



Improving the Universities and Enterprises' Integration Effectiveness with the Help of Digital Technologies

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Abstract

To fulfill the requirements for the further digital production functions and coordinate objectively contradictory interests of interacting entities we may impede the fulfilment of these requirements, for example, the lack of the necessary level of competence of employees, uncertainty in the distribution of powers, functions, responsibilities, and interests of personnel. Because of this, in reality, more than a quarter of production resources, including equipment, do not benefit the owner of capital or employees who carry out production and innovation processes during operation. The practical implementation of the described process involves the combination and interaction of the efforts of many participants, such as regional administration, scientific and educational organizations, production and commercial and financial companies, private investors. The integration and coordination of these actors can ultimately bring about positive changes in the regional economy. First of all, such changes can include: promotion of regional products in both interregional and international markets; possibility of economic stimulation of effective interaction of regional scientific and entrepreneurial sphere. Even relatively small enterprises have an advantage over large enterprises in terms of knowledge management and innovation using digital technologies.

Keywords

Integration • Digital technologies • Innovative potential

JEL Classification

R01 • F02 • O03 • O04 • Q02 • R03

1 Introduction

A number of parameters and indicators are expected to be implemented by 2024. Such as: more than 10 competitive leading companies in global markets (Goncharova, 2018; Materials ANO, 2020). At the same time, it is the application of new knowledge in the production process that leads to a more flexible and operational functioning of organizational and management structures. This study aims to justify the relevance and necessity of using digital methods in the interaction of research institutions and business structures.

2 Methodology

In shaping Russia's economic policy, a strategic setting is currently playing a significant role (Materials of the rating agency "Expert RA", 2020).

For digitalization and innovative orientation of the Russian economy, it is planned to study the level of activity of the interaction of two subsystems—digital and innovative—with state support.

Key structural elements for which it is planned to create institutional and infrastructure conditions in order to offset the forms of business, these are:

- Education and personnel;
- information infrastructure and security;
- Technological gaps and research competencies;
- Regulatory regulation.

The listed areas in the strategic sense are related to the effectiveness of a number of processes:

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- improvement of the educational and scientific system;
- transformational changes adequate to labor market;
- functioning of a large array of data center system and Russian communication networks;
- creation of a database reflecting the needs of businesses, citizens, and authorities operating on a digital platform;
- formation of a three-level concept of security (state, society, personality) against information threats to the external and internal environment;
- ensuring the existence of processes to support scientific directions on issues of digitalization of the economy in applied and search research, the creation of research infrastructure of digital platforms;
- functioning of a new regulatory environment to ensure the existence of economic activities to create and develop modern digital technologies.
- positioning of the enterprise, his divisions and separate subjects of the social and economic relations with the help of effectiveness ratio of performance of functions in digital process. It is especially significant that such type of activity defines a position in relation to several levels: reference as to the best in world practice (industry, enterprise); technologically possible, i.e. established according to normative and technical documents of the enterprise; to an average on group of the enterprises analogs; minimum in industry or enterprise compared to global practice; average for similar enterprises;
- determining the option of interaction of the enterprise entities on the principle of complementarity. In this case, the complementarity of relations in the process of interaction can be represented in the form of the action of one entity, simultaneously aimed at satisfying its interests and those of other entities of the enterprise, interacting regarding the sharing of three elements: digital resources, labor, and capital.

3 Results

To fulfill the requirements for the further digital production functions and coordinate objectively contradictory interests of interacting entities we may impede the fulfilment of these requirements, for example, the lack of the necessary level of competence of employees, uncertainty in the distribution of powers, functions, responsibilities, and interests of personnel. Because of this, in reality, more than a quarter of production resources, including equipment, do not benefit the owner of capital or employees who carry out production and innovation processes during operation.

The authors emphasize that a number of factors may impede the implementation of the listed requirements. For example, if you do not have the necessary level of personnel competence, there is uncertainty about the allocation of authority and functions, as well as the degree of responsibility and interests of personnel. For this reason, in real conditions, about a quarter of all production resources, including equipment, do not benefit the owner of the capital or those employees who carried out production and innovation processes during the operation.

