

ICEST 2022**III International Conference on Economic and Social Trends for Sustainability of Modern Society****DIGITAL PLATFORM AS A WAY TO IMPROVE THE REGION'S
INNOVATIVE INFRASTRUCTURE**

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Abstract

Innovative development is the main priority of the modern Russian economy. An important component of innovation activity for any region of the country is the presence of a developed innovation infrastructure, which takes into account not only entities in the form of enterprises and organizations, but also processes, resources and tools that provide maintenance of the innovation process. The creation of such an infrastructure must be implemented based on the specifics of a particular region taking into account its strengths and weaknesses. The object of the study is the Krasnoyarsk Territory, a subject of the Russian Federation. The purpose of this article is to consider ways to improve the innovative infrastructure of the region by referring to the use of a digital platform. On the basis of digital technologies such a new form of organizing the interactions of many factors involved in production activities, social and cultural life as digital platforms is emerging. Platform solutions allow restructuring all areas of human activity - the production of various products and services, trade, management, healthcare, education, etc. In the course of the research a comparative analysis of several digital services was carried out in order to create a functioning digital platform. The study uses the following methods of scientific knowledge: observation, comparison, analogy, synthesis and analysis, induction and deduction, factor analysis.

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1. Introduction

One of the priority areas of the socio-economic development of the Russian Federation at present is the development of science, the national innovation system, technologies and effective mechanisms for implementing innovation policy. A significant part of the innovation system is occupied by its infrastructure, which serves as a link between the creators of innovations and producers of goods and services and is a factor in activating innovation processes. Therefore, such innovation infrastructure that would contribute to the growth of the efficiency of innovation activity in general is needed. In modern trends in the development of the economy a promising step for most of its areas was to ensure the accelerated introduction of digital technologies in the economy and the social sphere. Digitalization is inextricably linked with the innovation infrastructure and is one of the distinctive ways to improve it. The use of digital technologies, including digital platforms, greatly simplifies the processes of communication, learning, information exchange between all users of these platforms, whether they are students of schools and universities, researchers, representatives of various companies, etc. It is the digitalization process that has become one of the national development goals Russian Federation for the period up to 2024.

2. Problem Statement

The functioning of the digital platform is of particular importance within the innovation infrastructure of the region. Digital platforms allow combining knowledge, development, research, scientists, students, educational institutions, small businesses, innovative infrastructure entities for the purpose of economic development of the region, country and the whole world as a whole. The digital platform should provide informational representation of organizations, groups, persons in the form of their "visibility" for each other and for the authorities of science and education in the region; the opportunity to present their own activities, achievements and prospects; reliable and up-to-date information on the activities of the Ministry of Education and Science and other regional executive authorities of the Krasnoyarsk Territory in the field of education, science and innovation, on their policies and ongoing activities; the opportunity to enter into communication, discuss common issues, create joint projects, exchange and share resources; the ability to organize or participate in events and activities; the ability to create groups for educational, scientific, cultural, social activities; the opportunity to receive financial and organizational support through participation in grant competitions, various support programs, etc.

3. Research Questions

As part of the national program "Digital Economy of the Russian Federation", it is necessary to transform priority sectors of the economy and the social sphere, including healthcare, education, industry, agriculture, construction, municipal services, transport and energy infrastructure, financial services, through the introduction of digital technologies and platform solutions. The relevance of the study is due to the need to address this issue. This study proposes a way to improve the innovation infrastructure of the

Krasnoyarsk Territory using a digital platform that will serve as the basis for the innovative development of the region.

4. Purpose of the Study

The purpose of the study is to create a functioning digital platform to improve and maintain the level of innovation infrastructure of the Krasnoyarsk Territory.

5. Research Methods

The study uses such methods of scientific knowledge as observation, comparison, analogy, synthesis and analysis, induction and deduction, factor analysis. The theoretical and methodological basis of the study is represented by the work of domestic and foreign scientists on innovation management.

