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ECOSYSTEM OF INNOVATION: CONCEPT AND CHARACTERISTICS

Abstract

This article discusses the concepts of the innovation ecosystem given by various organizations and authors. The basic elements of innovation ecosystems and their relationships at various stages of the innovation life cycle are highlighted. The main features and characteristics inherent in the innovation ecosystem are identified. Various approaches to structuring the innovation ecosystem are considered, as well as determining factors for success and signs of the efficiency of the innovation ecosystem. The article reveals the possibilities of the economy that become available as a result of the development of an innovative ecosystem. The role of universities in the formation and development of the innovation ecosystem is touched and a systematic approach to the innovation ecosystem is shown. Thus, summing up, it can be noted that the problem of the development and effective functioning of the innovation ecosystem is fundamentally multifaceted and should be addressed comprehensively, using all available potential, both in terms of business structures, including educational institutions, and state and quasi-state organizations. Particular attention is paid to the study of innovative ecosystems as integral entities that influence the development of socio-economic conditions of the country. It is concluded that the nature of the innovation ecosystem is diverse and the need to use an integrated approach to solving the problem of developing an innovative ecosystem.

Key words: innovation ecosystem, entrepreneurship, knowledge economy, innovation culture, ecosystem features, research methods, integrated approach.

The concept of ecosystem has historically been inherent in the biological sphere. The biological ecosystem is a complex set of relationships between living organisms, the environment and living conditions in a certain territory, the functional purpose of which is to maintain an equilibrium steady state [1]. At the same time, simple biological ecosystems are part of a more complex organization, thereby forming the biosphere. Over time, the use of the term "ecosystem" has become expedient in relation to communities characterized by similar functions and structure. Later, the concept of ecosystem began to be used in economic sciences In general, according to the definition of L. Bertalanfi's complex systems, ecosystem is a complex self-organizing, self-regulating and self-developing system.

In 2005, Charles W. proposed the concept of an innovative ecosystem to create conditions that enhance the competitiveness of enterprises in the national and regional economies. The concept is centered on the idea of innovation as a process of transforming research into a marketable product or service that requires a lot of collective effort from participants: companies, universities, research companies, venture funds, and the like. An innovative ecosystem formalizes these efforts, allowing for a synergistic effect. An innovation ecosystem is a term used to describe the large and diverse array of actors and resources that contribute to the emergence of continuous innovation in today's economy.

The concept of an innovation ecosystem is often used to emphasize the emergence of innovations as a result of the interaction of various actors and to distinguish them from national innovation systems and policies.

While ecosystems are a common context for doing business in some industries, such as software and communications technology, ecosystem research is underdeveloped and under-theorized.

According to Schumpeter, the concept of innovation ecosystem refers primarily to successful innovation regions (Silicon valley, Bangalore), successful ICT platforms (iPhone, Android) or new industries (cloud computing), and entrepreneurs and investors around the world who seek to jump on the bandwagon of success [2].

The author L. Kopeikin considers the term “innovation ecosystem” as a set of conditions that ensure the successful creation and development of enterprises [3]. Another definition reads: “An innovation ecosystem is a complex relationship between entrepreneurs and institutions... For the functioning of the ecosystem, it is important to have a culture of entrepreneurship, which is valued in society, namely the acceptance of risk and failure, trust between entrepreneurs and institutions, success stories as a result of hard work» [4].

The Russian venture company provides the following definition of the innovation ecosystem: “...a complex interconnected system of organizations of various forms of ownership, state institutions, legislative and other incentives, social relations, services and practices, in which the most effective way is the process of turning innovative engineering ideas into successful high-tech companies”.

An innovation ecosystem can also be defined as a community (or network community) that acts as a catalyst for the interaction of participants for the transformation, exchange, dissemination and effective distribution of knowledge and other resources [5].

The innovation ecosystem is characterized by the presence of various interactions and relationships between several organizations in the field of innovation. The ecosystem as a multi-level phenomenon makes it difficult for a company to manage innovation development singly, and as a consequence, one of the characteristics of an innovation ecosystem is the presence of large groups of participants. Therefore, success in the ecosystem requires new strategic thinking – both cooperation and competition. In support of this idea, the Supreme body EUREKA High Level Group in its recommendations on the management of innovation policy of the European Union argues that the development and support of the innovation ecosystem require “5S”: cooperation(cooperation), competition(competition), complexity (complexity), competence (competence) and communication (communication).

A key success factor and at the same time the competence of the ecosystem is the ability of the company to manage dynamic strategic relationships related to innovation. For many companies, the attempt to enter the innovation ecosystem turns into a costly failure. This is due to the fact that along with new opportunities, innovation ecosystems also present a new set of risks. Therefore, the defining characteristic of the innovation ecosystem is the ability to adapt and develop through repetitive cooperation, conflicts and compromises, changes in the positions of participants and the creation of new roles.

Successful innovation systems tend to be characterized by an active knowledge economy, including academic, public and business sectors of research, and activities for effective commercialization. All this is supported by the flexible mechanisms of the state policy. In addition, successful innovation ecosystems also need a culture of innovation based on interaction, openness to international opportunities.

