

Methodical Approach to the Startup Ecosystem Formation: Foreign Experience and Opportunities for Ukraine

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Abstract: In modern conditions, startups play a key role in ensuring the sustainable development of national economies around the world. In view of this, the purpose of this study is to substantiate a methodological approach to creating a startup ecosystem in Ukraine based on the generalization of best global practices. To achieve the stated goal of the study, the following scientific approaches and methods were used: analysis and synthesis; system approach; bibliometric analysis; content analysis; economic and statistical analysis; rating evaluation; expert assessments; comparative analysis; system-logical analysis; cluster analysis; monographic method; graphic method. The article clarifies the essence of the concept of a “startup ecosystem” as a network association of organizational structures of various forms of ownership that provide support for the creation of innovative startup projects at different stages of their life cycle with subsequent scaling. As a result of the study, it was proven that the development of startups in Ukraine involves the creation of an effective ecosystem that would provide their support at all stages of the life cycle (from the creation of an innovative project to its implementation in the form of a company). To achieve this, the composition of the elements of the startup ecosystem was formed according to the main stages of their life cycle and a methodical approach to the formation of a startup ecosystem in Ukraine was developed, which is characterized by a specific set of institutions in the country, the complex combination of whose efforts will provide support for the formation of startups (at all stages of their life cycle) and will contribute to the activation of innovative entrepreneurship. The practical value of scientific developments lies in the fact that the proposed methodological approach has been implemented in the activities of the Association of Industrialists and Entrepreneurs of the Kharkiv Region.

1 INTRODUCTION

A modern trend in innovative and entrepreneurial activities of the countries of the world is the creation and scaling of startups, which become the driving force of their economic development based on the creation of new jobs, attracting investments, stimulating innovations, expanding market segments and improving the quality of life. Startups are the so-called “engine” of technologies and innovations, an “amplifier” for modernization, digitalization [1-3] and sustainable development [4] of the countries of the world.

It can be noted that the startup movement is developing due to modernization and creativity,

which have great potential to change the global economy. Today, there are 150 million startups in the world, of which 50 million new startups are launched every year. On average, 137 thousand startups appear every day [5].

In 2021, the volume of financing for various startups in the world amounted to more than 600 billion USD. At the same time, the income of some international startups as innovative ideas and companies has increased many times: Apple's assets exceed 350 billion dollars, Google – 130 billion, Facebook – 51 billion dollars. In addition, the development of startups allows solving employment problems in countries around the world. In 2022, in countries that are members of the Organization for Economic Cooperation and Development, startups

provided about 50% of all new jobs. Governments of countries around the world and various organizations and institutions support the development of startups, realizing their importance and potential benefits for the economy.

Therefore, at present, a startup should be considered as a “kind of catalyst” for economic growth at the local, national, and global levels. They can help find financial resources, technologies and specialists that will bring the country's economy to a fundamentally new level of development. For the formation and functioning of a full-fledged and effective ecosystem of startups, it is necessary to reform the relevant institutions, implement the concept in the field of IP culture, and officially make the development of startups an important component of the economic strategy.

The above testifies to the relevance of the selected research topic and the need for further development within the outlined issues.

2 LITERATURE REVIEW

Startups are the object of research by many foreign and domestic scientists, who focus on various aspects of this problem: essence and characteristic features, varieties and their features, life cycle models, success factors and advantages, sources of funding, support ecosystem, etc.

Among the works devoted to various aspects of the creation and development of startups, it is appropriate to highlight the research of leading foreign (S. Blank [6], M. Bliemel et al. [7], S. Breschi et al. [8], J. Gans [9], M. Henry [10], A. Skala [11]) and Ukrainian (N. Bielikova [12], O. Dymchenko et al. [13], L. Frolova et al. [14], O. Havrysh et al. [15], I. Hubarieva [16], N. Kulyk [17], N. Podolchak et al. [18], I. Savin [19], O. Trofymenko and O. Ilyash [20], M. Tymoshenko [21]) scientists.

Based on the significant scientific achievements of scientists in this field, it should be noted that the dynamism of the development of the startup industry, the specificity and scale of challenges, both global and national, as well as the increasingly significant role of startups in ensuring innovative entrepreneurship and economic growth of the countries of the world require deepening of research related to the analysis of the specifics of the development of startups at various stages (creation, development) and stages of the life cycle,

approaches to identifying its stages and determining effective managerial influences, improving the general management cycle for the creation and scaling of startups, determining directions for improving the ecosystem of startups taking into account the specific features of certain countries of the world.