5.1. Digital Platforms in Research and Innovation

Digital technologies create new opportunities for communication, storage, transmission and processing of information, create fundamentally new virtual objects and environments, tools for analytics, design and management. On this basis a profound transformation of production, economic, social and cultural processes takes place. The creation of the Internet, compact electronic gadgets, the development of a new generation of computer algorithms and programs, artificial intelligence technologies, work with "big data" and "distributed registries" - all this forms the "digital world", which becomes an integral part of reality (Styrin et al., 2019).

Digital platforms are increasingly occupying a place among the modern infrastructures of the economy; they provide information exchange and transactions between economic entities, including innovation infrastructure entities, the creation of digital services and products on a single technological basis, the deployment of value chains, clusters and entire ecosystems in different fields of activity (Dashkov & Chernikova, 2021).

Parker et al. (2017) in the book "Platform Revolution" calls a digital platform a business based on the implementation of value-creating interactions between external producers and consumers. The platform is an open infrastructure for interaction participants and sets rules for them. Its main goal is to bring users together and facilitate the exchange of products or social values, contributing to the creation of benefits that are meaningful for all participants.

The Accenture consulting company defines a digital platform as a group of technologies, technological solutions that provide the creation of a specialized system of digital interaction. MIT experts argue that a digital platform is primarily "a high-tech business model that creates value by facilitating exchanges between two or more interdependent groups of participants" (Mesropyan, 2018, p. 4).

Rostelecom proposes the following definition of a digital platform:

it is a system of algorithmic mutually beneficial relationships between a significant number of independent participants in an economic sector (or field of activity) carried out in a single information

environment, leading to a reduction in transaction costs through the use of a package of digital technologies for working with data and changing division of labor systems (Digital Economy, 2017, p. 2).

From the point of view of institutional economics, digital platforms are hybrid structures: hybrids of markets, firms, communities, and technological systems. They can be seen as an intermediary institution of a new generation (Gelishanov et al., 2018).

The fundamental design of the digital platform is described by Parker et al. (2017); its basis is “the key interaction between producers and consumers” - this is the main form of activity, value exchange, which primarily attracts users to the platform.

So, the creation of platforms should occur step by step. Development should start with identifying key interactions, as value sharing brings the most users to the platform. Its main components - participants, units of value and filters - must be precisely defined and carefully designed to make the key interaction as easy, attractive and valuable for users as possible. The fundamental task of the platform is to facilitate key interaction, and if the platform copes well with this task, then it can exist and develop (de Reuver et al., 2018).

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 research and development can be distinguished as following:

- platforms for renting and sharing infrastructure (World Community Grid, Kwipped, Ebay, GenTech, IVOA, Navitas). Universities and business companies create Internet platforms with the help of which they rent out technological infrastructure;
- social networks of scientists. They provide scientists with services for maintaining a personal account, forums, organizing "virtual communities", forming a rating, creating an electronic archive of documents (ResearchGate, Academia, "Scientists of Russia", SciPeople, SSRN, etc.);
- data-centric platforms. Data-centric architectures make it possible to accumulate digitized data and search for the necessary components in them using machine learning algorithms (Data.gov, Science.gov, etc.);
- open educational projects (MOOC - EdX, Coursera, Moodle; "Universarium", Eduson, "Single window for access to educational resources");
- financial and accounting and analytical platforms for holding competitions and supporting scientific projects (RFBR, RSF, the Innovation Promotion Fund, the Government Tasks Support Portal of the Ministry of Education and Science);
- open/virtual laboratories (VirtuLab, PhET, Wolfram Demonstrations Project, IrYdium Chemistry Lab, "Virtual Laboratory" teachmen.ru, Online Labs in;

- crowdfunding platforms. On such a platform, a scientist can advertise their research project and start a public fundraising campaign. Successful niche services are Barnraiser (agriculture); Medstartr (medicine), CoinFunder (bitcoin and blockchain), Experiment;
- open corporations/hackathons (Major Hacking League, Habr, Hackathons.rf, etc.);
- publishing services that help researchers prepare publications, place them in electronic and paper journals, etc. (Baldwin & Woodard, 2014).

