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The concept of forming the ecosystem of education, science and innovation at the present stage

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Abstract

The article discusses the creation of a special digital platform, the task of which will be to support the processes of formation of the ecosystem of science, education and innovation at the present stage. The author analyzed the platforms where the following will be presented: key participants in the country's scientific and educational system - universities, research institutes, authorities, innovative infrastructure organizations, large and high-tech business companies, etc.; scientific schools, research groups, individual users (scientists, experts, teachers, students, etc.); planned and ongoing projects, educational courses, discussion platforms, etc. Attention is paid to the fact that the digital platform should become a significant infrastructure that provides information openness, supports integrative processes in the scientific and educational field and the formation of an "intellectual ecosystem" at the present stage.

Keywords: concept, formations, ecosystem, formations, science and innovation

1. Introduction

The most important challenge of the digital economy from the standpoint of business management is the development of digital platforms and the formation of ecosystems based on them, which not only change the way the organization and implementation of labor activity in the modern world. Among the most well-known global educational platforms, platforms for multi-user online courses (massive open online courses, MOOCs), implemented according to the "one teacher - many students" scheme, predominate. The first global educational platforms were EdX, Coursera and Udemy, which provided established professors and universities with the tools to deliver online courses to a wide audience around the world. Currently, all universities in Uzbekistan have websites that contain a huge amount of information. Also important is the information openness of university business partners. The formation of an ecosystem of science and education in the conditions of low activity and low openness of potential participants, their attraction to the usual forms of activity ("rut effect") and insufficient resources is not an easy task.

Thanks to digital technologies, the emergence of new business processes and business models has become possible, the emergence of digital markets and their respective communities, which together radically changes the nature of interaction between participants in socio-economic relations, requires adequate changes in economic thinking and behavior. Therefore, today it is relevant to study the digital transformation of the economy and their legal foundations. Such an understanding is extremely important for education, science and innovation at the present stage, since their formation, integration, internal and external rules of interaction determine the prospects for digital transformation.

The purpose of the study is to determine the distinctive properties of modern education, science and innovation at the present stage.

A characteristic feature of such an ecosystem was the network nature of the interaction of participants ^[3]. A company's business ecosystem includes all companies, organizations, or groups of people that directly or indirectly influence the company: suppliers, distributors, lenders, technology providers, regulators, add-on manufacturers, outsourcing companies, competitors, and even customers. Crucial for the long-term success of the ecosystem and its ability to self-renewal, that is, the future transformation of education, is leadership in innovation and competition between ecosystems in the field of science and technology ^[4]. The ecological metaphor "ecosystem" focuses on the interconnection and interdependence of these participants, while their roles in the network can be mobile. I would like to note that today all modern business ecosystems are based on platforms. In some studies, platforms are characterized as the "core" of the ecosystem.

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To achieve this goal, a mechanism for solving a number of particular tasks is needed:

- based on the analysis of the current state of education and science, technology and At the present stage, identify the main internal factors of its growth and highlight the key areas of its development, including through innovation;
- systematize the investment potential and investment attractiveness between countries and determine priority areas and methodological support for the formation and implementation of innovative projects, including projects implemented jointly with other countries;
- explore the fundamental possibilities and advantages of the ecosystem approach to creating an institutional environment for attracting private and foreign investment in joint projects; and also justify that the formation of the education ecosystem, Science and innovation at the present stage in the presence of the state in various roles (customer, investor, owner of resources, etc.) is organically implemented using the mechanisms of public-private partnership. Economic development of macroeconomic systems at present time is inextricably linked to taking advantage of the international cooperation, including joint investments in implementation of various cooperation projects: innovative, development of industry and service sectors, social, educational, tourist, cultural, etc.

Business borrowed the definition of ecosystems from biology. This term was introduced in the 1930s by the British botanist Arthur Tansley. Ecosystem he called local communities of organisms that interact with each other and the environment. To thrive, these organisms compete and cooperate, co-evolve and adapt to external shocks.

In the early 1990s, business strategist James Moore adopted this concept and suggested that the company be viewed not as an individual player, but as a representative of a business ecosystem that includes many participants from different industries. "Like its biological counterpart, the business ecosystem is gradually moving from a random set of elements to a more structured community," Moore noted.

Today, ecosystems are described as dynamic and constantly evolving communities that create new value through cooperation and competition¹.

Therefore, today in any area you can use the ecosystem.