Separately, it is worth noting the research of scientists, which is devoted to the theoretical and applied aspects of the formation of startup ecosystem models. It should be emphasized that the concept of the startup ecosystem has recently been widely used in the context of innovation and entrepreneurship [22-25]. The understanding of the term “startup ecosystem” is quite broad, and although there is no single, universally accepted definition, the term is used in relation to a certain geographic region (for example, Silicon Valley) with a high density of startups and entrepreneurs [23]. It should be noted that the scope of the ecosystem can vary from a collection of several startups to a region or country, but the use of this term in relation to individual cities is the most common. For example, The Global Startup Ecosystem Ranking report defines a startup ecosystem as “a city or geographic area (with an approximate radius of 100 km) that uses shared resources” [26].

As in natural ecosystems, a key characteristic of a startup ecosystem is the interdependence (or “common fate”) of the various organisms within the ecosystem. In other words, the startup ecosystem represents the relationship between its individual actors or groups of actors, which distinguishes ecosystems from other concepts, such as clusters, organizations (for example, meetings, and hackathons) [27]. Recently, many authors, including C. Mason and R. Brown, emphasize the significant role of entrepreneurs in the startup ecosystem, defining it as a set of interconnected entrepreneurial entities (both potential and existing), entrepreneurial organizations (for example, firms, venture capitalists, business angels, banks), institutions (e.g. universities, public sector institutions, financial institutions) and entrepreneurial processes (e.g. the rate of opening new businesses in the region, the number of growing firms, the level of venture business, the number of businesses, that are scalable, the level of entrepreneurial ambitions, etc.), which formally and informally unite with the aim of developing the local entrepreneurial environment [22].

Startup Commons defines a startup ecosystem as a network consisting of individuals, startups at different stages of development, and different types of organizations cooperating as a system to create new startup companies [28].

Depending on the territorial specification, scientists define and study the ecosystem of startups at the level of a specific city, country or at the global level [29]. The startup ecosystem encompasses a variety of organizations that interact to bring significant growth to the market through growth of startup companies, returns to investors, and benefits to end customers. Interrelationships between components create a complex network of relationships between startups, organizations, and the external environment.

Taking into account the above and previous research results, it is proposed to consider the startup ecosystem as a network association of organizational structures of various forms of ownership that provide support for the creation of innovative startup projects at various stages of their life cycle with subsequent scaling [25].

In the scientific literature, there are various models of startup ecosystems. One of them is proposed by H. Caleb [30], who puts entrepreneurs in the spotlight because their leadership is considered key to the success of the startup economy. It also includes such elements as the state, universities, mentors, service companies, corporations, investors and public initiatives that support entrepreneurship in the startup ecosystem model. Each of these elements is considered as a comprehensive tool, the support of which forms a successful ecosystem of startups.

B. Spigel [31] considers organizational and social factors as the key internal components of the model of startup ecosystems. These factors include general entrepreneurial culture, success stories, human talent, investment capital, social networks and mentorship. The proposed model also includes material factors such as: government institutions and universities, service companies, as well as infrastructure and local markets with geographic significance. These internal factors act as components that influence processes in the startup ecosystem.

Scientists are also considering approaches to defining the ecosystem of startups based on the triple and quadruple helix model (The Triple and Quadruple Helix Model) [32-37]. According to these approaches, the formation of innovations in startups

is a result achieved not by one institutional player, but the result of interaction between all participants of the ecosystem as a source of new organizational plans [32, 33]. Thus, at its core, the triple helix model describes the institutional framework for innovation development (including startup-based), which is created by a triadic network between the academic community, industry, and government [32-35]. The main relationships between the three institutional factors in the triple helix model of startup ecosystems are as follows [34]: (1) technology transfer, (2) cooperation and conflict resolution, (3) shared leadership, (4) replacement of certain functions, and (5) chain. In particular, technology transfer is a key element of the triple helix, especially in industries with high innovativeness of startups [36, 37].

