WAYS OF DEVELOPMENT OF KNOWLEDGE INFRASTRUCTURE IN UKRAINE

Abstract. The contradictory logic of the formation of knowledge economy in Ukraine of the post-Soviet period is connected with a long decline as a result of inefficient liberal-market reforms and uneven movement in the regime of catching development in relation to the leading economies of the world. Therefore, the Ukrainian economy undergoes post-industrial and information stages, characteristic of developed countries, accelerated pace, which complicates the adaptation of institutions of knowledge economy and reduces their efficiency. The unevenness of regional development is due to the objective (geographical and natural-climatic situation; the degree of provision of raw materials; infrastructure prerequisites for economic development, etc.) and subjective factors (the policy of regional power, which determines the quality of management of economic processes and financial and financial and budget. It is the disproportions in economic and social aspects that is the main indicator of weakening the effectiveness and efficiency of functioning of public administration entities of different levels. The main consequence of disproportions is the constantly increasing needs for budgetary appropriations, the cost of finding new forms of organizational, legal, resource support for the development of depressive territories, significant indirect losses related to the decrease in competitiveness and investment attractiveness of the region. Knowledge infrastructure is defined as an institutional complex that combines a wide range of organizations, institutes and networks of interaction that contribute to the creation and evolution of the knowledge base of a given spatial industry, as well as the resources and competencies required for the dynamic development of its innovation potential. Under the spatial industries we mean the level of innovation system - international, national, regional. Agents of the Institute of Knowledge differ in their roles and strategies of behavior, as well as in the type of knowledge that are accumulated and transmitted. Therefore, it is necessary to mention, that the knowledge infrastructure is extremely important in the development of the knowledge economy in Ukraine.
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ШЛЯХИ РОЗВИТКУ ІНФРАСТРУКТУРИ ЗНАНЬ В УКРАЇНІ

Анотація. Суперечлива логіка формування економіки знань в Україні пострадянського періоду пов’язана з тривалим спадом в результаті неефективних ліберально-ринкових реформ та нерівномірним рухом в режимі нездоганяючого розвитку по відношенню до провідних економік світу. Тому українська економіка проходить постіндустріальний та інформаційний етапи, характерні для розвинених країн, прискореними темпами, що ускладнює адаптацію інститутів економіки знань і знижує їх ефективність. Нерівномірність регіонального розвитку обумовлена об’єктивними (географічним та природно-кліматичним становищем; ступенем забезпеченості сировинними ресурсами; інфраструктурними передумовами економічного розвитку та) та суб’єктивними факторами (політика регіональної влади, яка визначає якість управління економічними процесами та фінансово-бюджетною сферою). Саме диспропорції в економічному і соціальному аспектах є основним індикатором послаблення результативності й ефективності функціонування суб’єктів державного управління різного рівня. Головним наслідком диспропорцій є постійно зростаючі потреби у бюджетних асигнуваннях, затрати на пошук нових форм організаційного, правового, ресурсного забезпечення розвитку депресивних територій, значні непрямі втрати, пов’язані зі зниженням конкурентоспроможності та інвестиційної привабливості регіону. Інфраструктура знань визначається як інституційний комплекс, який об’єднує широкий спектр організацій, інститутів і мереж взаємодії, які сприяють створенню та розвитку бази знань певної просторової галузі, а також ресурсів і компетенцій, необхідних для динамічного розвитку. Його інноваційного потенціалу. Під просторовими галузями ми маємо на увазі рівень інноваційної системи – міжнародний, національний, регіональний. Агенти Інституту знань відірваність за своїми ролями та стратегіями поведінки, а також за типом знань, які накопичуються та передаються. Тому необхідно зазначити, що інфраструктура знань є надзвичайно важливою у розвитку економіки знань в Україні.