The next stage in the development of digital platforms, after providing separate functions of research activities, was the creation of holistic multifunctional “virtual research environments” that support the “full cycle” of research work from formulating problems to publishing results. For example, at Oxford University, such developments are being carried out to support research in biology and the humanities (Wandela et al., 2013).

The digital platform provides software, organizational support for the work, support for calculations and the scientific component of projects. Support for the standardization of innovation activities in the digital economy and digital platforms is carried out through the accumulation and analysis of experience in the use of digital platforms in supporting innovation activities; development of standard schemes of innovative activity, standard documents, regulations, etc.

Digital platforms also support the marketing structure in innovation activities by developing standard business models and recommendations for their application; a typical set of measures to create demand for innovations; resolving issues of rights to the results of intellectual activity and remuneration schemes (Kupriyanov & Semenov, 2020).

The digital platform in research and innovation allows you to multiply the flow of new and promising projects, accelerate the implementation of innovative projects, while reducing the cost of their implementation by reducing the costs of interaction between subjects of innovation and process optimization.

5.2. The use of a Digital Platform as a Way to Improve the Innovation Infrastructure of the Krasnoyarsk Territory

In order to improve the innovative infrastructure of the region it is proposed to create a digital platform on the basis of the Reshetnev Siberian State University of Science and Technology whose task will be to support the formation of an ecosystem of science, education and innovation in the Krasnoyarsk Territory.

Calculations have shown that the most problematic is the production and technological subsystem of the innovation infrastructure. However, this is not due to a reduction in equipment costs, but rather to a reduction in the number of researchers and, therefore, to a decrease in the number of advanced technologies created. The point is not only in the amount of funding, but also in the general vector of development of the scientific industry, its significance and prestige for researchers.

A way to improve the innovation infrastructure using a digital platform is the achievement of information openness of science and education organizations. Each university, scientific institution, engineering company, the most significant business companies should have their own representation on

the platform, which contains information that is important for partners, reflecting their interests and requests in the field of applied research and development, training.

Currently all universities of the Krasnoyarsk Territory have websites that contain a huge amount of information. A representative office, unlike a website, should directly address potential partners, briefly and clearly convey the essence of proposals or opportunities for cooperation; provide a reliable and fast communication channel for initiating interactions. The scheme of collective use is shown in Figure 1.