Bill Kaulitz of the mit center for entrepreneurship has identified seven “links” that make up the innovation ecosystem. The most important, in his opinion, is culture and entrepreneurs.

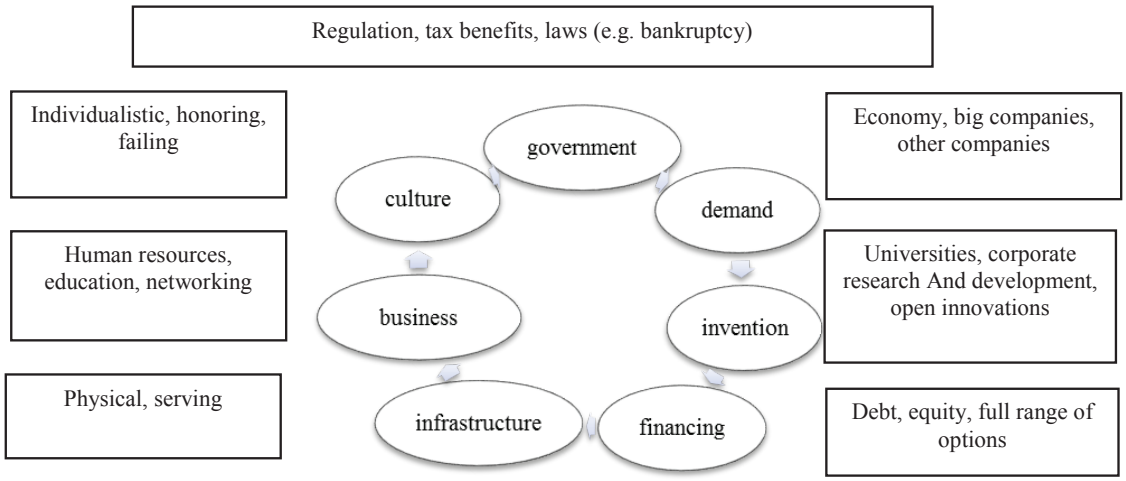

Figure 1 – A systematic approach to the innovation ecosystem [1]

In this context, the innovation ecosystem includes:

- material resources (financing, equipment, facilities, etc.);

◆ human capital (students, teachers, employees, industry researchers, industry representatives, etc.) that represent institutional organizations involved in the ecosystem (universities, engineering colleges, business schools, companies, venture capitalists, industry research institutes, competence centers, as well as state and/or local organizations for economic development and business support, financial agencies, authorities, etc.).

The presented components of the innovation ecosystem are inextricably linked and the financial network in the innovation ecosystem is identified as a key success factor in supporting participants are of particular importance in achieving the goal of the innovation ecosystem.

Functionally, the innovation ecosystem consists of two separate but largely distant economic subsystems – the knowledge economy, which is determined by basic research, and the commercial economy, which is determined by the market. The two subsystems are loosely linked because the resources invested in the knowledge economy must be processed and produced from the commercial subsystem.

Another feature is that the objects in the ecosystem are either geographically localized or strategically linked by a focus on the development of a particular technology. Silicon valley is the best known example of a geographically localized (regional) ecosystem. Successful examples of innovative ecosystems at the national level are the innovation system of Finland, USA, Canada, Japan; regional-MIT (Massachusetts University), Silicon Valley (Stanford University), new Jersey (Princeton University); corporate-IBM, Microsoft, Google, etc.

The degree of flexibility and dynamism, the openness of the ecosystem, and the scale and quality of its interactions and relationships provide important evidence of the" health " of the innovation ecosystem and the contribution that the innovation ecosystem can potentially make to the region and its innovation activities. It should be noted that the innovation ecosystem cannot exist without the global economy, since it is from it that the demand for innovation and change comes, and the global economy without the innovation ecosystem is doomed to stagnation and degradation, because the innovation ecosystem accumulates a key creative resource.

E. Utkin believes that the core of the ecosystem should be a large company. For regional innovation ecosystems, this is necessary to provide a link to global business competition. Other authors argue that the innovation ecosystem of the regional level should be built around the University, as the University has the opportunity to train and raise scientists and innovation managers, as well as to create a community in which ideas will be exchanged and investors will be attracted in order to commercialize innovations. In any case, it is obvious that the creation of an innovation ecosystem emphasizes the need to stimulate the creation, interaction and innovation of startups around the so-called knowledge centers, regardless of where they are localized – on the basis of universities or companies. A business ecosystem operates in an existing business context using available resources. The innovation ecosystem focuses on creating creative and modern business opportunities.