Ключові слова: економіка знань, інноваційна модель, імплементація, інфраструктура знань, диспропорція

Formulation of the problem. The economy of developed countries is increasingly based on knowledge, innovations and new technologies that are today

Keywords: knowledge economy, innovative model, implementation, knowledge infrastructure, disproportion.
considered the driving force of economic growth. In the context of the national economy of Ukraine, based on the formation of economic and scientific and technical policy, such factors as: increasing complexity of products and processes should be taken into account; increase in knowledge in all industries; the growing importance of key competencies of enterprises that need to be coordinated, which means concentration on activities that creates more value added; increasingly intense global competition, along with the reduction of product life cycles; The growing flexibility and mobility of employees, which entails the need to develop the conceptual bases of constructing the appropriate model of knowledge management. It is obvious that the above factors should be taken into account when forming an effective national innovation system of Ukraine.

**Analysis of recent research and publications.** M. Mumford noted that during the last decade there is a general agreement among a number of scientists on the definition of "creativity". Knowledge is the ability of an individual to go beyond the boundaries of the studied situation in order to create original values, according to F. Barron, S. Mednyk, V. Molyako, I. Grinenko, E. Fromm, K. Szymid, S. Lytvynenko, O. Voitenko. Creativity is the process of personal individuality. O. Yakovleva, K. Szymid, O. Voytenko, G. Eysenck, D. Veksler, R. Sternberg believe that creativity is a kind of intellectual behavior. The works of J. Gilford, A. Maslow, R. Stanbera, P. Torrens, H. Gruber, D. Perkins, and S. Reich are devoted to the general foundations of creativity.

American scientist John Kao defined knowledge as a holistic process of generating ideas, as well as their development and reproduction in reality. J. Gilford emphasized that the process of divergence and transformation is the basis of creativity and singled out six signs (parameters) of creativity, which can be summarized as the ability to identify and pose a problem, generate a large number of ideas and their production, improve objects, flexibility, originality and the ability to solve non-standard problems [2]. J. Gilford and P. Torrens defined knowledge as the ability for divergent thinking, F. Barron emphasizes the definition of creativity as an internal process that spontaneously transforms into action.

Torrens made a number of improvements to the test, which allowed him to secure international status. The scientific contribution of researchers in defining knowledge through goal setting as a creative dimension in the problem field (F. Barron, H. Gardner, H. Gruber, D. Perkins) is significant. There is also a published version that creativity is a random change in the stages of the creative process resulting in the generation of creative products (R. Jones, P. Langley, T. Taylor).

**The purpose** of the article is the analyses of the structural elements of the knowledge infrastructure in Ukraine and the ways of its development.

**Presentation of the basic material of the study.** As a result of the analysis of the European experience of formation of knowledge infrastructure (with), we have drawn up the following classification of agents with and their specific roles are highlighted:
Universities that are the nucleus from, because they make the highest contribution to both the field of educational services and to scientific research and development, educating new generations of scientists, researchers, as well as leaders of research projects. At the same time, universities are a key element of fundamental studies [1].

State research organizations operating in multidisciplinary industries, the role of these organizations differ depending on the country, but they together with universities develop significantly scientific, technical and other research industries. Private research organizations that are more focused on applied research.

Consulting firms that play an important role in the production and distribution of applied knowledge in technical and management areas; These firms are especially important when transferring new technologies, management ideas and models to production and service firms; With them, they are in close interaction in the process of creating and providing high-tech business services.

Production and service firms whose domestic research activities, as well as staff development programs, make a huge contribution to the enrichment of technological, management and partly social elements of the national knowledge base.

Organizations of cooperation (intermediary organizations) that contribute to the creation of joint ventures and alliances are an important and new element of knowledge infrastructure [2]. They play an important role in structuring all over the construction of connections, interdependencies between different categories of organizations and institutions within knowledge and innovative processes.

The multiplicity of agents involved in innovative and psychological processes, as well as their growing interdependence, entail the need to create new ways of interaction and coordination, in order to better cope with the complexity and uncertainty characterizing hierarchical structures and structures of market management. This is especially characteristic of organizations such as networks and consortia whose efficiency and the amount of value created depends largely on the ability of their partners (as well as existing and/or potential competitors) to develop adaptive coordination mechanisms and effective sources of motivation to maintain cooperation and for cooperation Avoiding conflicts. These mechanisms should also be involved in institutes; intermediaries, state and other agencies.

