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DEVELOPMENT OF INNOVATION EVOLUTION AND OPEN INNOVATION PROCESS MODEL OF SCIENTIFIC ORGANIZATIONS AND ENTERPRISES OF UKRAINE

На основі розвитку концепції потрібної спіралі та моделей інноваційного процесу запропоновано інтеграційну модель розвитку інноваційної системи України та модель відкритого інноваційного процесу. Обґрунтовано, що розвиток інноваційної системи України суттєво залежить від впровадження відкритих інноваційних процесів в наукових організаціях та підприємствах України. Запропоновано показники оцінки та управління відкритими інноваційними процесами.

Ключові слова: концепція потрібної спіралі, модель відкритих інновацій, відкритий інноваційний процес, інноваційна система.

1. Introduction

The most important factors of modern development of advanced countries are technological progress and intellectualization of production factors of knowledge-intensive and high-tech industries. This makes a powerful technological breakthrough for companies and organizations around the world, providing further acceleration and development, compared with others. The basis of organization innovation is the introduction of enterprise participation in the innovation process of developing and bringing to market new products and technologies.

The experience of developed countries shows that the innovative development of the national system can only be effective when using the strategic partnership between the governments (society), science, and business, through open innovation, providing joint rapid development of research organizations and enterprises by introducing the desired society competitive products.

The need for the formation of innovation system of Ukraine with a significant contribution to research organizations and businesses is identified, but the practical realization of large-scale approaches specific to innovative development of the national economies of European countries remains very slow.

In connection with this the problem to develop effective models of innovation system of Ukraine, scientific organizations and enterprises of Ukraine by applying open innovation processes is of particular relevance.

For a significant number of Ukrainian research organizations and enterprises innovative development is the only way to get closer to the needs of domestic and foreign markets, but insufficient emphasis on developing models of open innovation processes is the main barrier to the effective development of the national innovation system and innovation research organizations and enterprises of Ukraine.

2. The object of research and its technological audit

To develop models of innovation and open innovation processes of scientific organizations and enterprises the pre-

requisites of formation of an open innovation model and evolution stages of the innovation process of models are analysed. It is established [1–4] that the successful development and implementation of innovation is possible outside an enterprise and scientific organizations. So, for open innovation process it is required the involvement of several participants that create their own added value. Such model of expansion of the boundaries of open innovation creation is essential for Ukrainian research organizations and businesses to attract participants from European and global research area. Therefore the integration model of innovation system of Ukraine and the model of open innovation process for companies and research organizations in Ukraine are proposed.

3. The aim and objectives of research

Studies aimed to determine the features of the formation model of innovation system of Ukraine and innovative models of scientific organizations and enterprises of Ukraine on the basis of the concept of the triple helix and open innovation processes.

The following tasks are defined to achieve this aim:

1. Formulate a model of innovation system of Ukraine and the model of open innovation process.
2. Justify the need to develop innovative systems and innovative development of Ukrainians scientific organizations and enterprises by implementing open innovation processes.

4. Research of existing solutions of the problem

Currently the triple helix concept of «Triple Helix Model» is successfully implemented in the economic practices of developed countries, including the European Union, as a basic concept of organization of national innovation systems [1–8] and has prospects for use in the development of innovative systems of Ukraine [9–13], although innovation of Ukrainian scientific organizations and enterprises is constrained by imperfect legislation, difficult access to financing, imperfect equipment, difficulties with raw materials, lack of information about markets, and so on.

Recent developments in the economy of Ukraine are not conducive to technological changes of proper intensity and economic structure is ineffective because, based mainly on the production of products with low added value, and such products are considerably inferior to its economic efficiency of high technology products [14], developed as a result of scientific researches.

