Digital Innovation as a Regional Economy Development Factor

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Abstract. The article considers the phenomenon of digital innovation as a factor in the development of the regional economy. Using the example of the Siberian Federal District, the authors found that there is a direct relation between the value of indicators of innovative development of regions and indicators of the development of the digital economy. In addition, the article included a SWOT analysis of the development of digital innovations in the Kemerovo region-Kuzbass, as a raw material region with the potential for development in the sphere of digitalization.

1. Introduction

At the present time the Russian economy is transforming into a digital economy based on innovation. The term “innovation” is multifaceted and is applied at different levels both national and international. Innovation is implemented not only in the field of product manufacturing technologies, but also in the field of organizational decision-making and the social sphere [1].

The definition of the digital economy was proposed by the World Bank. From its point of view, the digital economy is a new way of economy based on knowledge and digital technologies. At the same time, society, business and government acquire new digital skills and opportunities. Thus, digital innovation is essential for the digital economy.

The aim of creating digital innovations is to increase labor productivity, competitiveness of companies, reduce production costs, create new jobs, reduce poverty and social inequality [2].

Digital innovation emerged in the 1960s in the USA, European countries and the USSR. The following Table 1 gives innovation development stages in the world [3].

The process of introducing innovative technologies takes less and less time during the transition to a new stage of development. In the course of the research, the laws regulating the creation and implementation of digital innovations in Russia were used. In addition, the reports and collections published by Rosstat and the HSE on the topic of innovative development and digitalization were studied. Also articles of different authors (Kapranova L. D., Donichev O. A., Grachev S. A., Bakirova R. R. and others) were considered.
Table 1. Development stages of innovation processes.

| Step | Characteristic                                      |
|------|----------------------------------------------------|
| 1    | Automation of existing technologies                |
|      | The expansion of mobile communications, the Internet and |
|      | various types of communication systems             |
| 2    | Changing operating models of companies             |

2. Results and discussion

In order to achieve economic and social effects from the development of digital technologies, it is necessary to achieve their balanced development in areas of application: public administration, education, medical care, business and households.

Digital transformation of the regional economy, implemented through the introduction of digital innovations, can lead to the following results:

- increasing the region's income (GRP) due to digitalization of production and management systems;
- saving budget funds due to their rational spending and reappropriation;
- creation of the efficient regional infrastructure;
- improving the innovative attractiveness of the region;
- increasing living standards;
- growing competitiveness of resident enterprises.

To provide digital transformation, first of all, it is necessary to form a high-quality regulatory and legal framework. Currently, the main normative legal act regulating digitalization processes is the National program № 7 "Digital economy of the Russian Federation", dated 4 Jun 2019. This program should increase the intensity of the introduction of digital technologies by increasing costs for the development of the digital economy, expand access to the Internet, increase the provision of services for storing and processing data. In addition, the program span issues of information security, regulation, personnel policy, etc. [4].

The adoption of the Digital Economy Program has set the regions of the Russian Federation the task of implementing digital transformation, accelerating the digitalization process. In these conditions, digital innovations are becoming increasingly actual. In the future, more and more innovations will take place in the digital sphere. According to the forecast made by the Institute of Statistical Studies and Economics of Knowledge NRU HSE, by 2024 the volume of demand for digital technologies will almost triple. Publishing and patenting activity will increase accordingly. The greatest demand will be present for cordless communication technologies - demand volume almost doubled, distributed ledger systems - almost sixfold, and neurotechnologies and artificial intelligence - 3.5 times (Fig. 1) [5].

In order to support the implementation of digital innovations, it is planned to adopt Federal Law 258-FZ “On experimental legal regimes in the field of digital innovations in the Russian Federation”, dated 31 July 2020. This law will create the legal environment for the accelerated creation and implementation of digital innovations by removing some legal restrictions. In addition, this legal act will establish the definition of "digital innovation" as "a new or significantly improved product (commodity, work, service, guarded result of intellectual activity) or a process, a new sales method or an organizational method in business practice, organization of jobs or in external relations".
At the same time, these innovations should be introduced into use, created or used in the following directions:
- medical activity;
- design, production and operation of vehicles;
- agriculture;
- financial market;
- sale of goods, works, services remotely;
- architectural and construction design, construction, overhaul, etc. ;
- provision of central and local government services, central and local government oversight;
- industrial production (industry);
- other directions established by the Government of the Russian Federation [6].