The creation of a regional ecosystem of education, science and innovation should be based on the main current regulatory and policy documents of modern Uzbekistan, as well as take into account the major projects implemented in the region in the economy and the scientific and educational sphere. First of all, it should be noted that through the efforts of the Ministry, a strategic document was adopted in the country aimed at combining the efforts of state bodies and organizations in the field of innovative development - the Decree of the President of the Republic of Uzbekistan "On approval of the strategy for innovative development of the Republic of Uzbekistan for 2019-2021." No. UP-5544 dated September 21, 2018. The main goal of the Strategy is to strengthen the quality of human capital and the entry of the Republic of Uzbekistan by 2030 into the 50 leading countries of the world according to the Global Innovation Index (GII).

In the direction of improving the regulatory framework for scientific and innovative activities in the country, large-scale work has also been done. Over the past period, the Ministry has developed and implemented more than 62 regulations.

A significant event was the adoption of the two most important laws of the Republic of Uzbekistan "On Science and Scientific Activities" and "On Innovation Activities", which today serve as a solid basis for the development of research and innovation activities in the country, given that an important condition for the dynamic development of Uzbekistan is the accelerated implementation modern innovative technologies in the economy, social and other spheres with the wide application of the achievements of science and technology.

In the direction of achieving this goal, last year the Ministry carried out comprehensive work to include our country for the first time after a long break in the Global Innovation Index rating. Uzbekistan ranked 93rd out of 131 (the last time in 2015 Uzbekistan ranked 122 out of 140). Undoubtedly, this achievement became possible due to the special attention of the Head of State, paid to the issues of increasing the efficiency of research and innovation activities in the country, the ongoing reforms and the implementation of a policy of transparency and openness in the innovation sphere. For example, last year, the Concept for the Development of Science of the Republic of Uzbekistan until 2030, developed by the Ministry, was adopted, which defines the foundations for the development of this area in the medium and long term. Thus, the Concept defines a plan for the phased development of science in terms of such indicators as:

increase in the share of funds directed to science (in relation to GDP);

increasing the share of Uzbek researchers in the total number of articles published in international scientific journals;

increasing the involvement of young specialists in science and bringing the average age of scientists up to 39 years;

renewal of machinery and equipment in research institutions and universities implementing scientific development projects.

To achieve the above goals, the Concept provides for a roadmap that includes activities in the following areas:

improvement of the management system in the field of science; improvement of the system of financing science and scientific activities and diversification of sources of financing; training of highly qualified scientific and engineering personnel and their orientation towards scientific activity;

creation of a modern infrastructure for the development of science; formation of a modern information environment conducive to the development of science.

Along with the Concept, the Law "On Startups" and the Strategy for the Development of Artificial Intelligence in the Republic of Uzbekistan for 2021-2022 were also developed, which is the basis for the formation of a startup ecosystem, which is a relevant and promising direction for our country..

Targeted projects and projects are being implemented jointly with foreign partners. In particular, 44 joint research projects were implemented for a total of 17.4 billion soums. Among the partner countries for the implementation of joint research projects: Russia, Belarus, Germany, China, Turkey, India, etc. Also, it is planned to implement joint projects with the Eurasian Research Support Fund (EAPI).

35 innovative start-ups were launched with the participation of investors, commercial banks and research institutions through the commercialization of promising scientific research.

In order to introduce venture financing and attract financial resources from business entities for innovative projects, Decree of the President of the Republic of Uzbekistan No.

¹ <https://trends.rbc.ru/trends/innovation>

UP-5583 dated November 24, 2019 was adopted.

In addition, this year the Ministry plans to implement three major investment projects, such as "Creation of the Uzbek-Chinese medical technology park for the synthesis of medicines", "Modernization of the national innovation system of Uzbekistan" and "Cultivation of industrial cannabis", for a total amount of 18.5 million US dollars.

In accordance with the Decree of the President of the Republic of Uzbekistan "On additional measures to improve the efficiency of commercialization of the results of scientific and scientific and technical activities" No. PP-3855 dated July 14, 2018, a new system for the commercialization of scientific developments was created, aimed at ensuring the accelerated implementation of domestic scientific, applied and innovative projects and developments, increasing the contribution of science to strengthening the competitiveness of the country's economy, as well as creating effective mechanisms for promoting promising domestic achievements in scientific and scientific and technical activities. It should be noted that the conditions for creating business ecosystems based on blockchain platform solutions are:

- strategic technological trends that have a breakthrough potential and the potential for transition from pilot projects to the mass introduction of technologies in various sectors of the economy and spheres of life. These trends are associated with the possibility of increasing the speed, scale, reliability, high degree of updating, user-friendliness of the interface and other characteristics of the platform, multiplying the range of opportunities for ecosystem participants.

