Priorities of digital transformation of economic industries in the regional context

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Abstract. This article is devoted to the study and analysis of gradually and steadily penetrating new digital technologies into all economic processes of the country and regions, having a significant impact on the very essence of the economy. In most cases, the expanding use of modern information and communication technologies leads to the emergence and development of new effective management technologies, entrepreneurial practices, and successful businesses. The digital transformation of economic sectors is considered as a driver of regional development and the formation of the digital infrastructure of the regions. The article is aimed at identifying the problems and prospects for the development of regions in the conditions of digitalization, for this it is necessary: to analyze the index of the development of regions on digitalization, to identify the main problems of the development of regions in the conditions of digitalization, to assess measures for the digital transformation of regions. The article concludes that the digital transformation of the economy sets new parameters for the competitiveness of countries. The technologies of the "digital age" are changing production and business-models, principles and rules for the formation of value added chains, sales channels and interaction with consumers. The article notes that currently, enterprises of even traditional industries and technologies face not only the need to maintain competitiveness based on the use of information technology in the processes of organizing economic activity, but also the need to transform the entire business model. This determines the relevance of the development of an indicator reflecting the readiness of the enterprise for such a transformation.

Keywords: digitalization, regional economy, industries, information technologies

1 Introduction

The rapid development and spread of digital technologies in recent years has significantly changed the appearance of key sectors of the country's economy and regions. More and more organizations are striving to transfer business processes to the digital environment, thereby significantly reducing transaction costs and significantly increasing the volume of economic activity. Among the important national goals, among others, digital transformation is highlighted [1].

A giant, virtually barrier-free market is being formed on the Internet with truly global competition and very high dynamics of all its elements (companies, products and services, consumers).

The studied topic of digital transformation of economic industries in the regional context has been relevant in recent years and has attracted more and more attention. The process of digitalization in modern conditions is irreversible and enterprises need to seriously prepare for this.

The purpose of the research in the article is to study the problems and prospects of introducing new digital technologies into all economic processes of the country and regions. To achieve this goal, it is necessary to: analyze the index of regional development on digitalization, identify the main problems of regional development in the context of digitalization, assess measures for the digital transformation of regions.

The methodological basis of the research is the principles and methods of solving the problems and prospects of regional development, as well as the formation of the digital infrastructure of the regions.

The digital transformation of economic sectors is the driver of the development of regions and the formation of the digital infrastructure of regions. The use of digital technologies at enterprises is becoming a factor in increasing competitive advantages, automating production processes, ensuring environmental safety and economic efficiency of production. Digital activity technologies are used by various organizations in various fields: Sberbank, Tinkoff Bank, Alfa-Bank, Gazprom, Lukoil. Among foreign

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organizations, such organizations as Johnson & Johnson DePuy Synthes, Bayer Pharmaceuticals, Haier, etc. can be noted.

In 2018, the volume of the industrial Internet of Things amounted to $113,4 billion. In 2019, the market volume of smart factories reached $ 153,7 billion, it is predicted that by 2024 this number will reach $ 244,8 billion. The leading positions in the presence of intellectual enterprises are occupied by countries such as Switzerland, the USA, Japan, Germany. Increasingly, there is a need for online education, which, accordingly, has given rise to many online universities and various courses offering advanced training in a remote mode. [2]

The use of digital technologies in enterprises allows, firstly, to automate production processes. The advantage of automation of production processes is to reduce production costs and improve the quality of manufactured products. The potential of digital technologies ensures the achievement of this goal, the digitalization of which can serve as a means of solving operational and transformational tasks of the organization. [3]

2 Materials and Methods

The introduction of digital technologies at the enterprise seems to be ineffective if digital technologies are not used in interaction with key stakeholders (suppliers, contractors, buyers of products). Therefore, when determining the digital potential of an enterprise, indicators reflecting the readiness of the external environment of the enterprise for the introduction of digital technologies, as well as indicators characterizing the readiness, need and capabilities of specific key stakeholders of the enterprise for the proposed new options for interaction should be taken into account. Let's define the digital potential of an enterprise as an integral indicator reflecting the current level and future opportunities for the use of digital technologies by an enterprise, taking into account environmental conditions.

The possibilities of using digital technologies are determined by the availability of the necessary resources of the enterprise, as well as the possibilities of attracting them in the future for the creation, implementation, application and use of software and hardware for data storage and processing. Also, the digital potential should reflect the involvement of various categories of personnel in the use of digital technologies for current economic activities and management. The conditions of the external environment are formed taking into account the industry specifics, as well as the capabilities and readiness of the company's stakeholders to interact in the use of digital technologies.

