

## **Digitalization of the economy: an overview of trends in Kazakhstan**

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**Abstract:** the article describes the directions of development of digital technologies in industrial and IT companies within the framework of the Industry 4.0 program.

**Keywords:** digitalization, technologies, program "Digital Kazakhstan", information systems.

The concept of "digitalization" comes from the noun "digit" or the adjective "digital". Thus, this term is due to the introduction of digital technologies, data transmission currents, as well as digital transmitting devices (computers, smartphones, tablets, televisions, smart watches, etc.) into all spheres of society and the economy. In the Cambridge Dictionary of Business English, in relation to the field of information and communication technologies (hereinafter referred to as the IT sphere), the word digital is defined as the use of a system capable of using a computer and other electronic equipment in which information is sent and received electronically as a sequence of numbers 1 and 0, as well as something related to. With computer technology and the Internet, Digitalization can be viewed in a broad and narrow sense. Digitalization in a broad sense is the process of introducing digital technologies and transmission systems at the level of.

The state program "Digital Kazakhstan" is an important comprehensive program that aims to improve the standard of living of every citizen of the country through the use of digital technologies.

The main objectives of the Program were to accelerate the pace of development of the economy of the Republic of Kazakhstan and improve the quality of life of the population, as well as to create conditions for the transition of the economy to a fundamentally new trajectory – the digital economy of the future. [1]

The implementation of the state program will be carried out in the period 2018-2022 in five key areas:

1. "Digitalization of economic sectors" is the transformation of traditional sectors of the economy of the Republic of Kazakhstan using breakthrough technologies and opportunities that will increase labor productivity and lead to an increase in capitalization.

2. "Transition to a digital state" is the transformation of the infrastructure of the state to provide services to the population and business, anticipating their needs.

3. "Implementation of the Digital Silk Road" – development of high-speed and secure infrastructure for data transmission, storage and processing.

4. "Human capital development" – transformations covering the creation of a creative society and the transition to new realities – the knowledge economy.

5. "Creation of an innovation ecosystem" – creation of conditions for the development of technological entrepreneurship with stable links between business, the scientific sphere and the state, as well as the introduction of innovations in production.

All the activities and projects implemented within the framework of the Digital Kazakhstan program will help to increase the efficiency and transparency of public administration, provide employment, improve the quality of education and healthcare, as well as improve the investment climate, increase labor productivity and increase the share of small and medium-sized businesses in the GDP structure.

The digital transformation of the industry of Kazakhstan is gaining momentum every day.

Around the world, many organizations today are on the path to changing traditional business models and creating sustainable competitive advantages through the use of digital technologies. In recent years, the era of digital transformation has been actively developing in Kazakhstan.

“The transformation of the principles of information systems operation is of particular importance in the light of the key priorities of the Republic of Kazakhstan to become one of the 30 most developed countries in the world in the period up to 2050, as well as with the implementation of the “Digital Kazakhstan” Strategy. Thanks to the rich capabilities of existing Microsoft platforms, the continuous development of solutions using the latest technology trends, it is possible to accelerate progress in empowering employees, attracting customers, streamlining operations and transforming products,” said Natalia Matasova, Microsoft Kazakhstan Partner Channel Development Manager at the Digital Solutions conference. for the industry of extraction, processing and production” in Astana.

“The use of artificial intelligence, the Internet of things, the adaptation of modern technologies is precisely applicable in key production processes. Technologies such as large server capacities are used, "cloud" technologies are beginning to be applied. Today, new areas of the industry, such as the transfer of key ERP systems to the cloud, are quite serious projects that allow you to save a lot of money and, accordingly, apply innovative approaches. The "cloud", in fact, is a service that is updated and does not need to be bought every time, like, for example, "iron" servers. From migrating from hardware to a cloud platform, we have significant savings in all related organizational issues. That is why today we talk a lot about the use of new modern technologies, and the “cloud” itself is not only a platform on which one or another service or application can be placed, it is, of course, a significant set of services, such as artificial intelligence, computer education. We are talking about the fact that in the near future we expect many professions to be transformed and replaced by robots, by the use of artificial intelligence, so it is very important in this case for the extractive industry to start thinking about these issues, and accordingly, systematically introduce new technologies,” Matasova said.