The main attributes of business ecosystems based on blockchain platform solutions are the digital technologies themselves and the system of participants with their inherent functions and complex interactions and capable of adapting in order to increase the overall success of the ecosystem.

Digital technologies and the level of their development predetermine the diversity of the value proposition and the quantitative and qualitative characteristics of the participants in the business ecosystem. In digital transformation, the key technologies are: blockchain, Internet of Things, artificial intelligence, virtual reality, robotization, big data, machine learning. We emphasize that the convergence of technologies makes it possible to create fundamentally new products and services.

It should be noted that the development of business ecosystems based on blockchain platform solutions is due to the very emergence of the technology and its advantages, and as a result of demonstrating the growing results of applying technology in business within the framework of industry consortiums and projects implemented by technology startups.

For example, with the support of the Ministry, the Scientific and Technical Council was established to select scientific and innovative projects aimed at solving regional problems of the Republic of Karakalpakstan. The Strategy for Innovative Development of the Republic of Karakalpakstan for 2021-2025 is being developed. The issue of organizing scientific internships for 100 young scientists and researchers of the Republic of Karakalpakstan abroad is being worked out. In cooperation with the International Center for Salt Soil Biofarming (ICBA), projects are being implemented to strengthen the role of women in society, support them, including the development of women's entrepreneurship.

Based on the Decree of the Cabinet of Ministers of the

Republic of Uzbekistan PKM-No. 313 dated May 22, 2020, adopted last year, the Ministry is implementing measures to create youth technology parks in the regions of the republic. In order to form a team of talented youth to work in these technoparks, the Ministry has developed a mobile educational platform "TexnoBus". Scientific organizations are provided with access to leading databases of scientific and technical information, such as SpringerLink (Springer Nature), Clinical Key (Elsevier), Wiley (John Wiley & Sons, Inc.), etc., training webinars are held, and technical support is provided. Work has begun to strengthen the work of the Office of the National Coordinator in Uzbekistan in terms of assisting the scientific and innovation community in participating in competitions and events of the 9th Framework Program of the European Union for the development of scientific research and technology "Horizon Europe".

A contract was signed for the provision of services for the UNESCO Office in Uzbekistan in the amount of 37 thousand US dollars to carry out work on the analysis of the scientific, technical and innovative potential of the regions of Uzbekistan within the framework of the UNESCO IsDB project "UNESCO Global Observatory of Science, Technology and Innovation Policy Instruments towards strengthening inclusive Science, Technology, Innovation Systems for the Sustainable Development Goals".

For the first time in the country, the project "English for Science" was launched, within the framework of which free training courses were organized aimed at improving the knowledge and skills of domestic scientists and researchers in English. When forming an ecosystem, education providers enter into mutually beneficial relationships, create and redistribute resources among themselves, including interested students, educational content, quality control tools, and financial resources. A fully developed educational ecosystem is an open and growing community of various education providers that serve a wide range of student needs in a particular area of knowledge and competencies or in a particular territory. The territory or region is the minimum scale of the educational ecosystem, while a separate institution (school, university, etc.) cannot become such a system on its own, although it can have "ecosystem" properties and become the center of its formation. The ecosystem requires not only providers of educational opportunities, but also various integrators who create trajectories for the movement of students in its space, help to take into account and record their achievements, find and connect public resources, etc. As cooperation and sharing of resources develop in the ecosystem, it has many advantages in comparison with educational organizations and centralized educational systems:

- The ecosystem creates the "maximum good", for example, provides education at higher quality and lower costs;
- The ecosystem is highly adaptive – able to quickly respond to student needs and changes in the institutional environment;
- Ecosystems are scalable - the configurations of participants and resources that are created are applicable at different scales, from groups of students or individual institutions to the scale of the entire planet. Thus, the educational ecosystem is always localized, it responds to local needs and connects students in this context. Educational ecosystems create a greater variety of educational opportunities than traditional educational systems. They include a wide variety of organizations, activities and resources: schools, colleges, libraries, sports clubs, practice clubs, community centers,

online courses, forums, mobile apps, online gaming universes, and more. The ecosystem does not replace existing educational formats, but “grows” the educational system through new formats and connectivity tools, creating a multidimensional learning space with unique opportunities for personal and collective education.