In recent years, researchers have proposed some variations of the triple helix model to integrate additional variables that affect collaboration between NGOs, academia, and business. In particular, a four-link spiral model was proposed to describe the startup ecosystem, which, in addition to the three key institutional bodies, also takes into account the role of culture, civil society, and mass media [38]. The model of four spirals determines the importance of the environmental component in the development of startup ecosystems [39]. Among the interactions that take place in the wider social context, the processes of production of innovations and new knowledge in modern economies are the main ones. In addition, special attention is paid to institutional planning and changes, i.e., systemic processes of updating and reforming the institutional management base of innovative entrepreneurship [38].

Startup ecosystems include entities participating in the four-link spiral model, whose actions determine the business path and success of startups, especially for those characterized by a high degree of technological innovation and provision of services at the global level, needing relationships with by other subjects of the ecosystem [40]. The Aspen Institute [41] analyses the existing framework of the entrepreneurial ecosystem and identifies the following main determinants of the ecosystem that affect entrepreneurial success: education and scientific research, human resources, government intervention, networking and support, financing.

C. Ziakis et al. [42] propose to include the following factors influencing the sustainability of startups in the startup ecosystem model: education

and scientific research, human capital, funding, government, business support and communication, entrepreneurial culture, and incentives for startups. The startup ecosystem can be considered through the analysis of its structural components (business angels, accelerators and incubators, mentors, state support, venture capital, investors, universities, research and development) and their role in the development of startups [43]. In general, this ecosystem is an open system aimed at creating and constantly improving startups. This system integrates startups with the entities that ensure their existence, and all of them function in a certain environment, being interconnected by a network of dynamic relationships.

In view of this, the purpose of this study is to further develop theoretical and methodological support and develop a methodical approach to creating an ecosystem of startups in Ukraine based on the generalization of the best global practices.

3 METHODOLOGY

The basis for the study was research data from international organizations, rating agencies, information portals; statistical reporting of the World Bank; data from international scientometric databases Scopus and Web of Science; Laws of Ukraine; by-laws and regulatory legal acts of the Cabinet of Ministers of Ukraine; materials of the State Statistics Service of Ukraine; scientific publications on the selected topic and related ones; developments from the project activities of the Research Center for Industrial Problems of Development of the National Academy of Sciences of Ukraine, information materials and reports of domestic companies, Internet resources and results of the authors' own research.

To achieve the set goal of the study, the following scientific approaches and methods were used: grouping, deduction and abstraction; analysis and synthesis; systematic approach; morphological analysis; bibliometric analysis; content analysis; economic and statistical analysis; rating evaluation; integral evaluation; expert assessments; comparative analysis; system-logical analysis; cluster analysis; monographic method; graphic method.

In order to study the world experience in assessing the development of startups and their support infrastructure, the following indices were

considered: Global Startup Ecosystem Index; Most startup friendly countries in the world; Global Startup Ecosystem Report (GSER); Startup Index of Nations, Cities; Startup Ranking.

As statistical analysis shows, the leader in the number of startups at the end of 2022 is the USA. According to experts, there are currently 75,056 startups in the country due to a favourable business climate for their development and a developed ecosystem. The USA has 5.7 times more startup teams than India, which ranks second with 13,125 active startups [44].

According to experts [45], in 2017, more than 6 thousand startups were operating in India, and in 2022 – 80 thousand. It is worth paying tribute to the state policy of India, the implementation of which contributed to ensuring low taxes for startup developers and creating institutional conditions for full development. And therefore, at least 5% of the country's GDP is provided by startups.

According to the Ministry of Science and Technology of India [46], in 2014-2023 the number of startups in the country increased by 257 times or from 350 to 90 thousand. At the same time, 100 startups appeared in the field of space technologies. Currently, the number of biotechnology startups has increased from 50 to 6 thousand startups. According to the Startup India website, there were 96,753 startups registered with DPIIT (The Department for Promotion of Industry and Internal Trade is a central government department under the Ministry of Commerce and Industry in India), as well as 196 government-recognized accelerators and 1,093 incubators.

In 2022, the Government of India decided to invest INR 1,711 crore in startups under the Startup Fund of Funds (FFS) scheme. In addition, an additional INR 267.50 crore has been allocated for incubators under the Startup Seed Fund (SISFS) scheme. A number of other schemes have been introduced to boost the local startup ecosystem, such as the Credit Guarantee Scheme for Startups (CGSS), a three-month income tax exemption.

