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Global trends of the digital economy development

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Abstract

There is still no single harmonized concept of “Digital economy” in the world, and we are talking about digital technologies and their impact on the economies of countries. The aim of this article is to identify global trends in the digital economy development and its tools – digital technologies. In particular, in the developed countries of the world, the culture of using digital technologies is higher, and involves not only the use of postal communication systems, but also banking services, searching for information, etc. While in developing countries, this level of culture is only being formed.

Keywords: Digital economy, Information and communication technologies, Service sector, Internet.

Tendencias globales del desarrollo de la economía digital

Resumen

Todavía no existe un concepto armonizado único de "economía digital" en el mundo, y estamos hablando de las tecnologías digitales y

su impacto en las economías de los países. El objetivo de este artículo es identificar las tendencias mundiales en el desarrollo de la economía digital y sus herramientas: las tecnologías digitales. En particular, en los países desarrollados del mundo, la cultura del uso de tecnologías digitales es mayor e implica no solo el uso de sistemas de comunicación postal, sino también servicios bancarios, búsqueda de información, etc. Mientras que en los países en desarrollo, este nivel de la cultura solo se está formando

Palabras clave: Economía digital, Tecnologías de la información y la comunicación, Sector servicios, Internet.

1. INTRODUCTION

In the last few years, publications on the topic of the “Digital economy” have been appearing more and more frequently on the pages of scientific and popular publications. This kind of “fashion publications” is explained by the introduction of the term “Digital economy” at the level of state regulators, a number of international conferences, meetings where issues of the so-called digital economy were discussed. The Russian community of scientists, analysts and politicians supported this category. It is used in discussions, although there is no harmonized concept of “Digital economy” in the world. This is despite the fact that there are already a number of studies on this topic, and the Higher School of Economics is forming analytical collections that characterize the development of digital technologies in Russia and in the world. In the world, the digital economy is associated with the development of the fourth industrial order. Developed countries have different understanding of the digital economy (ASHMAROV, 2018; MINAKOVA, 2017; GNATYUK &

PEKERT, 2018; OLKHOVSKIY, 2018; NARKEVICH & NARKEVICH, 2018; NOVIKOV, 2017; SCHWARZKOPF, 2018; MOISEENKO, 2017; BOGATOV ET AL. 2017).

1. “A global network of economic and social activities supported by platforms such as the Internet, as well as mobile and sensor networks” (Government of Australia);
2. “System of economic, social and cultural relations based on the use of digital information and communication technologies” (World Bank);
3. “Economy that primarily functions through digital technologies, especially electronic transactions made using the Internet” (Oxford dictionary);
4. “Doing business in markets that rely on the Internet and/or the world wide web” (BCS, UK);
5. “Markets based on digital technologies that facilitate the trade in goods and services through electronic commerce on the Internet” (OECD);
6. “Economy that can provide high-quality ICT infrastructure and mobilize ICT (information and communication technologies) capabilities for the benefit of consumers,

businesses, and the state” (Research center of the Journal “Economist” and IBM company);

7. “Digital equipment manufacturing, publishing, media production and programming” (UK Government).

Thus, the term “Digital economy” does not imply a change in the classical principles of economic construction. And it does not even involve changing the economic mechanism. The term “Digital economy” implies the use of digital technologies in classical Economics, which are essentially tools of the fourth technological order. In different countries of the world, the level of development of these tools varies, which can be clearly demonstrated using analytical data and various ratings.

2. METHODOLOGY

The work used system, comparative, economic and mathematical, and other research methods. Published works of research and higher educational institutions of the Russian Academy of Sciences, analytical materials of international organizations, and statistical materials at the federal and regional levels were used as materials.

3. RESULTS AND DISCUSSION

In their work, R. Bucht and K. Hicks (BUCHT & HICKS, 2018) believe that the digital economy is part of the fourth technological order, which consists of three components:

1. Digitalization and integration of vertical and horizontal value chains;
2. Digitalization of goods and services;
3. Digital business models and user access.

