

**MINISTRY OF EDUCATION AND RESEARCH OF THE REPUBLIC OF
MOLDOVA
FREE INTERNATIONAL UNIVERSITY OF MOLDOVA**

With manuscript title
C.Z.U.: 378.07(569.4):001.895(043.2)=111

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**EVALUATION AND MANAGEMENT OF INNOVATION
ECOSYSTEM IN HIGHER EDUCATION INSTITUTIONS IN
ISRAEL**

**SPECIALTY 521.03 - ECONOMY AND MANAGEMENT IN THE FIELD
OF ACTIVITY**

ABSTRACT

Doctoral thesis in economic sciences

CHISINAU, 2023

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The Doctoral thesis and the abstract may be consulted at the Library of the Free International University of Moldova and the web page of the Free International University of Moldova (<https://ulim.md/doctorat/sustinerea-tezelor-de-doctorat/>) and the National Agency for Quality Ensuring in Education and Research (<http://www.cnaa.md/>).

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TABLE OF CONTENTS

I. CONCEPTS OF THE RESEARCH.....	4
II. CONTENT OF PHD THESIS.....	8
III. GENERAL CONCLUSIONS AND RECOMMENDATIONS.....	19
IV. BIBLIOGRAPHY	24
V. LIST OF PUBLISHED WORKS	24
ADNOTARE	26
ANNOTATION.....	27
АННОТАЦИЯ	28

I. CONCEPTS OF THE RESEARCH

Actuality and importance of research theme. Globalization, internationalization, intellectualization, and digitalization processes are taking place today in the world economy. They require an investigation and application of new models for growth and development within all higher education institutions including those with a long history and firmly rooted social structure. Particular attention in this direction should be paid to the transformation of higher education institutions, which like no other organization, reflects the ability of the economy to generate, transfer and use knowledge. The goals of sustainable development, the ideas of global education, new information technologies and the resulting change in the traditional structure of labor markets led to a review of the tasks of education, traditional forms and methods of teaching, and contributed to a change in the educational paradigm as a whole.

Scientific and innovative activities in universities are traditionally a source of new developments, yet they become innovations only in the conditions of their commercialization, the success of which depends on the effective management of the interaction processes between science and market. Nowadays, significance of a higher educational institution determines by the development level of scientific and innovative structures, the ability to commercialize scientific and technical ideas and developments, the degree of influence of a scientific and educational institution on the innovative economy of the region and the country as a whole.

With the spread of the open innovation concept and the understanding of the role of education in innovative development, the concepts of the knowledge ecosystem and the innovation ecosystem arose. Universities that successfully combine educational and research activities are a key element of the ecosystem. New possibilities of the educational environment contributed to the application of the ecosystem approach to identify areas for improving the innovative and educational activities of universities, substantiate specific areas and forms of interaction between universities, business and the state, and develop relevant educational programs. The ecosystem approach has been applied in education as a response to the growing complexity and diversity of processes that determine the functioning of educational and innovation systems. Considering the educational system through the prism of the interaction of its elements among themselves and with the environment, the ecosystem approach allows a shift in emphasis from the characteristics of system individual elements to the relationship between them and the features of their interaction. The more stable and diverse the connections are, the more the educational system has development options and the more adaptive it is to changing conditions.

The study of the Israeli innovation ecosystem directly reflects the complexity, variability, flexibility and mobility of the modern innovation development process, both in functional and spatial aspects. An innovation ecosystem is being formed within the framework of Israeli higher educational institutions with the aim of unlocking their innovative potential, successfully organizing the commercialization of scientific research and development. This framework meets the needs of modern society and contributes to the innovative development of the country.

Despite considerable attention to this problem, many issues within organizations regarding innovation activities remain unsolved, while the main concern involves lack of methodology for assessing and managing a university innovation ecosystem. The foregoing evidence determines the relevance and significance of the chosen topic for the present research.

Study degree of the research theme. At the moment, the innovation ecosystem of higher education institutions is considered a relatively young phenomenon and, accordingly, an area of research. Nevertheless, there is a significant amount of published work accomplished by scientists,

researchers, and recognized experts in the field, who have defined key terms and established a conceptual framework.

Issues of the theory of innovation, theoretical concepts and approaches to the innovation ecosystem are given considerable attention in the works of a number of researchers: A. Tensley, J.F. Moore, R. Adner, R. Kapoor, B. Mercan, D. Goktas, D.S. Oh, C. Wessner, et al. Various aspects of the development of national innovation systems and innovation ecosystems are considered in the works of H.W. Chesbrough, D.J. Jackson, N. Rubens, M.G. Russell and other authors.

Works by Israeli authors S. Lach, Sh. Parizat, D. Wasserteil covered the problems of Israeli innovation policy, the creation of a venture capital industry in Israel, and, above all, the penetration of Israeli technologies into the world market.

H. Etzkowitz, Y. Cai, D.B. paid attention to the innovative development of the university and its role in national and regional innovation systems. Audretsch, P. Benneworth, G.J. Hospers, R. Cowan, E. E. Lehmann, A.L. Wal, R. Boschma et al.

The conceptual foundations of the higher education institutions innovation ecosystem and the directions for the development of this concept are presented in scientific works: M. Guerrero, K. Dunn, F.T. Rothaermel, G.H. Moraes, D.S. Agung, L. Jiang, S. Shane, E.G. Carayannis, M. Zedtwitz, F. Pirnay, as well as Israeli scientists H. Messer-Yaron, Y. Niv, I. Pinto, U. Kirsch, D. Getz, R. Klein, E. Barzani, E. Leck, and others.

Many scientists and practitioners have been studying the problems of managing an innovation ecosystem, including universities: E. Autio, J. Levie, S. Heaton, D. S. Siegel, D. J. Teece and others.

By their scientific studies, the Moldovan scientists Cojocaru I., Rosca A., Rusu A., Guzun M., Stratan A., Novac A., Gribincea C., Duca A., Dumitrasco M. and other authors consider the processes of innovative development of the Republic of Moldova, aimed at the development and/or implementation of innovations, improvement of innovative potential, cooperation between enterprises (including SMEs) and research institutions in the Republic of Moldova. The significance of the innovation activity of Moldovan higher education institutions and a number of barriers on this path are reflected in the works of Andrițchi V., Suslenco A., Prisacăru V., Cosciug C., Simciuc E., Cuciureanu G., Minciună V. and others. The scientific interest in solving the problems of developing innovative activity at the level of the country and higher education is given considerable attention; however, the matters related to the evaluation and management of the innovation ecosystem in the field of higher education are not sufficiently disclosed.

The contribution of economists is the basis for further research, development of theoretical provisions and practical recommendations in the field of assessment and management of the innovation ecosystem of higher education institutions. However, higher education institutions do not consider increasing competition, globalization, as well as the current state of the economy, while planning innovative activities in their organizations. This requires advancement of assessment methods, tools and improvement of innovation management mechanisms, especially at the stages of formation and development of the innovation ecosystem in universities.

Purpose of research consists in the scientific substantiation of the methodological provisions of the management mechanism, and the development of scientific and practical recommendations for assessing the development of the higher educational institutions innovation ecosystem in Israel to increase their competitiveness.

Objectives of research. The designated goal of the dissertation research led to the formulation of the following tasks:

- to reveal the conceptual aspects of the innovation ecosystem;
- to explore approaches to the formation and development of a university's innovative ecosystem;
- to describe approaches to assess the innovation ecosystem of higher education institutions;
- to conduct an analysis of Israel's national innovation system;
- to diagnose the innovative ecosystem of higher educational institutions in Israel;
- to analyze the factors of the external and internal environment of the innovation ecosystem of higher educational institutions in Israel;
- to develop a mechanism for managing the innovation ecosystem of higher education institutions;
- to form an approach to the development of a strategy for the formation and development of the innovative ecosystem of Israeli universities;
- to develop a methodology for assessing the development of the university's innovation ecosystem.

Hypothesis of research. The working hypothesis of the dissertation research is the assumption that the formation and development of an innovative ecosystem within higher education institutions contributes to the development of universities' research activities. This will increase the effectiveness of universities' activities in the development of innovations, training of personnel for the implementation of innovative activities, commercialization of intellectual property results, additional financing, and speed of identification and development of talents. Furthermore, the aforementioned modifications create conditions that will make Israeli education more attractive and aligned with international standards.

As part of the hypothesis, the author assumes that the mechanism for managing the innovation ecosystem of the university aimed at its development will be effective if the following conditions are met:

- maintaining a balance between teaching, fundamental, applied research and academic entrepreneurship at the university;
- creating favorable conditions for the interaction of participants in the innovation process;
- identifying and coordinating organizational and resource opportunities between the participants of the innovation ecosystem;
- providing conditions for the creation and functioning of the management center of the innovation ecosystem;
- forming the structure of the innovation ecosystem should take place according to the principle of a self-organizing system that has the ability to self-develop and self-regulate in the face of a changing environment;
- involving the governing structures of higher educational institutions, government and business structures to develop strategic directions for the development of the ecosystem;
- providing legal regulation (including internal management regulations), the appropriate organizational structure of the university, innovative infrastructure, a high level of entrepreneurial culture, etc.

Synthesis of research methodology and justification of chosen research methods. The methodological base relies on general scientific methods of comparison, questioning, studying

sources, general logical methods of analysis and synthesis, deduction, modeling, generalization, as well as interdisciplinary and particular scientific methods, including graph theory.