Intermediary institutes can take many forms, such as: innovative centers, international or regional scientific and technical conferences, technical communities, technological forums, university associations, research unions, industrial and business associations, academic and industrial unions, etc.

Such institutions can be state, public-private, non-profit, private. They play the role of channels for information exchange, communication, negotiation between different categories of agents or organizations involved in the processes of knowledge and innovation generation. Thus, these institutions hold back conflicts
and at the same time contribute to the diffusion of new knowledge, ideas or models. Their activities are most important at regional and local (municipal) spatial levels [3].

The second category of support institutions of the state or public-private agencies and political structures (institutions or representatives) that have a direct or indirect impact on such Galums as higher education; R&D and innovations; science and technology; for industrial and regional development. They take the following forms: national and regional ministries, agencies and departments in each sector (higher education, science and technology, professional and technical education, industrial development, etc.); public and public-private funds (at international, national and regional levels); city and local authorities; National and regional councils (public councils, research advice, chambers, etc.). These institutions and their strategies contribute to the coordination of various agents with and in the initiation of cooperation between them, as well as provide funding, administrative and technical support for innovation. Below the list the trends that we have identified as a result of drawing up a knowledge infrastructure is presented [5]

### Table 1.

<table>
<thead>
<tr>
<th>Types of organizations, their basic forms</th>
<th>Types of produced / disseminated knowledge and / or role in psychology and innovative dynamics</th>
<th>Behavioral norms and forms activities, the best forms of interaction</th>
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<tr>
<td><strong>Universities:</strong></td>
<td>A central role in production, transmission, accumulation and distribution of all types of knowledge (fundamental and applied, general and basic). All disciplines, &quot;subject knowledge&quot;. In the most developed countries universities remain the main sources of educational services and the main players in the research environment and innovation processes</td>
<td>In the most developed countries universities for the most part state, but now state financial support is steadily decreasing, universities are under pressure, which creates motivation to find private sponsors with the help of research contracts (applied research), conducting trainings, finding industrial grants for student researchers, creating subsidiaries. There is already a trend (which varies from country to country) of a shift in the focus of universities from fundamental researchers to the applied field to shorter projects and specialized education standards</td>
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- Forms: general / specialized; technical / medical / humanitarian; research / non-research; public / private-public / private
- Components: university as a whole; academic council, administration, management structure, departments, faculties, laboratories / teachers / researchers on a permanent and temporary basis / post-graduate and doctoral students / other employees / interface for interaction with external partners / subsidiary companies
State research organizations
Forms: international research institutes / national research laboratories / academies / other national and regional research institutes; interdisciplinary / scientific / medical / industrial / technical / humanitarian / administrative, etc.; education and training / only research

Constituent parts (components):
- institution as a whole / academic council, administration, management structure, departments, faculties, laboratories / researchers on a permanent and temporary basis / post-graduate and doctoral students / engineers and technicians / other employees / interface for interaction with external partners / subsidiary companies

The role of these organizations varies from country to country. Most often R&D for the defense sector of the country, as well as R&D in strategic fields of civil sciences (especially in health care, security, transport communications, environment and energy) are carried out.

These organizations play a key role in IP (at the national level), are important components of the innovation process, because it is they who have the opportunity to initiate work in little-studied areas.

Since these organizations are state-owned, their strategies and field of activity are structured by the state. However, in most countries, cooperation between these organizations, universities and industry, as a result of which the spectrum of newly produced knowledge expands, "market-oriented" activity increases (with the help of patenting, licenses, contract research, creation of subsidiaries).

