarded as factors. Identification of significant factors peculiar to each individual subprocess, followed by an analysis of the forms of their projection on these sunprocesses will allow to identify specific and general management tools for the innovation process. The ability to classify factors for a number of characteristics will reveal the management tools that best match the management impact objectives.

The subjects of the innovation process in the field of medicine are medical research institutes, laboratories, medical academies and universities, leading research and development works, business incubators, medical and pharmaceutical enterprises, research centers, consulting centers, holdings, distributors, marketers, and households .

Speaking about the components of the innovation process, an important condition is the integration of these components both within each of them and as a whole. In our scientific research, integration implies the unification of all components of the innovation process, which are subjects (including micro, meso and macro level interests), subprocesses, factors and conditions that influence the formation and development of innovative processes, both within each individual component, and for all the components taken together.

Consideration of the innovation process in medicine allows us to show a close interaction with medical science, the necessity and significance of scientific results, their active implementation in medical practice, and the production of innovations and their social and economic effectiveness.

The management of the innovation process in medicine presupposes the interaction of medical science and healthcare practice, the implementation and realization of scientific innovations in the field of health care, and the training of highly qualified specialists capable of introducing scientific developments.

The unification of science, education and manufacturing into a single innovation process will allow providing medicine with highly qualified specialists, new technologies for diagnostics, prevention and treatment of diseases, innovative drugs, with production and operation of new devices and equipment, and modern methods of healthcare management.

The result of competent management of the innovation process is the full implementation of innovations in medicine that will diagnose and timely detect diseases, treat and achieve a curative result, provide better medical care, meet the needs of patients in providing modern medical care, develop medical science, help to create specialists who are able to conduct medical research and elaborations, and successfully implement them in practice.

We propose the following approach to consider the issues of innovative activity development in medicine:

1. The usage of new knowledge to create the final product in the form of goods, services, and technology. In our case, product, process, marketing and organizational medical innovations;

2. The analysis of the market, especially to know for whom new products and services created (the Law of Supply and Demand), what are the requirements, and who are the main consumers and competitors (according to Porter competition);

3. Training of personnel able to create medical innovations and able to introduce and use them, people who can promote these innovations to the market, sell and generate income (social and economic effect);

4. The need for the creation and/or modernization of medical organizations and institutions, specifically, the promotion of cooperation, the integration of all participants and the creation of new centers for medical innovation;

5. The protection of the results of medical innovation, specifically, an alignment of the legislative and regulatory framework for the protection of medical intellectual property, preparation and filing of documents for the protection of intellectual property;

6. The formation of targeted interdepartmental research programs aimed at creating "breakthrough" medical technologies;

7. The formation of effective innovative policy at the state, regional, sectoral and institutional level in the healthcare sphere;

8. The need to develop a set of indicators for assessing the effectiveness of innovation activities of the medical innovation production subjects, indicators that will allow to carry out such an assessment from the position of the state and the market, thus determining the feasibility of spending on innovation and the attractiveness of innovative projects in healthcare;

9. The need to develop investment policy with consideration of various sources of financing and schemes for cooperation between public and private sectors;

10. The need to develop the Concept for the development of medical innovations with including or attracting related industries, such as construction, Nano industry, biotechnology, genetic engineering, the chemical industry, pharmaceuticals, crop production, and etc.

Nowadays, the main factors that prevents the formation and development of medical innovations are:

- uncoordinated development of innovations with the possibilities of their use in practical health care;
- lack of a database with complete and timely information on medical innovation technologies that have emerged and are being effectively used abroad;
- the absence of a unified cost management system, the lack of an unified system of scientific search and training;
- the absence of cooperation between research and development sector and the sector which is responsible for the implementation of research results in practice;
- the health care system is not fast enough supplied with information and communication technologies;
- weak material and technical basis of medical science;
- ineffective management of scientific research;
- the lack of effective levers to increase motivation for self-development of scientific potential;
- a low involvement of faculty members in the implementation of scientific programs and projects, and low level of funding for scientific programs and projects, etc.