The research methods in the dissertation research are:

- theoretical description methods: analytical, comparative and descriptive methods;
- theoretical methods-actions: dialectical method of cognition of the innovative ecosystem of higher educational institutions, identification of existing approaches and concepts;
- empirical methods-descriptions: practical study of the Israeli higher education system and ratings of Israeli higher educational institutions; dissertation research; observation; questioning; studying the strategies of the world's leading universities and Israeli universities;
- empirical methods-actions: studying the influence factors of the external and internal environment on the formation and development of an innovative ecosystem of higher educational institutions, drawing up a phased forecast for its development within the framework of a specific strategy.

Abstract of thesis chapters, focusing on performed investigations and their need of achieving the purpose and the objectives of the research. The doctoral dissertation is presented on 168 pages of the main text. The structure of the doctoral dissertation includes an introduction, four chapters, conclusions and recommendations, a bibliography of 276 sources, 26 tables, 34 figures and 62 appendices.

In the introduction, the relevance and significance of the research topic, the degree of study of the topic are argued, the purpose and objectives are indicated, the research hypothesis is reflected, the research methodology, elements of scientific novelty, the research problem, the theoretical and practical significance of the work are presented, a summary of the dissertation chapters content is given.

Chapter I "Theoretical foundations of the innovation ecosystem of higher educational institutions as an object of management" investigates scientific approaches and main theoretical aspects of the concept of innovation ecosystem. Approaches to the formation and development of the innovative ecosystem of the university are disclosed and its main elements are described. Approaches to the assessment of the higher educational institutions innovative ecosystem are characterized.

Chapter II "Materials and methods of research" presents the content of the methodological foundations of the study, namely, the methods, technologies and research tools are characterized. The methodology for formulating conclusions based on the results of the study is described.

Chapter III "Analysis of the national innovation system and diagnosis of the innovation ecosystem of Israeli higher education institutions" analyzes the national innovation system, characterizes and evaluates higher education in Israel, as well as diagnostics of the innovative ecosystem of higher educational institutions are given. The factors of formation and development of innovative ecosystems based on universities are analyzed.

Chapter IV "Improvement of the mechanism for management and evaluation of the development of the innovative ecosystem of higher education institutions" presents the scheme of the mechanism for managing the university's innovation ecosystem and reveals the content of its structural elements, characterizes an approach to the development of a strategy for the formation and development of the university innovation ecosystem, and develops a methodology for assessing the development of the innovation ecosystem of higher educational institutions and the methodology for calculating the integral index.

In the conclusions and recommendations, at the theoretical and practical levels, the results of the research are summarized, key conclusions are formulated and presented, recommendations are given in accordance with the purpose of the given topic of the dissertation research.

II. CONTENT OF PHD THESIS

The first chapter "Theoretical foundations of the innovation ecosystem of higher educational institutions as an object of management". Scientific approaches to the content of the innovation ecosystem and the main theoretical aspects of the innovation ecosystem concept are investigated from the point of view of the interaction of various actors. Approaches to the formation and development of the university's innovation ecosystem are revealed and its main elements are described. An analysis of the conceptual apparatus "innovation ecosystem" was carried out. Likewise, the elements of innovation ecosystems of universities were defined. Approaches to evaluating the innovative ecosystem of higher education institutions were characterized

Disclosure of the "innovation ecosystem" (IE) content has undergone a certain evolution, i.e., from approaches that focus on individual components of the ecosystem, to an approach that seeks to integrate all components. "Innovation ecosystem" as a concept is considered by most scientists as the interaction of actors and their relationships based on cooperation in the form of a network community (organization), the purpose of which is to create innovations. The key role of interaction and interconnection between all IE participants is to generate new ideas (shared value proposition) and bring them to market. At the same time, IE participants need to use driving factors, anticipate possible obstacles and adjust their development strategies. IE is characterized by openness, complexity, self-organization, self-regulation and self-development. The application of the IE concept extends to the interests of business, education, civil society, small and medium enterprises, etc.

The main elements of the innovation ecosystem are knowledge and technology, actors and networks, innovation infrastructure, mutual exchange of resources between multiple partners, institutions, including special regulatory environments, social promotion of entrepreneurship, culture, and so on. In the innovation ecosystem, the emphasis is not on the functional roles of actors but on the collaborative nature of their interactions with each other and potential participants. According to the author, multi-purpose and integrated approach to the formation of an innovation ecosystem is necessary to ensure the availability of all necessary elements and to conduct joint work of all participants to create innovations.

The innovation ecosystem begins to acquire practical significance in the field of higher education, gradually becoming the core or integrator of regional and national innovation systems. The author formulated the generalized concept of the university innovation ecosystem (UIE) as a set of relations based on cooperation and knowledge exchange between various stakeholders (external environment). The aim is to create new ideas, to transfer technologies and to turn research into real results, to organize unification processes around the university, to integrate and coordinate the resources of other members of the innovation ecosystem (state, enterprise, etc.) on mutually beneficial terms. Universities are seen as one of the most prominent examples of a multi-component and polystructural ecosystem. According to the author, there is no universal model of the innovation ecosystem of the university, which will have the same structure. The main structural elements of the UIE in each university have their own characteristics and depend on various factors of the external and internal environment.

The author has developed the innovation ecosystem model of the university, which is shown in Figure 1.

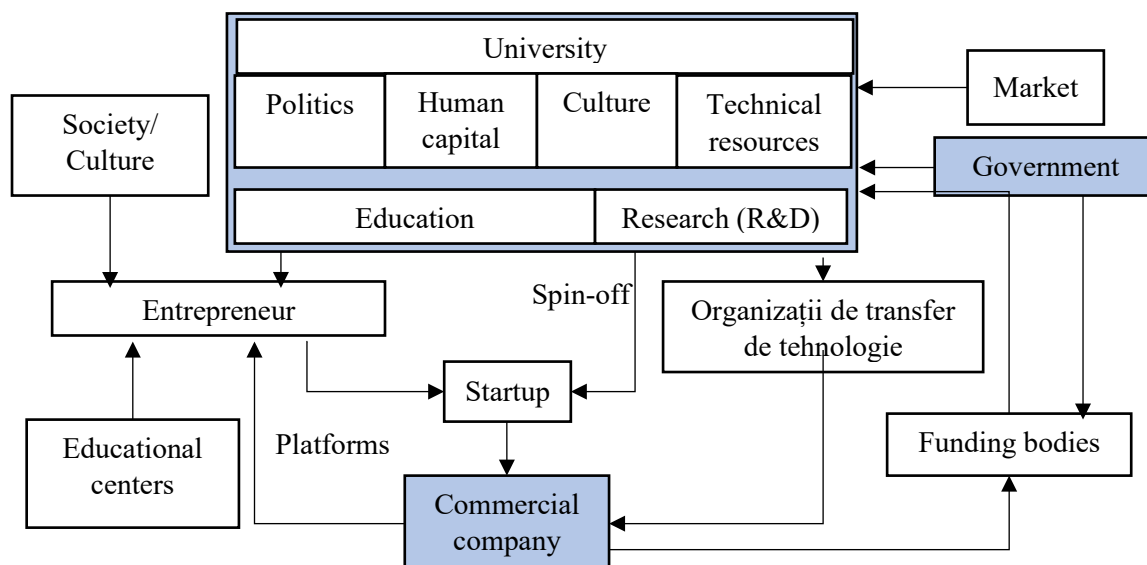


Figure 1. Innovation ecosystem model of the university [developed by the author based on¹]

The model includes human capital; established policies and procedures; tangible and intangible assets; organizational structures, including functional networks and organizational and economic mechanisms, and others.

In general, two groups of subjects of the university innovation ecosystem can be distinguished: external and internal. The first group includes the state (state and regional bodies), business partners (large industrial enterprises, small and medium-sized businesses, university graduates), research organizations, other universities, venture partners, investors, social organizations, etc. The second group of UIE subjects includes: scientific staff (professors, research associates, etc.), students (students, doctoral students, postgraduate students) engaged in research work; administration and employees of structural units that ensure the process of creating and commercializing innovations.

Universities are unique in their ability to link education, research and innovation, providing human resources and skills, funding and infrastructure, networks and leadership. Universities carry out several activities that promote innovation, including patenting, licensing, research collaborations, consulting, networking, entrepreneurship training, and helping start new businesses. The increasing complexity of organizational and coordination activities requires more systematic innovative approaches to the formation and development of innovative ecosystems of higher education institutions. All UIE participants should be given the right to use alternative, independent mechanisms to consider their interests in governance, evaluate the performance of the university's innovation ecosystem and evaluate events to discuss them.

The focus on different approaches to assessing the innovation ecosystem of higher education institutions is caused by a significant increase in competition between universities, an expansion of the educational services range, an intensive introduction of innovative forms of research and educational activities, and others. The author systematizes methodological approaches to assessing

¹ ISRAELI, M., BLAGORAZUMNAYA, O. *The innovative ecosystem of Israel's universities as a vector of sustainable development*. In: The international scientific conference „The modern paradigms of the national and global economy development” 30 – 31.10. 2020. Chisinau: Moldova State University, 2020, p.33-38. ISSN 978-9975-152-70-9.

the innovation ecosystem of higher education institutions and substantiates the need for an integrated approach that takes into account the choice of key ecosystem participants, the results of their interaction, the formation of a network community, the results of creating platforms, and the application of innovation management. An integrated approach to the analysis of innovation ecosystems requires the study of institutions, participants, networks of their interaction, the specifics and influence of environmental factors (culture, resources, technologies, and so on), as well as the internal environment.

The second chapter "Materials and methods of research" presents the content of the methodological foundations of the study, namely, the methods, technologies and research tools are characterized. The methodology for formulating conclusions based on the results of the study is described.

