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FEATURES OF INNOVATION IN HEALTH CARE

The article considers the relevance of the development and introduction of innovations in the medical industry. The authors cite the classification of the main types of innovations, note the need for their development. The work reveals the specifics of the innovation cycle in the medical industry. The changes in the application of innovative technologies in the healthcare sphere are demonstrated, examples of successfully implemented innovative technologies in medical practice are given, which contributed to the increase of innovations in the medical industry as a whole.

The main goal of this work is to analyze the need for close interaction between the healthcare sector and medical science in order to introduce innovative scientific achievements into medical practice. The need to train qualified personnel capable of successfully implementing scientific innovations was also noted. The authors also highlight the main problems facing the introduction of innovations in the healthcare sector, highlighting issues on innovative provision of health care. The issues of state guarantees and legislative protection of domestic scientific developments are also considered as a basis for further development of innovations in the industry.

Key words: innovations, innovative development, innovations in public health, innovation cycle, medical technological innovations.

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әл-Фараби атындағы Қазақ ұлттық университеті, Қазақстан, Алматы қ.

Денсаулық сақтаудағы инновацияның ерекшеліктері

Мақалада медицина өнеркәсібіндегі инновацияларды дамыту мен енгізудің өзектілігі қарастырылады. Авторлар инновацияның негізгі түрлерінің жіктелуін айтады, олардың даму қажеттілігін атап өтеді. Жұмыста медицина өнеркәсібіндегі инновациялық цикл ерекшелігі көрсетілген. Медициналық салада инновациялық технологияларды қолданудағы өзгерістер көрсетіліп, медицина практикасындағы табысты енгізілген инновациялық технологиялардың мысалдары келтірілген, бұл тұтастай алғанда медицина өнеркәсібіндегі инновациялардың өсуіне ықпал етті.

Бұл жұмыстың басты мақсаты медицина саласындағы инновациялық жетістіктерді енгізу үшін медицина мен медицина саласының тығыз өзара әрекеттесу қажеттілігін талдау болып табылады. Сондай-ақ ғылыми жаңалықтарды ойдағыдай іске асыруға қабілетті білікті кадрларды даярлау қажеттілігі атап өтілді. Авторлар денсаулық сақтау саласындағы инновацияларды енгізудің негізгі проблемаларын, сондай-ақ денсаулық сақтауды инновациялық қамтамасыз ету мәселелерін айқындайды. Мемлекеттік кепілдіктер және отандық ғылыми әзірлемелерді заңнамалық қорғау мәселелері де индустриядағы инновацияларды одан әрі дамыту үшін негіз болып саналады.

Түйін сөздер: инновациялар, инновациялық даму, қоғамдық денсаулық сақтаудағы инновациялар, инновациялық цикл, медициналық технологиялық инновациялар.

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Особенности инноваций в здравоохранении

В статье рассматривается актуальность развития и внедрения инноваций в медицинскую отрасль. Авторы приводят классификацию основных видов инноваций, отмечают необходимость их развития. В работе раскрывается специфика инновационного цикла в медицинской отрасли. Продемонстрированы изменения в области применения инновационных технологий в сфере здравоохранения, приведены примеры успешно внедренных инновационных технологий в медицинскую практику, которые способствовали повышению инноваций в медицинской отрасли в целом.

Основной целью данной работы является анализ необходимости тесного взаимодействия сферы здравоохранения с медицинской наукой для внедрения инновационных научных достижений в медицинскую практику. Отмечена также необходимость подготовки квалифицированных кадров, способных успешно реализовать научные инновации. Авторы также освещают основные проблемы, стоящие на пути внедрения инноваций в сферу здравоохранения, выделяя вопросы по инновационному обеспечению сферы здравоохранения. Также рассматриваются вопросы государственных гарантий и законодательной защищённости отечественных научных разработок как основы для дальнейшего развития инноваций в отрасли.

Ключевые слова: инновации, инновационное развитие, инновации в здравоохранении, инновационный цикл, медицинские технологические инновации.