Thus, the most important task for agents from political structures is to identify and implement new coordination tools and schemes in order to overcome institutional inertia and suppress factors, to move forward structured and effective mechanisms of interaction between complementing agents included in psychological and innovative processes. Therefore, effective coordination is a key factor in the competitiveness of firms, sectors and regions[6]. In the course of the study of agents, we came to such conclusions about the processes of creation, accumulation and dissemination of knowledge and innovation and their institutional dynamics.

a) knowledge, innovation, learning and competencies are key factors in economic and social development; They determine economic growth and competitiveness at all spatial levels.

b) institutions as generally accepted collective norms of behavior and interaction play a major role in the processes of creation, accumulation and
dissemination of knowledge and innovation within any individual geographical space. Let us also note the special role of cultural and ideological dimension - ideology and culture play an important role in the functioning of the national innovation system, and their elements (norms, values, behaviors, etc.) are a context for changes within the system itself.

c) the value of spatial factors is large, especially in the long run, the creation, accumulation and dissemination of knowledge and innovation. Structural interconnections and dynamic coordination mechanisms that function between different spatial levels, play a crucial role in innovative and knowledge processes[8].

d) regardless of the industry, field of research and knowledge, geographical location does not exist a single organizational and behavioral model, universal dynamics or development trajectory that could ensure the efficiency of the processes of creation, accumulation and dissemination of innovation and knowledge.

e) all agents, organizations and institutes involved in innovative processes are the driving forces, sources and consumers of the innovation system. This means that there can be no "main player" in the innovation system, that it is necessary to study every agent carefully, his strategy and behavior - draw up a map with.

f) The institutional nature, specific strategies and temporary boundaries of each agent with. Innovative and psychological processes require the time compatibility of all agents with, otherwise conflicts and difficulties in coordinating processes. To solve problems, intermediary organizations are needed - state agencies, professional associations, whose role is important at all spatial levels.

g) structural relationships between all agents with the necessary ones. There are no agents that exist autonomously. At the theoretical level of recognition of this fact, it is necessary for the transition from static, part, monodis -clerical approach to dynamic, systemic and multidisciplinary when conducting an analysis of the innovation system. From a practical point of view, recognizing this fact entails an increase in the role of intermediary institutions, their role becomes crucial [9].

h) the innovative system and systems with cannot be capable of self - organization and self -regulating. There are no perfect market mechanisms and procedures that allow agents to coordinate their activities effectively. We believe that in the face of uncertainty and imperfection of information, there is a need for flexible and decentralized institutional forms of coordination and cooperation, regardless of the industry, field of research or space. Mechanisms of agents motivation to create and disseminate knowledge and involve the private sector in innovation are also needed.

i) Improvement of political and legal environment is important at all levels: international, national, regional. Among the factors that play an important role in knowledge and innovative processes, let us note the following: ways of allocation of funds for R&D, tax legislation, higher education, priority areas of research, the status of the researcher, conditions for the creation of Spin management companies.
In parallel, scientific and technical policy, regulators should ensure a balance between fundamental and applied research, state and private interests, long-term and short-term purposes, national and regional (local) interests[10]. All of the above factors indicate the multidimensional and complex nature of innovative processes and processes of creating / accumulating / disseminating knowledge. In our opinion, the degree of interaction of spatial / institutional factors explains the differences between innovative processes in individual industries and regions.

From the study, we can conclude that in general the dynamics of innovative and knowledge processes, as well as the forms of interaction between agents with the systemic nature, which repeats in one way or another the complex multidimensional nature of the economic and social system.

**Conclusion.** Formation of Ukrainian TNCs can become one of the strategic priorities of state policy, which, provided that the appropriate external environment is created, will increase the competitiveness of the economy and through the exclusive capabilities of national TNCs will allow some extent to protect the national economic interests, promote the development of Ukrainian economic structures, and internationalization. Capital, integration of Ukraine into the world economy, its participation in global transformation processes.

Innovations are the basis of economic development of a competitive economy based on knowledge. Sustainable economic growth and increase in living standards can only be achieved by improving labor productivity and introducing new quality products and services that are successfully competing in the world market. At the present stage, the increasing inefficiency of the formed economic model, its inadequacy global challenges facing Ukraine, require the development of a new paradigm of development of the national economy. Only the formation of a new economy, diversified and innovative, will allow Ukraine to ensure the competitiveness of Ukraine in the world market. In order to improve the efficiency of development of the national economy, an analytical model of the national innovation system is proposed, which consists of three spatial levels and takes into account the dynamics that occurs among innovative and knowledge processes.

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