The following research methods were used in the dissertation research: systemic, structural, sociological, multivariate comparative and factor analysis, methods of statistical processing of information and expert assessments, the method of describing organizational structures, expert methods, comparative and comparative analysis, mathematical modeling methods, tabular methods and graphical presentation of information, statistical data. In the process of writing the dissertation work, general scientific methods were also used: scientific abstraction, classification, comparison, analysis and synthesis, systematization, formalization, modeling, methods of comparative, structural-functional and system analysis.

Methodological support in the dissertation research includes various methods for analyzing primary information collected for the purposes of this study and secondary information that exists in open sources and formulating the main conclusions and recommendations that take into account the peculiarities of research methods for assessing and managing the innovation ecosystem of higher education institutions. In order to facilitate the process of cognition, according to the author, it is advisable to pay attention to the study of the main theoretical approaches and concepts, using analytical, empirical research methods, more aimed at studying innovation ecosystems at the global and national levels. This approach will increase productivity and update the findings of scientific research.

The third chapter "Analysis of the national innovation system and diagnosis of the innovation ecosystem of Israeli higher education institutions" analyzes the national innovation system, characterizes and evaluates higher education in Israel, as well as diagnostics of the innovative ecosystem of higher educational institutions are given. The factors of formation and development of innovative ecosystems based on universities are analyzed.

Israel belongs to the developed states of the innovative type of development, which has a well-formed national innovation system (NIS)². Israel is a leader in a number of dimensions in the GII ranking that reflects the strength of its innovation system, such as heavy investment in R&D and quality scientific research³. The indicators ratings give an assessment of the country's position in the global innovation space, but it may not quite clearly characterize the features of the country's national development and its innovation system.

Israel NIS acts as a link between the state, the scientific, technical and research sphere, private business and the industrial sector, and the banking system. It contains all the elements of

² LEMARCHAND, G.A., LECK, E., TASH, A. *Mapping research and innovation in the State of Israel*. UNESCO Publishing, 2016, nr. 5, 345 p. ISBN 978-92-3-100147-5.

³ *Israel Innovation Authority's 2019*. Innovation Report. Israel Innovation Authority. [accessed 03.04.2021]. Available at: https://innovationisrael.org.il/en/sites/default/files/Israel%20Innovation%20Authority-2019%20Innovation%20Report_eng.pdf.

the innovation cycle: fundamental and applied science, research and development (R&D), funding structures, and a system for commercializing innovations.

There are three R&D sectors in Israel⁴: commercial, scientific and government. Each of the sectors in Israel operates in the context of technology transfer independently, according to its own goals and means. Sources of funding for research and development can be divided into public, business sector funds, other national sources, foreign sources. The structure of domestic spending on research and development by sources of funding differs by country, as shown in Figure 2.

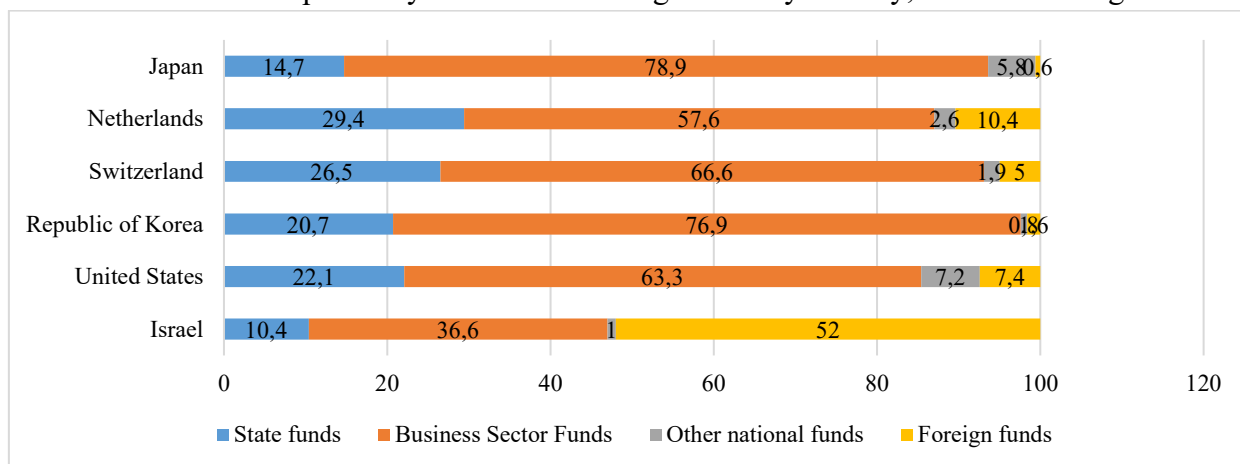


Figure 1. Structure of internal costs for research and development by funding sources, 2020, % [developed by author based on ⁵]

Compared to other countries in Israel, foreign sources of funding are high and account for 52%, 36.6% are funds from the business sector. The share of public funds for R&D is the lowest among the OECD countries and is 10.4%.

Israel's innovation system is characterized by a high level of human capital development. Israel ranked 23rd in Human Development Index in 2022 (0,906)⁶. In terms of R&D personnel per 10,000 employed in the economy, Israel ranks second among other countries with 212 people. This indicator reflects the high potential of the Israeli NIS in terms of innovative activity of the personnel of various organizations.

The structure of Israel NIS was formed gradually, the forms and arrangement of its elements have their own unique features. The author presents a simplified model of Israel's innovation system in Figure 3.

⁴*Technology Transfer in Countries in Transition: Policy and Recommendations*. WIPO, 2012. [accessed 19.11.2020]. Available at: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_transition_2_b.pdf.

⁵ ГОХБЕРГ, Л.М., ДИТКОВСКИЙ, К.А., ЕВНЕВИЧ Е.И. *Индикаторы науки 2022: статистический сборник*. Москва: НИУ ВШЭ, 2022. 400 с. ISBN 978-5-7598-2376-6.

⁶ *Human Development Index*. [accessed 01.07.2022]. Available at: <https://worldpopulationreview.com/country-rankings/hdi-by-country>

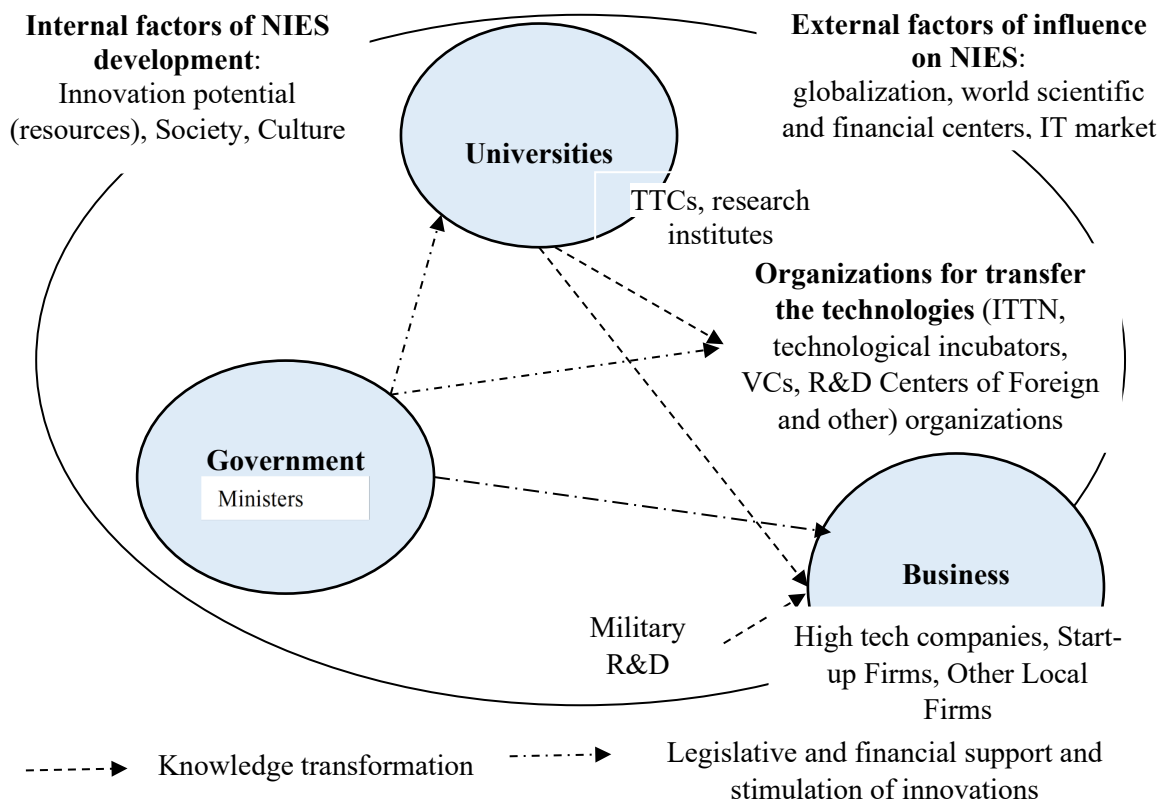


Figure 3. Israeli national innovation system model [developed by author based on⁷]

This model is presented in the form of a triangle and is characterized by the close interaction of three main elements: the state; business; universities in the part of their activity that is related to R&D. In the model, next to the main elements, other technology transfer organizations are represented: technological incubators, venture capital institutions (VCs). In the group of firms (business), in addition to high-tech companies, subgroups can be distinguished: small innovative firms, Start-up Firms, Other Local Firms, R&D Centers and foreign firms located outside the Israeli market. Technology transfer processes are also displayed in the form of two types of inter-firm links (forms of cooperation) between NIS elements. The first group covers processes and organizations that reflect the transformation of knowledge, the transfer of technologies and innovative products. These organizations include universities and research institutes that work closely with the business sector. The commercialization of scientific research and technology is carried out through the University-owned Technology Transfer Company - TTC. The second type of relationship between NIS agents relates to resource flows, which include public funding for university research, public and commercial investment (in technology incubators, as well as direct investment in start-ups). Thus, Israel NIS is characterized by large foreign high-tech corporations, developed small innovative businesses, stock market and venture capital.