Development of the innovation process models has gone from understanding the innovation process as a process of consecutive linear transformation of inputs (resources, information, etc.) into outputs (new products, new technologies) through technological push or market demand to understand the innovation process as a process of successive and parallel closed stages that include both stages of research, development prototype production [15], then a selection process and the transformation of ideas in the final product («Funnel» model, «Stage-Gate» model). Using such models of innovation process, the industries enterprises focused on creating a closed innovation, keeping them within the company or held for better times [16].

However, in the 90's of last century, due to the significant development of markets, technologies, many companies have started to use external knowledge in their R&D processes through effective communication with the environment and creating innovation in the network of internal and external party in interest (stakeholders) [17]. This led to a change in environment innovation and formation of open innovation concept [4].

Research of the experience with open innovation shows that companies can receive acceleration of its growth and increase profits by interaction with external sources of knowledge by reducing time to market for innovative products and technologies.

The most obvious advantage of innovative models is the new sixth generation logic centered on openness and collaboration, providing new strategic growth opportunities of companies and enterprises at lower risk of development and implementation of more innovative ideas and technologies [17].

In the following decades, the concept of open innovation has gone from doubt rethinking and broad implementation and amplification of global competition and the rapid development of information and communication technologies have led to the need for models of the seventh generation, combining open and networked innovation approaches of innovation cooperation and creation of integrated innovation network. Network models aimed at establishing links between all participants of the innovation process.

Important characteristics of the network model to create innovations with the support of internal and external stakeholders discovered an innovative process for effective communication with the environment [16], creation of open web platforms for such communications [17], introduction of open business – models [18] and development of intelligent production [19].

When considering the basic principles of innovation processes in economic systems one must take into account characteristics of the innovation process, and the general principles of the characteristics of participants in the innovation process [20] that are associated with the creation, development and diffusion of innovation [21].

Common mechanisms of activation of innovative processes relate to core and support processes that are essential to the process of creation and innovation [22].

Despite the diversity of theoretical and research interpretations, problems of national innovative systems development and development of innovation research organizations and enterprises, the question of their innovative development by applying open innovation processes remains not fully explored.

5. Methods of research

The following methods are used to achieve the objectives: analysis and synthesis, logical generalization of literary information, comparative confrontation of statistics, economic analysis.

6. Research results

Economic growth in developed countries economically justified transition of understanding the sources of innovation, not confined to a single institutional framework, and the interaction between the participants of strategic partnership «science (scientific organizations, universities) – business (industry, company, corporation) – society (power)» accordance with prescribed set of relations and functions («Triple Helix Model»).

This conceptual framework provides a broad perspective for understanding the sources and routes of innovation, and can be an attractive paradigm for the development of national innovation systems, to the innovative development of enterprises, research organizations, universities, companies seeking to expand their knowledge base and create open innovation development, guaranteeing the right of society to competitive products.

Taking the concept of the development of triple helix model and innovation process an integration model of innovation system of Ukraine «Six Helix Model», Fig. 1, is proposed, which defines institutional members (elements) partnerships (enterprises, companies, corporations, research organizations, universities, governmental and non-governmental organizations) in Ukraine and Europe in six spaces, justifying the need to develop relations between the spaces of institutional members (elements), providing a constant space institutions of other participants as best source of synergistic creation and implementation of open innovation, creation and development of integrated open innovation infrastructure.

Integration model of innovation system of Ukraine «Six Helix Model» takes into account the roles and functions of all institutional members (elements), explaining the differences between innovation performance of six spaces for development of the national innovation system, and so focusing on the intersection of space and near-boundary permeability of six spaces of institutional participants, as an important source of creative and organizational synergies for open innovation in open innovation processes.

Synergy is the most relevant at the level of interaction between enterprises and research organizations, which increases the role of partnerships in society in the field of knowledge and innovation economy and who can integrate intellectual resources to create and implement new joint open innovation (products and technologies), strengthening business cooperation scientific organizations and universities of Ukraine and Europe and all institutional participants of «Six Helix Model».