Automation of production processes allows you to reduce the time for production. Another advantage of using digital technologies to automate production processes is the ability to store and process a large set of data, as well as to analyze and predict possible options for the development of the enterprise.

Secondly, the possibility of remote participation in the decision-making process at the enterprise, consultations, in other words, digital technologies allow the manager and specialists to manage the business regardless of location. To promote products to the market, it is necessary to use a marketing tool, among which, the Internet, allowing you to reach a large number of potential customers and find customers and partners in other countries, is a priority.

On the other hand, when using digital technologies, it is necessary to take into account the possible risks associated with providing confidential information, protecting computers from malicious software. [2].

Thirdly, digital technologies have been actively used in the recruitment process. Despite the fact that a person's personal qualities, his ability to adapt to new conditions is impossible remotely, however, they allow an employer and a potential employee to save time and possible travel costs for an interview, and managers to analyze the responses received for a vacancy and not get confused in the selection process of candidates. At the same time, the issue of staff professional development often arises. To date, it is possible to conduct such courses in an online format, which, in turn, allows an employee to take them on the job.

It should be noted that the development of digital technologies in the whole country is unevenly occurring. In 2017, Yamalo-Nenets Autonomous District took the first place in terms of the share of residents using the Internet – 96,6 %, the second place was shared by Khanty-Mansi Autonomous District and Chukotka Autonomous District by 91,2 %, the Republic of Tatarstan closes the top three leaders – 89,6 %. The Chuvash Republic, the Ryazan Region and the Oryol Region have the lowest indicators in terms of the share of residents using the Internet, with indicators of 66,8 %, 65,6 and 65,3 %, respectively [4].

If issues related to the spread of the Internet are solved with the development of information and communication technologies, then the issue of training qualified personnel is acute. For example, in some regions there are more vacancies than specialists: 57,8 thousand vacancies are offered in Moscow, 19,1 thousand vacancies in St. Petersburg, 1,4 thousand and 1,2 thousand vacancies respectively in Yamalo-Nenets Autonomous District and Chukotka Autonomous District [5].

The number of specialists in the field of information technology is 1,45 million people, taking into account specialists in the field of telecommunications and communications, this indicator varies within 1,8 million people, which is 2,4 % of the economically active population. At the same time, it should be noted that in European countries this indicator is significantly higher, for example, in Germany – 4 %, Finland – 7 %. 20 % of specialists in the field of information technology are concentrated in Moscow, while the regions feel an acute shortage of qualified specialists in the field of digital economy [6].

The demand for specialists in the field of information technology decreased during quarantine, but already in August 2020 exceeded the indicators of the same period in 2019 by 6 % [3].

Today, the Government is implementing the federal project "Personnel for the Digital Economy", designed until 2024, within which it is planned to train 800 thousand graduates with digital competencies. This project is implemented within the framework of the "Digital Economy of the Russian Federation" program, where anyone can take appropriate courses on the website digitalcertificate.rf and get confirmation of their competencies. In 2020, 39,117 residents of Russia from 48 regions became holders of a digital certificate for 400 programs. A total of 42 997 people

were trained in 2019–2020. It is worth noting that in October 2020, applications were submitted by more than 100 thousand people, 39 117 people who were trained were selected. Among the regions, Tatarstan became the leader in the number of certificates received – 3 517 people or 10 % of the certificate recipients. The top ten regions also included Nizhny Novgorod Region, Bashkortostan, Rostov Region, Ivanovo Region, Stavropol Territory, Udmurt Republic, Kaliningrad Region, Perm Region. The age of the participants ranged from 18 to 63 years: 40 % – 25–34 years, 34 % – 35–44 years, 13 % – 45–54 years, 10 % – 18–24 years, 2 % – 55–63 years [6].

Many experts have repeatedly noted that the successful development of the digital economy is the result of effective interaction between the state and the business community in the field of digital technologies. To do this, it is necessary to analyze the experience of successful countries in the field of digitalization of economic sectors and adapt it to the Russian reality. Depending on the level of digitalization of strategy and business operations, there are four types of organizations. [6] In the first, analog, the potential of digitalization does not cover either the strategic or current activities of the company. In the second case – digital organization I (operational application) – the scope of digitalization application is only the management of operational processes to increase their speed and quality and costs reduction. The third type, digital organization II (strategic compliance), involves the coordination of technological capabilities with the strategic goals of the organization, and digitalization covers all business operations and part of the company's strategy. In the latter type, digital organization III (strategic integration), technologies are directly integrated into the strategy development process, and digital potential is used to find new directions for business development. [7]

Thus, the digital potential is an indicator reflecting the new challenges and opportunities that have appeared for the enterprise in the conditions of intensive digitalization of business processes, as can be seen from Fig. 1.