Universities are one of the main participants in Israel's innovation system. Research and development in Israel is carried out at the country's eight universities, dozens of state and public research institutes, and hundreds of civilian and military enterprises⁸. International ratings emphasize the high level of the Israeli education system. The participation of Israeli universities in the ratings of educational organizations indicates their focus on innovation and development.

⁷ ISRAELI, M. *National Innovation System of Israel: features and structure*. In: EcoSoEn, 2020, nr. 1-2, p. 155-164. ISSN 2587-344X.

⁸ *Israel Ministry of Foreign Affairs*. [accessed 11.04.2022]. Available at: https://mfa.gov.il/MFARUS/Pages/Israel_MFA_Russian.aspx.

To analyze the innovation ecosystem, the author singled out the enlarged structural elements of the university innovation ecosystem: 1) scientific, 2) personnel, 3) organizational and 4) financial and 5) the interaction of the UIE participants.

1) The scientific component of the university innovation ecosystem implies the potential of the university for the development and deepening of fundamental and applied scientific research and the use of their results, as well as the achieved level in using the results of intellectual activity (registration of patents, know-how and licensing agreements) and recognizing the importance of scientific research and innovation activities (participation in grants, support programs at various levels, etc.). Evaluation criteria can be the total number of publications; number of publications indexed in Web of Science and Scopus; the number of citations of publications indexed in Web of Science and Scopus; the number of grants received for the reporting year and others. Israeli higher education institutions are simultaneously engaged in scientific research and commercialization of developments.

2) The personnel component of the innovation ecosystem of the university is formed by qualification and competence characteristics of various categories of university staff, which determine readiness for innovation; the potential for attracting and adapting young teachers and scientists as the most promising human resource for the innovative development of the university. Israel has over 145 scientists for every 10,000 employees, one of the highest rates in the world, according to the Investment Promotion Center⁹. Research is carried out by graduate students of various specialties, who make up 32% of all university students¹⁰. This index is very high compared to other developed countries.

3) The organizational function involves, to form an innovative ecosystem of universities, the creation of an appropriate infrastructure in them that ensures the development of the scientific component, as well as a business environment based on cooperation. The result of the organizational function of the UIE is the creation of start-ups based on the university, technology transfer centers, business incubators and technology parks. The level of use of the results of intellectual activity of universities in the form of applications for intellectual property (IP) is shown in Figure 4.

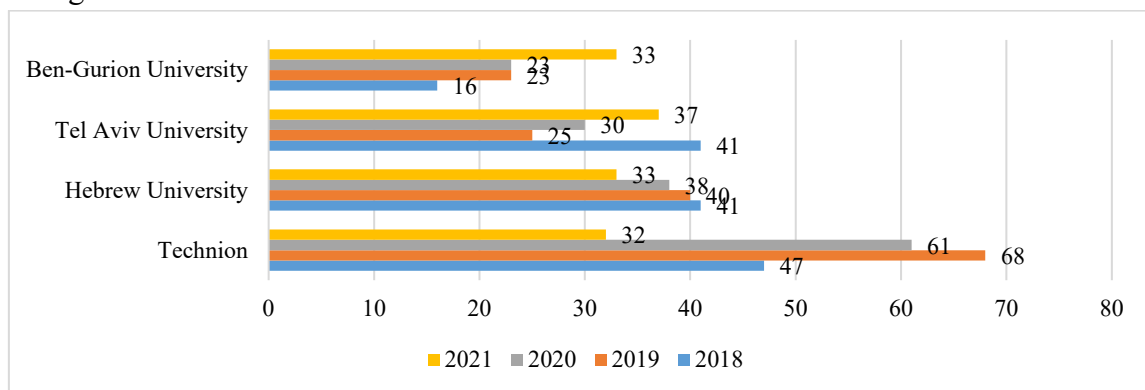


Figure 4. Number of IP applications of Israeli universities in 2018-2021 [developed by the author based on ¹¹]

⁹ *Investment Climate Statements: Israel*. U.S. Department of State. 2021 [accessed 01.07.2022]. Available at: <https://www.state.gov/reports/2021-investment-climate-statements/israel/>

¹⁰ *Higher Education in Israel: Background & Overview*. [accessed 07.04.2022]. Available at: <https://www.jewishvirtuallibrary.org/background-and-overview-of-higher-education-in-israel#2.>

¹¹ *Statistical Country Profiles*. WIPO statistics database, 2021. [accessed 07.02.2022]. Available at: https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=IL

The data in Figure 4 shows that Technion-Israel Institute of Technology (Technion) received the highest number of IT applications in 2018-2021 compared to other universities, but there is a significant decrease in 2021 compared to 2019. Also, at Herber University there is a slight decrease in IP applications in 2020 compared to 2019. In the other two universities, the number of IP applications is increasing annually.

All universities in Israel enter into agreements with subsidiaries (TTC) that commercialize research results. The TTC actively promotes patents for inventions by faculty and university staff.

There is no single model for building an innovative infrastructure in universities. Each Israeli university is developing its own innovation infrastructure. This is explained by the fact that universities have a different profile of training specialists (technical, economic, legal, etc.), their own capabilities and resources.

4) The financial component of the innovation ecosystem of universities should ensure the growth of the quality and volume of funding for scientific research and innovative projects. Israel spent 5.44% of GDP on R&D in 2020, more than any other country¹². Research universities in Israel are characterized by a high diversification of R&D funding sources: public (science fund, R&D programs); private (in the form of donations from state or charitable organizations, including from foreign sources with the assistance of diasporas around the world; investors and commercial companies), from Israeli and international funds for competitive research based on interstate agreements. This allows maintaining a high level of academic freedom, conducting research that does not have an immediate commercial return, and retaining talents in national universities.

5) The innovation ecosystem of the university is characterized by a special interaction between its participants that create a favorable environment for the speedy implementation and commercialization of innovative research. Israeli universities work closely with companies in a nationally built ecosystem that includes the state, the army, financial institutions (venture companies, funds), international projects and multinational corporations.

In general, the innovative ecosystem of Israeli universities is at various stages of development (formation, functioning, development). The results of testing conducted by the author showed that 55.6% of respondents consider the stage of formation characteristic of the innovation ecosystem, 22.2% - UIE is formed, 22.2% - UIE is developing. In this regard, the innovation ecosystem requires the interaction of participants from different departments of the university.

Despite the positive aspects of the entrepreneurial environment in Israel, factors that inhibit the development of the innovation ecosystem of universities have been identified. In the absence of a single concept, it is difficult to involve interested parties in the innovation development process, since they must have a single view of the possibilities and problems of ensuring the growth of the ecosystem. In the ecosystem, policies and programs must constantly develop, so as not to lose talented personnel, to have access to resources and opportunities, necessary for more effective functioning of the ecosystem.

The fourth chapter "Improvement of the mechanism for management and evaluation of the development of the innovative ecosystem of higher education institutions" presents the scheme of the mechanism for managing the university's innovation ecosystem and reveals the content of its structural elements, characterizes an approach to the development of a strategy for

¹² *OECD Science, Technology and R&D Statistics*. [accessed 11.02.2022]. Available at: https://www.oecd-ilibrary.org/science-and-technology/data/oecd-science-technology-and-r-d-statistics/main-science-and-technology-indicators_data-00182-en.

the formation and development of the university innovation ecosystem, and develops a methodology for assessing the development of the innovation ecosystem of higher educational institutions and the methodology for calculating the integral index.

The author has developed and proposed a mechanism for managing the innovation ecosystem of higher educational institutions, including a set of such elements as: goals, objectives, management principles, subject, object, methods, ways of interaction of elements, conditions, and factors of functioning of the mechanism and the results of the mechanism (Figure 5).

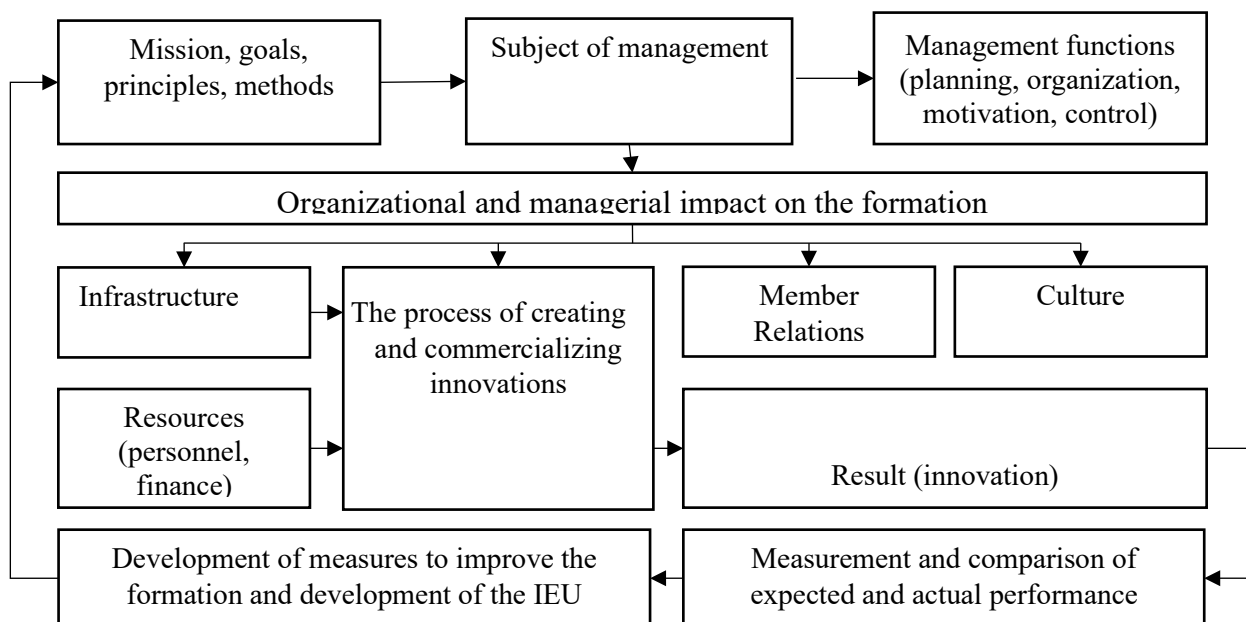


Figure 5. Scheme of the mechanism for managing the innovation ecosystem of the university [developed by the author based on¹³]