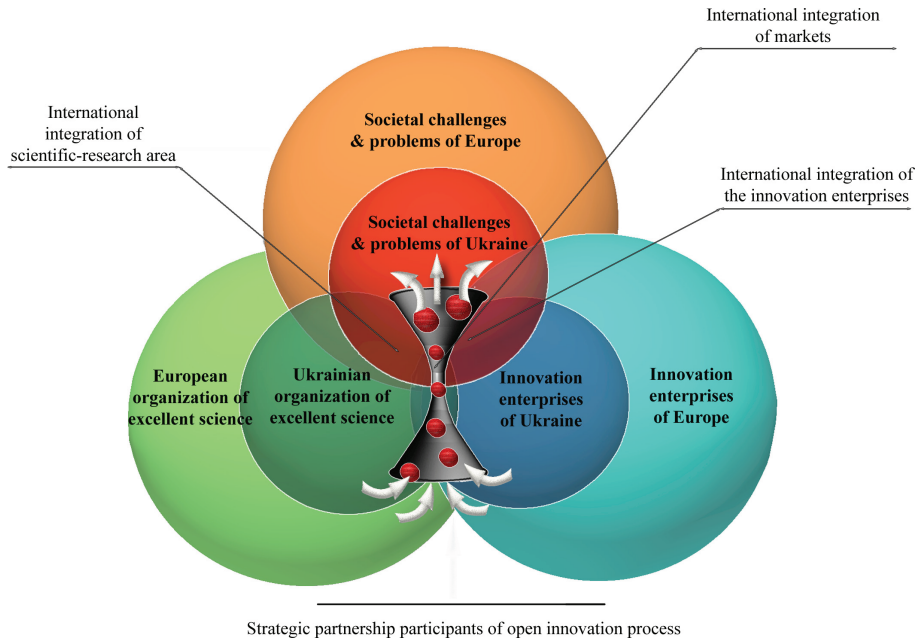


Fig. 1. Integration model of innovation system of Ukraine «Six Helix Model»