To determine the level of interaction of subjects and the percentage of their performance of production functions, it is necessary to find out how influences in relation to personnel: qualification, authority, responsibility, and motivation. The totality of factors, or individually under certain conditions, can lead to destabilization. As an example, a weak level of motivation is a narrow link in the production of personnel interaction and thus reduces responsibility for the quality indicators of the production function. During this period of operation, it is supposed to predict the stability of the enterprise by connecting two key points:

From a position of realization of innovative potential among basic tasks for development of a digital economic system, authors allocate:

- perspective development of the research sphere with ensuring digitalization of knowledge and creation of conditions and incentives for the purpose of cooperation with the enterprise environment;
- providing conditions of digital and technological modernization of economy and for functioning of the enterprise competitive environment, at the same time her subjects have to have abilities to strategic thinking, readiness for training, assimilation and use of tools of digital economy;
- creation of systems of a transfer of various knowledge with necessary feedback and also their distribution and transformation in a form of competitive technologies for business (Goncharova et al., 2018).

The promotion of new products at the same time becomes the process of introducing the results of scientific work in the form of new knowledge as an economic resource in individual segments and the Russian market as a whole.

This process with regard to digital scientific and technological developments and technologies can be seen as a set of interrelated actions characterized by the following features:

- when creating products with technical complexity, the costs of qualified scientific work are required, while any scientific knowledge is produced once with a multifaceted application potential, unlimited in time, therefore, the

consumption cost of labor spent on the creation of digital technology and the application of technical knowledge embedded in it must be taken into account;

- it is difficult to accurately quantify the effect of scientific and technical products at the time of its introduction due to the property of its uniqueness;
- only qualitative differences exist between product analogues;
- each type of knowledge carries with it special scientific information, therefore, scientific and technical products, embodying the original knowledge, are specific and unique in their content;
- varying degrees of readiness of a digital technology product for industrial development cause uncertainty in the costs of material, human, financial, informational, time resources necessary for the implementation of the innovation, and this, in turn, complicates the process of determining the price of products;
- innovative capabilities of consumers determine the success of digital technological innovation or technology.

The analysis of practical activities allows us to conclude that small business structures, in cooperation with specialized scientific centers, form local scientific and production associations that transform the idea into the final result of technological innovation, as well as conduct experiments with new types of technologies and then launch them into the production process. Currently, in Russian business, a great return can be gained from investments in streamlining business processes, organizational and managerial innovations. With the right division ratio, reducing expenses receives a greater increase in labor productivity than when investing in science, technology, and R&D. The prerequisites for successful digitalization are:

- the necessary and sufficient level of intellectual and technological potential for launching innovative processes of economic digitalization;
- attracting new social groups and constantly increasing the number of participants in the digital innovation chain;
- focus on the direction of digital technology and innovative development of the entire institutional system, including formal and informal groups;
- relevance and relevance of the regional economy and individual economic entities to the products created by the digital economy;
- creation of innovative infrastructure with the help of digital tools, for example, technology parks, business incubators, technopolis;
- the existence of environmental and social problems in the digital economy;

- regional ownership of small innovative entrepreneurship in the areas of digital development;
- formulation of the list of social and legal issues on the regulation of innovative activity from all participants in the digital economy market.

By increasing the degree of complexity, technic park structures can be arranged as follows: incubators, technology parks, technic polices, regions of science and technology.

Through efficient transfer structures, a two-way technological flow can be provided for the participation of Russian inventors in the global technology market. In the Russian economy, many innovative projects remain unclaimed, so technology transfer needs to be analyzed when transferring them to foreign participants or as a means of implementing innovative projects. At the same time, the technology transfer itself does not aim at the efficiency of development implementation (Goncharova, 2015; Goncharova & Shakhovskaya, 2019; Goncharova et al., 2019).

