

ABSTRACT

to the dissertation for the degree of Doctor of Philosophy (PhD) in the specialty
"6D051700 - Innovation Management"

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«Modernization of the management system of knowledge - intensive
industries in Kazakhstan»

The relevance of the topic. The term “knowledge-based economy” has been used in academic literature in a variety of contexts, and has been used interchangeably with other terms such as “knowledge-based economy”, “knowledge society”, “networked economy”, “information economy”, Digital economy, knowledge society, new economy and intangible economy over the past five decades. The information and communication technology (ICT) sector is the driving force behind the development of virtually the entire economy in the conditions of knowledge-based economy. Technological solutions stimulate innovation, contribute to the creation of new business models and phenomena in the information society.

The COVID-19 epidemic, which began in early 2020, shook the global economy, and raised an important question for technology providers about the timeliness of development directions so far, and also triggered a technological boost.

In turn, the COVID - 19 crisis has impacted all industries, forcing changes in working methods, such as introducing remote work and moving some processes from traditional to digital format.

Meanwhile, health economist and biostatist Andreas J.W. Goldschmidt, in the process of searching for patterns, suggested that there is a phase shift and an overlap of the 6th Kondratyev wave by the IT industry and healthcare, therefore, obstacles to growth can be overcome by maintaining good health of people and their environment. According to Šmihula (2009), the typical culmination of each Kondratyev wave is an economic crisis characterized by stagnation caused by technological deadlock and increased demand for new inventions and innovations. The crisis completing the application phase creates favorable conditions for the emergence of new inventions, but it takes some time to start a new technological revolution and there will be innovations that can stimulate investment growth.

In addition, foreign scientists characterize the knowledge-based economy as the use of knowledge to introduce innovations, which certainly refers to the analysis of the digital value chain in the form of digitalization of knowledge, and their inclusion as a resource in the value chain, depending on the digital economy.

In the aim of creation conditions for accepting the challenges of the technological revolution, within the framework of state programs for industrial and innovative development, an active policy is being pursued to develop knowledge-intensive industries, however, the trend in the share of R&D costs in GDP has not reached a significant increase. At the same time, the number of organizations that carried out R&D practically did not change over the five-year period of implementation of the state program of industrial and innovative development, the

indicator of innovative activity of small enterprises maintains its growth rates, and passive interaction in the field of innovation with other organizations is also observed, including with research institutes from enterprises.

Currently, the Government has initiated a Strategic Plan until 2025 for the successful implementation of the Third Modernization, aimed at building a new economy through technology and digital solutions while maintaining the benefits of a resource economy with a stake in national human capital and it was approved the national project "Technological breakthrough through digitalization, science and innovation" for the period from 2021 to 2025. All of the above justifies the need to study extensive issues related to theoretical and methodological provisions on the management system of knowledge-intensive industries, and the mechanism of organizational and economic relations, including monitoring measures to support and increase the country's intellectual potential, taking into account market needs.

Purpose and object of the study. The purpose of the dissertation research is to determine the theoretical and methodological foundations of the formation of a knowledge-intensive economy and the structure of the mechanism for modernizing the management system of knowledge-intensive industries, taking into account the choice of management approaches and tools that exist in the world theory and practice. Following the set goal, the following tasks are solved:

- research of theoretical and methodological approaches and conceptual foundations to the construction of a management system for knowledge-intensive industries and the formulation of the author's vision;
- highlighting the features and approaches to improving the management system of knowledge-intensive industries at the present stage;
- efficiency evaluation of the implemented state measures for the development of local knowledge-intensive industries;
- analysis of the current state of the management system of knowledge-intensive industries in Kazakhstan and the identification of factors limiting the development of knowledge-intensive industries;
- substantiation of proposals for improving the structure of the management mechanism of knowledge-intensive industries;
- development of recommendations for construction the management system of knowledge-intensive industries.

The object of the research. The object of the study is the management system of knowledge-intensive industries at the macro and micro levels.

The subject of the research. The subject of the study is the organizational and economic relations that arise in the process of interaction between the elements of the management system of knowledge-intensive industries.

Theoretical and methodological base of the research. The theoretical and methodological basis of the study was the methodological foundations of the structure of the knowledge economy compiled by the World Bank Institute (WBI) and the OECD, compilations, and reports of the OECD countries on the development of the knowledge economy as part of measures to study the driving force of economic growth of their member countries, reports and publications

made within the framework of the formation of clusters in the context of Industry 4.0 and the strategy of open innovation, the works of foreign and Kazakh scientists in the field of the knowledge economy.

The dissertation research includes a comprehensive study, according to which the analysis of the management system must be carried out with the transition from the upper level to the lower level - to the macro and micro levels. The study used modern methods of researching economic processes, such as systemic, comparative analysis, survey method, econometric methods with using MS Excel, MS Visio and R program during the process of collecting statistical data.

The information base of the research. The dissertation research was based on the data of the information base of the official republican and regional statistical bodies of the Republic of Kazakhstan and foreign countries, data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, data from international databases of the World Bank, specialized analytical reports of experts of the Organization for Economic Cooperation and Development, information from sources of government agencies and national companies, as well as publications of foreign databases Scopus and Web of knowledge, monographs, and publications of domestic scientists, materials of scientific and practical conferences.