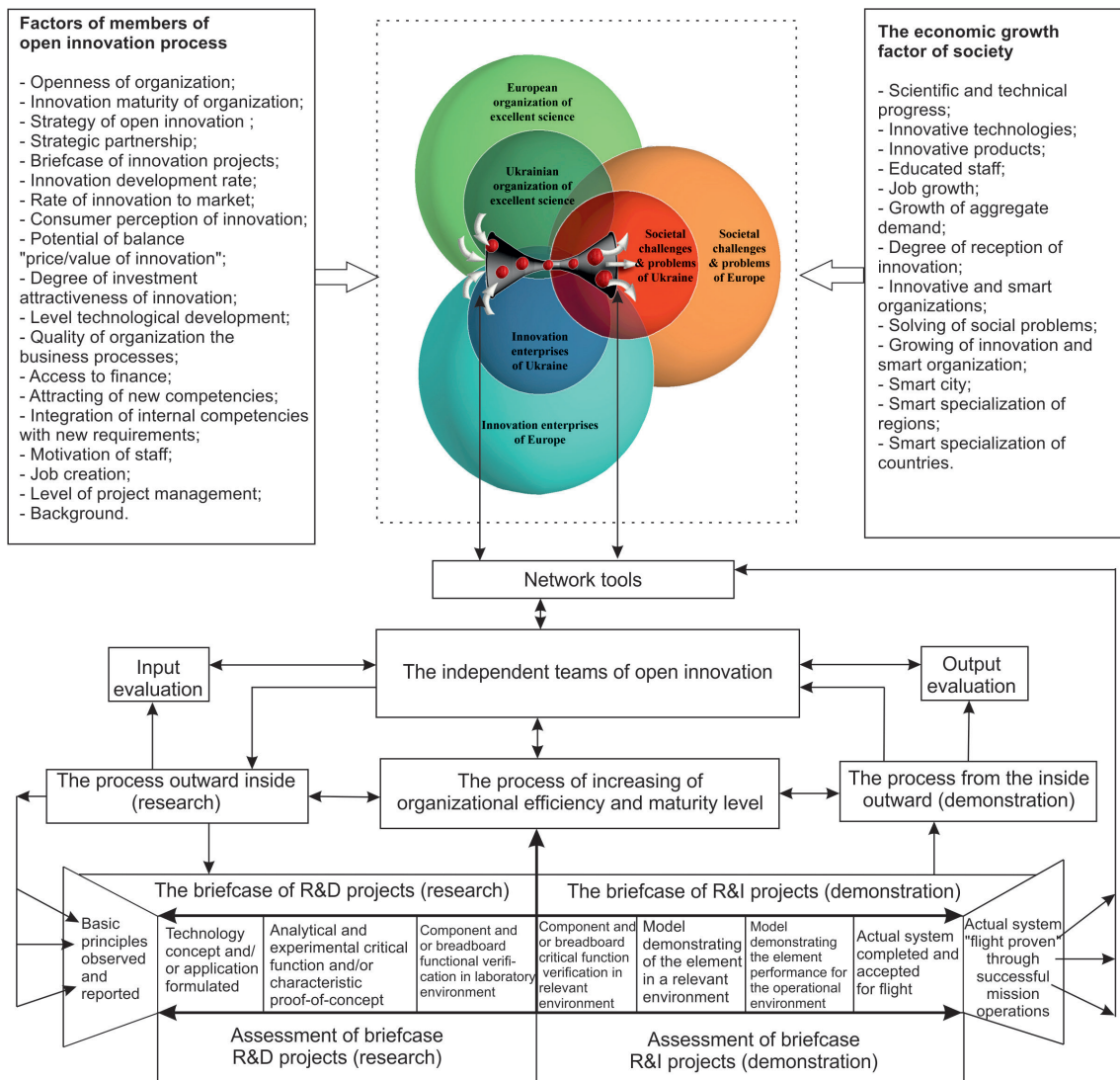


Fig. 2. The model of open innovation processes

However, the presence of institutional participants (elements) on the crossing areas of institutional spaces as an important source of synergy integration model of innovation system of Ukraine «Six Helix Model» does not guarantee their cooperation and innovative development of each of the institutional participants.

In order the relationship between all the institutional participants (elements) of innovation system starts to work, it is necessary to run the interaction mechanisms, one of which is an open innovation process, whose effectiveness depends greatly on the source of accumulation of innovation, the role of which is carried out by enterprises and scientific organizations.

A model of open innovation process, which involves the use of subprocesses: outward inside, inside outward and connecting, Fig. 2.

Feasibility of the model of open innovation processes by scientific organizations and enterprises of Ukraine is restricted by their ability to overcome barriers to the implementation of open innovation processes, enterprise culture on open innovation, standardization of internal procedures of open innovation process, development of skills and motivation of responsible employees by creation of open innovation team supported by the top management of the enterprise is the key to the implementation of organizational changes and the adoption of officials of the open innovation process.

The feature of the proposed model of open innovation processes is that with a favorable impact of internal and external factors, the process of the open innovation developing and implementation is due to the use of three sub processes:

- outward inside, forming database of participants in an open innovation process by increasing the number of external knowledge and use them for the joint development of new open innovation (products and technologies), which can significantly reduce the level of costs and speed up development time for new open innovation, reducing the time of bringing them to markets;
- inside outward, showing the level of integration of the new open innovation (products and technologies) in the chain of added value of open innovation process participants by developing existing and creating new business models, including business models of the spin-companies and promotion of new products and technologies through the sale of surplus intellectual property, licenses, etc.;
- connecting combining inside and outward subprocess from the inside outwards by increasing organizational efficiency, organizational maturity level of all participants in the open innovation process, cooperation alliances, consortia and active implementation of research and innovation and demonstrative projects.

