

VIRTUAL AND AUGMENTED REALITY TECHNOLOGIES

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Annotation: *In this article, the essence of virtual and augmented reality technologies. Augmented reality (AR) augmented reality (AR) technologies as sensory devices that help to fill in and receive information about an object. VR (virtual reality, VR, artificial reality) Virtual reality is a way to create information about an object using technical means, to convey it to people through their imagination. Opinions and comments are provided on the challenges of AR / VR technology development and the characteristics of the global market.*

Keywords: *real reality, virtual environment, informatization, digital economy.*

The digital economy is a virtual environment that complements reality. Western experts are unanimous that digital technologies will not work unless the relationship between the economy and government is regulated. Active informational processes change consumer behavior. Marketing is also gradually approaching the essence of economic relations, the main driving force that forces everyone to enter into economic relations - needs. The management process in the digital economy (through professionals) is a computerized system of interaction management, which carries out a wide range of activities for the active use of electronic information to meet the growing needs of mankind. For example, it predicts, plans, organizes, executes, monitors and coordinates the activities of the system. That is, there should be a common integrated system of economic management based on data collection and analysis to develop and implement the country's development path.

In the long run, a "digital" (electronic) economy could become a tool capable of realizing centuries-old dreams of freedom for people doomed to hard physical labor. Many people have ample opportunities for creativity, science (both fundamental and practical). The digital revolution is coming in earlier and stronger in some industries and countries, and later and less in others. Services, media and entertainment will be the first, followed by telecommunications companies and banks. But according to the general opinion of analysts and the results of a survey of managers of companies, digitization affects us all to one degree or another. after that, we cannot make such a distribution for most objects. Examples of this are still available today: the IP camera or any other transmitter connected to the network - which world is it part of? Undoubtedly, they are the essence of the phenomena of both worlds. Mobile phones today store a lot of information: phone numbers, birthday information, photos, passwords and more. Even if we are not physically connected to the phone, we feel functionally integrated with it. It does not take much courage to say that the process of unification of real and virtual worlds has begun and cannot be stopped.

The combination of real and virtual worlds creates a new hybrid world with different rules that are different from the laws and regulations that are common to us today. In this sense, there is no such thing as a "digital" economy that is separate from the rest of the economy: a "digital" (electronic) economy is one that exists in a hybrid world. The hybrid world is the result of a combination of real and virtual worlds, which are characterized by the ability to perform all the "vital" actions in the real world through the virtual world. Low cost of information and communication technologies (ICT), high efficiency and openness of digital infrastructure are necessary conditions for this process.

Digital business is the emergence of new business models that combine the physical and

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digital worlds. School of Management describes digital change as "the use of modern technology to radically increase the value and productivity of enterprises." will change the world in which companies operate. They will either have to fill vacancies in the new market or adapt themselves to changes by changing existing vacancies. It turns out that the digital transformation of organizations is a response to the development of new information technologies and their active spread around the world. At different levels of digital transformation, the difference between them is the same as the difference between the two terms - "digitalization" and "digitization". Digitization is the transfer of information from physical to digital means. Examples of digital conversions include e-books, video courses, digital photocopying, and more. There is no change in the structure of information: it is only in electronic form. Digitization is often used to improve an existing business model and optimize business processes.

As we interact with the virtual world, we can understand the transition from the digital economy to digital modeling and the Internet of Things. Of course, financial relations in the national economy cannot be realized without a digital currency in the form of a national cryptocurrency.

Many information systems perform operations better, faster, and less expensive than humans, which allows for unprecedented speed of movement due to the minimization of the number of errors. There are now examples of robot assistants, robot journalists, and even robot leaders who distribute tasks more efficiently than humans to help students. A set of information services that interact with each other during a process is the result of the digital transformation of service business processes. Many banks now carry out borrowing processes without human intervention. In the new form of companies, taxi calls are carried out using all the information systems between the customer and the driver, and human participation is not even considered. However, it is not always possible to completely exclude human participation from business processes. In this case, digital conversion allows you to quickly collect data and provide remote control over digital communication channels using robotic technology. Examples of such changes are in the services sector, oil production, power generation and manufacturing. Undoubtedly, the term "digital transformation" is becoming more and more popular in modern business. It seems that new technologies, which are actively developing around the world, will soon radically change our perception of digital technologies and artificial intelligence.