The author's understanding of improving the mechanism for managing the university innovation ecosystem consists of a number of proposals that reflect the two sides of ecosystem management - structural and managerial. As part of the structural side, the author proposes the creation of a coordination center based on the university with its own structure of elements interaction for the implementation of appropriate management and regulation of the management process in the formation and development of the UIE. In the context of the managerial side, the processes of managing relations between UIE participants are considered, which, taking into account the interaction, will be the most productive within the framework of their behavior models: autonomy, partnership, consensus and division of functions. The classical functions of management (planning, organization, motivation, control), the role of management, organizational leadership, culture was also considered and the features of their manifestation during the formation and development of the UIE were highlighted.

The UIE governance mechanism cannot and should not become a static process. It should be based on an evolving network that goes beyond individual organizations and institutions and is determined by the goals and values of the participants, their potential, resources, the quality of interaction and the effect achieved. At the same time, it is important to use the resources and self-development energy of the university's innovation ecosystem core.

¹³ ISRAELI, M. *The mechanism for management the innovative ecosystem of the university*. In: EcoSoEn, 2022, an. 5, nr. 1-2, p. 54-59. ISSN 2587-344X.

Purposeful management of the formation and development of innovation ecosystems is justified and necessary. This goal requires a strategic approach, namely the development of a strategy aimed at developing the innovation ecosystem itself. The author has developed and proposed a strategic approach to developing a strategy for the formation and development of the innovation ecosystem within three consecutive stages: conducting theoretical and practical research; creation of an algorithm for forming a strategy; development of the substantive component of strategic scenarios.

The second stage of strategy development is to create an algorithm, which is schematically presented in Figure 6.

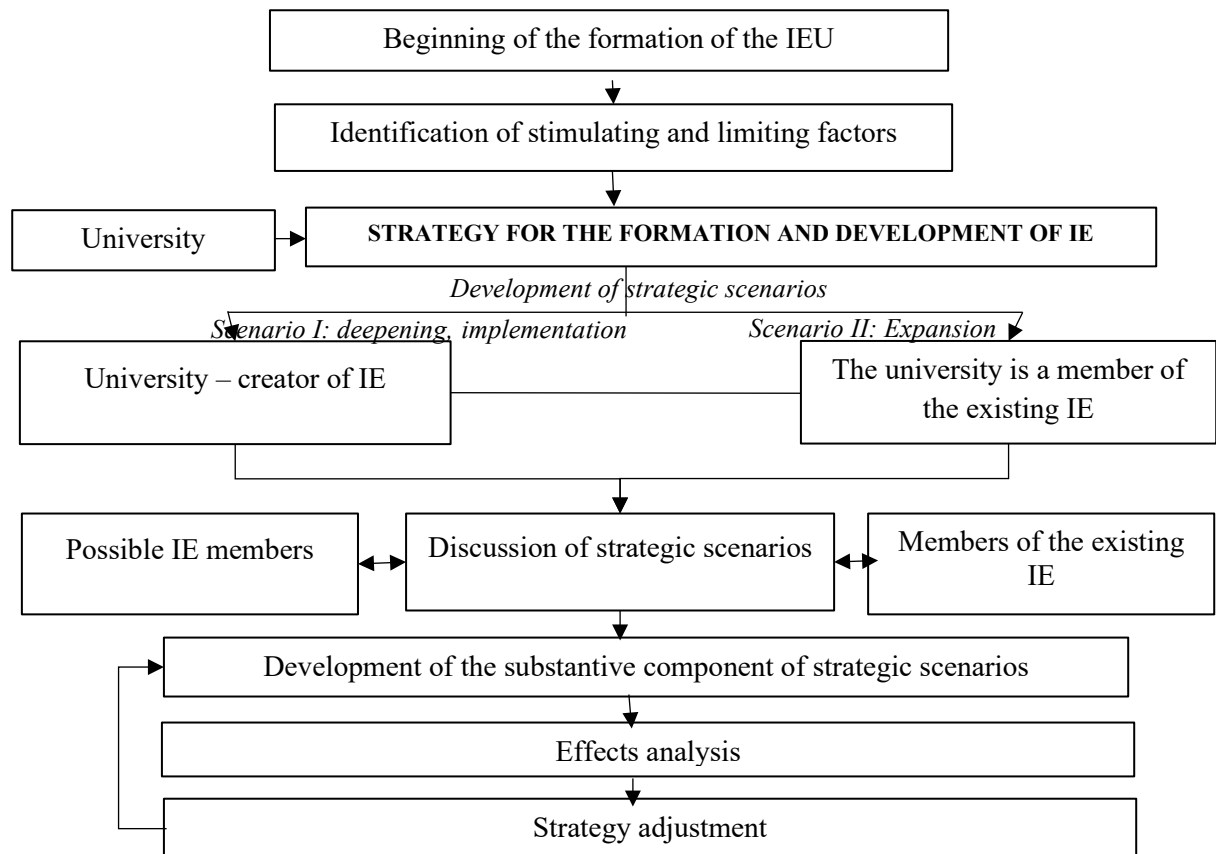


Figure 6. Algorithm for developing a strategy for the formation and development of the university's innovation ecosystem [developed by the author]

In the presented algorithm, the formation of the strategy begins with the analysis of the influence factors, as well as the identification of limiting factors that act as research boundaries. When developing the strategy, the author considered two scenarios for the formation and development of the UIE: the university is the creator of the ecosystem or the university as a participant is part of one or more IE. In accordance with the above scenarios, the strategy of the university can be of two types: the strategy for the formation and development of IE based on the university; strategy for integrating the university into the existing IE. Each of the strategies has its own goals, objectives, principles of formation and development.

When developing the content component of the second strategic scenario, the author identifies four strategies for the university's behavior as a participant in the existing innovation ecosystem: the strategy of a coordinated approach, the strategy of cooperation, the strategy of creating an innovation center, the strategy of creating a platform. These strategies characterize the

sequence of the university's activity manifestation as a member of the ecosystem (ascending from the conditionally passive role of the university to the active one). The author considered the university activity at the stages of the innovation ecosystem life cycle within the framework of development strategies.

A methodology for assessing the development of the university's innovation ecosystem based on Balanced Scorecard, which is recommended for implementation if there is a strategy or a strategic plan with directions for the innovative development of the university. The author proposed a list of indicators for assessing the development of the university's innovation ecosystem in terms of its functional components (Academic research and entrepreneurship, Interactions and Networks; Processes, Resources). The functional component "Academic research and entrepreneurship" demonstrates the results of scientific research and development of academic entrepreneurship of the university, as well as their contribution to the economy of the region. "Interactions and Networks" interprets the productivity of the UIE, the development of interactions and practices of co-evolution and collaboration, the presence of an innovative culture, social capital. "Processes" shows the starting conditions for the formation of the UIE, the circle of potential participants and the processes in the development of the UIE. "Resources" reflect the availability of resources for the development of the UIE. The author considers the characteristics of each functional component and their strategic aspects.

The proposed functional components and their indicators, according to the author, sufficiently characterize the conditions for the effective development of innovation activity formed at the university, and their systematic application will give an adequate assessment of the innovation ecosystem development. The proposed indicators can be supplemented with qualitative indicators based on a survey of ecosystem participants and various experts. This will make it possible to evaluate not only the effectiveness of the interaction of all participants in the innovation ecosystem, but also to determine the list of evaluation criteria, the possibilities of using the evaluation results. The choice of indicators (absolute and/or relative) depends on the objectives of the assessment and the availability of information about them.

Based on the developed system of complex indicators for assessing the development of the university innovation ecosystem, the author proposes the construction of an integral index of the innovation ecosystem development, as well as private indices (sub-indices) of functional components. Sub-indices are calculated based on the system of indicators for each functional component.

The calculation of this indicator will make it possible to track the dynamics of the development of the UIE of an individual university; comparison of universities by the level of the innovation ecosystem development as a whole and in its individual components, including a comparison of specific evaluation indicators; it will identify the "weak points" and reserves for the universities innovative activities development; monitor; provide the management of the UIE with the necessary information in the process of making management decisions; contribute to improving the competitiveness of the university and a worthy position in national and world rankings.

The formation and development of an innovation ecosystem is a complex and multi-stage process. Insufficient attention to certain aspects is fraught with risk for the university's innovation ecosystem in general and for its participants in particular. In this regard, the author developed a system and algorithm for assessing the development of the university's innovation ecosystem (Figure 7).