For the successful transfer of technologies to the final stage of commercialization of products, a constant exchange of information at various levels is necessary. When interacting with regional authorities and business, ANO Digital Economy created an effective case base. This database contains two promising areas:

- projects that are not related to the financial costs of the authorities, but are implemented at the expense of NGOs or businesses;
- cases launched at the expense of the budget or business, in order to achieve a clear economic effect, increase labor productivity.

Their scaling is possible in the regions of Russia. In the Volgograd region, the main industries can be distinguished by key activities:

- production of tractors, vessels, mechanical engineering, and metalworking;
- oil, gas production, i.e. fuel, oil refining industry;
- production of caustic soda, chemical fiber;
- textile industry;
- woodworking industry;
- Food industry;
- production of building materials.

The dominant position in the structure of commodity products belongs to products of the textile industry—up to 80% of the total value of commercial products (Goncharova & Shakhovskaya, 2020; Shakhovskaya & Goncharova, 2020a, 2020b). In the structure of agricultural production

approx. 70% fall on crop production and 30% on livestock production (pig breeding, large horn livestock, poultry farming, sheep breeding) (Shakhovskaya et al., 2020).

Industrial enterprises of the Volgograd region are expanding cooperation with large Russian companies, participating in the implementation of large-scale projects. Thus, more than one billion rubles amounted to the volume of cooperative supplies of the region to organizations of PJSC Gazprom following the results of 10 months of 2018.

According to the Industry and Commerce Committee of the Volgograd Region, the volume of supplies of industrial products of the region to Gazprom in January–October 2018 exceeded a billion rubles, which is ten times more than in 2014 (Materials of the site of the Volgograd region, 2017, 2020).

If in 2014 only four enterprises of the region maintained cooperative ties with the corporation, then today more than 20 organizations cooperate with it. In the period from 2014 to October 2018, they delivered products worth more than seven billion rubles (Shakhovskaya & Goncharova, 2020b).

Cooperation with the Russian Transnational Energy Corporation allows enterprises of the Volgograd region to obtain additional sales markets and increase production, in turn; PJSC Gazprom uses the industrial potential of the region to solve import substitution tasks.

For example, Volgogradneftemash manufactures technological equipment for a company—at present it is a block of stabilization columns, flare, and candle separators for the Kovykta gas-condensate field. The products of the plant “Polyplastic Volga”, which produces gas pipe polyethylene, are in demand. Gazprom also supplies pipeline fittings made by HSL, rubber products from the Aksios FM, metal constructions of the Akhtuba ZMK and other products (Expansion of cooperative ties contributes to the development of the Volgograd industry, 2020).

Industry is a driver of economic growth in the Volgograd region, making a significant contribution to the achievement of a common goal—an increase in the region's GRP to one trillion rubles. Thanks to the modernization of production sites and the implementation of priority investment projects, the region is strengthening its status as a federal industrial center, which allows expanding cooperative ties and participating in government programs. Specialists of the industrial trade with the aim of promoting the products of enterprises in the region in the domestic and foreign markets, expanding the sales markets assist them in participating in various Russian and international exhibitions. For the development of industrial cooperation, the Internet site “Regional Portal of Subcontracting” has been created on the oblast industry merchandising page, where 280 enterprises of the region have already been registered.

For export–import operations, it is the enterprises and organizations of the Volgograd region that carry out the largest volume of transactions. From the example of this region, we can conclude that in the field of investment cooperation and the provision of technical assistance to enterprises and organizations, a relatively long time period is needed to prepare enterprises and organizations for the development of foreign investment. At the same time, such cooperation must necessarily contain three stages: trade (commercial and marketing) partnership—simple cooperation (assembly from components)—joint production, and scientific developments. In our example of analyzing the activities of the region in practice, the Volgograd region performs functions, being at the second stage of cooperation.