Another key technology on which the digital economy relies is the Internet of Things. That is, many appliances are connected to the mains, but these are secondary. More and more objects in the material world are connected to the Internet, which allows them to collect information and even remotely control these objects. In practice, a virtual copy of a material object, consisting of various indicators of the external world and the object, appears on the Internet, allowing the object to be controlled via the Internet. An example of an Internet of Things is a virtual data transmission system that sends a list of parts that need to be replaced as part of a breakdown and unscheduled repairs in a technical support service. The next stage in the development of the Internet of Things industry is the ability of products to interact not only with humans, but also with automated interactions on conveyor lines, maintenance systems, logistics and many other business areas. But there are still issues to be addressed, such as electronics with minimal power consumption, as well as the creation of new communication standards for the interaction of objects.

Another innovative trend in digitalization is Augmented Reality (AR). Augmented reality technology is one of the most promising technologies that allows you to add virtual world objects to the real world. Imagine that as you walk down the street, you see more information about the people and objects around you. There are examples of augmented reality that are being actively used in real life. For example, in some parks in Moscow, you can see signs that the object of the material world

is connected to the object of the virtual world. Games with augmented reality elements are actively spreading, stores have virtual mirrors and locker rooms, and augmented reality is also being tested in cars. Virtual reality technologies are not so widely used in business, where 3D modeling technologies are in high demand. Examples of creating digital 3D models of the real world are service enterprises, construction companies, manufacturers of complex technological products, oil production and other industries. The scope of 3D modeling includes not only the creation of models of objects, but also their filling with data, which, in turn, leads to the optimization of the management decision-making process and, consequently, the connection of product design tools with the means of their production. allows you to At the same time, the mass introduction of virtual reality technologies will need to further enhance the reality of virtual world imagery in new generations of devices that allow for more human participation in virtual reality. Of course, the digital economy is also closely linked to robotics. The role of robots in human life has been discussed many times by science fiction, but now robots are entering our real lives quickly and directly. The fact that robots perform simple functions that humans perform in production can significantly reduce the number of errors and increase the speed of work. It is no secret that many industrial companies actively use robotics in assembly lines and logistics, which reduces the importance of the human factor and attracts a minimum number of people. Reducing the cost of industrial robots will allow them to be more cost-effective than using them, and in practice people will have to control how the machines automatically produce without human intervention. In Germany, there is even the term 4.0.Industry, which refers to the creation of fully automated production and logistics networks that interact in the process of automation production. The combination of robotics, the Internet of Things, artificial intelligence and 3D printing now allows for the construction of fully mechanized factories for the production of everything from sneakers to cars. 3D printing is a technology that can radically change some industries and machinery. The creation of a large number of 3D printers that can print products from polymers, concrete, metal, and even gold also changes the understanding of the production cycle itself, as many product types can only be printed in three dimensions without leaving home. model and 3D printer. 3D printing is also actively involved in mechanical engineering, where it is cheaper to print than to get the details in the "classic" way. Clothing and footwear designers are also launching new products. Builders, jewelers, and medical professionals are also actively using 3D printing in their business processes. A self-printing printer has also been developed. Chinese companies have begun to develop designers who can assemble a 3D printer for anyone at home. Although there are still questions about printing complex products in the path of technology, it is very likely that there will be an opportunity to print products with complex components that can be printed on new sneakers, taking into account the characteristics of the soles. The point is, such work can be done without leaving home.

Now let's talk about technology synergy. The use of innovative digital technologies in combination with other tools will not only change this or that business process, but also completely reorganize the network by producing products that did not yet exist. The most interesting thing about digital transformation is the changes that are taking place and the fact that all of these technologies can be used together. In terms of the theory of synergetics, it can be said that the social system is constantly changing, and random changes in institutional forms (fluctuations) are an indicator of disorder at the micro level of the system, as well as the possibility of its development. Some fluctuations turn out to be so strong that they determine the future development trajectory and cause qualitative changes.

Amplified and virtual reality makes the new world visible to the human eye. Robotics and 3D printing allow you to fully automate many routine operations. It can be said that the emergence of many advanced technologies will radically change people's lives, eliminate many old professions and

create new ones, and will undoubtedly turn the world into a digital world. Such digitalization of the world will lead to great changes in all industries, and, most importantly, many new companies will emerge, which will not only find a place in the wave of digital change, but also become the leaders of the companies that manage it. If all the problems are solved and a digital transformation authority is established, it is necessary to start analyzing the opportunities and customer needs of new technologies in the network that will allow them to meet them. Then it is necessary to determine the prospects for the standardization of internal business processes and services and formulate a plan for their digitization. reported by medium-sized companies. Examples of Uzbek companies moving towards digital change are in the banking sector, telecommunications, education, services and information technology.

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