Digital Platform of Industrial Cooperation – Innovative Direction of Regional Industry Development

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Abstract: The authors consider the role of the digital economy in Russia and some related processes. The aim of the study was to develop recommendations for the formation of a digital platform for the industrial cooperation. It is obvious that Russia is not a leader by the index of business digitalization (the leading countries are Finland, South Korea, and Netherlands). The authors make a conclusion about the feasibility of using a digital platform for industrial cooperation, which allows linking resources and consumers of products and services in a single information space. They also consider the creation of a regional subcontracting centre as the organizational model focused on the cooperative relations formation for production chains of large, small, and medium business, as well as on the stimulation of innovations through technology transfer, promotion opportunities for products of industrial enterprises on regional markets.

Keywords: digitalization, subcontracting, industrial enterprises, cooperation, digital technologies.

1 Introduction

The "digital economy" is the subject of endless debate and discussions. Today, we are witnessing fundamental changes in the society and economies due to digitalization. The transformation of national economy sectors should be the basis, because this transformation is one of the factors that is the key to the success of the Russian economy: its highly innovative and future-oriented industrial potential.

Industrial production and related services are at the heart of the national economy. They represent more than a half of its economic indicators. 2019 is declared as a year of regional development and digitalization of the country. Nowadays, we are forming a new industrial structure based on various digital technologies. Digitalization is not a new trend, but a new way of life.

The development of digital technologies plays a key role in the development of the modern society. In recent years, all the languages of the world were penetrated by such terms as 'smart city', 'smart CRI' and, in this context, Russia is no exception. Digitalization has become the main topic of news, and state programs 'Digital economy', 'Digital energy', 'Digital agriculture' and others have become a fundamental development trend not only of the state, but also of all major industrial holdings.

This course on the industry reorientation to perspective technologies is caused by the need for developing domestic technologies, reducing the "brain drain" and aging of qualified personnel, and also stimulation of digital development of industrial sector in the Russian Federation [1].

Fig. 1. Index of business digitalization by countries (Source: Authors based on Rosstat data [2])

Figure 1 shows the business digitalization index by countries. As we can see, Russia is in the group of developing countries implementing technologies for economic relations. Leading positions are occupied by countries such as Finland, South Korea, and Netherlands. Taking into account development trends of the digital future, which was emphasized by the Russian President who said that "digitalization is the general path of economic development", Russia has an exceptional opportunity to realize its potential during the digital revolution and take its rightful place among the leaders, effectively implementing the basic principles and goals of the digital economy.

The digital transformation trends from 1998 to 2018 are presented in figure 2. 1998 – the first stage of automation (30% of the total number of business processes of the company). The further process was marked by the transition from the automation of individual processes to the digital components of Industry 4.0. The process of forming Industry 4.0 in Russia has its own specifics [3]. In some studies, it is noted that Industry 4.0 is the "4th industrial revolution", which is characterized by advanced digitalization and integration of industrial production and logistics processes, the use of the Internet and "smart" objects (machines and products) [4, 5].

Fig. 2. Digital transformation of the economy (Source: Authors)

2. Research Methods

To achieve research tasks the authors have used a complex of scientific methods. The main research method was content analysis. This method allowed identifying the most functional information resources necessary for this study.

3 Literature review

Analysis of the scientific works revealed the fact of significant interest to the topic "industry 4.0, digital economy", its various aspects. At the same time, most scientists and practitioners agree that the digital economy is a complex concept that is based on the convergence of technologies, but in real, there are no scientific works are in both domestic and international databases about it [6]. As a result, the aim of the study is to analyze the main trends in the digital economy in Russia and develop recommendations for the formation of a digital platform for the industrial cooperation. In addition, the authors have formed a list of key stakeholders for the implementation of the digital transformation projects on the regional level that have the potential for integration and cooperation at various interaction levels to exchange large data amounts to make reasonable management decisions.

The history of industrial automation begins in the 80-s of the XX century, when the first programmable controllers for maintaining various technological processes appeared. Over time, they began forming an automated information systems that have large input / output modules, which allows you to receive information about the process in real time.

With the development of digital technologies, automated enterprise management systems (AEMS) were connected to the so-called MS systems that allowed collecting information on the optimization of the quality control process. In fact, MS system is software allowing you synchronize and manage the quality within any production. Despite the fact that MS systems are shop floor systems, they can be integrated with each other within the whole enterprise. MS system tasks include process equipment management, load tracking, personnel management and others.