4 Conclusion

The practical implementation of the described process involves the combination and interaction of the efforts of many participants, such as regional administration, scientific and educational organizations, production and commercial and financial companies, private investors. The integration and coordination of these actors can ultimately bring about positive changes in the regional economy. First of all, such changes can include: promotion of regional products in both interregional and international markets; possibility of economic stimulation of effective interaction of regional scientific and entrepreneurial sphere. Even relatively small enterprises have an advantage over large enterprises in terms of knowledge management and innovation using digital technologies.

References

- Expansion of cooperative ties contributes to the development of the Volgograd industry. <http://www.volgo-grad.ru/news/209125/>. Data Accessed on November 11, 2020.
- Goncharova, E. (2015). Criteria for the efficiency of the process of commerce-lization of innovations at the present stage of economic development. *Management of Economic Systems*, 8(80), 24. <http://www.uecs.ru/innovaciiinvesticii/item/3676-2015-08-28-06-32-55>. Data Accessed on October 16, 2020
- Goncharova, E. (2018). Innovation as a component of economic development strategy. *Bulletin of the Academy of Knowledge*, 25(2), 98–102.
- Goncharova, E., & Shakhovskaya, L. (2019). Problems of spatial development of regions of Russia. *Polish Journal of Science*, 3(22), 4–8.
- Goncharova, E., Shakhovskaya, L. (2020). Formation of a regional innovation infrastructure based on the concept of green economy development in Russia. Digital economy: Complexity and variety vs. rationality. In E. Popkova, B. Sergi, (Eds.), Proceedings of the

- 9th National Scientific and Practical Conference (Vladimir, Russia, April 17–18, 2019), Institute of Scientific Communications (Volgograd, Russia), Vladimir State University named after Alexander and Nikolay Stoletovs (Vladimir, Russia). Lecture Notes in Networks and Systems (LNNS), 87. Springer Nature Switzerland AG, pp. 472–481. <https://doi.org/10.1007/978-3-030-29586-8>
- Goncharova, E., Starovojtov, M., Starovojtova, YA. (2018). Innovations as a component of the strategy of economic development. *Management of Economic Systems*, 1(107), 16. <http://uecs.ru/innovacii-investicii/item/4748-2018-01-15-07-38-40>. Accessed on October 10, 2017.
- Goncharova, E., Shakhovskaya, L., Starovojtov, M., Starovojtova, YA. (2019). The financial planning and its tasks in modern models of enterprise management. “Competitive, sustainable and safe development of the regional economy” (CSSDRE 2019) Volgograd, May 15–17, 2019) Volgograd State University, Publisher: Atlantis Press, Ser. *Advances in Economics, Business and Management Research*, 83, 264–269. <https://www.atlantis-press.com/proceedings/cssdre-19/125909721>. Data Accessed on October 16, 2020)
- Materials ANO “Digital economy”. <https://data-economy.ru/>. Data Accessed on January, 18, 2020.
- Materials of the rating agency “Expert RA”. Site of the rating agency “Expert RA”. <http://raexpert.ru>. Data Accessed on June 18, 2020.
- Materials of the site of the Volgograd region. <http://www.volgograd.ru/volgo-gradskaya-oblast/ekonomika-volgogradskoy-oblasti.php>. Data Accessed on November 18, 2017.
- Materials of the site of the Volgograd region. <https://www.volgograd.ru/voprojekt/natsionalnye-proekty/>. Data Accessed on December 1, 2020.
- Shakhovskaya, L., & Goncharova, E. (2020a). Cluster approach as a factor of energy efficiency improvement in Russian regions. *Znanstvena Misel (slovenia)*, 1(45), 27–31.
- Shakhovskaya, L., & Goncharova, E. (2020b). Regional clusters in Russia as a condition for the formation of a smart economy. *Economics and Business: Theory and Practice*, 9–2(67), 145–148.
- Shakhovskaya, L., Goncharova, E., Morozova, I. (2020). Use of the cluster approach to improve energy efficiency in the regions of Russia. *East European Scientific Journal = Wschodnioeuropejskie Czasopismo Naukowe (Warszawa, Polska)*, 9(61), part 5, 14–17.