An example of best practice is the experience of Turkey, where startup development was systematically ignored until 2010. However, when the government of the country realized the role of this direction and its development prospects, startups raised a total of about 100 million dollars. Getir was launched as a startup in 2015, after which it managed to raise over 400 million dollars, and later increased its value to 2.6 billion dollars. Currently,

Getir, a startup in the field of restaurant delivery, has over 32,000 employees and operates in the markets of Turkey, the USA, the Netherlands, Germany and the UK.

The number of startups in the top 10 countries is shown in Table 1.

Table 1: Number of startups in leading countries as of the end of 2022¹.

Country	Number of startups, units
United States	75,056
India	13,125
United Kingdom	6,220
Canada	3,303
Indonesia	2,347
Germany	2,295
Austria	2,262
France	1,567
Spain	1,407
Brazil	1,116

According to Startup Ranking [48], the leading countries in terms of the number of startups founded in 2023 were the United States (3,687 startups), followed by India (990) and the United Kingdom (555). The analysis shows that the majority of startups are in the areas of financial technology, healthcare, and artificial intelligence (Table 2).

Table 2: Distribution of startups in the world based on their industry of implementation and the corresponding percentage of the total number, 2022².

Implementation sector	Share, %
FinTech	7.6
Life Sciences and Healthcare	6.8
Artificial Intelligence	5.0
Gaming	4.7
Advertising Technology	3.3
Educational Technology	2.8
Green Technology or Eco-Friendly Practices and Technologies	2.1
Blockchain	1.5
Robotics	1.3
Cybersecurity	0.7
Agricultural technologies	0.6

Let us consider the leading countries of the world in the context of the creation of startups and their support ecosystems, as well as their socio-economic development. The level of creation of startups and their support ecosystems in the countries of the world is determined by such indicators as: The Index of the Most Startup-Friendly Countries in the World, the Global Startup Ecosystem Index and the number

¹ compiled based on [47]

² compiled based on [49]

³ compiled based on [25; 48; 50-54]

of startups per 1,000 population of the country [48; 50-54]. These indicators were used to conduct a cluster analysis of 55 countries of the world using the Statistica 8.0 package.

According to the analysis [25], three clusters of countries of the world were identified by the level of creation of startups and their support ecosystems (Table 3).

Table 3: Clustering of countries around the world by the level of startup creation and their support ecosystems³.

Cluster	Cluster characteristics	Countries
First	Average level of values according to the indicators of the Index of the most startup-friendly countries in the world, the Global Startup Ecosystem Index and the number of startups per 1 thousand population	18 countries, including Canada, Luxembourg, Israel, Belgium, Sweden, Denmark, the Netherlands, Australia, etc.
Second	High level of values according to the indicators studied	3 countries: US, Singapore, Estonia
Third	The lowest values of indicators among the studied countries according to the Index of the most startup-friendly countries in the world, the Global Startup Ecosystem Index and the number of startups per 1 thousand population	33 countries, including India, Germany, Poland, South Korea, Japan, the Czech Republic, Turkey, Ukraine, etc.

Let us analyse in more detail the startup ecosystems of some countries of the world, in particular, the leading countries and some representatives of the cluster, which are potential leaders in the development of startups.

Thus, the first country in the group of leaders is the United States, which occupies a leading position in the development of startup ecosystems, having 7 cities (regions) in the ranking of the 20 largest ecosystems for the period 2019–2023. The United States has formed an advanced environment for the development of startups, which presents opportunities for breakthrough technological creativity [55]. The national startup ecosystem of the United States is used by foreign entrepreneurs, determining that the country has the best conditions for scaling and developing a global company - the American version of free market capitalism is

focused on profits and high risk, which also provides startups with opportunities, financing and ecosystem support. All this has allowed creating a startup ecosystem, which is mainly based on the private sector without excessive intervention from the public sector. This market-driven approach to startup development has led to the creation of some of the most successful startups in the world.