Conclusion

In order to develop innovative activities in medicine and to form an innovative process, it is important to

- create conditions for the development of fundamental and applied scientific research;
- form integral legislative and regulatory frameworks in order to regulate innovative activities in medicine;
- formulate an innovative health policy;
- concentrate financial and human resources on priority medical directions of development;

- integrate the efforts of representatives of science, education, practical medicine, government authorities and business communities in order to develop innovative medical activities and elaborate the production of medical innovations;

- form an innovative infrastructure for medical science, develop mechanisms for commercializing the results of medical scientific and technical activity, form a market for medical innovations, and integrate the efforts of leading domestic and foreign research institutes and research centers for the production of the most effective medical innovations, etc.

The development of medical innovations, obtained during the management of the innovation process, will increase the competitiveness of the domestic health care system, raise the technological level of the domestic system of medical care, improve innovative indicators, and help to develop an innovative economy as country-innovator by realizing the strategy of advanced development.

С.А. Рахимова

Г. В. ПлехановатындағыРесейэкономикалықуниверситеті, Мәскеуқ., Ресей

МЕДИЦИНАДАҒЫ ИННОВАЦИЯЛЫҚ ҮРДІСТІ БАСҚАРУ

Аннтоция. Мақала инновацияларды енгізу тетігіне және экономикалық мүмкіндік беретін инновацияларды игеру тетігіне қара отырылған саланың субъектілерінің қызметіне әсерін арттыру үшін медицинадағы инновацияларды дамыту жолдарын іздестіруге және проблемаларды анықтауға арналған.

Автор медицинаны жоғары технологиялық қызметке қатысты экономикалық және әлеуметтік салалардағы басым салалардың бірі ретінде қарастырады. Медицинада инновациялардың түрлерін жіктеуі ұсынылған: медицинадағы инновациялар, өндірістік, үрдістік, маркетингтік және ұйымдастырушылық инновациялар. Медициналық инновацияларды алу үшін инновациялық үрдістің біріккен моделі ұсынылған. Инновациялық үрдістің негізгі компоненттері анықталды: субпроцесстер (кезеңдер), субъектілер, факторлар және жағдайлар. Олардың әрқайсының мәнімен мазмұны анықталды. Инновацияларды медицинадағы үрдісті басқару негізінде алуға болады деген қорытынды жасалынды. Медицинадағы инновациялық үрдістің күтілетін нәтежелері ұсынылған. Медицинадағы инновациялық үрдісті қарауға көзқарас ұсынылады. Медициналық инновацияларды алуға және дамытуға кедергі жасайтын факторлар анықталды.

Түйін сөздер: медицинадағы инновациялар, медициналық инновациялар, инновациялық үрдістерді басқару.

С. А. Рахимова

Российский экономический университет имени Г.В. Плеханова, г. Москва, Россия

УПРАВЛЕНИЕ ИННОВАЦИОННЫМ ПРОЦЕССОМ В МЕДИЦИНЕ

Аннотация. Данная статья посвящена выявлению проблем и поиску путей развития инноваций в медицине, повышению результативности деятельности субъектов рассматриваемой отрасли, механизмам осуществления инновационной деятельности и получения инновации, посредством которой можно улучшить экономические, социальные показатели.

Автором рассматривается медицина как одна из приоритетных в экономическом и социальном плане отраслей, которая относится к высокотехнологичному виду деятельности. Представлена классификация видов инноваций в медицине. Даны определения понятий: медицинские инновации, продуктовые, процессные, маркетинговые и организационные инновации в медицине. Предложена объединенная модель инновационного процесса в целях получения медицинских инноваций. Выделены основные компоненты инновационного процесса: подпроцессы (этапы), субъекты, факторы и условия. Раскрыты сущность и содержание каждого из них. Сделан вывод, что инновацию можно получить на основе управления инновационным процессом. Дано определение управления инновационным процессом в медицине. Представлены ожидаемые результаты от грамотного управления инновационным процессом в медицине. Предложен подход к рассмотрению инновационной деятельности в медицине. Определены факторы, препятствующие получению и развитию медицинских инноваций.

Ключевые слова: инновации в медицине, медицинские инновации, управление инновационным процессом.

Information about authors:
Rakhimova Saule Abaybekovna – Senior Research Officer, Plekhanov Russian University of Economics.E-mail: Saulesha_rahimova@mail.ru.

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