The next level of software is ERP. It is a system that manages several production shops or technological platforms in order to manage production assets (such as personnel, finance, industrial resources, raw materials, etc.). Today, most enterprises in the Russian Federation use the level of MS and ERP systems to manage their production. Of course, modern digital technologies have an impact on the structure of the production management system, from the level of control systems and to the level of ERP system, making it more perfect, optimal and convenient. These technologies include cloud computing, artificial intelligence, machine learning, 3-D printing and others.

The merger of industrial automation and information technologies has led to the emergence of a new ecosystem of industrial Internet broadcasting. Participants of this system are engaged in the development of new approaches to the production management, testing and commercialization of these solutions, they produce many new innovative products and implement them in various industries. For example, an innovation that originated within a University and was picked up by talented technology entrepreneurs (the pattern recognition technology in the assembly of units can be tested on the engineering company and subsequently enter the list of products – from digital design to assembly, and the customer will be able to use it as a complete solution). The ecosystem is based on a large amount of data that is generated every second in industrial enterprises. Data is becoming a valuable asset and 'fuel' for all digital innovations. Their competent use allows receiving new products and services, making correct administrative decisions. The assessment of the benefits of using IT in the industry is shown in figure 3.

Fig. 3. Advantages of IT usage (Source: compiled by the authors)

As a result, in our country there is a digital transformation of industry, which means the process of transition of the industrial sector from one technological mode to another through digital technologies in order to improve the efficiency and competitiveness of enterprises. Why are digital technologies attractive for the industry? They allow increasing the production efficiency. Modern digital technologies enable not only to collect information from a large number of sensors and devices, but also accumulate, structure, analyze these data by artificial intelligence methods, make conclusions, offer practical steps to optimize industrial production with a ready financial calculations. Thus, we get an assessment of production efficiency not only for the technical staff of the organization, but also for financiers and management. In general, the concept of Internet of things is a concept that allows you to collect data from different enterprise systems sensors into IT systems and more effectively manage the production.

An important characteristic of the regional economic development is the innovative activity of enterprises. In December 2014, the Russian government adopted Federal law No. 488-FZ of 31 December 2014 "On industrial policy in the Russian Federation" [7]. According to this law, one of the main goals is the formation of high-tech competitive industry, ensuring the transition of the state from export of raw materials to a new innovative type of the development. The law defined the industrial information and digital system as one of the main tools for the implementation of the industrial policy.

The above circumstances are the basis for the recommendations development to form a digital platform for industrial subcontracting and technology transfer within the region, which will strengthen industrial capacity and implement national projects in the industrial field. The launch of a digital project will solve the cooperation problem. Those, who have access to the platform of digital products and services, will get undoubted advantages. The digital platform is an innovation that changes the existing market structure and creates new markets [8].

4 Results

The essence of the proposed concept is to create a uniform digital platform for subcontracting industrial enterprises in the region. A fundamental prerequisite for determining effective prospects of the digitalization projects realization in the context of cooperation is that all industrial enterprises are built and working according to common standards and use common standards for reporting information about the life cycle of products (standards SPDP (System of Product Development and Production), USDD (Unified System of Design Documentation), USTD (Unified System of Technological Documentation), USTPP (Unified System of Technological Preparation of Production, etc.). Therefore, the key conclusion in the context of the definition of the digitalization strategy is a principal possibility of development of a standard, configured under specific features of the economic activity, program of digital cooperation of an industrial complex. The platform is a virtual territory where business connections are formed between different participants who build their business and innovations in this virtual information space.

Subcontracting has proved its effectiveness in the international practice, where the main way of organizing production is to rely on the cooperation of small, medium and large businesses. The use of the subcontracting mechanism provides an opportunity for a parent company (contractor) to avoid unproductive costs for the maintenance of underutilized productions and to concentrate efforts on the most important tasks - modernization, updating of a model range of products, technological re-equipment. Subcontractors (usually small and medium enterprises) achieve a high level of equipment utilization and high productivity performing work on subcontracts. The use of the mechanism of subcontracting allows to optimizing the production process and significantly increasing competitiveness, both at the enterprise and regional levels.