Singapore is a recognized leader among Asian countries for starting a business, including venture capital. Singapore is a model for innovation, a country of choice for registering startups operating in Asia, due to its financial stability, approach to business and tax policies. Because Singapore has a small market and population, the growth of its ecosystem depends on scaling abroad [56]. Singapore's economy is attractive to large business investors, including a significant number of venture capitalists who are willing to fund international startups. Singapore's ecosystem is characterized by a growing number of accelerators and support networks for startups. For example, Enterprise Singapore has programs to stimulate the development of startups, allowing them to access financial assistance and business loans in their early stages of existence. Initiatives such as Startup SG are aimed at promoting Singapore's startup ecosystem. The country also has a strong digital infrastructure and many sources of investment. In addition, the country's universities are involved in the development of startups not only by preparing a highly skilled workforce for the research and development sector, but also by connecting programs to startups and encouraging entrepreneurship on campus. The Singaporean public sector implements many tools to support the startup ecosystem: it provides significant support to young businesses, provides a favourable innovation policy (dividends and capital gains are not subject to tax), and there are significant tax preferences for registered resident companies [57].

Estonia, a very small country with a population of 1.3 million, has the highest IT development potential in Europe – about 10% of the country's working-age population is employed in the IT sector, which accounts for about 7% of the country's GDP and 14% of its exports. Tallinn, the capital of Estonia, has been compared to the Silicon Valley of Europe, as it has the highest number of startups per capita [58]. One of the most important milestones in the history of the Estonian ecosystem was the success of Skype, an application developed mainly

in Estonia. The founders of Skype used this windfall to support new successful Estonian startups, such as Skycam, teleport, and SpaceApe [59]. According to Statistics Estonia, one in 56 employed Estonians was involved in startups, and the top 20 startups created 59% of jobs in the sector in 2022, demonstrating the country's need to attract talent from abroad [59]. The Work in Estonia program launched by the Estonian government, aimed at attracting new IT professionals as well as talent in the natural and exact sciences, has doubled the international talent pool in the past five years. According to the White Paper Startup Estonia 2021–2027 [58], the country continues to support its startup ecosystem and has set a number of goals aimed at growing Estonia's startup and technology sector to 15% of the country's GDP by 2025.

As the main government initiative for the Estonian ecosystem, Startup Estonia works on policy development, as well as promoting and strengthening the ecosystem. In addition, thanks to events such as Latitude59, the country continues to attract international attention and investment in its ecosystem every year. Estonia's success in developing startups and creating one of the most effective systems of support for entrepreneurship development is based on a complex combination of the following key factors: an active and progressive government that promotes the development of innovative businesses, simplification of business processes; an effective and dynamically developing startup ecosystem (venture funds, incubators, accelerators, universities and other development institutions), ensuring full access to the European market and markets in other regions of the world [58].

If we consider Ukraine, it should be noted that in 2019, 510 million dollars was invested in Ukrainian startups and IT companies, of which the share of foreign capital was 80% of the received investments. According to Startup Ranking [48], the country ranked 37th among 137 countries in the world in 2023. In other international rankings dedicated to the development of the startup movement and its support ecosystem, Ukraine ranks as follows: in terms of the number of startups per 1,000 population of the country – 45th place in 2022, in terms of the index of the most startup-friendly countries in the world – 43rd place, in terms of the global startup ecosystem index – 49th place in 2023.

According to The global startup ecosystem Report 2023, Ukraine improved its results compared

to the previous 2022, rising one position to 49th place in the world. In Europe, Ukraine maintained its position and is in 30th place, ahead of Hungary and Serbia with an overall score gap of less than 5% [26]. As noted in the report [45], Ukraine is on the path of recovery, and most of its ecosystems have risen in the 2023 ranking compared to 2022.

The report emphasizes that due to the ongoing war in Ukraine, it is difficult to predict the consequences for startup development and the speed of recovery of Ukraine's physical and economic infrastructure. In addition, it is noted that, despite the fact that Ukraine experienced economic difficulties for several years even before the war, the country has created a startup ecosystem that is scalable and global [26].

In recent years, despite the unfavourable political and economic situation in Ukraine, the startup industry has grown by an average of 20–30% per year. The number of internationally recognized Ukrainian startups also increased, and the amount of their funding increased. The number of international startup deals in 2022 remained at the previous year's level and amounted to 33, but the amount of their funding increased more than 2 times or from 40.7 to 87.6 million dollars. [26, 60] The startup ecosystem of Ukraine was in the process of active formation and was characterized by positive dynamics of its development before the start of the full-scale war in 2022. But 2022–2023 showed that the development of startups slowed down due to the difficult economic situation of the country.