Thus, the authors say that digitalization of the fourth technological order involves the use of digital technologies in some sectors of the economy. According to the authors, the tools of digitalization are: mobile devices, Internet of things platforms, geolocation technologies, advanced user interfaces, authentication and fraud prevention, three-dimensional printing, smart sensors, big-data analytics and advanced algorithms, multi-level interaction with the client and maintaining the client dossier, portable augmented reality devices, and cloud computing.

World Bank experts believe that digital technologies include the Internet, mobile phones, and all other means of collecting, storing, analyzing, and sharing information in digital form (WORLD BANK,

2016). At the same time, there is no question of new means of production that can significantly increase labor productivity and in any other way affect positively the production processes in the economy, as well as increase the gross domestic product. Here, we can rather talk about digital processing of data at every stage of production of goods, performance of works and provision of services.

UNCTAD, the United Nations Conference on Trade and Development, follows a similar interpretation. According to UNCTAD experts, the digital economy is the use of digital Internet technologies in the production of goods and services and their trade. In fact, the modern concept of “Digital economy” implies a partial change in the technological base of the economy, which will allow automating routine operations. This significantly changes the speed of implementation of many processes, provides new opportunities, but does not change the basic foundations of the economy. Probably, it would be more correct to talk about the computer economy (IVANOV & MALINETSKY, 2017).

The report of the UN Economic and Social Council dated February 23, 2015 states:

The main problem of poor people in developing countries is that insufficient access to information can limit their economic opportunities. Information and communication technologies can help overcome such obstacles. They can not only expand the economic opportunities of marginalized groups, but also improve the efficiency of existing enterprises. With their help,

companies of various sizes can reduce their operating expenses and expand their presence in the market, thereby increasing their stability and profitability (Report of the UN Economic and Social Council on February 23, 2015).

From the context of the above definitions, it is clear that the goals of the digital economy are to increase public access to information, including purchasing goods and services. But the digital economy is more important for corporations. For them, the digital economy is a tool for expanding their presence in the market, and as a result, increasing the profitability of production. There are two ways to expand markets using digital technologies. The first is through the activation of Internet activity of the population: to understand its needs, and thus to adjust production to the population, of course, taking into account the purchasing power of the population of a country. The second way is to use actively modern, including digital technologies in production in order to reduce production and circulation costs (SHCHERBININA, 2017; MOISEENKO, 2017; KOMAROVA, 2018; KOBETS, 2017; KUPRYUSHIN & CHERNYATINA, 2017; NARKEVICH, 2018; VERNIGOR, 2017; YANKOVSKAYA, 2019; YANKOVSKAYA & KUKUSHKIN, 2019).

A survey of those born after 1980 in South Africa found that 74% of respondents interact with representatives of various companies and brands over the Internet and expect their opinions about a particular product to be taken into account in future developments.

Based on the above, in the modern world, the category “Digital economy” does not imply a change in the classical foundations of the economy. Here, and further, we will talk about the use of digitalization tools in the production, processing and consumption of the gross product. The use of digital technologies in the modern world is of a partial nature (TORQUATO et al, 2018).

Global gross product grew by 2.3-2.5% in 2015 and 2016. At the same time, the global segment of the digital economy, which accounts for 5% of the world’s product and more than \$ 3.4 trillion, did not grow at all.

In 2015, it decreased by 5.8%, and in 2016 it decreased by 0.6%, which does not promise bright prospects (GRAMMATIKOV, 2017).

Analysis of the prospects for the development of basic research shows that the volume of work in the biological cycle is more than 30 times higher than the volume of research conducted in the field of computer science (IVANOV & MALINETSKY, 2017).

Despite this, it is difficult to dispute the importance of digital technologies in the global economy as a whole, as well as in its individual sectors. UNCTAD lists the ten most digitally exposed sectors of the world economy: media and entertainment services in the first place, retail trade in the second place, high-tech industry in the

third place, health system and services in the fourth place, etc. (table 1).