The organizational model of the regional digital economy platform includes as a basis a technological platform where the main managing tools can be implemented to provide functioning of the economic digital space. This model provides interrelation of needs and opportunities of suppliers and consumers of resources, products and services on the basis of innovative technologies and digital economy principles. The fundamental tasks of the platform of industrial cooperation and subcontracting are optimization of production processes by placing orders by industrial companies for the development, production and maintenance of industrial products, as well as implementation of technological

processes at other industrial enterprises, which makes it possible to build a more effective organizational structure of the production and optimally load production facilities.

The database of the digital platform of industrial cooperation contains information about industrial enterprises and their products. All this information will be available at the centre for subcontracting and industrial cooperation. Through the center, orders will be placed by industrial giants for the development, production and service of products. The regional subcontracting center will coordinate the work of information management systems of its member enterprises, based on the strict centralization of management functions, caused by the need to control the most important elements of the unified system at the stage of its formation and early development.

In the conditions of a volatile economy, enterprises face some common problems, to overcome which the state provides support. For example, when there is a shortage of working capital. In order to help a company to find these funds and, for example, apply for a subsidy for the production development or for the development of new technologies, we propose to create a navigator of support measures. These are three simple questions that the company needs to answer in order to form a suitable list of services (the choice of industry, enterprise size and a problem type). On the basis of these data, a huge list of support measures will be formed on the digital platform, where there is information about the contact person, regulations on the provision of support measures, and the necessary documents. In the case of enterprise authorization, the enterprise can subscribe to this application. For each measure of the state support, it will be possible to obtain a list of all necessary documents. The electronic signature confirms the legal significance of the application. It should be noted that the successful implementation of this idea requires a fairly equal contribution from representatives of both the public and private sectors of the economy [9].

Further, after receiving subsidies, the enterprise is obliged to report on the implementation of projects supported by either the regional industrial development fund or the federal one. On the basis of the digital platform, here will be enterprises with import substitution projects providing information on the monthly and quarterly basis. These data are the basis of reports that will be considered by the government, all the representatives of the federal and regional authorities will have access to it. It is possible for regional ministries of the industrial development and federal sectoral departments to introduce import substitution plans here.

Fig. 4. Organizational model of the digital platform of the industrial cooperation

As an option for the possible structure of the organizational model of this platform, we can consider the set of ecosystems presented in figure 4 with the allocation of a regional center for subcontracting. The service of initiative projects is necessary in the case if an enterprise (having a project or an idea) needs to attract investors and a development institution for financing. The logic of the project is so that the company fills in the application form and this form is accessed by representatives of different development institutions. For example, the industrial development funds, these funds are interested in the development and investment issues in a particular sector of the economy. This service allows combining businesses with investors.

As a platform, the industrial information system should combine a number of important thematic blocks related to the monitoring of import substitution, monitoring of the financial and economic condition of the backbone enterprises. The digital platform will create conditions for effective interaction, reducing the time spent on investment projects. Digital industrial cooperation is able to integrate the production processes of many enterprises, coordinated actions of which will make the competitiveness of their business much higher [10].

When creating a platform, it is necessary to lay down a number of principles:

- openness of data and openness of services in order to allow any participant of this platform to publish data on measures of state support both at the regional level and at the level of industrial development institutes;
- single entry – once collected data about the company, they can be reused, providing a single view for all participants.

In order to form a digital platform for industrial cooperation and subcontracting, members implement the activities presented in figure 5.

Fig. 5. Measures for the formation of the industrial cooperation (Source: Authors.)

5 Conclusion

As a result of the analysis the following conclusions can be made:

1. The processes of digital transformation of economic relations, which are the essence of the 4th technological revolution (Industry 4.0), are actively developing in the world nowadays. Russia is not a leader by the index of the business digitalization.
2. The platform of digital products and services is the most important element of the regional digital economy, where different business relations are formed between participants (business entities) and innovations in this virtual information space, coordinated actions of participants will make the competitiveness of their products much higher.
3. The proposed organizational model of the digital platform for the regional industrial cooperation is universal and can be applied to most industries in different regions of the country. It is designed for the effective digital interaction and connects businesses with authorities and with each other. Due to this fact, subjects of the Russian industry have an opportunity to receive the state support, find producers and suppliers, take part in purchases. The results of the introduction of a unified interaction system should lead to an increase in the competitiveness of domestic enterprises, activation of sales, growth of research and development practices and their implementation in the real business practice.

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