An effective innovation ecosystem enables entrepreneurs, companies, universities, research organizations, investors, and government agencies to collaborate effectively to maximize the economic impact and potential of their research and innovation. In other words, to launch an innovative growth model, the economy needs not only a modern infrastructure (research centers, technology parks, development institutions, etc.), but, above all, a horizontal network environment of communications between all sectors and organizations. The presence of such an environment contributes to the self-education of various innovative ecosystems, the totality of which forms the innovative landscape of the territory, where powerful flows of new knowledge originate and circulate on the basis of the interweaving of different network environments. The growth of the innovation ecosystem is possible due to the correct regulation of corporate taxation parameters, subsidies to small innovative enterprises, regulation of intraspecific competition and the absorption coefficient of small innovative enterprises by corporations.

Thus, the concept of innovation ecosystem was proposed as a tool for creating conditions that increase the competitiveness of organizations in national and regional economies. A successful innovation ecosystem is driven by the harmony between the knowledge economy and the commercial sector. With the effectiveness of these sectors, innovative countries, regions, platforms, new industries, industries and companies emerge, which directly represent a successful innovation ecosystem.

For the functioning of the ecosystem, it is important to have a culture of entrepreneurship, trust between entrepreneurs and institutions, success stories. Another factor in a successful innovation ecosystem is the development of a networked community for the transformation, exchange, dissemination and efficient distribution of knowledge and other resources.

From a managerial point of view, success in the ecosystem requires both cooperation and competition, the ability of a company to manage dynamic strategic relationships related to innovation, the ability to adapt and develop, and openness to international opportunities. The degree of development of these features is an important indication of the "health" of the innovation ecosystem. There are different views on the importance of an element in an innovation ecosystem. However, the most important condition is the presence of knowledge centers, regardless of where they are localized – on the basis of universities or companies. And to launch an innovative growth model, the economy needs, first of all, a horizontal network environment of communications between all sectors and organizations.

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Аңдатпа

Мақалада әр түрлі ұйымдар мен авторлар ұсынған инновациялық экожүйенің тұжырымдамалары қарастырылады. Инновациялық экожүйенің негізгі элементтері және олардың инновациялық өмірлік циклдің әр түрлі кезеңдеріндегі байланыстары бөлектелген. Инновациялық экожүйеге тән негізгі белгілер мен сипаттамалар анықталған. Инновациялық экожүйені құрылымдаудың әр түрлі тәсілдері қарастырылған, сонымен қатар инновациялық экожүйенің тиімділік белгілері мен жетістік факторлары анықталған. Мақалада инновациялық экожүйенің даму нәтижесінде қол жетімді болатын экономиканың мүмкіндіктері туралы айтылады. Инновациялық экожүйенің қалыптасуы мен дамуындағы университеттердің рөлі жайында айтылып, инновациялық экожүйеге жүйелі көзқарастың қалыптасқаны көрсетілген. Қорытындылай келе, инновациялық экожүйенің дамуы мен тиімді жұмыс істеу проблемасы түбегейлі көп қырлы екендігін және бизнес құрылымдар, оның ішінде білім беру мекемелері, сондай-ақ мемлекеттік және квазимемлекеттік ұйымдар тұрғысынан барлық қолда бар әлеуетті пайдалана отырып, жан-жақты шешілуі керек екенін атап өтуге болады. Инновациялық экожүйелерді елдің әлеуметтік-экономикалық жағдайларының дамуына әсер ететін интеграциялық субъектілер ретінде зерттеуге ерекше көңіл бөлінеді. Қортындылай келіп, инновациялық экожүйенің табиғаты әр түрлі және инновациялық экожүйені дамыту мәселесін шешуде интегралды тәсілді қолдану қажеттілігі туралы тұжырым жасалды.

Тірек сөздер: инновациялық экожүйе, кәсіпкерлік, білім экономикасы, инновациялық мәдениет, экожүйе белгілері, зерттеу әдістері, интегралды тәсіл.

Аннотация

В статье рассмотрены понятия экосистемы инноваций, данные различными организациями и авторами, выделены базовые элементы инновационных экосистем и их взаимосвязей на различных этапах жизненного цикла инноваций, определены основные признаки и характеристики, присущие экосистеме инноваций. Рассмотрены различные подходы к структурированию инновационной экосистемы, а также приведены определяющие факторы успешности и признаки эффективности экосистемы инноваций. В статье раскрываются возможности экономики, которые становятся доступными в результате развития инновационной экосистемы, затронута роль университетов в становлении и развитии инновационной экосистемы и показан системный подход к экосистеме инноваций. Делая выводы, можно отметить, что проблема развития и эффективного функционирования инновационной экосистемы имеет в своей основе многоплановый характер и должна решаться комплексно, путем использования всего имеющегося потенциала как в предпринимательских структурах, включая и образовательные учреждения, так и в государственных и квазигосударственных организациях. Особое внимание в статье уделено исследованию инновационных экосистем как целостных образований, оказывающих влияние на развитие социально-экономических условий страны. Сделан вывод о многоплановости характера инновационной экосистемы и необходимости использования комплексного подхода при решении проблемы развития инновационной экосистемы.

Ключевые слова: инновационная экосистема, предпринимательство, экономика знаний, культура инноваций, признаки экосистемы, методы исследования, комплексный подход.