The effectiveness of the proposed models depends on the use of indicators to measure and monitor open innovation processes that can display using subprocesses: outward inside, inside outward and connecting.

Indicator «adsorption capacity» («ability to absorb external information») describes subprocess «outward inside». The ability to absorb the external knowledge allows participants of open innovation process to improve the ability to learn effectively from external innovation environment that surrounds them, including customers (clients),

scientific research partners and outsourcing, competitors, suppliers, government agencies and organizations.

«Internal capabilities» indicator describes subprocess «outward inside» and foresees the needs assessment of the open innovation process participants (knowledge, skills, competence) in a systematic and targeted use of external expertise aimed to focus on the organizational precondition that describe the learning from external sources of knowledge.

«Adsorption capacity» and «internal capabilities» indicators have a significant impact on the creation of new open innovation (products and technologies) that can improve the performance of open innovation process, and important opportunities in terms of quantitative assessment of adsorption capacity of participants in an open innovation process.

«Integration» indicator describes subprocess «inside outward» and demonstrates a new level of open innovation integration (products and technologies) in added value chain of participants in an open innovation process by developing existing and creating new business models. «Integration» indicator also characterizes the way how the participants of open innovation process use a diverse set of competent external partners for implementation of open innovation process.

«Intellectual property» indicator of «inside outward» subprocess describes the promotion of new products and technologies by patenting and selling surplus intellectual property rights, licenses, and so on.

«Scale» indicator of the «inside outward» subprocess describes the possibility to use new open innovation (products and technologies) for a large number of transactions of business models of open innovation process participants, or for a large number of customers with low marginal costs.

«Organizational maturity» indicator of connecting subprocess can characterize the way of the partial application of R&D cooperation, joint R&D&I researches and systematic use of external participants for changes in organizational structures, application of new standards, IT-technologies, organizational optimization of forming the compatible innovation ecosystem by the open innovation process participants.

«Organizational efficiency» indicator describes the connecting subprocess and permit to evaluate the ability of participants in an open innovation process to apply innovative development model, organizational and economic mechanisms and algorithms to accelerate effectively the implementation process of development and implementation of open innovation (products and technologies).

Thus, the open innovation process parameters allow to set a direct theoretical and practical relationship between external knowledge on the one hand and value added chain of participants in an open innovation process on the other side and organizational efficiency, allowing to accelerate the creation and implementation of open innovation (products and technologies).

The effectiveness of the model of open innovation processes can be evaluated by applying the indicators: reduction of the creation cycles and implementation of open innovation (products and technologies), increasing international integration R&D&I and competitiveness also implementation of new organizational and economic mechanisms for implementing the open innovation processes.

7. SWOT analysis of research results

Strengths. The strong side of the research is development of integration model of the innovation system of Ukraine.

The advantages and possibilities of the model of open innovation processes are studied.

Weaknesses. The weak side is that it requires an understanding of economic subsystems to enable the practical implementation of the proposed models.

Opportunities. For further research there are the opportunities to develop organizational and economic mechanisms of the proposed models.

Threats. Threats to the results are the necessity to carry out the organizational changes in the management of scientific organizations and businesses to form organizations and enterprises of open innovation type.

8. Conclusions

1. On the basis of triple helix and open innovation process concept the integration model of innovation system of Ukraine «Six Helix Model» is proposed, which combines innovative institutional members of the European Union and Ukraine (scientific organizations, universities, enterprises, state and public organizations) by a wide range of relations and functions, opening up broad prospects for Ukraine's integration into the European Union. It provides an understanding of the sources and routes of open innovation and promotes new understanding of the innovation dynamics of joint accelerated development by applying open innovation processes and implementation of competitive products necessary for public.

The model of open innovation processes is proposed and it is proved that the development of innovative system of Ukraine heavily depends on the implementation of open innovation processes. Internationalization and integration of Ukraine into the European Research Area will strengthen the presence of Ukrainian research organizations and enterprises in the European cooperation.