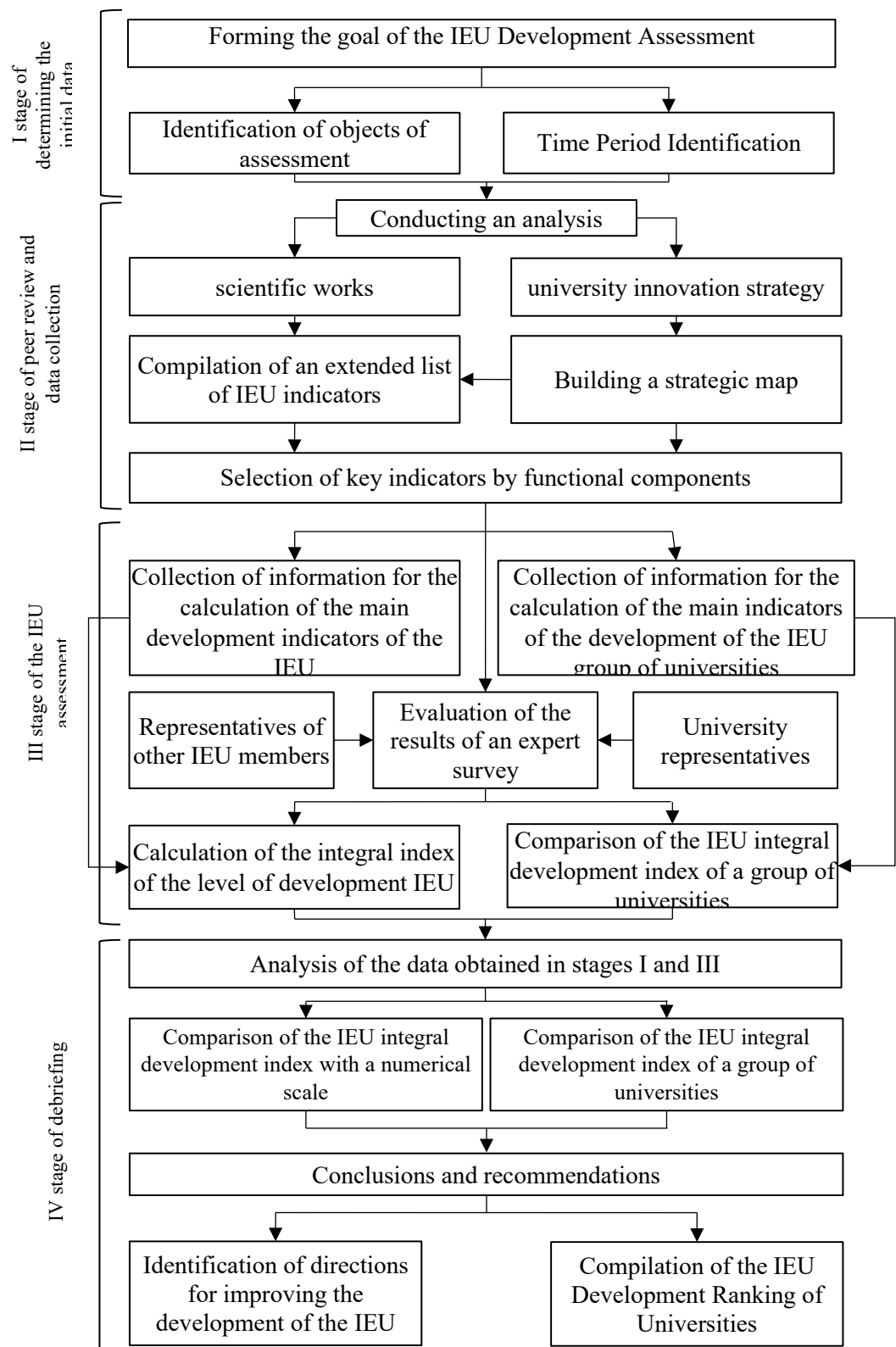


Figure 7. Algorithm for assessing the development of the university's innovation ecosystem [developed by the author]

The methodology developed by the author for evaluating the effectiveness of the university's innovation ecosystem consists of four stages: the stage of determining the initial data; the stage of expert evaluation and data collection; the stage of evaluating the UIE and calculating the integral index; the stage of summing up the results. This methodology is an approach to assessing the effectiveness of the strategic aspects of the functional components of the university's innovation

ecosystem related to the overall goals and the developed strategic map of the relationship between the strategic goals and directions of the UIE.

III. GENERAL CONCLUSIONS AND RECOMMENDATIONS

Based on the conducted research, the following conclusions were drawn:

1. As a result of research, the author highlights the fundamental approaches and main aspects of the concept of the innovation ecosystem. It was revealed that the research of scientists focuses both on individual aspects of the innovation ecosystem (knowledge transfer, connections and configuration of structures, etc.), and on its participants (from the standpoint of universities, central firms, small and medium-sized enterprises, etc.). The diversity and completeness of interpreting the concept of "innovation ecosystem" should imply a parallel consideration of innovation ecosystems from the standpoint of their participants or aspects, i.e. integration approach.

2. Summarizing the conceptual and theoretical positions of various researchers on the composition of the elements of the innovation ecosystem, the author concluded that there is no single methodology for the formation of its composition and structure. Understanding the composition of innovation ecosystems as interrelated actors, processes, and links between them is determined by their formal and informal nature, institutional and infrastructural support (techno parks, incubators, services, etc.) goals. The need for missing knowledge and technologies, the need for a significant reduction in the processes of initiation and implementation of innovations unite actors and build relationships on certain principles (self-organization and self-development; joint generation and use of information and intellectual resources; openness to external challenges, and others).

3. Based on the existing definitions of the university innovation ecosystem, the author formulated a generalized concept of this process, which covers the main priority aspects identified by the researchers. The university innovation ecosystem is a complex of relationships between the subjects of the innovation process, its participants have different competencies and capabilities, constantly exchange knowledge, manage its flows, distribute, and use this knowledge, are interdependent from each other and interact based on partnership agreements in the process of commercialization.

4. The emergence of the "innovation ecosystem" concept in the scientific and educational environment means a transition to a new paradigm in management, which has its own philosophy and requires a different behavior in strategic and operational management, and for practitioners it simplifies the introduction of innovative opportunities and training, reducing the time to market new products (technologies and/or services), expansion of market access. The concept of a higher education institutions innovative ecosystem should become not only a new educational concept, but also a natural, harmonious, open and innovative model for the development of modern higher education. A higher education institution, as the core of an innovation ecosystem, should have a few specific qualities, including: the development of an effective development strategy; focus on leading positions in the field of territorial innovative development; positioning the university as a leader in innovative development; creation of intellectual property and the ability to offer breakthrough technologies and solutions. The process of forming and developing the innovative ecosystems of higher education institutions is aimed at increasing their competitiveness, impact on the regional and national economies, and human development. For the successful implementation of this process, it is necessary to modernize the system of higher education, taking into account national specifics and innovative development of the country.

5. In the dissertation work, the author defines a few special criteria for the innovation ecosystem of the university: the direction of the higher educational institution, the level of education, the approach to science, the degree of diffusion of innovations, the level of entrepreneurship development, the quantity and quality of links with the external environment, the physical infrastructure and its capabilities, and much more. The development degree of these and other criteria has a direct impact on the functioning, establishment and further development of the university's innovation ecosystem.

6. In the dissertation work, the author defines approaches to assessing the innovation ecosystem: institutional, structural, network, platform, factorial and traditional (rating). The conclusion is made about the need for an integrated approach to assessing the universities innovation ecosystem, which requires the study of institutions, participants, networks of their interaction, the specifics and influence of environmental factors (culture, resources, technologies, and so on), as well as the internal environment.

7. As a result of research, the author revealed that due to the interaction of the state, business and the academic sector, the Israeli development model has turned into a high-tech innovative industry, a start-up industry. The relationship between the role of the Israeli public sector, which supports the interaction between R&D in the military and civilian sectors, is determined; cooperation programs with the private sector; stimulation of foreign R&D centers of transnational corporations in Israel; the industrial sector benefits from access to advanced knowledge and technologies developed by research universities. The author noted that state structures support industries that are a priority for the state, such as low-tech, nanotechnologies, biotechnologies, cybersecurity technologies, and environmental protection technologies, through grant programs of the R&D fund and special programs, targeted assistance to industry research institutes, the creation of specialized incubators and venture financing funds, the organization of specialized centers in academic institutes and others.

8. The relationship between science, education and the high-tech industry of Israel in the field of innovation is determined, which develops in a consolidated and systematic manner based on the accumulated national innovation potential and international cooperation with leading countries. According to the author, in this process, state policy in the field of financing R&D, training and providing highly qualified personnel, and bridging the gap between the technical sector and the rest of the economy, should stimulate and accelerate the introduction of new technologies. The functioning of the national innovation system involves many tools: the protection of property (both material and intellectual), capital and labor management, the financial market and consumers. However, the interaction of the state, science and business, and, accordingly, the procedure for the functioning of innovative development tools depends on the specifics of the country, its economic and legal conditions.

9. The problems of the innovation ecosystem of Israeli universities are identified based on the analysis of the main elements (scientific, personnel, organizational, financial, interaction of participants): the desire to conduct more applied research compared to fundamental research does not always have a positive impact on the research activities of universities; the persistence of the trend of a low number and insufficient motivation of university researchers reduces the innovative activity of universities; low levels of state funding for university R&D forces universities to look for other sources; the gap between the formation of an innovation infrastructure and obtaining noticeable results from the functioning of the innovation ecosystem has an impact on supporting and stimulating the commercialization of intellectual activity; the lack of a management

mechanism for the formation and development of innovative ecosystems hinders the effective relationship of its participants; the lack of consistency in the presentation of statistical data on the innovation activity of ecosystem participants hinders the adoption of decisions on its further development trajectory.

