

ANNOTATION

**Thesis for obtaining Doctor of Philosophy (PhD)
specialty - 6D050600 - Economics**

SAPARALIYEV DAULET TOKTASYNOVICH

"IMPACT OF INNOVATIONS ON THE ECONOMIC EFFICIENCY OF MEDICAL CENTERS" (USING THE EXAMPLE OF THE "RESEARCH-CLINICAL CENTER FOR CARDIAC SURGERY AND TRANSPLANTOLOGY" LLP)

Topic of the research. One of the key factors of improving the efficiency of medical services, along with increasing the professionalism of medical personnel, is the implementation of innovations. The development of high-tech health care systems indicates progress in the country, which is especially important in nowadays epidemiological situations. Meanwhile, the health care system of Kazakhstan is experiencing serious problems, which requires the implementation of product-based, technological, organizational innovations and significant investment. Also, efficiency of innovative activity of medical centers have their own characteristics that involve the use of specific methods and indicators. In addition, it should be borne in mind that innovations in medicine require significant and long-term investment. Therefore, it is necessary to have tools for quantifying the effect of innovation, which is especially important for private medical centers that do not have the ability to conduct their own research. The crisis in the innovative health care sector of the Republic of Kazakhstan associated with to the reform and recession in the economy and it is also associated with the lack of specific measures to optimize innovative activity. For these aforementioned reasons the topic of research is about several unsolved problems in innovative efficiency of medical centers.

The aim of the study is to analyze the effectiveness of the implementation of innovations in organizations of the healthcare system (by the example of the "Research-Clinical Center for Cardiac Surgery and Transplantology" LLP) in the context of the uncertainty of the expected results.

Based on this aim, the following specific **tasks** were set and solved:

1. Based on the literature review, develop the concept of organizational innovation in the healthcare system and framework for analyzing economical effectiveness while implementing innovations.
2. Identify factors and stages of the innovative process, affecting organizational and economic progress.
3. Develop methodological indicators for assessing the impact of different types of innovations on the economic efficiency of organizations in the healthcare system.
4. Analyze domestic and foreign experiences in terms of innovative optimization methods.
5. Develop scientific and practical directions for improving innovative activity of medical centers.

The hypothesis of this study is based on the statement that the qualitative and quantitative effect, measured by such indicators as income growth and cost reduction, labor

productivity growth and improvement in the quality of processes, directly depends on the level of innovation by the organization, while the introduction of innovations may not always lead to the expected result.

Methodology. To realize established tasks following methods were used: systematic approach, economic-statistical modeling, comparative economic, abstract - logical, monographic and morphological analysis, peer review, graphical and analytical approaches that make it possible to represent the information visually. To assess the indicators of the impact of various types of innovations on the economic efficiency in the health care system was used a systematic approach using specific scientific methods such as: 1) Literature review analysis and generalization to determine theoretical and methodological approaches, to define and evaluate innovation, their properties and characteristics;. 2) Regression-correlation analysis using GRETl data analysis package in accordance to ARIMA model and the maximum likelihood method to assess the effectiveness of innovations on the growth of clinic revenues, the dynamics of cost reduction and resource improvement. 3) Questionnaire method to assess the effectiveness of innovation.

The main ones to be presented for defense are as follows:

1. With regard to medical institutions in health care, the author's interpretation was given “innovation” is the end result in activities of an innovative nature, which is introduced into the work of an organization in the health care system, and in addition, which brings both quantitative and qualitative positive economic effect;

2. From the point of view of the health care system, such direct indicators of the effectiveness of innovations were highlighted as the growth of the medical organization and the reduction of costs, as well as the use of resources and the improvement of the quality of medical services;

3. Based on the results of empirical research, it is confirmed that the income of the medical center is to increase technological innovation, qualifications;

4. The groups of factors influencing the economic activity of the medical center have been identified: (dollar exchange rate, inflation index, advanced training);

5. The economic effect is calculated through cost reduction, using innovative technology instead of traditional. Calculations show that innovative technology reduces the length of stay of patients in the Center by 35-40%, promotes their faster rehabilitation, reduces material costs for treatment, significantly increases the annual hospital capacity and brings additional profit to the hospital without increasing the bed capacity;

6. A set of primary recommendations for the digitalization of the management of medical centers has been developed.

The scientific novelty of the dissertation research is as follows:

1. As the result of implementation innovation in the work of medical organization, bringing both quantitative and a qualitative positive economic effect, the author's position was formed.

2. Based on the generalization and systematization of classical and modern concepts, a theoretical and methodological concept of research and a methodological toolkit of direct indicators was formed, which indicates an increase of income and decrease of the outcome as well as indirect indicators of improving the use of resources and improving the quality of medical services.

3. An assessment model of innovation impact and increase in qualifications of the personnel on the income of a medical center in the healthcare system was suggested.

4. An economic and mathematical model for assessing quantitative performance indicators through groups of factors (advanced training, dollar exchange rate, inflation index).

5. Based on the grouped indicators, the effect of implementing innovative technology on medical treatment was calculated, which helps to faster rehab, reduce bed-days and material costs for treatment, significantly increases the hospital's annual throughput and brings additional profit for the hospital without increasing the bed capacity.

6. A set of primary recommendations for digitalization of management has been developed for medical centers.

Theoretical significance. Suggested concepts of innovation and assessment indicators of economic efficiency enlarges the theoretical understanding of this concept, which allows healthcare institutions to navigate in terminology and general understanding. Suggested results are aimed to increase activity not only in investment terms but also in innovative term o healthcare organizations, make it possible to provide not formal, but real integration of research and scientific regional and sectoral organizations, educational and industrial organizations to increase the activity in applying innovations and cooperation, to attract additional investment on the further development of innovative projects of organizations and to increase investment attractiveness.