It is worth noting that one of the important problems for Ukrainian startups is the lack of financial resources for their development. Startups have the opportunity to attract funds from several sources, which depend on what stage of the life cycle they are at. Thus, in the early stages (pre-seed), entrepreneurs typically use their own funds and/or borrow from friends and family (bootstrapping) before seeking financial assistance from angel investors, accelerators, incubators, etc. [61]. During the seed stage, startups typically raise capital from angel investors and venture capital firms to support their minimum viable product (MVP) and develop product-market fit. In many startup ecosystems, venture capital firms and government agencies may also typically collaborate to provide startups with seed funding. If successful at the seed stage, startups move on to Series A and B financing rounds, which are primarily provided by

venture capital firms, to raise significant financial resources [61, 62].

Thus, startups are a potentially important sector of the economy and a fundamental asset for the future growth of Ukraine. Startups have become a modern challenge in the context of the intensification of the development of the innovative and digital economy.

4 RESEARCH RESULTS

Based on the analysis of the startup ecosystems of the countries of the world that are leaders and potential leaders in this field, and their development trends, it was determined that the construction of startup ecosystems is based on a new approach, which involves considering the ecosystem of startup development as a dynamic self-regulating and evolutionary system with a high level of uncertainty [44]. This approach requires a new type of cognitive skills for cooperation between different types of organizations, such as private, public, public and municipal.

The experience of the world's leading countries shows that it is reasonable to consider the policy of the development of startup entrepreneurship separately from the general policy of supporting entrepreneurship in the country. Successful development of the innovative private sector requires strategic collaborations within the ecosystem. By itself, the public sector cannot act as a driver of economic growth, but it can provide systemic support for the development of local startup entrepreneurial initiatives. The public sector can take the lead in creating long-term platforms and subsystems of local startup ecosystems. This includes fostering cooperation and sustainable exchange of information between all ecosystem participants, as well as formulating a development vision for all ecosystem participants.

Thus, the countries of the world have accumulated a lot of experience in forming and supporting the development of the startup ecosystem. The experience of successful startup ecosystems should be implemented in domestic practice, but taking into account its features, existing strengths and weaknesses.

In accordance with the above, it is advisable to develop a methodical approach to the formation of the startup ecosystem in Ukraine, which involves its formation according to the main stages of the life

cycle of startups [25]. The essence of the methodological approach is to create a network of relevant innovation structures and institutions, whose activities are aimed at ensuring the effective implementation of a startup at the main stages of its life cycle. In addition, it is proposed to involve third-party organizations into the startup ecosystem, cooperation with which is carried out within the framework of concluded memoranda and agreements. The following general scheme of a methodical approach to the formation of the startup ecosystem in Ukraine is proposed, taking into account the best global practices:

The first stage. Improvement of the organizational structure of the university. In order to establish many startups, it is necessary to form a high entrepreneurial culture in society, in this regard; the role of the education system in the creation, development and success of startups is multifaceted. For the development of entrepreneurship culture, it is important to include appropriate content at all levels of education [63]. But thanks to higher education, a person receives the most modern knowledge and skills in a narrower academic or professional field, which, among other things, allow him to independently solve the most complex problems in an innovative way [64, 65]. The introduction of multidisciplinary content on startup entrepreneurship in higher education is of great importance for future high-tech startups, as the highly educated population has the greatest potential to create new startups.

Universities play an important role in the creation, development and success of startups [66]. Their contribution consists in training and imparting knowledge, supporting an innovative environment and providing students with opportunities to develop entrepreneurial skills [66]. Universities should become not only a place for training specialists in various specialties, which can potentially be useful for startups, but also places where scientific research and development of new technologies are carried out, innovation development is ensured, providing access to laboratory facilities, financial support and expert knowledge [67]. Many of today's successful startups emerge from academic laboratories and research groups. Many European entrepreneurial universities have startup incubators and accelerators where students and graduates can develop their ideas and get support from experts and investors. Universities can create an environment that promotes the development of entrepreneurial spirit

among students [68]. This can be achieved through the organization of entrepreneurial clubs, innovation forums, hackathons and other events that encourage students to think about creating their own businesses. In addition, successful entrepreneurs and experts can be involved in mentoring [68].