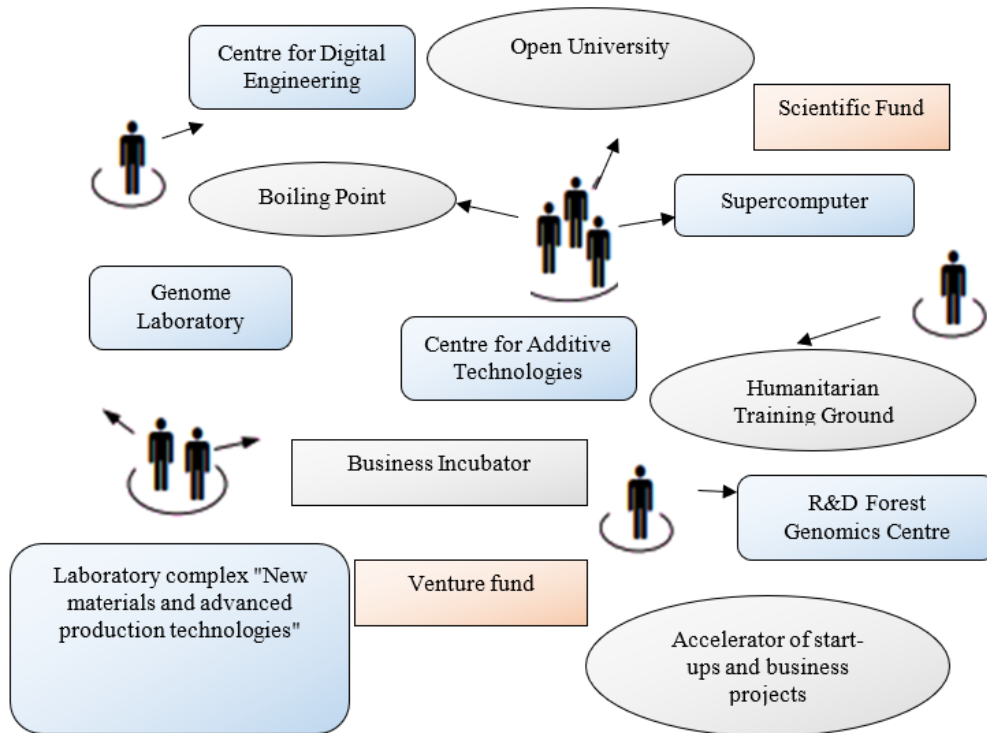


Figure 1. Shared Infrastructure

The digital platform should give individuals and groups that come up with initiatives and projects in the field of education, science, innovation, cultural and social activity the opportunity to create their own representation, initiate events and projects, find partners, points of application of efforts within the region - issues, orders, resources, cooperation.

Regarding the option of improving the production and technological subsystem, it may be the creation of an industrial platform that will allow the creation of equipment and software for enterprises or organizations. This also includes the rental and sharing of technological infrastructure, such as equipment, computing power, laboratory facilities, etc.

The main task of creating and fruitful functioning of the digital platform is the formation of a collective subject of activity in the field of science and higher education of the Krasnoyarsk Territory. The collective subject is formed through the setting up and implementation of active actions of individual (scientists, teachers, students of universities and high school students, residents of the region) and institutional (regional authorities, universities, academic institutions, foundations, engineering companies, business companies) users.

Thus, it is possible to depict the planned structure of this digital platform (Figure 2).

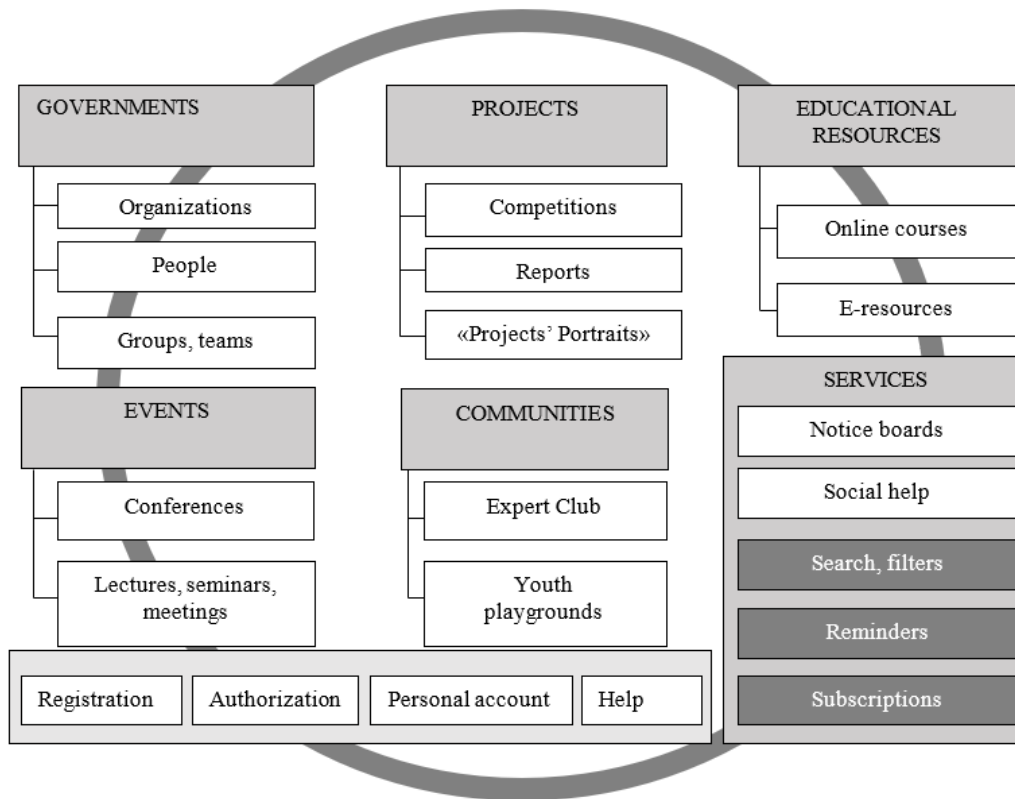


Figure 2. Structure of the created digital platform

All these activities are recommended to be carried out in order to generate interest among students and the population as a whole to enter universities, receive education, research activities, followed by an increase in personnel at the subjects of the innovation infrastructure and the growth of the region's innovative activity through the creation of new advanced technologies.