Practical significance. Following scientific and practical results were obtained:

- The proposed model for assessing the influence of factors on the income of a medical center, and an economic and mathematical model for assessing quantitative performance are aimed to improve economic situation, also adjust the competitiveness of an organization, moreover supports further optimization of State programs, such as «Program for the development of health care in the Republic of Kazakhstan «Саламатты Қазақстан», «Program for the development of health care in the Republic of Kazakhstan «Денсаулық».

- Implementation of science-based innovative technology to medical institutions, which benefits both qualitative and quantitative, furthermore supports State programs like: « Program for the development of health care in the Republic of Kazakhstan «Саламатты Қазақстан»; "Program for the development of cardiological and cardiac surgery care in the Republic of Kazakhstan"; "Program on measures to improve the blood service in the Republic of Kazakhstan"; « Program for the development of health care in the Republic of Kazakhstan «Денсаулық».

- Developed a set of primary recommendations for digitalization the management of medical centers for authorized state, scientific organizations, institutions which is aimed at optimizing road implementation maps "Concept for the development of e-health in the Republic of Kazakhstan for 2013-2020".

Evidence-based suggestions and recommendations for digitalization have been used and introduced into the management and organizational activities of the Center (act of implementation from 25.02.2019).

Publications the article "Issues of an integrated approach to innovation medical institution "considers the issues of an integrated approach to innovation activity and the study of the control parameters of innovation activities of a medical institution. Saparaliyev D.T. - idea, literature review, problem definition, collection and analysis of information, data

processing, choice of style, article design, choice of journal, and publication process, in collaboration with L.S. Spankulova idea and method of research and S. Joshibaev - consultation on the topic of research.

The article "Analysis of theoretical approaches to innovation in health care" reflects theoretical approaches to innovation in healthcare, through the prism of modern models of economic growth and methods of more optimal functioning processes in the health care system. Saparaliev D.T. - literature review, problem definition, information collection and analysis, data processing, interpretation and discussion of results, article formatting, journal selection, and publication process, in collaboration with L.S. Spankulova. - consultation on the research method and S. Joshibaev - consultation on the research topic.

A description of the results of an economic and mathematical model for assessing quantitative performance indicators through a group of factors (professional development, dollar exchange rate, inflation index) are published in the article "Impact of new technologies and innovations to the income of companies". Saparaliev D.T. - literature review, problem definition, information collection and analysis, data processing, interpretation and discussion of results, article formatting, journal selection, and publication process, in collaboration with L.S. Spankulova - research method and consultation on the issues of economic and mathematical modeling, S. Joshibaev - consultation on the research topic.

The article "The economic effect of the use of thoracoscopic technology in cardiac surgery to accelerate the rehabilitation of patients" published results such as economic efficiency when using innovative (thoracoscopy) technologies in cardiac surgery. Saparaliev D.T. - literature review, problem definition, information collection and analysis, data processing, interpretation and discussion of results, article formatting, journal selection, and publication process, in collaboration with L.S. Spankulova - research method and consultation, Dzhoshibaev S. - consultation on the research topic.

The results of an empirical study identifying significant factors of economic activity, which proposes a model for assessing impact of technological innovation and professional development in the healthcare system are published in the article "Impact of new technologies, innovations & barriers on the service delivery and financial income of the private business in transitional economies: the case of health centers". Saparaliev D.T. - idea, literature review, problem definition, information collection and analysis, data processing, study design, journal selection, and publication process, in collaboration with L.S. Spankulova. - consultation and editing of the article's conclusions, Zhaksylykova A. - review of the publication, Aldashova G. - the concept of the research, Saimova M. - translation and design of the article, Akhmetova G. - preparation of the text of the article and contact with the editor of the journal.

The publication "Quality and efficiency innovation in the provision of medical services" reflects the assessment of the effectiveness of innovation in the form of improving the quality of the process and the degree of satisfaction with the level of medicine. Saparaliev D.T. - idea, the definition of the problem, collection, and analysis of information, data processing, interpretation and discussion of the results, presentation of the article, choice of the journal, and the publication process, in collaboration with Spankulova L.S. - consultation.

The results of a review and analysis of the national policy in the field of innovation and nanotechnology in Kazakhstan, showing the three main practical problems that Kazakhstan faced in implementing policies in the context of the Dutch disease, are published in the article "The knowledge-based economy and innovation policy in Kazakhstan: looking at key practical

problems". Saparaliev D.T. - idea, collection, and analysis of information, problem definition, research design, data processing, choice of style, article design, choice of journal, in collaboration with L.S. Spankulova - consultation and formation of the main conclusions, Saimova M. - consultation and editing of the text, Esbergen R. - translation of the text and contact with the editor of the journal, Demeuova G. - data collection, Bolatova B. - design and concept of the study, Taskarina B. - literature review, Idrasheva A. - interpretation and discussion of the results.

The article "The problem of innovations and new technologies in medicine" reflects descriptions of the application of innovations and new technologies in medicine, the development of the health care system, and the state's role in the innovation sphere in medicine. Saparaliev D.T. - literature review, problem definition, information collection and analysis, data processing, article formatting, journal selection, and publication process, in collaboration with L.S. Spankulova. - consultation and interpretation of results.