Ensuring the physical safety of people at work is a very important job that has always been and will always be relevant. This issue is regulated by a large number of standards and regulations from the state. And, of course, there are already IT solutions that help ensure security. The simplest example is the recognition of car numbers and people's overalls using video surveillance and video analytics technologies.

As Microsoft marketing manager for cloud products Viktor Dubovtsev noted, innovative developments such as smart helmets, real-time video analytics and many others are popular with many companies.

In the coming years, a large number of companies will use artificial intelligence in a variety of areas of production. Artificial intelligence technology, perfect analytics, global access, will greatly affect how manufacturing processes go. For example, use cognitive services, these are video, speech recognition services, and so on, in order to monitor security in enterprises. Mathematical models that duplicate the real production process can scroll through mathematically different border modes, give out where and when errors can happen. Or bots that take the place of a human operator, give hints to staff, making it easier to make rounds and maintain equipment. In Kazakhstan, several companies are already using such digital technologies. For example, some companies use mathematical models that make the calculation of the most optimal routes for the delivery of goods both by automotive vehicles and using rail transport along several branches, while making the ideal logistics solution for the delivery of goods, including weather data, identifying defects, repair work, etc. further. [2]

“Something much more is needed. The information received should be automatically analyzed in order to reach people in an aggregated form, that is, to provide what is really important. Thus, the analytical component, and not the observation itself, comes to the fore. Video analytics is actively used in production in Russia and abroad: for example, a “smart helmet”, which monitors the fact that employees have helmets on their heads in real time. The presence of a shock sensor

allows you to use feedback. For example, an employee can lightly punch a hard hat three times, and the operator will see this event as "the employee asks to contact him." You can also see the location of the employee and so on," shared Dubovtsev.

In turn, Nestor Komarnitsky, Deputy Financial Director of ArcelorMittal Temirtau, shared his opinion on the main directions of development of Industry 4.0 technologies and spoke about the experience of already implemented projects and further plans for implementing the transformation in their company.

ArcelorMittal Temirtau has been using information technology for many years. The introduction of both IT and digitalization technologies is proceeding in stages. Starting this year, tracking the location of personnel underground at the Kazakhstanskaya mine will be put into commercial operation, as well as a number of other solutions will be actively used and developed. For example, access control to the plant is now carried out through a face recognition system. In 2019, this access control method will be extended to several other facilities of ArcelorMittal Temirtau. In addition to all this, we have research work in progress, and a number of pilot projects have been launched to introduce technologies in limited volumes. Based on the results of pilot projects, we will make decisions on implementation. For example, now we are negotiating on a "smart helmet", on the development of a video analysis system, we are developing the use of business analysis tools, such as Microsoft PowerBI, and so on. On average, our company is digitized by 25-30%, but this is a virtual number. The total number of employees of the company is more than 30 thousand people, and there are more than 4.2 thousand automated jobs. The path of digitalization in general will take 20-25 years and, accordingly, the result will not be soon. The main thing is to understand what digitalization gives to a business, how technologies will increase its efficiency, what the introduction of digital technologies will give, whether labor safety will improve, whether profitability will increase, and so on. The main problem of digitalization today is a large shortage of personnel. Specialists are needed, especially in the regions.[3]

Recall that the Former President of the State, Nursultan Nazarbayev, in his Address to the people of Kazakhstan, instructed to develop and adopt a set of measures for the technological re-equipment of basic industries until 2025, which includes elements of the fourth industrial revolution.

The Fourth Industrial Revolution, better known as "Industry 4.0", takes its name from a 2011 initiative led by businessmen, politicians and scientists who identified it as a means to increase the competitiveness of Germany's manufacturing industry through increased integration of "Cyber-Physical Systems", or CPS, into factory processes. In other words, Industry 4.0 is the production side, in which household items, from cars to toasters, will be connected to the Internet.

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