Introduction

In the Message of President Nursultan Nazarbayev to people of Kazakhstan «Strategy» Kazakhstan – 2050 «: a new policy established state» emphasized that the priority objective for the Republic of Kazakhstan is a «society of prosperity based on a strong state, developed economy and universal labor opportunities» (Nazarbayev N.A., 2012)

The public importance of the report «Kazakhstan's way – 2050: Common goal, common interests, common future» President of Kazakhstan underlined that our country should develop in line with global economic trends, «it is important to adjust and strengthen the trend of innovative industrialization for sustainable development of the country principles of knowledge-based economy» (Nazarbayev N.A., 2014).

It is known that the introduction of innovations is the main way to increase the competitiveness of enterprises, quality, maintain high rates of development and their profitability in various sectors of the economy and social sphere.

The quality of health care is one of the main indicators of the welfare of the country's social life. Head of the Republic of Kazakhstan Nazarbayev NA Continuous attention is paid to the improvement of national medicine. Innovation always means a jump into a new field or an attempt to realize innovation.

Healthcare should meet ever-increasing demands, meet new standards, which the Head of

State constantly speaks (Innovations in healthcare, 2017).

Material and methods

In the scientific literature there is a wide range of approaches to the definition of the concepts «innovation», «innovation activity».

Literally, innovation (from English innovation) is translated into Russian as the introduction of a new one and means the process of using innovation or invention (from the English invention). That is, a new idea or innovation (from the English novation) from the moment of introduction acquires a new quality – it becomes an innovation (Yagolkovsky S.R., 2011).

Historically, the formation of theoretical foundations for the study of innovations began in the early XX century, one of the founders of which is the Austrian economist Josef Schumpeter. He was one of the first to study the issues of innovative development of the enterprise; about innovative processes as new combinations that are formed as a result of the reorganization of production due to the use of new technology, the emergence of new raw materials, the introduction of new products, the emergence of new markets (Schumpeter J., 2007).

Another researcher B. Santo considers innovation through the prism of economic benefits: innovation as a «social, technical and economic process that, through the practical use of ideas and inventions, leads to the creation of the best products and

technologies, and if it is oriented toward economic benefit, on profit, its appearance on the market can bring an additional income ...» (Santo B., 1990).

OECD (2005) defines innovation as the introduction of a new product or its significant improvement that leads to a new product (product or service), a process, a new marketing strategy, an organizational strategy, a new business strategy, management of the organization or new external relationships (Marcin W., 2016).

A great contribution to the foundation of the theory of innovation was laid by ND Kondratiev. Outlining the doctrine of large cycles of conjuncture for about half a century, he substantiated the regular connection between «upward» and «downward» waves of these cycles with waves of technical inventions and their practical use. ND Kondratiev links technological and economic innovation waves with radical changes in other spheres of society: «... wars and social upheavals are included in the rhythmic process of the development of large cycles and are not the initial forces of this development, but the form of its manifestation» (Schumpeter J., 2007).

Innovations are specific both from the theoretical, conceptual points of view, and from the practical side, which formed the basis of this scientific research. The difference lies in the content and classification characteristics and approaches. Innovative approaches take place in implementation areas in the practice of health development, which is proved by examples of the development of this industry in Kazakhstan. The important thing is that innovations often have a short-term effect, as life itself must be updated and improved.

The research methods used were economic, systemic, logical and comparative analysis, as well as economic-statistical, marketing and historical comparison of problematic aspects and components. The research was based on the results of an analysis of the materials of foreign and domestic literature on the issues of innovation in health care as an industry and in its sub-sectors.

Literature review

Various authors, whose works are published in foreign editions, reviewed in the databases of Scopus and Thomson, also paid attention to innovations introduced at enterprises. In particular, Marcin V. Stanievsky, a well-known scientist in the field of innovation policy, investigated the factors influencing the innovation activity of the enterprise and built a model for assessing the level of influence of innovations in the enterprise's activity (Marcin W., 2016).