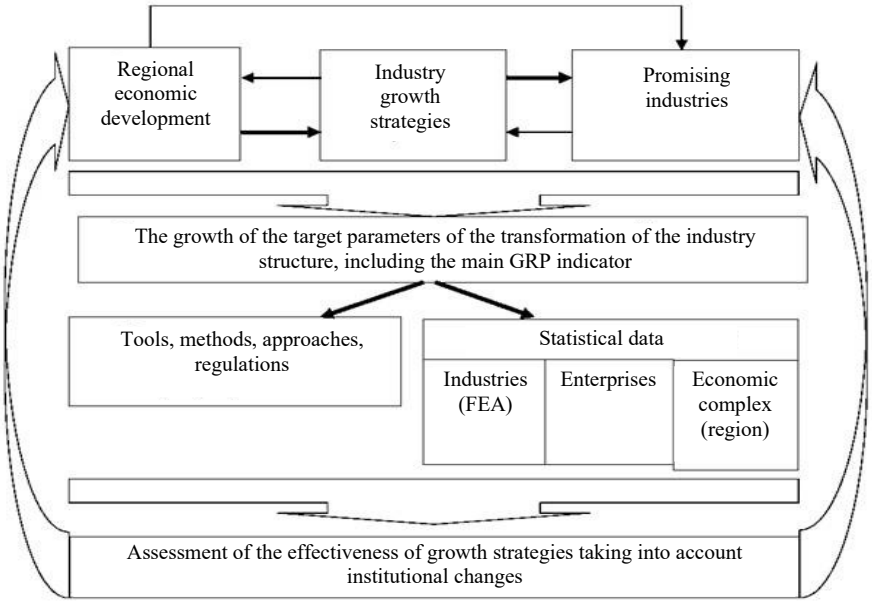

Fig. 1. Algorithm of formation of digital potential of business development in the region.

At the same time, it is worth noting the role of educational institutions in the field of information technology. The Volga Federal District took a leading position in training specialists in the field of information technology in 2017. The number of graduates was 7181 people. Among the cities, the leading positions in this indicator were taken by such cities as Ufa, Samara, Voronezh, Rostov-on-Don, Novosibirsk. In 2017, the number of students trained in the field of information technology amounted to 22.5 thousand engineers, 111 regional universities took part [5].

In 2021–2022, the number of budget places in the IT specialty increased to 80 thousand, in percentage terms increased by 25 %. It is predicted that by 2024 the number of budget places in IT specialties will increase by 2,5 times. If we compare the regions, then in Ingushetia in 2021–2022 it is planned to increase budget places by 3 times. It is planned that in Moscow, the number of budget places in this specialty increases by 15 %, in the Stavropol Territory and the Ryazan region, in Mordovia by 60 %, in the Novgorod region – by 80 %, the pioneer in the formation of a new era of man, taking into account digital transformations, is considered to be Schneider Electric, a French power engineering company that pays close attention to improving the well-being of employees and giving them the opportunity to make decisions independently [8].

According to the 2017 rating compiled by «Russoft», the ranking of universities in the field of information technology is headed by Bauman Moscow State Technical University, St. Petersburg National Research University of Information Technology, Mechanics and Optics (ITMO), St. Petersburg State Polytechnic University. In the 2014 ranking, St. Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO) was in the lead, Bauman Moscow State Technical University was in second place, and St. Petersburg State University was in third place, which was in fifth place in the 2017 ranking [1].

According to the version of «QS Computer Science & Information Systems 2017», Lomonosov Moscow State University is in 48th place, St. Petersburg State University

occupies positions 151–200, and Bauman Moscow State Technical University occupies positions 251–300.

3 Results and Discussion

It is expected that by 2025 about 170 standards in the field of artificial intelligence will be developed in Russia, and already in 2030 artificial intelligence will be taxed. Specialists express the opinion that artificial intelligence and machine learning will become one of the factors of changes in enterprises.