Digital innovations are carried out on the basis of technologies, the list of which is established by the Government of the Russian Federation, and in the field of the financial market - by the Central Bank of the Russian Federation. This list includes the following technologies: neurotechnologies and artificial intelligence, big data technologies, quantum technologies, robotics components and sensorics, distributed ledger systems, Internet of things and others [7].

In order to determine the influence of the digital component on the innovative activity of the region, it is necessary to compare innovative and digital development indicators of Siberian Federal District regions.

The following indicators were selected as indicators of innovative development: the volume of innovative goods, works, services; developed and used advanced production technologies; internal costs for research and development and the number of scientific personnel; the cost of technological innovations; the organizations innovative activity level.

The following indicators were used as digital economy development indicators: subscribers of fixed and mobile broadband Internet access; the proportion of the population using the Internet (in total, for ordering goods, works, services, for receiving central and local government services); the proportion of organizations using broadband Internet and cloud services [8]. For each indicator, the regions were ranked from highest to lowest. Further, for each region, places in the district were obtained on the basis of innovative and digital development indicators ranks sum (Table 2) [5, 9, 10, 11].
Table 2. Places of Siberian Federal District regions in digital economy indicators and innovative development indicators in 2018.

| Region          | Place in the Siberian Federal District in innovative development indicators | Place in the Siberian Federal District in digital economy indicators |
|-----------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|
| Altai Republic  | 9-10                                                                      | 5                                                                   |
| Tyva Republic   | 9-10                                                                      | 6                                                                   |
| Khakassia Republic | 8                                                                         | 10                                                                  |
| Altai region    | 6                                                                         | 8                                                                   |
| Krasnoyarsk region | 1                                                                         | 2-3                                                                  |
| Irkutsk region  | 5                                                                         | 4                                                                   |
| Kemerovo region - Kuzbass | 7                                                                         | 9                                                                   |
| Novosibirsk region | 2                                                                         | 1                                                                   |
| Omsk region     | 4                                                                         | 7                                                                   |
| Tomsk region    | 3                                                                         | 2-3                                                                  |

The leaders in both directions included the Krasnoyarsk region, the Novosibirsk region, and the Tomsk Region. The last places are occupied by the Altai Republic, the Tyva Republic, the Khakassia Republic, the Kemerovo Region - Kuzbass. The leaders in both areas coincide, therefore, in those regions where innovative processes are developed, the implementation of digital technologies and, accordingly, digital innovations is more active. At the same time, the positions of the regions in digital and innovative development indicators do not have an exact correspondence. Consequently, in the Siberian Federal District, digital innovations do not sufficiently affect the innovative development of the region and it is necessary to take measures to support the development of digitalization.

The question of introducing digital technologies in the Kemerovo region - Kuzbass is currently especially relevant. The lag in the sphere of digital innovations can lead the region to an adverse development case with an almost complete refocusing to the materials sector of the economy, damaging industry, loss of scientific and human resources, and economic degradation of the region as a whole. We will identify the weaknesses and threats to the development of digital innovations in the region, which are caused by the lag behind digital regions. On their basis, we will determine the strengths and opportunities of development of digital innovations (Table 3) [12].

Table 3. SWOT-analysis of the development of digital innovations in the Kemerovo region.

| Weaknesses                                                                 | Strengths                                                                 |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1. Insufficient level of development of scientific studies and applied developments. | 1. Development of platforms for engineering (project-oriented) support of scientific and technological revolution for their implementation in business. |
| 2. Underdeveloped business environment in science-intensive and high-tech business. | 2. The existence of the state and municipal administration the |
resource development, rather than on achieving breakthrough results in the form of innovative products and technologies.

Structures responsible for the development of innovative activities in the Kemerovo region.