Another representative of foreign science in this field A. Khazanchi bases his research on the belief that the introduction of innovations contributes to the maintenance of profitability, the acquisition of a competitive advantage and the long-term operation of the enterprise (Khazanchi, S., 2007); and foreign scientist K. Talke – on the fact that innovation is the main factor affecting the efficiency of the enterprise. In his opinion, the more innovations are introduced in the enterprise, the higher the efficiency of its development (Talke, K., 2011).

Scientist Metts G.A. In his research he paid special attention to the aspects of strategic development and the role of innovations in the establishment of the enterprise (Metts, G.A., 2011).

Among the scientists of the Russian Federation there are also numerous studies on various areas of innovative development. So, Zavalin P.N. Consider innovation in terms of cost savings. The research of innovative development, in his opinion, boils down to the results of the creative process in the form of created (or introduced) new use values, the application of which requires changing habitual stereotypes of activities and skills from those using them. The concept of innovation, according to the Russian scientist, extends to a new product or service, the way of their production, innovation in organizational, financial, research and other fields; any improvement that provides cost savings or creates conditions for such savings (Zavalin P.N., 2014).

Fatkhutdinov R.A. It defines innovation as an effective result in many areas of the enterprise. Thus, he believes that innovation is the end result of introducing innovation in order to change the management object and obtain an economic, social, ecological, scientific-technical or other type of effect (Fatkhutdinov R.A., 2008).

As for Kazakhstan researchers, their sphere of scientific activity is devoted to the development of innovations in individual regions and sectors, the attraction of intellectual property to the economic circulation, etc. So, among Kazakhstan scientists it should be noted Orazaly Sabden, who defines innovation as a process in which an invention, or an idea, acquires economic content (Sabden O., 2009).

The Kazakh scientist Mutanov G.M. He also extensively studies the issues of innovation development, where he understands innovation as the most general form, which introduces innovation that ensures qualitative change in processes, products and services, and that is defined as innovation (Mutanov G.M., 2012; Mutanov G.M., 2014).

Thus, the works of many foreign and domestic scientists-economists are devoted to the issues of

innovative development. Among the foreign researchers should be noted the works of Schumpeter J., Santo B., Zavalin P.N. Fatkhutdinova R.A., Trifilova A.A., Kochetkova S.V., Maksimova Y. (Schumpeter J., 2007; Santo B., 1990; Zavalin P.N., 2014; Fatkhutdinov R.A., 2008; Trifilova A.A., 2005; Kochetkov S.V., 2006; Maksimov Y., 2006)

The problems of innovative development are devoted to the research of Kazakhstani economists, among which there are works by Aubakirova Zh.Ya., Kupeshova S.T., Mutanov G.M., Mukhamediev B.M., Mukhtarova K.S., Sabden O., Sagieva R.K. (Aubakirova Z.Y., 2014; Kupeshova S.T., 2011; Mutanov G.M., 2012; Mutanov G.M., 2014; Mukhamediev B.M., 2014; Mukhtarova K.S., 2016a; Mukhtarova K.S., 2013a; Mukhtarova K.S., 2013b; Mukhtarova K., 2016b; Mukhtarova K.S., 2016c; Mukhtarova K.S., 2015; Mukhtarova K.S., 2013c; Mukhtarova K.S., 2013d; Sabden O., 2009; Sagieva R.K., 2013).

There is also a group of Russian scientists dedicated to a number of studies of innovation in the regional aspect, in which emphasis is placed on studying the rating of Kazakhstan's regions, their profile and development strategy (Mukhtarova K.S., 2016a; Mukhtarova K.S., 2013a; Mukhtarova K.S., 2013b; Mukhtarova K., 2016b; Mukhtarova K.S., 2016c; Mukhtarova K.S., 2015; Mukhtarova K.S., 2013c; Mukhtarova K.S., 2013d).