In the first quarter of 2018, the amount of investments in the field of AI amounted to more than $ 1,9 billion, and over the year the volume of investments reached 69 %. Artificial intelligence is already actively used by many organizations. So, since 2012, VisionLabs has been operating, whose initial investments amounted to 3 million rubles. The company develops tools for facial recognition in the financial sector and has entered the top three world leaders. NTechLab is also engaged in the development of facial recognition technology, the volume of global investments in 2020 amounted to $ 6,2 billion. Among the achievements of the companies should be noted FindFace – search for photos in social networks. Another company in the field of artificial intelligence is Promobot, a company from Perm, whose robot promoters have become widespread not only in Russia. Also in a number of other countries, including China. Canada, USA, etc. I would also like to point out the company CubicRobotics, specializing in the development of an intelligent household assistant.

Six research centers for the study of artificial intelligence are planned for 2021 in Russia, and the state will allocate 7,3 billion rubles for its development.

Another important aspect of the development of regions in the context of digitalization is the development of innovative activity. According to the index of innovative development of regions, the regions are divided into four groups: group 1 – leaders, with a rating of innovative development exceeding 20 %. These include Moscow, the Republic of Tatarstan, St. Petersburg, the Tomsk Region. The second group includes regions with an innovation development rating from 20 to 40 %, among them the Chelyabinsk region, Kaluga Region, Samara Region, etc. The third group includes regions with an innovation development rating from 40 to 60 %: Ivanovo region, Udmurt Region, Chechen Republic, etc. The fourth group includes regions with an innovation development rating of more than 60 %: the Republic of Kalmykia, the Jewish Autonomous Republic, the Republic of Dagestan, the Republic of Ingushetia, etc.

The situation with COVID-19 served as an impetus for the development of digital technologies. Thus, digital technologies have provided remote access to public services and contributed to the accelerated development of remote services in the field of ordering and delivery of products.

Today, many countries are faced with the need for prompt decision-making to implement government tasks in various sectors of the economy. This was influenced by the accelerated development of digital technologies, the COVID-19 pandemic, a decrease in foreign direct investment and income of the population, an increased threat to food security, the transition to the online format of international scientific conferences, the aggravation of international relations and the increased risk of sanctions measures.

The socio-economic development of the country is influenced by the use of digital technologies. Digital technologies are an indispensable element of the modern development of the state and the attraction of investment capital.

In the recent past, it was believed that the elements of the socio-economic development of the state are the use of manual labor, the lack of competition with the backwardness of technology development.

In the modern world, the fundamental element of development is investment in knowledge. In the modern world, the demand for educational services has grown, while there is a greater demand for T-shaped specialists who have knowledge in various fields.

Many countries are striving to improve the educational level of the population in order to effectively and competitively develop the country. The era of COVID-19 and the transition to online mode also affected educational services when educational institutions switched to online education.

4 Conclusion

Based on the above, we can conclude that:

- firstly, the use of digital technologies for the development of regions contributes to the efficiency of socio-economic development of the regional economy;
- secondly, digital technologies have found wide application in various organizations;
- thirdly, the uneven development of digital technologies in the regions. Moscow remains the leader in the spread of digital technologies, where 20 % of specialists are concentrated. According to the index of innovative development of regions, Moscow and St. Petersburg are also leaders among the leaders;
- fourth, there is a shortage of specialists in the field of information technology. The number of specialists in the field of information technology is 2.4 % of the economically active population. The Government is taking measures to train specialists in accordance with State bodies. In 2019–2020, 42 997 people were trained. In the number of graduates in information technology specialties, the Volga AR became the leader in 2017. To date, there has been an increase in budget places for the development of IT specialties by 25 %. Among the age groups (55–63 years), according to state programs, only 2 % of the population have completed courses on mastering digital competencies;
- fifth, Russia is lagging behind foreign countries in terms of the number of specialists from the economically active population in the field of information technology. Finland occupies a leading position with 7 % of specialists in the field of information technology from the economically active population;
- eighth, in the ranking among educational institutions in the field of information technology, the leading positions are occupied by the universities of Moscow and St. Petersburg, which indicates that the universities located in the region are lagging behind;
- ninth, measures are being taken today to develop digital technologies, funds are being allocated and it is

planned to develop standards for the development of artificial intelligence.

Further development of the digital economy will affect all aspects of the company's activities, its competitiveness, relationships with suppliers, contractors, and consumers. The readiness of the enterprise to accept new transformational changes requires not only the introduction of information technologies into the processes of organizing the economic activity of the enterprise, but also changes in the entire business model, which, in turn, requires the formation of a criterion that allows you to track these changes, as well as an assessment of their feasibility. Such an indicator can be the digital potential of the enterprise. The proposed approach to the assessment of digital potential allows us to analyze not only the current level of digitalization of business processes at the enterprise, but also the possibilities of increasing the digital potential of the region and the whole country as a whole.

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