The rating shows that digital technologies are largely used in the non-production sphere. The exception is the production and assembly of cars. In addition, the industries listed in the table do not meet the daily needs of the population. The conclusion is that modern digital technologies are most common in the non-productive part of the economy and do not have a significant impact on the mass production of goods that the population feels a daily need for, such as the production of food, clothing and footwear, etc. In addition, the main goal of modern digital technologies is to promote goods and services, and not to digitalize production or provide various types of public services to the population.

Table 1: Rating of the leading industries that have experienced the consequences of the development of digital technologies

Economic sector	Place in the rating
Media and entertainment services	1
Retail trade	2
High-tech industry	3
Healthcare system and services	4
Travelling, transport and logistics	5
Telecommunication services	6
Professional services	7
Financial services	8
Production and assembly of cars	9
Consumer goods in packaging	10

The most widely used digital technology in the world is broadband Internet (table 2). In the developed world, 95-100% of business sector organizations use this technology. The most common goals of using this technology in business sector organizations are: using e-mail and performing financial transactions. The second most important digital technology for organizations is cloud services.

Such services are used by 17 to 66% of business sector organizations. The third most important digital technology in the world is ERP systems. This type of technology is associated with managing an organization, processing and storing information, planning and forecasting. The share of organizations using such technologies is 19-48%. In the fourth place in terms of prevalence there are electronic sales. The share of organizations using such technologies ranges from 16 to 29%.

It is obvious that the future of using such technologies belongs to trade. The world leader in the use of such services is China, where the practice of ordering food at home, as well as purchasing goods via the Internet is quite common. 45% of business organizations in China use this type of digital technology. The use of RFID technology in the production and service sector can be ranked fifth in importance. From 8 to 42% of business sector organizations in some developed countries use this technology. Moreover, it can be used in security, circulation, and quite often recently used in production, for example, when monitoring the use of resources.

Table 2: Intensity of use of digital technologies in some countries of the world, 2017, (share of organizations using digital technologies in the total number of organizations in the business sector, %) (Indicators of the digital economy, 2019)

Country	Digitalization index of business	Broadband and Internet	Cloud services	RFID-technologies	ERP-systems	Electronic sales
Russia	28	82	23	6	19	12
UK	35	95	35	8	19	20
Germany	38	95	16	16	38	24
Denmark	46	100	51	9	40	29
Netherlands	43	100	35	18	48	16
South Korea	45	99	...	42	28	11
Japan	46	95	47	18	...	24
Finland	50	100	66	23	39	21
France	36	99	17	11	38	17
Sweden	43	97	48	12	31	29

According to the results of a study by the international consulting company Accenture and data from the all-Russian Academy of Foreign Trade (GRAMMATIKOV, 2017; Indicators of the digital economy, 2019), the share of the digital economy in global GDP in 2016 was 22.8%. At the same time, the US – 33.7%, the UK – 31.7%, and Germany – 25.9% can be considered as the leading countries in terms of the share of the digital economy in GDP. Japan, Brazil and China can be considered as promising countries for the development of digital technologies, in which the share of the digital economy by 2021 may be 22.0%, 24.6% and 12.6%, respectively.

Table 3: The scale of the digital economy in some countries of the world

	2016			2021			Increase in the share of the digital economy in GDP, %
	GDP, billion dollars ¹	Volume of the digital economy, billion dollars	Share of the digital economy in GDP, %	GDP, billion dollars ²	Volume of the digital economy, billion dollars	Share of the digital economy in GDP, %	
UK	2515	817	31,2	2847	979	24,6	19,8
Germany	3467	898	25,9	3675	1104	30,0	22,9
Russia	1283	26	2,0	1725	97	5,6	276,4
USA	18575	6259	33,7	20454	7432	36,3	18,7
Japan	4949	964	19,5	5083	1116	22,0	15,8
Brazil	1796	389	21,7	2028	498	24,6	28,0
China	11120	1198	10,8	14725	1851	12,6	54,5
World	74949	17073	22,8	85642	21155	24,7	23,9