Results and discussion

Due to the fact that health is a social sphere, the economic effect becomes less obvious. Therefore, creating an innovative product or service, the researcher, first of all, focuses on medical and social effects.

Thus, with regard to health care, the following definition can be given: innovation is the end result of innovation activity, introduced into the work of a medical organization and bringing a positive effect (medical, social or economic) (Yagolkovsky S.R., 2011) – see Figure 1:

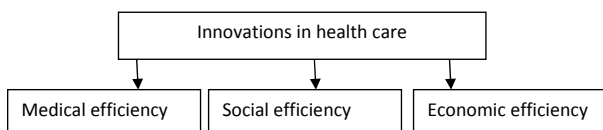


Figure 1 – Efficiency of innovation in health care

Analyzing innovative activity in public health services, all innovations in this industry can be divided into the following three groups (see Fig. 2):

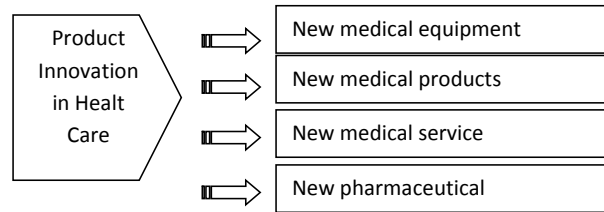


Figure 2 – The main areas of innovation in health care

In full, innovative activities in health care include all types of research: fundamental, applied, experimental design, activities to develop innovations and introduce the practice of a medical organization, that is, the implementation of innovations. Next comes the large-scale production and the phase of routineization (Sadovoi M.A., 2013) – see Fig.3:

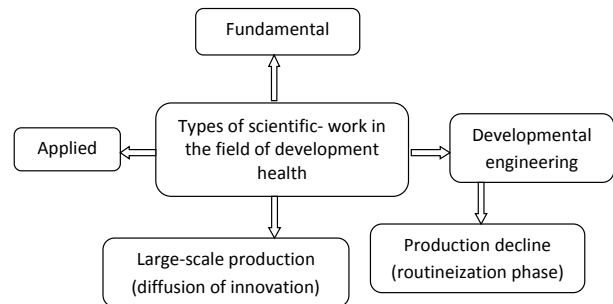


Figure 3 – Classification of scientific research in health care

The first stage of research works has generalized features in all three innovation cycles

Fundamental research in medicine is represented by studying regularities and basic principles, which in turn are changed and adjusted depending on the purpose of development and the tasks of the branches of medical science.

Applied research is characterized by a narrowly focused study and allocation of fundamental fields of science, directions for achieving practical goals and solving specific health problems.

The phase of developmental development in health care is characteristic for all innovative products and is usually carried out in the order of implementing the results of research.

The release of a small batch or the introduction phase into the practice of the organization determines the availability of innovation to meet the requirements and demand necessary in medical organizations.

Large-scale production (diffusion of innovation) determines the introduction and distribution of innovative products to other medical organizations.

The decline in production (the phase of routineization) presupposes a stable realization of innovation in medical organizations (Sadovoi M.A., 2013).

Based on the final product, in the medical industry, the innovation cycle has its own specifics. It should be noted that for all innovative products in the field of health, the innovation cycle has its own characteristics that distinguish it from the innovation cycle implemented in other industries.

The innovative cycle, characteristic of the new pharmaceutical preparation, is a complex of successive research projects in which the possibility of creating and using a new medicinal product is determined.

After that, a preclinical research phase is carried out, characterized by carrying out tests on laboratory animals and a stage of clinical research that finds its application in conducting research on humans. The next element of the cycle is the production of a small batch of a pharmaceutical preparation. At this stage, as necessary, production studies can be carried out, the purpose of which is to prepare recommendations for improving the characteristics of products, improving technology and organizing the production process, reducing production costs [36].

And only with the successful completion of previous stages of the innovation process goes to the next stage – a large-scale production, which involves the development of the pharmaceutical drug by the consumer. Since other innovations come to replace innovations, the natural stage of this innovation cycle is the fifth stage – the decline in production.