The scientific novelty. The scientific novelty of the dissertation research consists in the development of a conceptual approach to the formation of the structure of the mechanism of modernization of the management system of knowledge-intensive industries, ensuring interaction, creation of modification, exchange and application of knowledge, taking into account the strategic goals of the state development. The author obtained the following scientific results:

- it was determined the author's vision of the management system of knowledge-intensive industries based on generalization foreign literature about the management of knowledge-intensive industries;

- it was given the macro-perspective of the structure of a knowledge-intensive economy, which consists of factors of a knowledge-based economy (human capital, R&D investment and ICT development, knowledge creation, a culture of innovation), as well as saving the environment and industry specifics is presented;

- the author has developed a conceptual model of a macro-perspective for the formation of a management system of knowledge-intensive industries, which consists of knowledge-based economy components (human capital, R&D investment and ICT development, knowledge creation, a culture of innovation), as well as saving of the environment and industry specifics is presented;

- it was determined the scheme of interaction between the elements of the management system for knowledge-intensive industries at the macro and micro levels, which consists of a strategy, an integrated R&D program, mechanisms of cooperation and link "science-industry", sources of funding, the process of developing or introducing new products or technologies, and an impact assessment involving monitoring and performance evaluation ongoing program;

- the scheme of the management system of knowledge-intensive industries at the micro-level has been determined, which consists of a strategy, an integrated

R&D program, mechanisms of cooperation and link "science-industry", sources of funding, the process of developing or introducing new products or technologies, and an impact assessment involving monitoring and performance evaluation ongoing program;

- it was identified the key factors of the knowledge-intensive economy are on the basis of dispersion-regression analysis, which showed the impact the gross regional product, based on the macro-perspective of the structure of the knowledge-intensive economy;

- it was assessed the efficiency of the implemented state measures in the framework of the state program of industrial and innovative development of the country in the transition to a knowledge-intensive economy using the Malmquist productivity index;

- the indicators for assessing the innovative activity of companies are determined based on the concept of "marketing mix" by the method of survey research and the application of the proposed algorithm for determining indicators for assessing knowledge-intensive industries for monitoring;

- recommendations were developed according to the algorithm for constructing a management system of knowledge-intensive industries in the context of 4.0 based on open innovations.

The main provisions to be defended:

1) The author's vision about the concept of "management system of knowledge-intensive industries" is presented as a set of interrelated elements that ensure the implementation of goals, objectives, and principles of management of knowledge-intensive industries through the organizational and economic mechanism of interaction, creation of modification, exchange and application of knowledge, which is based on new ideas about a holistic approach.

2) The key factors of the knowledge-based economy were identified based using the variance-regression analysis of panel data, which showed the impact on the gross regional product along with the indicator of the environment and industry specialization based on the conceptual model for assessing the macro-perspective of the structure of the knowledge-intensive economy.

3) The Malmquist productivity index is proposed to determine the effectiveness of implemented government measures within the framework of program of industrial and innovative development of the country in the context of the transition to a knowledge-intensive economy for the period from 2007 to 2020. According to this index, the fall in oil prices has a negative impact on the implementation of government programs. In turn, the implementation of the "Digital Kazakhstan" program made it possible to stabilize the effectiveness of the implemented measures to form a management system of the knowledge-intensive industries in the Republic of Kazakhstan. The Covid-19 pandemic has had a negative impact on the performance of the Malmquist Index.

4) As a result of the survey, indicators for evaluating knowledge-intensive industries used to assess the impact based on the concept of "marketing mix" were identified.

5) Recommendations have been developed aimed at construction a management system for knowledge-intensive industries based on open innovations in the context of Industry 4.0.

Theoretical and practical significance. The theoretical and practical significance of the research results are important for development, they can become an additional theoretical and methodological basis for further research in the field of public policy on cluster initiatives and innovative development, human capital management, and construction a management system of the knowledge-intensive industries. It was represented practical importance the proposed tools for assessing the effectiveness of implemented government measures to form a macro-perspective of the structure of the knowledge-intensive economy based on the Malmquist productivity index could be applied and determining the industry specialization of the region based on the Herfindahl-Hirschman indicator and indicators for assessing the innovative activities of companies based on the concept of "marketing mix" contributes to create a knowledge-based economy. Conclusions, proposals, and scientific and practical recommendations can be taken into account and used in the implementation, development, and improvement of strategies, programs, concepts, and plans for the development of knowledge-intensive industries at the institutional level.

Approbation of the main results of the work. Approbation of the thesis was carried out at all stages of the research. The main provisions and conclusions of the dissertation work were discussed at the following international scientific and practical conferences: 13th European Conference on Innovation and Entrepreneurship, 2018 (Aveiro, Portugal), International Conference the 32nd International Business Information Management Association Conference «Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional expansion to Global Growth», 2018 (Seville, Spain),

International scientific and practical conference in the framework of the VI International Farabi Readings, dedicated to the 85th anniversary of Al-Farabi KazNU and the 70th anniversary of the Higher School of Economics and Business, 2019, (Almaty, Kazakhstan), the 13th International Management Conference «Management Strategies for High Performance», 31th October – 1st November 2019, (Bucharest, Romania).

Publication of research results. The main provisions and conclusions for the defense were reflected in 12 scientific works, of which 1 was published in a journal with a non-zero impact factor and included in the Scopus database, 6 - in scientific publications recommended by the Committee for the Control of Education and Science MES RK, 5 - in collections of scientific papers based on the materials of scientific and practical conferences, including 4 held abroad.

The structure of the dissertation. The thesis consists of content, designations and abbreviations, an introduction, three chapters, the conclusion, references and applications.