3. The beginning of the development and implementation of digital projects in other spheres in the region.

Opportunities | Threats
---|---
1. The possibility of using federal budget support programs for the development of small innovative entrepreneurship.  
2. Possibility of holding interregional innovation forums.  
3. Development of Priority Social and Economic Development Area. | 1. Lack of business initiative in the sphere of small innovative entrepreneurship.  
2. The growing lag of the general scientific and technological level of development and business from the international level.  
3. Lack of a Special Economic Zone as a factor in attracting investment.

The insufficient level of development of Research and Advanced Development and applied developments in compared to other regions significantly thwart progress the development of the innovative potential of Kuzbass. To evening-out this factor, it is necessary to develop entrepreneurial technology initiatives. The strengths is that modern engineering centers are currently appearing in the region, one of which operates on the basis of Kemerovo State University. The activities of these centers are associated with the development of complex technological solutions and staffing in the sphere of computer engineering.

The formation and development of a business environment is one of the most important conditions for the development of digital innovations in the regions. However, in the consideration region, the business environment in the science-intensive and high-tech business is poorly developed.

To evening-out this factor in the region, the Kuzbass Innovation Policy Department was created. The region has developed a concept for innovative development of the Kemerovo region until 2030, one of the tasks of which is to accommodate regional enterprises in bringing high-tech products to the Russian and international markets through regional and interregional programs [13]. This factor should help stimulate the creation and development of business initiatives in Kuzbass.

A weakness in the field of digital innovation in the Kemerovo region-Kuzbass is to focus projects more on development of resources than on the achievement of results in the form of innovative products and technologies. In a way as the region is resource-oriented, dependence on raw materials is also observed in the sphere of digital innovation.

This weakness can be evening-out by the formation of new projects in other areas in the region - in public health service, industry, ecology and other sectors [14]. These changes come from within the framework of the national program "Digital Economy".

Focus on the threats facing the region and the opportunities that Kuzbass can use to eliminate them.

To create conditions for the development of digital innovations and form the foundation for the digitalization of the economy, special economic zones (SEZs) have been created in Russia. These territories are given a special legal status and economic benefits by the state, which allows attracting Russian and foreign investors to priority industries for Russia [15].

The threat of the absence of special economic zones as a factor in attracting investments can be evening-out by creating Priority Social and Economic Development Area development (PSEDA). For
2020, there are four PSEDAis in the region in the cities of Novokuznetsk, Prokopyevsk, Yurga and Anzhero-Sudzhensk [16]. This form of economic zone involves the introduction of preferential tax conditions, simplified administrative procedures and other preferential. These measures contribute to the formation of business initiatives and attract investment to the region. PSEDA can become an alternative SEZ option for the development of the region.

The low level of entrepreneurial initiatives in the sphere of small business initiative is also a threat to the development of digital innovations in Kuzbass. It is possible to evening-out this problem by using federal budget support programs aimed at developing small innovative businesses. One of the forms of support from the federal budget is grants allocated for innovative projects.

The growing lag between the scientific and technological level of development and business and the level of leading digital regions can be overcome by holding interregional innovation forums, which attract investment in promising projects, as exchange of experience and networking of representatives of various projects.

3. Conclusion
The regions digital transformation process is a necessary condition for effective regional development. The study showed that digital innovation is essential in this process. This fact is confirmed by the development of the regulatory framework in this direction, in particular, the preparation of the draft Federal Law 258-FZ “On experimental legal regimes in the field of digital innovations in the Russian Federation”, dated 31 July 2020. In addition, the demand for digital innovation is expected to grow significantly by 2024, especially in wireless technologies, distributed ledger systems and artificial intelligence. The relationship between the level of innovative development and digitalization processes was identified based on the indicators of the regions of the Siberian Federal District. In those regions where innovative processes are developed, and the digitalization process is more active. Consequently, the impact of digital innovation on the development of the regions is growing. In order to determine the ways of developing digital innovations in the region and avoid lagging behind digital regions, a SWOT analysis was carried out using the example of the Kemerovo region-Kuzbass. To overcome the threats and support the development of digital innovations, it was proposed to continue the creation and development of TASED, use support programs from the federal budget and hold of interregional innovation forums.

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