Developed countries of the world demonstrate quite high productivity in the digital sector of the economy. It exceeds 500 thousand dollars (table 4). This allows not only recouping investments in this sector of the economy, but also contributes to the development of this sector of the economy. The share of employees working in the digital sector of the economy ranges from 3.8% to 5.1%. This makes it

¹ At exchange rates

² At exchange rates

possible to produce up to 1/3 of the GDP of developed countries. This ratio indicates a high efficiency of business in the field of digital technologies in the developed countries of the world. The situation is different in Russia, where 2.2% of employees are employed in the digital sector of the economy.

They produce 2% of GDP, and labor productivity is only 16.4 thousand dollars. This is much less than in a number of manufacturing industries, such as agriculture or industry. However, this situation demonstrates the reserves and opportunities for the development of the digital sector in Russia. At this stage, we can say that there are sufficient personnel for the development of the digital sector of the economy in Russia. However, the volume of production in the digital sector is insignificant.

Table 4: Labor productivity in the digital economy of some countries of the world, 2017

	Share of employees in the digital sector (% of the total number)	Number of employees in the digital sector, million people	Labor productivity in the digital sector of the economy, thousand dollars
UK	5,1	1,632	500,6
USA	4,1	6,285	995,9
Germany	3,8	1,585	566,6
Russia	2,2	1,586	16,4

On the one hand, the reasons for this situation are the sanctions policy pursued against Russia and restricting access to advanced world technologies, and not only digital ones. The second reason is that in the modern world, the practice of selling technologies is taking a backseat. They sell, as a rule, not technology, and “iron”. At the same time, a trial version of the technology is presented for free, so that in a few years it can be sold at an exorbitant price, when the Russian manufacturer can no longer carry out production without it. The third, important position that hinders the development of the digital sector of the economy is the lack of specific goals and mechanisms for motivating the use of digital technologies.

It is the lack of motivation in the business sector that does not allow using digital technologies widely enough, and additionally receiving products produced using digital technologies. The fourth position that hinders the development of digital technologies in Russia and many developing countries (with the exception of China) is the insufficient amount of funding for science, including in the field of digital technologies.

The leaders in science funding are the United States. They spend more than \$ 511 billion a year and thus provide the highest productivity in the field of digital technologies (table 5). In second place in terms of fixing science is China. It is noteworthy that in 1991, domestic R&D spending in China and South Korea did not exceed the amount of R&D funding in Russia. However, thanks to a sound

economic policy, domestic R&D spending in China is now more than 10 times higher than in Russia, accounting for 2.11% of GDP.

It is obvious that in Russian realities, to increase domestic R&D expenditures to 2.11% of GDP (from 1.11% to 2.11% (as in China), it is not enough to increase budget subsidies by 2 times, it is necessary to increase the volume of production of goods, works and services by at least 5 times.

4. CONCLUSION

In the developed countries of the world, digital technologies, as a tool of the digital economy, provide labor productivity exceeding 500 thousand dollars, while in the developing world it is ten times smaller. This is due to factors such as the low purchasing power of the population in the developing world, low spending on R&D and research and development related to information and communication technologies in general, and the lack of incentives, motivations, and organizational and economic mechanisms that encourage the use of digital technologies by organizations and citizens in the developing world. The main area of use of digital technologies in the world is the service sector. In particular, large corporations and smaller manufacturers are focused on making part of their sales using the Internet, while increasing turnover and profit.

Despite low purchasing power, similar trends are common in developing countries around the world. It is obvious that at this stage of development of the economies of the developed countries of the world, the service sector will be increasingly saturated with digital technologies. Production will not lag behind. It is obvious that in the near future, digital technologies for monitoring the use of resources will be actively implemented. This trend will be extended to developing countries around the world.

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