6. Findings

The design of digital platforms takes place in stages, starting with some basic functionality, with a subsequent increase in functions and capabilities. Necessary functions and tools can either be built in as native software modules of the platform or be enabled through connection to external resources and platforms.

6.1. The Process of Initiating the Introduction of a Digital Platform

The digital platform of the scientific and educational ecosystem will be deployed as follows.

First stage: The image of the regional intellectual system. The platform includes representatives of individuals, groups, organizations and reflects ongoing activities (projects), its results and achievements, plans for the future; requests for scientific and technical developments.

Second stage: Communicative environment and online education environment. In addition to representative offices, it includes services that reduce the costs of interaction and cooperation; help to enter into cooperation; allow you to organize events offline and online; allow experts to develop discussions of technological and socio-economic issues that are significant for the region, the country and the world; provide educational navigation.

Third stage: Environment for the implementation of joint scientific, applied projects, innovation activities. In addition to the services listed above, it provides digital tools: project management; accumulation of resources within the project - digital libraries, intermediate results of research and development, documentation, etc.; expert support of projects; collective use of scientific equipment, production, expedition sites, etc.; designing, organizing a startup, searching for resources; search for partners (investors, customers, suppliers); product promotion.

Fourth stage: Environment for the accumulation of intellectual, social, reputational capital. The platform uses digital tools: promotion and protection of scientific results; creating professional networks; accumulation of ratings and ratings (reputation).

In modern conditions of digitalization and the development of innovative systems, the created digital platform can be developed on the basis of relevant services that allow you to timely and efficiently perform all types of work intended for the correct functioning of the digital platform. On the basis of data collected from developer sites, various conferences, universities, etc., services were selected on which a digital platform can exist, affecting precisely the process of training, advanced training and retraining of personnel. A comparative analysis of the functionality of the following services was carried out: Electude, edX, Totara, Thinkific. The comparison was carried out in the following functional areas: planning and management of research activities, accounting for the results of R&D, registration of R&D results, management of additional education. The Totara system is the most advantageous to use in accordance with the requirements of the efficient operation of digital platforms.

The analysis of the innovation infrastructure of the Krasnoyarsk Territory carried out during the research and the identification of the problem, which consists in reducing the number of researchers and reducing the number of patent technologies created, led to the fact that for the growth of these indicators it is necessary to attract new, promising people to research and innovation activities. Based on this, as an improvement of the innovation infrastructure of the Krasnoyarsk Territory, it was proposed to create a digital platform that can combine knowledge, development, research, scientists, educational institutions, small businesses, subjects of innovation infrastructure for the economic development of the region.

7. Conclusion

Over the course of many centuries, society has undergone many changes and transitions: from a traditional society to an industrial one, from an industrial one to a post-industrial or information society. The information society is characterized by the development of information technologies, which has led to the general digitalization of various areas from agriculture to healthcare.

Digitalization is inextricably linked with the innovation infrastructure and is one of the distinctive ways to improve it. The use of digital technologies, including digital platforms, greatly simplifies the processes of communication, learning, information exchange between all users of these platforms,

whether they are students of schools and universities, researchers, representatives of various companies, etc.

In the course of the research, the goal was achieved, which was to analyze the modern innovation infrastructure of the Krasnoyarsk Territory and create a functioning digital platform to improve and maintain its level.

The practical significance of the research lies in identifying the strengths and weaknesses of the region's innovation infrastructure, conducting a comparative analysis of several digital services in order to create a functioning digital platform.

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