10. It is concluded that at the moment the universities innovation ecosystem is non-systematic and fragmented due to the lack of their participants: a single concept (only contractual obligations are fulfilled); collective assets located at different stages of the value chain; readiness for additional "investments" in a joint product. At the same time, key universities represent Israel's research cluster and are the anchor of Israel's technology and innovation system.

11. The analysis of competitiveness factors made it possible to identify external opportunities and internal reserves of the innovation ecosystem of Israeli universities, and made it possible to determine strategic directions for developing a competitive strategy for the development of the innovation ecosystem of the university. The development of the university innovation ecosystem directly depends on the development of the external environment (state policy, integration of economic sectors with science, infrastructure and development programs, etc.), as well as on the internal potential of universities for development (partnerships, human capital, infrastructure and programs, entrepreneurial culture).

In order to improve the assessment and management of the innovation ecosystem of higher education institutions, based on the results of the study, the author formulated the following recommendations:

1. Researchers and practitioners in the field of innovation ecosystems are encouraged to use the author's definition of the university's innovation ecosystem management mechanism. The structure of the mechanism is a set of processes, principles and methods that ensure the achievement of certain goals, the necessary dynamics of increasing funding, resources and connections in the process of interaction of its participants, their communities regarding the creation and commercialization of innovations. This definition reveals the essence of the structure of the management mechanism, which consists of interrelated elements that characterize the direction of the innovation ecosystem (mission, goals, and principles), the type of managerial activity of the subject (function). It consequently sustains an organizational and managerial impact on the process of creating and commercializing innovations, providing resources, interacting with ecosystem participants, entrepreneurial culture, results. The developed mechanism will allow regulating the management process based on the creation of a coordinating center based on the university and improve the productivity of relations between participants within the framework of their behavior models (autonomy, partnership, consensus, and division of functions) during the formation and development of the UIE. In order to facilitate the process of cognition and improve the accuracy of the conclusions formulated in the dissertation work, according to the author, it is advisable to conduct more of theoretical research on the study of the main approaches and concepts of the university's innovation ecosystem, using analytical, empirical methods.

2. A recommendation to the Israeli Innovation Authority, the Israeli Ministry of Education, is to implement and apply an integrated approach of the analysis in the formation and development of the innovation ecosystem of universities in order to maximize opportunities and minimize threats. This process will form a common understanding of the problems, ensuring the growth of the ecosystem and develop strategic measures to eliminate them. To achieve that, it is necessary to develop a unified concept, policies, initiatives and specific support programs to ensure the formation and development of innovative ecosystems, improve the migration situation with

scientific personnel in the country, provide universities with access to resources and support the national culture of entrepreneurship.

3. The Government of Israel is recommended to increase the allocated budget funds for university R&D as an investment to strengthen the material and technical base of higher education institutions, create a more comfortable educational infrastructure, attract more talent and innovators.

4. The Israel Innovation Authority, the Israeli Ministry of Education, the Israeli National Bureau of Statistics are recommended to develop a database for managing innovation activities of various subjects, which is understood as an automated information system that allows collecting, storing, processing and transmitting (issuing) information. To do this, it is necessary to put into practice the provision of periodic reporting, reflecting the level of innovation activity of higher education institutions and other participants in the country's innovation ecosystem, in order to improve the efficiency of planning, organization, motivation, control, coordination and decision-making in the interests of all stakeholders.

5. Subjects of the Israeli higher education system are encouraged to develop their own model of the innovation ecosystem, taking into account the specifics of the university and the innovation environment, taking the model proposed by the author as a basis. The model includes human capital, applicable regulations and procedures, tangible and intangible assets, organizational structures and other elements.

6. As recommendation for the higher education system in Israel was to take as a basis the mechanism for managing the innovation ecosystem of the university proposed by the author to form an effective system of interactions between participants in order to increase their innovative activity. The author proposes to put into practice a set of management measures at the stages of formation and development of an innovation ecosystem, taking into account the specifics of the activities of a particular university. The creation of a coordination center as an element of the management mechanism, proposed by the author, will improve and structure management processes, distribute tasks between participants and improve interactions between them. The activities of the focal point should be aimed at managing the provision of resources for the process of creating and commercializing innovations in order to obtain high results.

7. A recommendation for the Universities and interested parties was to implement a strategic approach to developing a strategy for the formation and development of an innovative ecosystem within the framework of three consecutive stages: carrying out theoretical and practical research; creation of an algorithm for the formation of strategies. Development of a content component of strategic scenarios. At the same time, universities are recommended to adhere to one of the strategic scenarios (university - creator of IE or university - participant of existing IE) when choosing an approach to developing a strategy for the formation and development of IE. Performers – participants of the innovative ecosystem (research units, technology-transfer support units, business development units and companies, etc.) was recommended to carry out complex strategic activities that correspond to the specific strategies of the first or second scenario, depending on the stage of the IE life cycle.

8. The Israeli Ministry of Education, the National Bureau of Statistics of Israel, subjects of the higher education system are recommended to calculate the integral index of the development of the innovation ecosystem of the university based on indicators of functional components (Academic research and entrepreneurship, Interactions and Networks, Processes, Resources), for comparison with other UIE and formation of a national rating for the development of innovative

ecosystems; encourage higher education institutions that provide such data to adapt to the new reporting format, track which indicators affect the Israeli Higher Education Integration Composite Index. To calculate the integral development index of the university's innovation ecosystem, a balanced scorecard was implemented. Balanced Scorecard is a universal mechanism for interpreting the university's strategy through a set of interrelated indicators. To calculate the integral index of the development of the innovation ecosystem of the university, it is recommended to use a balanced system of indicators

9. Senior managers of universities are encouraged to create their own balanced scorecard to develop goals and management indicators of the strategy for the formation and development of the innovation ecosystem, harmonize strategic and current plans, and provide the necessary information on predetermined strategic aspects and indicators. The proposed four perspectives for building a strategic map for the formation of an innovation ecosystem (“technological entrepreneurship”, “interactions and connections”, “resources”, “infrastructure”) cover the “hard” and “soft” components of the innovation ecosystem in their causal relationships.

10. Subjects of the Israeli higher education system are recommended to put into practice the methodology developed by the author for assessing the development of the university's innovation ecosystem, which consists of four stages (the stage of determining the initial data; the stage of expert evaluation and data collection; the stage of assessing the UIE and calculating the integral index; the stage of summing up). This approach will accurately assess the effectiveness of the activities of various strategic aspects of the functional components of the UIE.

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V. LIST OF PUBLISHED WORKS

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ADNOTARE

la teza de doctor în științe economice Israeli Milana cu tema „Evaluarea și managementul ecosistemului de inovare în instituțiile de învățământ superior din Israel”, Universitatea Liberă Internațională din Moldova, Chișinău, 2023

Structura tezei: introducere, patru capitole, concluzii și recomandări, bibliografie din 276 de surse, 168 pagini de text principal, 34 figuri și 26 tabele, 62 anexe.

Scopul tezei este de a fundamenta științific prevederile metodologice ale mecanismului de management și elaborarea de recomandări științifice și practice pentru evaluarea dezvoltării unui ecosistem inovator al instituțiilor de învățământ superior din Israel pentru a-și îmbunătăți competitivitatea.

Sarcinile tezei: dezvoltarea aspectelor conceptuale ale ecosistemului inovației; explorarea abordărilor de formare și dezvoltare a unui ecosistem inovator al unei universități; descrierea abordărilor de evaluare a ecosistemului de inovare al instituțiilor de învățământ superior; efectuarea unei analize a ecosistemului național de inovare al Israelului; diagnosticarea ecosistemului inovator al instituțiilor de învățământ superior din Israel; analizarea factorilor mediului extern și intern al ecosistemului de inovare al instituțiilor de învățământ superior din Israel; dezvoltarea unui mecanism de gestionare a ecosistemului de inovare al instituțiilor de învățământ superior; să formeze o abordare a dezvoltării unei strategii pentru formarea și dezvoltarea ecosistemului de inovare al universității; dezvoltarea unei metodologii de evaluare a dezvoltării ecosistemului de inovare al universității.

Noutate științifică: constă în definirea ecosistemului de inovare al universității și dezvoltarea trăsăturilor sale. Ele se exprimă prin rolul de intermediar al ecosistemului dintre universitate și mediul de piață externă. În procesul acestei medieri, instituțiile științifice și educaționale, partenerii de afaceri și organizațiile guvernamentale sunt unite. A fost dezvoltat un model al ecosistemului de inovare al universității. Acesta ia în considerare interrelațiile dintre activitățile educaționale, de cercetare și antreprenoriale. A fost elaborată o schemă a mecanismului de gestionare a ecosistemului de inovare al universității. Această schemă a mecanismului este un set de procese, principii și metode care asigură atingerea obiectivelor de creare și promovare a inovațiilor. Acest proces presupune implementarea unor activități cuprinzătoare prin intermediul centrului coordonat. S-a format o abordare a dezvoltării unei strategii pentru formarea și dezvoltarea ecosistemului de inovare al universității. Această abordare include etape, scopuri, obiective și activități adaptate pentru implementare la nivel instituțional în sistemul de învățământ superior din Israel. A fost elaborată și propusă pentru implementare o metodologie de evaluare a dezvoltării ecosistemului de inovare în instituțiile de învățământ superior. Aceasta include calculul indicelui integral și constă din patru etape. Fiecare etapă se bazează pe elaborarea unei hărți strategice și pe interacțiunea aspectelor strategice care sunt o componentă funcțională a ecosistemului de inovare al universității.