In general, this Center already today has all the prerequisites to become the leading intellectual agency in the Central Asian region in the field of science and innovation, and is able to provide a full range of information and analytical services at the international level.

In addition, the development of business ecosystems requires taking into account the threats caused by their technological features. Platforms aggregate gigantic arrays of personal, business, scientific and technical information. Moreover, these arrays are presented in a “packaged” form, which greatly enhances the destructive threats of illegal use of data. The normal functioning of business ecosystems is possible only with adequate government efforts to protect critical infrastructure and ensure cybersecurity.

State regulators in many countries of the world are developing measures to limit the abuse of dominant position for ecosystem players.

The main proposals are as follows. First, companies with a significant presence in the market will be required to pay taxes in this jurisdiction. Secondly, all companies will also pay a certain minimum amount of taxes in all jurisdictions where they operate. It should also be taken into account that the reform of the global tax system in the digital economy is based on the concept of “user value”. However, the approach to measuring “user value”, and therefore the calculation of taxes for companies that profit from the use of user data, remains unresolved. In addition to the problems of taxing companies, there are also problems of taxing individuals, exacerbated by a sharp increase in self-employment and freelancing in the context of digitalization.

Conclusions

In Uzbekistan, the issues of strategy and prospects for innovative development are given close attention, which is relevant in connection with the globalization of world economic relations.

As the President of the Republic of Uzbekistan Sh.M. Mirziyoyev “An important condition for the dynamic development of the Republic of Uzbekistan is the accelerated introduction of modern innovative technologies in the economy, social and other spheres with the widespread use of science and technology.”

Business ecosystems in the education of science and innovation based on blockchain platform solutions create value by networking owners, partners, users, provide automatic interaction and transactions. Blockchain technology and related technologies allow participants to dynamically adapt to changing market conditions and ensure maximum customer focus, thereby gaining a competitive advantage over traditional enterprises. In Uzbekistan, two main documents regulate relations in the field of science, scientific and innovation activities - this is the Law of the Republic of Uzbekistan “On Science and Scientific Activities” No. ZRU-576 dated October 29, 2019 and the Law of the Republic of Uzbekistan “On Innovation Activities” No. ZRU-630 dated April 7, 2020.

Large-scale projects that implement the principles of ecosystems (“openness”, “trust”, “cooperation”, “initiative”)

and are aimed at:

- Creating new opportunities for cooperation between universities, research organizations and business companies, including partners in Russia and other countries;
- Formation of leadership collaborations that unite universities, academic institutions and business companies to solve the problems of technological development of production and achieve world-class scientific and technological results;
- Formation of an infrastructure to support scientific and innovative activities, creation of conditions for supporting start-ups and the activities of small innovative enterprises;
- Initiation of new socially significant humanitarian projects and practices related to the use of modern information and communication technologies;
- formation of new engineering and educational practices aimed at reproducing the modern culture of engineering and technical thinking and activity.

It must be understood that the technical development we expect will be achieved only if there is innovation. To create innovations, it is necessary to carry out research activities. And this, in turn, requires an increase in research funding.

Currently, more than a hundred scientific conferences are being held by universities and other organizations in Uzbekistan, the topics of which are very diverse. In most cases, only a few dozen people participate in each of these events. In terms of the level of the stated problems, the tasks set and the results presented, such conferences rather correspond to the regional level and, in fact, are poorly correlated with the global frontier of research. As a rule, such events are not focused on attracting representatives of business and government as potential beneficiaries and partners. The conferences should create new opportunities for cooperation between universities, research organizations and business companies of Uzbekistan, cooperation between the country's universities and foreign universities and companies. In the future, all key components of scientific activity can be carried out on the basis of digital platforms:

- problem posing;
- collection of information (observations, collection of factual data, organization of experiments);
- analysis of the results (systematization, search for the significant);
- synthesis of knowledge - generalization, formulation, hypotheses, theories, laws, building models;
- verification (criticism) of hypotheses, models, etc.

At present, various components of research activity are provided with platform solutions to varying degrees. The following most common types of digital platforms in the field of science can be distinguished.

First, platforms for renting and sharing infrastructure. Universities and business companies create Internet platforms through which they rent out technological infrastructure, including scientific equipment (especially unique research facilities and expensive devices), computing power, laboratory facilities, etc.

2. Social networks of scientists. They provide scientists with the services of maintaining a personal account, forums, organizing “virtual communities”, forming a rating, creating an electronic archive of documents, news feeds, etc. The

creative functioning of business ecosystems requires adequate state regulation.

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