Universities can collaborate with local enterprises and business communities, ensuring integration between the learning process and real business needs [68], and assists students and graduates in commercializing their innovative developments, for example, justifying the feasibility of startup ideas, and drawing up business plans, providing assistance in patenting, licensing and other forms of intellectual property protection [67].

Thus, at the first stage, for the formation of an effective ecosystem of startups, it is necessary to ensure the development of Ukrainian universities as entrepreneurial and innovative, which is of key importance for the creation, development and success of startups.

One of the key elements of the startup ecosystem should be the startup center and the startup school. The startup center provides the following functions: organization of presentations, crash tests, brainstorming; conducting educational seminars, trainings, business games with the participation of entrepreneurs; support for participation in all-Ukrainian and international competitions; development of partnership and mentoring with leading startup projects, startup hubs, investment funds. A startup school is opening within the startup center. The goal of the startup school is to promote creative thinking, professional development and the acquisition of skills necessary to generate business ideas and create your own startups. The startup school interacts: with university departments to implement the educational process and participate in the formation of an innovative ecosystem of startups; with the heads of faculties (institutes) of higher education institutions for the purpose of preparing start-up projects of the appropriate focus and their expert evaluation; with other structural divisions of the university for the quality performance of the tasks and functions assigned to the startup school.

As important structural divisions of a startup school, it is advisable to organize:

- co-working (from English Co-working – “to work together”) – to create a workspace where startup teams can form, work together on the

development of their projects, exchange ideas and experience, discuss business ideas, etc.;

- startup and business idea contests – regular holding of startup project contests, their examination and selection make it possible to identify promising business ideas and directions for their improvement, draw attention to the startup movement, attract stakeholders, including potential investors;
- startup festival – an event aimed at spreading awareness of a wide range of stakeholders of the startup movement in startups at their initial stage of existence, finally forming startup teams, attracting the attention of investors;
- bank of startup ideas – formation of a database of startup ideas for their further improvement or implementation, formation of business, government, and public proposals for their implementation.

The startup center, the startup school and all its structural elements should comprehensively support the first stage of the startup life cycle regarding the formation of startup teams, the development of the startup idea and the creation of the MVP.

One of the key structural elements of the startup ecosystem is a Science Park, which is created at the initiative of a higher education institution in accordance with the current legislation, in particular the Law of Ukraine “On Science Parks”, and with the involvement of representatives of the business sector by pooling the founders' contributions for the purpose of developing scientific and technical and innovative activities for the commercialization of the results of scientific research and their implementation on domestic and international sales markets.

In accordance with the formation of ecosystem support for startups at various stages of their life cycle, it is recommended to include the following structural elements in the Science Park: business incubator, technological platform, patent office, startup accelerator, Technology Park, legal clinic, marketing research centre, fund endowment.

The second stage of the methodical approach to the formation of the startup ecosystem in Ukraine involves the involvement of third-party organizations in the startup ecosystem. At this stage, agreements and memorandums of support are concluded with startup accelerators; memoranda are signed with venture funds; memorandums and agreements are signed with international financial organizations and development funds.

Key actions to ensure the life cycle of a startup from the side of the ecosystem at the appropriate stages include [25]:

- the first stage (initial): team formation (formation of creative thinking, activation of entrepreneurial activity); business idea generation (assessment of socio-economic development problems, determination of business and society needs, assistance in justifying business ideas, examination of startup ideas);
- the second stage (seeding): creation of MVP (estimation of necessary resources for creation of MVP, resource and technical assistance in creation of MVP); building business models (assessment of potential sales markets, definition of consumer segments, key values of the startup's product, sales channels, relations with consumers, key activities, partners, costs and revenues); creation of a prototype (assessment and assistance in providing resources, organization of creation of a prototype);
- the third stage (executive): development of a business plan (assessment and expert consulting on the justification and development of the main sections of the business plan); strategy development (assessment of the competitive environment, justification and development of a startup strategy);
- the fourth stage (final): protection of intellectual property (assessment of the technology market and assistance in the preparation of protective documents for the protection of intellectual property rights); search for financing (assessing the market for financial resources, attracting resources for financing startups).