Problema științifică soluționată: studiul aspectelor teoretice și practice ale ecosistemului de inovare în instituțiile de învățământ superior israeliene, crearea unui mecanism de management al acestuia și a unei metodologii de evaluare a dezvoltării.

Importanța teoretică constă în faptul că aplicarea fundamentelor conceptuale pentru formarea unui ecosistem inovator al universității dezvoltă aparatul științific și metodologic de organizare a activităților științifice și inovatoare și contribuie la obiectivitatea proceselor de gestionare a rezultatelor activității intelectuale.

Semnificația practică este determinată de gradul înalt de posibilitate de aplicare a rezultatelor studiului privind soluționarea problemei științifice și practice de evaluare și gestionare a ecosistemului inovației în domeniul învățământului superior. Schema mecanismului de gestionare a ecosistemului de inovare al universității și un set de măsuri pentru centrul său coordonator, abordarea a dezvoltării unei strategii de formare și dezvoltare a ecosistemului de inovare al universității, metodologia de evaluare a dezvoltării ecosistemului inovației, dezvoltat de autor, sunt aplicabile pentru a îmbunătăți sistemul de management al inovației în instituțiile de învățământ superior din Israel.

Implementarea rezultatelor științifice. Cercetările științifice sub formă de concluzii și recomandări au fost prezentate la conferințe științifice și în reviste: 4 articole (3,3 c.a.) publicate în reviste științifice de categoria „B”, 3 articole (2,0 c.a.) publicate în reviste științifice din alte baze de date, 4 rapoarte (1,9 c.a.) prezentate la conferințe externe și 1 raport (0,45 c.a.) la conferințe desfășurate în Republica Moldova.

ANNOTATION
To the doctoral thesis in economics by Israeli Milana
“Evaluation and management of innovation ecosystem in higher education
institutions in Israel”,
Free International University of Moldova, Chisinau, 2023

The structure of the thesis: introduction, four chapters, conclusions and recommendations, bibliography from 276 sources, 168 pages of main text, 34 figures and 26 tables, 62 appendices.

The purpose of research is to scientifically substantiate the methodological provisions of the management mechanism and develop scientific and practical recommendations for assessing the development of the innovation ecosystem of higher educational institutions in Israel to improve their competitiveness.

Objectives: to reveal the conceptual aspects of the innovation ecosystem; to study the approaches to the formation and development of the innovative ecosystem of the university; describe approaches to assessing the innovation ecosystem of higher education institutions; to analyze the national innovation ecosystem of Israel; to diagnose the innovative ecosystem of higher education institutions in Israel; analyze the factors of the external and internal environment of the innovation ecosystem of higher education institutions in Israel; to develop a mechanism for managing the innovation ecosystem of higher education institutions; to form an approach to the development of a strategy for the formation and development of the innovative ecosystem of the university; to develop a methodology for assessing the development of the university's innovation ecosystem.

The scientific novelty: lies on the definition of the innovation ecosystem in the university that has been clarified and its features have been revealed. They are expressed in the intermediary role of the ecosystem between the university and the external market environment. In the process of this mediation, scientific and educational institutions, business partners and government organizations are united. A model of the university's innovation ecosystem has been developed. It considers the interrelationships of educational, research and entrepreneurial activities. A scheme of the mechanism for managing the innovation ecosystem of the university has been developed. This scheme of the mechanism is a set of processes, principles and methods that ensure the achievement of goals for the creation and promotion of innovations. This process involves the implementation of comprehensive activities through coordinated center. An approach to the development of a strategy for the formation and development of the innovative ecosystem in the university has been formed. This approach includes stages, goals, objectives, and activities adapted for implementation at the institutional level in Israel's higher education system. A methodology for assessing the development of the innovative ecosystem in higher education institutions was developed and proposed for implementation. It includes the calculation of the integral index and consists of four stages. Each stage is based on the development of a strategic map and the interaction of strategic aspects that are a functional component of the university's innovation ecosystem.

The scientific problem is the study of theoretical and practical aspects of the innovation ecosystem in Israeli higher educational institutions, the creation of a mechanism for its management and a development assessment methodology.

The theoretical significance lies in the fact that the application of the conceptual foundations for the formation of the innovation ecosystem of the university develops the scientific and methodological apparatus for the organization of scientific and innovative activities and contributes to the purposefulness of the processes of managing the results of intellectual activity.

The practical significance is determined by the high degree of possibility of applying the results of the study relating to the solution of the scientific and practical problem of assessing and managing the innovation ecosystem in the field of higher education. The scheme of the mechanism for managing the innovation ecosystem of the university and the set of measures for its coordination center, the approach to the development of a strategy for the formation and development of the university's innovation ecosystem, the methodology for assessing the development of the innovation ecosystem is practically applicable to improving the innovation management system in higher educational institutions of Israel.

Implementation of scientific results. Scientific research in the form of conclusions and recommendations were presented at scientific conferences and in journals: 4 articles (3.3 a.l.) published in scientific journals of category “B”, 3 articles (2.0 a.l.) published in scientific journals of other databases, 4 reports (1.9 a.l.) presented at foreign conferences and 1 report (0.45 a.l.) at conferences held in the Republic of Moldova.

АННОТАЦИЯ

к диссертации на соискание ученой степени доктора экономических наук Израиля Миланы
“Оценка и управление инновационной экосистемой в высших учебных заведениях
Израиля”,
Международный Независимый Университет Молдовы, Кишинэу, 2023

Структура диссертации: введение, четыре главы, выводы и рекомендации, библиография из 276 источников, 168 страниц основного текста, 34 рисунков и 26 таблиц, 62 приложений.

Цель диссертации заключается в научном обосновании методологических положений механизма управления и разработки научно-практических рекомендаций оценки развития инновационной экосистемы высших учебных заведений Израиля для повышения их конкурентоспособности.

Задачи диссертации: раскрыть концептуальные аспекты инновационной экосистемы; исследовать подходы формирования и развития инновационной экосистемы ВУЗа; описать подходы к оценке инновационной экосистемы высших учебных заведений; провести анализ национальной инновационной экосистемы Израиля; провести диагностику инновационной экосистемы высших учебных заведений Израиля; провести анализ факторов внешней и внутренней среды инновационной экосистемы высших учебных заведений Израиля; разработать механизм управления инновационной экосистемой высших учебных заведений; сформировать подход к разработке стратегии формирования и развития инновационной экосистемы университета; разработать методику оценки развития инновационной экосистемы университета.

Научная новизна: уточнено определение инновационной экосистемы университета и выявлены ее особенности: посредническая роль экосистемы между университетом и внешней рыночной средой при объединении научно-образовательных учреждений, бизнес-партнеров и государственных организаций; разработана модель инновационной экосистемы университета с учетом взаимосвязи образовательной, исследовательской и предпринимательской деятельности; разработана схема механизма управления инновационной экосистемой университета как совокупность процессов, принципов и методов, обеспечивающих достижение целей по созданию и продвижению инноваций, что подразумевает реализацию координационным центром комплексных мероприятий; сформирован подход к разработке стратегии формирования и развития инновационной экосистемы университета, включающий этапы цели, задачи и мероприятия, адаптированные для реализации на институциональном уровне в системе высшего образования Израиля; разработана и предложена к внедрению методика оценки развития инновационной экосистемы высших учебных заведений на основе расчета интегрального индекса, состоящая из четырех этапов, включающая разработку стратегической карты взаимодействия стратегических аспектов функциональных составляющих инновационной экосистемы университета.

Научная проблема заключается в исследовании теоретико-практических аспектов инновационной экосистемой высших учебных заведений Израиля, разработки механизма её управления и методика оценки развития.

Теоретическая значимость заключается в том, что применение концептуальных основ формирования инновационной экосистемы университета развивает научно-методологический аппарат организации научно-инновационной деятельности и способствует целенаправленности процессов управления результатами интеллектуальной деятельности.

Практическая значимость определяется высокой степенью возможности применения результатов исследования, касающихся решения научной и практической проблемы оценки и управления инновационной экосистемой в сфере высшего образования. Разработанные автором схема механизма управления инновационной экосистемой университета и комплекс мероприятий для его координационного центра, подход к разработке стратегии формирования и развития инновационной экосистемы университета, методика оценки развития инновационной экосистемы являются практически применимы для совершенствования системы управления инновационной деятельностью в высших учебных заведениях Израиля.

Внедрение научных результатов. Научные исследования в виде выводов и рекомендаций были представлены на научных конференциях и в журналах: 4 статьи (3,3 а.л.), опубликованные в научных журналах категории "В", 3 статьи (2,0 а.л.), опубликованные в научных журналах других баз данных, 4 доклада (1,9 а.л.), представленных на зарубежных конференциях и 1 доклад (0,45 а.л.) – на конференциях, проведенных в Республике Молдова.

ISRAELI Milana

**EVALUATION AND MANAGEMENT OF INNOVATION ECOSYSTEM IN HIGHER
EDUCATION INSTITUTIONS IN ISRAEL**

Specialty 521.03 - Economy and management in the field of activity

ABSTRACT

Doctor thesis in economic sciences

Aprobat spre tipar: 03.04.2023

Hârtie ofset. Tipar ofset

Coli de tipar: 1,67

Formatul A4

Tiraj 50 ex.

S.R.L. RUCAN INVEST

mun. Chişinău, sec. Rîşcani, str. Crăsescu Victor str-la, 13A