Research work for a new medical service and will include the stages of fundamental and applied scientific research, which in turn will be aimed at finding solutions to problems in a specific medical field. The next stage in the cycle is connected with the registration of new medical technologies (NMT), which are practical in nature and are expressed in the application and testing of applied research data on patients. Registration of the National Meteorological Service is expressed in the design and presentation of a permit for the introduction of medical technology. The next link in the cycle is the implementation phase of the technology. The final

element in this innovative cycle is the provision of a new medical service for patients.

In particular, in medicine, the abolition of the pharmacy service in a medical organization and the involvement of pharmaceutical firms on an outsourcing basis can serve as an example (Oslo Manual, 2006; Yagolkovsky S.R., 2011).

In the Republic of Kazakhstan there are significant positive changes in the introduction of innovative technologies in the health sector. They are designed to facilitate the work of practitioners and the lives of their patients.

So, for this purpose, significant financial resources are annually sent to the industry – including the purchase of new medical equipment, modern medicines, and repairs in hospitals and clinics (Sadvakasov T., 2017).

Acknowledgment to that set of examples.

So, at the present stage the life of practicing doctors is difficult to imagine without mobile diagnostic devices that help to regulate the ratio of the number of doctors and patients, especially in those regions where there is a significant lack of medical institutions.

The healthcare market is also going on without the active introduction of IT technologies, which in 2016 amounted to \$ 92 billion. The most widely used innovation in this field is electronic medical cards that facilitate the work of a doctor.

To use them, you need the introduction of a computerized medical order for the order of medications and an electronic prescription so that patients can get online access to their medical records (Romanyuk A., 2017).

Neurosurgical operations on the brain and spinal cord, spine, open heart surgery and its vessels, endoscopic and plastic operations in gynecology, arthroplasty of joints, the newest methods of treatment of oncological diseases, develop microsurgery of the eye and medical rehabilitation.

The introduction of many breakthrough technologies became possible due to the re-equipment of medical organizations and the training of physicians in new methods of work. From year to year, the possibilities of the telemedicine system for advising rural residents and consulting patients with specialists from central republican clinics are being increasingly used.

The medical rehabilitation of patients has developed. Annually about 2 thousand patients after traumas, severe operations, transferred strokes undergo rehabilitation with the use of equipment from leading world manufacturers (Sadvakasov T., 2017).

Also, to the high technologies introduced, for example, in the Karaganda region in 2016, it is necessary to include the release of a unique medical fibrin glue, which is started in the regional blood center. This drug around the world has won fame as an important component of surgery.

Adhesive compound is prepared from blood components and allows surgeons to perform seamless operations and quickly stop bleeding. The connection of tissues during the operation is performed without punctures and the use of suture material, which reduces the time of operation, the risk of infection of the wound. The drug is indispensable in emergency surgery, when every second counts. It is especially suitable for head injuries, abdominal cavity – when there is a rupture of blood vessels, tissues and heavy internal bleeding that can not be stopped outside the operating room, and the nearest hospital still needs to be reached. In this case, fibrin glue can save the life of the patient – it is enough to spray it on the bleeding wound, and it seals it «sealed», forming a transparent clot, which will provide the patient with the surgeons, avoiding a large loss of blood.

These are only the most basic diagnostic and treatment technologies that were introduced in 2016. But their application could not be realized without the training of qualified personnel.

To improve the level of training and qualification of medical workers, economic mechanisms for motivating their work have been introduced – differential pay, incentive payments that depend on the end result at the out-patient and polyclinic level.

All these successive steps are aimed at increasing the duration and improving the quality of life of the population – the main landmark designated by the Head of State and to which it is necessary to strive (Sadvakasov T., 2017).

In the opinion of one of the authors of scientific research on the analyzed topic of the article (Innovations in healthcare, 2017), within the framework of innovation management it is expedient to single out the following types of innovations in the field of health:

- Medical technological innovations, which are associated with the emergence of new methods (methods, methods) of prevention, diagnosis and treatment on the basis of available drugs (equipment) or new combinations of their use;

- Organizational innovations, realizing an effective restructuring of the health system, improving the organization of staff and org. structure of management.