2. It is established that the model of open innovation process involves the use of subprocesses: outward inside, inside outward and connecting.

The chain of indicators for assessing and managing open innovation processes that allow participants to find innovative process:

- new knowledge and ideas which are outside of scientific organizations and enterprises;
- how to develop new competencies scientific organizations and businesses to use them in an open innovation process;
- new tools for access to financing and to reduce the time to bring the open innovations (products and technologies) to market are proposed;
- the advantages and possibilities of application of open innovation processes model are determined.

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РАЗРАБОТКА МОДЕЛИ ИННОВАЦИОННОГО РАЗВИТИЯ И ОТКРЫТЫХ ИННОВАЦИОННЫХ ПРОЦЕССОВ НАУЧНЫХ ОРГАНИЗАЦИЙ И ПРЕДПРИЯТИЙ УКРАИНЫ

На основе развития концепции тройной спирали и моделей инновационного процесса предложено интеграционная модель развития инновационной системы Украины и модель открытого инновационного процесса. Обосновано, что развитие инновационной системы Украины существенно зависит от внедрения открытых инновационных процессов в научных организациях и предприятиях Украины. Предложены показатели оценки и управления открытыми инновационными процессами.

Ключевые слова: концепция тройной спирали, модель открытых инноваций, открытый инновационный процесс, инновационная система.

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GLOBAL LOGISTICS: DEFINITION OF MAIN CONCEPTS AND ESSENCES

Проаналізовано змістовне вимірювання апарату понять, що використовуються у дослідженнях глобальної логістики. Виявлено неточності трактовок понять, що розкривають фактори, рушійні сили, процес та сутність глобалізації логістики. Розкриті фундаментальні ознаки цих категорій, надано визначення поняттю та сутності глобальної логістики.

Ключові слова: глобалізація логістики, глобалізація світу-економіки, фактори розвитку логістики, рушійні сили та сутність глобальної логістики.

1. Introduction

Global logistics as a modern stage in the periodization of this type of activity is realized on the basis of a certain concept, including economic, organizational, spatial-geographical, technical, technological, personnel, financial, political, moral and ethical aspects and characteristics, as well as factors and driving forces of development.

Clarification of the content and essential features of these positions creates a methodological basis for conducting research and practice of logistics business in new conditions.

The study of the transformation process of traditional logistics into the globalized logistics and essential features of this stage of logistic activity is interdisciplinary, it includes the sphere of a number of branch sciences and, above all, the sciences of globalistics, logistics and philosophy. Information as an object and product of any research is disclosed in certain concepts, scientific categories, terms and definitions. The effectiveness of any scientific research is largely determined by the extent to which the concepts and categories used in it correctly reflect the content, essential attributes of objects and phenomena, are an empirical generalization of a diverse reality in a specific scientific field, are logically interrelated and fixed in definitions. The uncertainty and inaccuracy of the interpretations of the conceptual apparatus can lead to a distorted conception of the essence and cause and effect relationships of the processes and phenomena under study and to unreliable results of the study.

The relevance and practical significance of this article is that it clarifies concepts and suggests definitions that will avoid methodological errors in the study of global logistics problems and in business practice in this field of activity.

2. The object of research and its technological audit

The object of research is the process of logistics globalization as a special type of activity, and the subject – the adequacy of its reflection in the scientific apparatus of research of this process.

The general methodology for identifying the essential features reflected in the categories and concepts of the process of logistics transformation into the global industry is built on the fact that all social relations of all participants and all levels, up to the global level, are manifested through interests. Specific methodology in logistics activity determines the place and role of logistics in the global economy, its imperative dependence on the whole set of world-system relations.

3. The aim and objectives of research

The aim of research is development of a methodological approach to scientific understanding and practical implementation of the process of transformation of traditional logistics into a globalized industry.

To achieve this aim, it is necessary to solve the following tasks: