Digitization and Digital Transformation: Status and Prospective Developments

Aybika Imranovna Beksultanova[1][a], Petmat Mahmadovna Dzhankhotova[1][b] and Saida Kemalovna Shardan [2][c]
[1]*Chechen State University named after A. A. Kadyrov, 364024, Grozny, Sheripova A. st. 32, Russia,*
[2]*North Caucasian State Academy, 369001, Krasnoarmeyskaya st. 85 A, Cherkessk, Russia*
adamovaaybika@mail.ru

Keywords: Digitalization, Digital transformation, Innovation, Technology, Computers, Implementation, Production, Internet.

Abstract: This article discusses the features of digitalization. The pros and cons of digital transformation are discussed. Today, digitalization is an important technological process affecting all sectors of the economy (from manufacturing to mining and agriculture), as well as almost all spheres of society, up to the level of human culture as a whole. Modern approaches to the definition of the concept of "digital transformation", its measurement, key features of phenomena that are generalized Digital transformation of industries are also systematized: The starting conditions and priorities are characterized as digital transformation, the factors determining its specifics in various sectors of the economy and the social sphere. Important features of digital transformation are considered on the example of seven major sectors of the economy and social sphere, namely industry, fuel and energy complex (fuel and energy complex), agriculture, construction, transport and logistics, financial sector and healthcare. Despite the significant industry features and uneven implementation of digital technologies, almost all researchers and experts agree on the highest estimates of the importance of digitalization for socio-economic development. Many authors note that there is virtually no alternative to this process, even in the most technologically inert industries. Moreover, the more "strong" term "digital transformation" has recently become widespread, which, from our point of view, reflects the growing expectations of radical shifts and effects from the introduction of a new generation of digital technologies. As a result, in recent years, the European Union, the United Kingdom, the United States, Canada, Japan, the Republic of Korea and some other countries have adopted many industry strategies for digital transformation. They represent a new stage of the digital economy formation agenda, combining the development plans of individual technologies with their specific applications.

1 INTRODUCTION

The deployment of the digital revolution on a global scale is increasingly immersing us in a new reality (Bereznoy, 2018). The variety of technical and technological innovations that change our lives has increased many times in the last decade, and in the most diverse areas of human life (Sadovaya, 2018).

When it comes to digitalization, first we mean the infrastructure, hardware and software, the list of Internet platforms and offers (Beksultanova, Vatyukova, Yalmaeva, 2020).

The intensive development and spread of digital technologies in recent years have significantly changed the appearance of key sectors of the economy and the social sphere. More and more organizations are striving to transfer business

[a] https://orcid.org/0000-0003-2885-3294
[b] https://orcid.org/0009-0008-2940-8882
[c] https://orcid.org/0000-0002-6822-6271

processes to the digital environment, thereby significantly reducing transaction costs and significantly increasing the volume of economic activity. 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). In such conditions, the ability to process and analyze large amounts of data becomes an important factor of competitive advantage. Sustainability and prospects for business development are determined by the ability to respond to changing customer needs many times faster than some 20-30 years ago and quickly bring new products and services to the market through electronic sales channels. Today, the market value of many companies is largely determined by "digital assets" (the size and loyalty of the Internet audience, brand awareness and reputation in cyberspace, etc.).

Digital transformation allows not only to significantly increase productivity, quality and level of resource efficiency, but also to form new business models based on new information flows. For the next five years, such a transformation at the global level is estimated to bring 30 billion euros of added value through new digital products and services and an additional 40 billion euros of annual investment in industry. 80% of companies will have digital value streams, which will lead to an 18% increase in the level of efficiency and productivity (Demyanova, 2018).

As part of the digital transformation of production, people, machines, products and systems are combined into a dynamic self-organizing real-time network structure using information and communication technologies and the Internet. As a result, all stages of the value chain become transparent, with continuous information links. An increase in flexibility is achieved up to the production of a batch consisting of a single product, with the economic and technological efficiency of mass production.

As a result, over the past few years, the world has quickly entered a new era – the era of the digital economy. The digital economy penetrates into all aspects of life: we are surrounded by various mobile devices, smart TVs, refrigerators, watches that not only monitor our behavior around the clock, but also begin to prompt, recommend, advise us. Sensors and sensors are integrated not only into expensive industrial equipment, but also into household appliances, furniture, clothing, interior items, cars. Moreover, all these devices and devices begin to interact with each other on the basis of Internet of Things protocols without human intervention (Zhuravleva, 2018). Emerging technology platforms remove intermediaries between the manufacturer and the consumer of a product or service, and accumulating amounts of data allow predicting the behavior of machines and people.

Thus, automation is designed with the help of information and communication technologies (ICT) to facilitate (as well as accelerate, etc.) human activity in certain technological areas, as well as to perform actions (related to data collection, processing and transmission) that do not require business decisions.

2 MATERIALS AND METHODS

1. The materials of the performed research contain the results identified in the framework of published reports and analytical materials of international organizations, specialized analytical publications, data from foreign and Russian news agencies, as well as interviews and articles by leading analysts and experts.

2. The following research methods were used in the work:

3. • Comparative approach;
4. • Classification;
5. • Generalization;

• Semantic and statistical analysis.

3 RESULTS

Despite the fact that various aspects of everyday life and part of the economy in Russia and the world are undergoing modernization on a daily basis, not everyone knows what digitalization is. In order to understand where the application is needed, what are the characteristics of this system, and how successful examples and such advantages can be explained, we will discuss the core of this system, its current state and expectations.

This process is understood as the introduction of new digital technologies at a high level. The problem of digital collection combines the process of converting raw data into useful knowledge that can be used for various purposes, including in the process of improvement and modern development to reduce costs and various processes of human activity.

For the first time the word "digitalization" appeared in the last 5 years of the 20th century, when in 1995 the American computer scientist Nicholas Negroponte from the University of Massachusetts

announced the concept of "Digital Economy" (Dubov, 2018). The Strategy for the Development of the Information Society in Russia for 2017-2030, approved by Presidential Decree No. 203 of May 9, 2017, provides for the following details: collection and use of research results. which, in comparison with traditional forms of management, can lead to greater efficiency of the variety of production, technologies, resources, security, sales, delivery of products and services" (Zhuravleva, 2018). Therefore, the term "digital" means the process of change in the digital economy.

Regardless of where the new technology will be applied, the idea of this implementation is to achieve the following goals:

Introduction to open information, which is an important part of the digital world.

Improving the social and political aspects of human life.

The speed and quality of Felix's business, which reduces not only cash injections from the owner, but also saves him time and effort to carry out activities.

Therefore, the digitalization of the economy, government, business, social relations, etc. it leads to the fact that the quality of life of people will continue to change for the better.

Based on these characteristics, it is nice to know that digital development in our country has its own characteristics that affect not only the quality of life, but also labor relations and other aspects of human life and the economy as a whole. They can be defined in the following ways (Inozemtseva, 2018):

- Mode of life. This is the first step and the fastest, since money is scarce, and many young people are ready to take advantage of new opportunities to prepare various everyday tasks.

- The second step is the introduction of new technologies in different areas of production. It is more efficient and resource-intensive. But without the use of such technologies, it is impossible to talk about the competitiveness of these products.

At the same time, the emphasis is on new opportunities in government and business. This not only speeds up the whole process, but also reduces the risk of errors. And in some cases increases the value received.

Considering the advantages of the ubiquitous digital system, it is worth highlighting:

Opportunities for new specialists.

Increasing productivity in all sectors of the economy.

High quality of people's lives.

Reducing the impact of authoritarianism and corruption.

But, at the same time, the very concept of this practice and the introduction of various electronic and other innovations give rise to many disadvantages that can be explained by the following processes and phenomena:

Reduced workload.

Increased risk of cybercrime.

The importance of financial injections and the issue of introducing new technologies.

But, the negative process and its consequences encompass the benefits and effects of society, the country's economy and the world system as a whole.

On a global scale, digitalization is a concept of economic activity based on digital technologies introduced into various spheres of life and production. This idea is being groundlessly implemented in all countries.

Digitalization is an innovation that affects the social structure of the region. The Fourth Industrial Revolution, or Industry 4.0, got its name in 2011 for German businessmen, which is better welcomed than the beginning of a new situation in the economy and society. The process of development of science and technology in the Russian Federation (Decree of the President of the Russian Federation No. 642 of December 1, 2016) shows today's "big challenges" for Russia, as well as the importance and potential of digital technologies. exchange. They have already begun. Not only the infrastructure is changing, but also the relationships between people. Foreign economic activity is regulated, which changes the nature of contacts and relations between states (Demyanova, 2018). The development of the Internet allows you to buy goods without leaving home and communicate with a partner who is far away.

Digitalization is not only automation and improvement of work and production processes (although this is often important), but also a change in the entire business process. Automation increases productivity, but also affects how companies do business, as digital transformation changes the product itself, changes the relationship between customers and suppliers, and transforms company processes. This is a comprehensive approach to the use of digital assets within an organization.

Digitalization involves a global rethinking of business methods, increasing the efficiency of companies by improving and optimizing business processes, optimizing organizational functions of IT systems. Data analysis is at the heart of digital technology. This is the name of the process of converting raw data into useful information. For example, if you connect all the company's equipment to a monitoring system, the owner or director will be

able to access data on the operation and operation of the equipment. On the basis of this data - to develop plans for the development of the company.

Data and digital processes are used to simplify and optimize business operations. Digital transformation is a deep and large—scale process when the whole company changes with the help of digital solutions. The goal of digital transformation is to enter new markets, create new sales channels and solutions that will bring new online revenues and increase the value of the company. And digitalization should not be confused with automation. The digitization process, as a rule, involves automation. However, the goal of digitalization is much broader: it consists in transforming the overall productivity of the company, achieving a complete digital transformation. Consider an example of a school or university education. The use of digital textbooks and video tutorials is automatic. But the law of the new educational system, which allows the student to choose the pace and the learning process itself, is digitalization.

States are trying to introduce digitalization into all aspects of their programs. For example, data analysis has long been used in the process of administrative power. A clear example that we face every day is the search for criminals using street cameras and requests to various government agencies via the Internet.

A big plus of digitalization of the sphere of life is that the life of residents is greatly simplified, there is no need to come to a person to submit documents, the number of bureaucratic difficulties is reduced. Now almost everything can be done via the Internet, using computers and other tools.

But the transition to digital technologies around the world is fraught with some risks. The importance and significance of human participation in many production and life processes is decreasing. This leads to the termination of some services and, as a result, deprives people of work.

Digitalization has a negative impact on product development, especially at the level of social Internet skills. This indicator shows a strong correlation with the growth rate of labor productivity. Perhaps this is due to the duplication of tasks and information in electronic and paper formats, which are stored in some organizations today.

New technologies help countries to improve in many areas: from education and medicine to public administration. To implement them, it is necessary to create a digital environment.

The rejection of digitalization can lead to the moral bankruptcy of the country. Although neighboring states will make full use of modern technology to improve various areas, the rights of conservatives are likely to fall.

Advantages of digitalization (Kudryashov, Sholina, 2018):

- Automation. Many systems, such as information processing, weapons, and others, will be controlled by machines without human assistance.

-Reducing the number of errors: it is possible to eliminate the risks associated with the human factor.

- Cost reduction by rationalizing the process and reducing the number of possible errors.

- Acceleration system. For example, you can digitize a company's system and automate data processing. In this case, the report will be prepared twice as fast, and you will not have to spend so much time searching for important information.

Disadvantages of digitalization:

- Dependence on technical resources: the effectiveness of digitalization depends on the quality of technical solutions. If one device fails, the whole system freezes.

- Strengthening governance and citizens: Digitalization allows managers to coordinate work in many areas. For example, with the introduction of a digital currency, the authorities will be able to control all financial transactions.

In addition, managers and top managers use digital marketing to develop short- and long-term growth plans for the company.

Perhaps the main center of digitalization in Russia and other countries is the economy, which is slowly being "digitized" these days. That is, all data is processed digitally.

The characteristic features of the digital economy are (Menovshchikova, Belaya, Selina, 2018):

- Internet service;
- purchase via the Internet;
- electronic payments;
- Online advertising;
- mechanical office work and so on.

The transformation of the digital economy gives citizens faster access to services and facilities.

In business, digital transformation takes place at a deeper level. Technical solutions alone are not enough. If there is a change in the state of the art, then it is necessary to review all processes. Business processes, development plans, operations and personnel are being rebuilt, etc. As a result of these changes, big changes are taking place, for example, new jobs are opening up and new areas of work are emerging.

Today, digitalization of a company is very expensive, but the price justifies the cost in the first month after the introduction of a new technology.

Firstly, the cost of raw materials and capital (materials, labor) is reduced. In the conditions of competition in this area, labor costs are gradually decreasing. CRM and ERP systems are developed with a narrow specialization in mind, and there are already a large number of them on the market. Therefore, they solve specific tasks and, as an advantage, can be proud of the price. The number of supported digital editions is also very important. The more changes there are in the company, the higher the cost of changes. The calculation takes into account the current state of equipment, processes and procedures.

Digitalization of the company's business processes provides more opportunities and allows for faster implementation of programs.

Advantages of the system (Mozoleva, 2017):

- A list of information and customer experience that helps to find each person's path;
- Collection and accumulation of information in the database allows the system to create the best working conditions through data analysis and save time and resources;
- Assistance in processing customer requests and information processing;
- Creation of new products and optimization to meet customer needs at the highest level, which leads to increased visibility and overall profit.

The only, but very serious risk of digitalization is its unsuccessful implementation.