Thus, an ecosystem of startups can be formed, which provides comprehensive support for startups throughout their life cycle [25]. In addition, when building an ecosystem of startups, it is necessary to take into account the complexity of the problem of finding a startup idea. The product that the startup offers must be in demand, take into account the needs of end users. That is why it is necessary to pay considerable attention to the integration of education, science, business and government during the formation of a startup idea. Considering the system of interrelationships between education, science and business within the ecosystem of startups, it should be noted that the development of a

business idea, as well as the innovation process as a whole within the university, is built based on the activities of subjects that generate new knowledge (scientists, teams of scientists, students, graduate students, departments, laboratories, divisions) and entities that commercialize developments (departments of scientific and startup activities, technology transfer centers, etc.).

At the stage of developing an idea and conducting scientific research, the elements of the managed subsystem, expressed through the structural elements of subdivisions and departments, should be involved: institutes, faculties, scientific laboratories, scientific and educational centers, startup centers (schools), etc. At the stage of implementing the results of scientific activity into practice, engineering centers, specialized research institutes and centers, etc. are involved [66].

The proposed methodical approach to the formation of an ecosystem for the formation of startup companies in Ukraine was tested and implemented at O. M. Beketov National University of Urban Economy in Kharkiv, and the organizational structure of its startup ecosystem was developed:

- Science Park in the form of a limited liability company;
- a startup center that provides for the following functions: organization of presentations, crash tests, brainstorming; conducting educational seminars, trainings, business games with the participation of entrepreneurs; support for participation in all-Ukrainian and international competitions; development of partnership and mentoring with leading startup projects, startup hubs, investment funds; including a start-up school;
- a business incubator, which provides for the creation of conditions conducive to the creation and development of small innovative enterprises, ready for the effective functioning of the market both in the university incubator and after leaving it;
- the business environment as a customer of the final innovative product, in particular, clusters of the city of Kharkiv and other regions of Ukraine.

Therefore, a methodical approach to the formation of the startup ecosystem in Ukraine around the university can form the basis for the development of innovative entrepreneurship and contribute to the development of the startup

movement in the country and its socio-economic development in particular.

5 CONCLUSIONS

As a result of the conducted research, the following scientific results of a theoretical and applied nature were obtained:

- 1) It was determined that the startup ecosystem is a network association of organizational structures of various forms of ownership that provide support for the creation of innovative startup projects at various stages of their life cycle with subsequent scaling.
- 2) On the basis of the study of theoretical and practical aspects of the creation of startup ecosystems in the countries of the world, their features and models in different countries, as well as the advantages they give to startups, are determined.
- 3) According to the results of the research of the experience of the leading countries of the world in the context of the development of startups and ecosystems of their support by conducting a cluster analysis based on data from 55 countries of the world according to indicators: the Index of the most startup-friendly countries in the world, the Global Index of startup ecosystems and the number of startups per 1,000 population for 2021, three clusters of countries with low, medium and high values of these indicators are highlighted. The leading countries included in the cluster with high indicator values are the USA, Singapore and Estonia. Ukraine is included in the cluster with the lowest indicator values. According to the results of the study of 55 countries of the world according to the following indicators: GDP per capita, number of startups per 1,000 population and the Global Innovation Index and the conducted cluster analysis, three groups of countries with low, medium and high values of these indicators were identified. The USA, Singapore and Estonia were also identified as the leading countries included in the cluster with high indicator values. Ukraine is also included in the cluster of countries with the lowest indicator values.
- 4) The peculiarities of the startup ecosystems of the leading countries and potential leaders in this field were studied and the characteristic features of their startup ecosystems were

summarized according to the following characteristics: state regulation, financing of startups, training (academic support), information support, infrastructural support.

- 5) A methodical approach to the formation of the startup ecosystem in Ukraine has been developed, which is characterized by a specific set of the country's institutions, a complex combination of efforts of which will provide support for the formation of startups (at all stages of their life cycle) and promote the activation of innovative entrepreneurship.

Prospects for further research are theoretical and methodological substantiation of possible strategies for the development of the startup ecosystem in the conditions of the post-war reconstruction of the national economy of Ukraine, as well as the development of practical recommendations for the use of public-private partnerships and crowdfunding as effective mechanisms for financing startups.

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