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CONDITIONS FOR THE DEVELOPMENT OF DIGITAL TECHNOLOGIES IN ENTERPRISES

The Fourth Industrial Revolution, manifested by the implementation of new technologies in enterprises and the development of new solutions based on large data sets to popularize increasingly effective digital goods and services tailored to the needs of consumers, entails a change in business models in enterprises. The change in the functioning of companies as organizations concerns not only the ways of using large data sets. Forms of employment are also changing, and the competencies of people and systems using technologies based on artificial intelligence combine and complement each other, creating a specific ecosystem. It should be assumed that in the near future, the work environment in various types of companies will be saturated with increasingly advanced technologies. People and machines will support and complement each other. Machines will increase the potential of people. Artificial intelligence technologies will support employees in areas where data collection, prediction, planning, and automation will count. This applies, for example, to creating marketing campaigns, customer profiling, building a customer knowledge base, managing production lines, modeling systems, optimizing processes in the manufacturing and service sectors, etc [1].

Digital transformation embedded in the broadly understood concept of Industry 4.0 does not exist in a vacuum. In order to get a full picture of the processes that are taking place around us and have a huge impact on how we work and live, it is always necessary to consider the broader context. Demographic changes, globalization and technological progress are key phenomena influencing the life of modern societies. In the understanding of technological progress, Industry 4.0 is defined as the automation and integration of all possible processes at an unprecedented level. This includes, among others, artificial intelligence, robotics, 3D printing and blockchain, which results in the automation of low-skilled jobs while creating a large demand for highly skilled workers. The fourth industrial revolution, also known as Industry 4.0, is very similar in nature to the previous three industrial revolutions. It brings not only significant changes in the way we live and work, but also changes in the structure of work.

Digital technologies determine organizational changes in the area of forming relationships with customers and counterparties (a more complete understanding of their needs, expanding communication channels) and modeling the organization's operations in the field of product and service production supplied to the market. These technologies should offer added value primarily to customers, but for this, it is necessary to focus on two complementary types of activities: changing the value proposition for the customer and redesigning the business using digital solutions that allow offering the customer the highest possible level of interaction and collaboration. Thus, the development of the digital economy and all its consequences change the way enterprises work and also affect the life cycles of various business models (for example, accelerating the processes of product obsolescence). In other words, digitalization and the evolution of information and communication technologies are constantly contributing to the development of IT applications that support business processes, but enterprises should carefully consider how they work in the context of the digital challenges of the future. From a company's perspective, technology cannot determine the direction of development but must be aligned with the company's strategy, its potential, and those areas that need support at the operational level.

Systematically carried out digitalization processes allow the enterprise to achieve digital maturity, which supports the creation of a business model and an organizational model defined by highly advanced technologies, such as Industry 4.0. The development of Industry 4.0 also leads to a change in business models from product-oriented to service-oriented, i.e., offering the best services in their field online to complete a certain part of the production process [3].

Industry 4.0 is not only about technology but also about new ways of working and the role of people in the organization. The main factors contributing to the development of Industry 4.0 are access to relevant data and the availability of tools for their analysis. The implementation of technological solutions in the field of Industry 4.0 can be an impetus for many beneficial changes in the enterprise, as presented in Table 1.

Table 1 – Development opportunities for enterprises based on Industry 4.0

Development opportunities	Description
Increased productivity	Industry 4.0 allows you to optimize the production process, reduce downtime, better allocate resources and create new products
Development of new industries	New industries emerge due to Industry 4.0 solution providers and companies implementing these solutions
Innovative economy	The economy is becoming more innovative and is also promoting the expansion of technology abroad
Attractiveness for investors	Highly skilled workers and a dynamically developing innovative economy with appropriate mechanisms attract investors
New jobs with high added value	New jobs are created, focused on automation and IT, as well as new industries related to, among other things, collaboration between robots and humans
Reducing production costs	Improved product quality and reduced inventory lower production costs
Efficient use of materials and energy	Rational use of materials and improved energy efficiency
Better meeting consumer needs	Products designed for individual orders are manufactured in small batches

Source: generalized based on [2]

The digital technologies that enterprises are currently implementing are based on digital solutions, commonly referred to as SMAC, i.e., Social Media, Mobility, Big Data & Analytics, and Cloud Computing.

Regardless of the industry, more and more enterprises are looking into cybersecurity solutions, which broadly refers to technologies aimed at better protecting IT networks, devices, applications, and data from hacker attacks, damage, or unauthorized access. These include all tools and systems that prevent damage, protect, and allow the recovery of the ability of computers, electronic communication systems, or cyber communication services to function properly. They also aim to protect electronic communications to ensure confidentiality while authenticating the individuals authorized to do so.

Other digital solutions that are becoming increasingly popular in business are based on machine learning, which focuses on teaching computers to learn from data and improve as they gain experience. These technologies include solutions that allow a computer to perform tasks that it was not previously programmed to do. Machine learning creates algorithms that are then trained to find patterns and correlations in large data sets and make the best decisions and predictions based on the results of such analysis. Machine learning systems become more efficient over time, and the more data they have access to, the more accurate they become.

Big Data systems allow the use of computing power and technologically advanced software to collect, process, and analyze data that is characterized by large volume, rapid production, and value. They are applied to data sets that are so large, complex, and from so many different sources that new technologies such as artificial intelligence are needed to process them.

Cloud computing is the provision of computing services such as databases, networks, and software to offer faster innovation, flexible resources, and economies of scale.

Experience design is an interdisciplinary activity that includes elements of psychology, ergonomics, art, usability, industrial design, and technology. It helps shape a company's relationships with various stakeholders around a product or service using IT systems [4].

Many directions and opportunities open up for enterprises in the digital economy to take advantage of technological progress. However, the implementation of the technologies described above requires fulfilling many requirements related to the digital transformation process.

References

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