- Economic innovations that ensure the introduction of modern methods of planning,

financing, stimulating and analyzing the activities of health institutions;

- Information and technological innovations aimed at automating the processes of collecting, processing, analyzing information flows in the industry;

- Medico-pharmaceutical, medical and technical innovations, which are a form of medical technological innovation, but presuppose, as an imperative, the use of new medicines (technical systems), competitive in price and basic parameters of medical efficiency.

To the product and process innovations in the healthcare system, one should include those that cover both the system of prevention and treatment of the disease, the rehabilitation of patients, the creation of fundamentally new drugs, new medical equipment and equipment, new information, accounting, management and other benefits that improve the quality of medical services, etc.

Thus, the author of the study concludes (Innovations in healthcare, 2017), innovations can be technical, involve the development or improvement of products or processes, or administrative, i.e. be aimed at improving the organizational structure and management and implementation processes. Such innovations can often be carried out independently of each other. Nevertheless, in some cases, the implementation of innovations in one area may depend or even require innovation in another.

Problems and solutions. There are many problems in the innovative provision of health care, which are as follows.

- 1) For the successful development of medicine, the right combination of clear state guarantees to the population and equal rights of all market participants is necessary, regardless of the form of ownership. As for investing in healthcare in Kazakhstan (as in the Russian Federation), the state is the main investor in advanced medical technologies.

- 2) Regarding the possibility of a partial investment in innovative technologies, it is restrained, on the one hand, by insufficient information support, and on the other hand by the absence of clear state guarantees and preferences (Innovations in healthcare, 2017).

- 3) The new objectives related to stimulation and infrastructure support for the development of science and innovation, as before, are not fully realized, their legislative and law enforcement provision is imperfect, moreover, it is delayed or postponed for indefinite periods.

- 4) The fact that in the scale of the country the effect of innovation activity is almost invisible, the close, constant and productive contacts between

science and business, the effective functioning of the national innovation system as a whole are disturbing.

5) Elimination of the main problems in the development of science, education, innovation requires significant resource and time costs. However, delaying their resolution is fraught with not just the preservation of the current situation, but also the very likely degradation of all the basic elements of the innovation cycle. Insufficient financing hinders the implementation of effective innovative projects, thereby reducing the overall level of innovative activity in the economy.

6) It should be noted that the developments developed by domestic enterprises and universities are in demand only slightly. This is due, first of all, to insufficient funding of health care and legislative vulnerability of domestic developments. Further development of this situation can lead, in particular, to the systematic procurement of extremely expensive foreign equipment, the introduction of domestic developments through foreign firms and, as a result, the increase in the cost of domestic health care (Innovations in healthcare, 2017).

Problems identified in the field of health are practically inherent in all CIS countries.

Conclusion

Thus, considering the features of the innovation cycle in health care, we came to the conclusion that

it has a number of its features depending on the final product. So, the innovative cycle of creating new medical technology differs little from the classical cycle described by us before. The creation of a pharmaceutical product includes additional stages: preclinical and clinical trials, and the cycle of creating a new medical service is of a truncated nature (Sadovoi MA, 2013).

As follows from the program documents, the innovative model of health development envisages close interaction between the healthcare system and medical science, the planning of scientific medical research depending on the healthcare needs, the active implementation of scientific results in medical practice, and the targeted training of specialists able to ensure the implementation of scientific achievements.

The unity of science, education and practice should provide health care not only with fundamentally new ways of diagnosing and treating a variety of diseases, but also with modern methods of quality management in healthcare.

The continuous progressive process of updating medical technologies, which provides for an increase in the effectiveness of treatment and prevention, requires the formation and adequate financial provision of targeted scientific programs in priority areas for the development of medicine and public health (Innovations in healthcare, 2017).

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