There are the following disadvantages:

- An unprecedented number of qualified specialists who are well versed in the modern digital world. If you want to improve your business and its subsequent work, you cannot do without specialists in this field.
- Tight deadlines and bad times set by customers. Business owners often do not realize that it takes a lot of time to change a system that has existed for years. It won't work right away.
- The human factor. All employees need to be trained and promoted, which takes time. Unfortunately, this process cannot be extended quickly.
- Incorrect goals and priorities.
- Small volume of investments.

The digital transformation of the education system, first of all, involves equipping schools and universities with advanced digital technologies designed to expand educational and learning opportunities for all. And, perhaps, in the future, attention will be paid to online learning, where students, if desired, will be able to gain knowledge without leaving home.

Digital Benefits of Education:

- make students independent from childhood;
- elimination of books: students do not always carry a lot of notebooks and textbooks with them, and teachers - all kinds of manuals: one stick will replace one kilogram of waste paper;
- saving money - reducing the cost of office equipment, using electronic versions of textbooks / notebooks requires less money;
- access to higher education for rural residents.

The advantages of this concept can be:

- reduced socialization of students;
- short distances and physical development;
- reduce the burden on teachers.

4 DISCUSSION

Digital transformation can make education more accessible, inclusive and accessible, but only with proper planning and implementation in order to avoid negative consequences.

According to statista.com , the global costs of digital transformation in 2020 reached - 1 trillion US dollars, in 2021 – 1.18 trillion US dollars, in 2022 – 1.97 trillion US dollars. Forecasts show that costs continue to grow and will double in the coming 2023. (Figure 1).

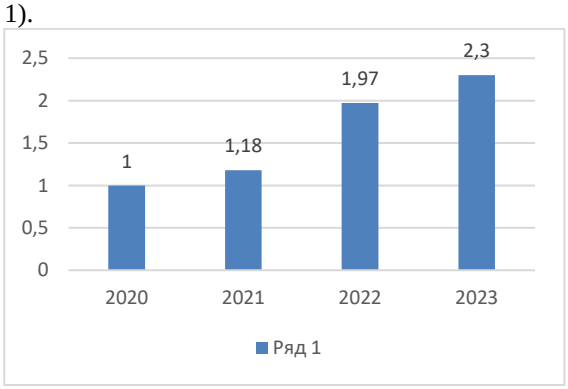

Figure 1: Revenue of the digital transformation market worldwide from 2017 to 2019 and in 2022 and 2023 (in trillions of US dollars), statista.com.

Digital transformation creates prerequisites for exponential growth of the organization. The analysis shows that such companies primarily own a digital platform (manage an ecosystem), but not necessarily other production assets as fixed assets.

Russia does not stay away from the world countries in terms of digitalization. Government policy measures aimed at the digital transformation of the most important sectors of the economy and the social sphere are widely discussed in our country

today. Digital transformation is fixed as one of the national development goals of the country for the period up to 2030. At the same time, monitoring of the implementation of this goal is carried out on the basis of four indicators: the achievement of "digital maturity" of key sectors of the economy and the social sphere; an increase in the share of mass socially significant services available in electronic form to 95%; an increase in the share of households with broadband Internet access to 97%; an increase in investments in domestic solutions in the field of information technology by 4 times compared to 2019. This system of indicators fully reflects the priorities and key areas of the Government's work and in this sense has not yet been widely criticized. However, for a comprehensive quantitative assessment of digital transformation as a phenomenon that permeates all spheres of life, this is clearly not enough. Digital transformation sounds from TV screens, filled news channels, and also formed the development strategy of many organizations. Many consider it as a necessary element of competitiveness, as well as improving the efficiency of public administration. On May 7, 2018, President Vladimir Putin instructed the Government to increase the share of expenditures on the implementation of the digital economy program by at least 3 times by 2025.

5 CONCLUSION

Currently, companies from various sectors of the economy are involved in digital transformation to varying degrees. Companies from the information technology industries are already "digital" in many ways. For companies from such sectors as telecommunications, finance, retail, digital transformation is already a matter of survival. And for companies from regulated, high-margin or fast-growing sectors of the economy, digital transformation will be in demand later, when other growth factors will reduce their influence. But it is obvious that digital transformation will affect all organizations, including authorities, and it was she who became the driver of the emergence of the profession CDTO.

Thus, the digital system has a great impact on social and economic processes in the daily life of citizens and the work of organizations. Development in each area has its own characteristics, and digital processes may not affect some indicators or, conversely, affect a lot. In general, digital processes have a positive impact on the release of new goods, works, services, improving the situation on the labor market; the material well-being of the population increases the level of education. Digitalization creates new business opportunities for some economic activities and reduces the growth potential for others. For example, remote work and training reduce passenger traffic, e-commerce reduces the need for retail space, at the same time, the delivery of goods purchased via the Internet and information technology-based services are developing.

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