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## Digital Economy and its Role in the Development of Online Higher Education

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**Abstract.** The term "digital economy" has been widely used not only in theory, but also in practice. However, the scientists have not yet reached agreement of opinion about the interpretation of the concept. In the present paper the authors give definitions to the following concepts: digital economy and digitization of education. Besides, the authors have analysed the main advantages and disadvantages of online education and investigated the influence of digital economy on the development of online higher education at universities. The present investigation used such general scientific methods as: observation, descriptive research, and modelling. The significance of the paper is determined by the fact that nowadays there is not enough investigation devoted to the theme of the influence of digital economy on the development of online education. The authors state that digitalization of economy directly impacts the development of online education. For example, there appear a lot of new knowledge, abilities and skills that an employee must possess, there develops active interaction between business sphere and educational institutions due to the need in regular training of employees on the job. Besides, qualified employees and the complex of all the correctly organized interconnected processes determine the successful transition to digital society.

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**Keywords:** online education, digitalization of education, strong points of online education, weak points of online education

## **1 Introduction**

Digital economy is rapidly developing which is determined by overall application of information and communications technology. Digitalization is literally penetrating all the spheres of people's life: social networks, online orders, electronic commerce, internet marketing, online education and so on. Online environment is becoming an essential part of life of any person irrespective of his/her age, educational background, profession or status. Therefore, the process of digitalization is becoming one of the innovative trends of the development of contemporary economy. We witness the transition from implementation of separate digital technology elements to the complex building of digital system in the framework of national and world economies. Due to that there appears the need for the efficient and rational interaction of all the participants of digitalization process – government authorities, business sphere, industrial and agricultural sectors, financial structures and, certainly, educational institutions.

## **2 Research Rationale**

The rationale of the present research is determined by the inevitable transition to digital economy, giving the main role to highly qualified specialists. That is the reason why the essential part of work of any educational institution is the proper establishment of educational environment at the age of high-technology systems. It is worth mentioning that the authors consider that educational process comprises not only the hours of direct interaction with students but the whole system of intramural interaction at the university.

## **3 Scholarly Importance of the Issue**

An American information scientist Nicholas Negroponte was first to use the term “digital economy” in 1995. However, he did not give the exact definition to the term, he merely used it as a figural expression. [1].

Then followed the digital economy investigations conducted by such scholars as: Bahl M. [2], Brynjolfsson E., Kahin B. [3], de Reuver M., Sorensen C., Basole R.C. [4] and others [5, 6, 7, 8, 9, 10, 11,12,13,14].

We should point out the investigations of such Russian scholars as: Kulkov V.M. [15], Urmantsev A. [16], Norets N.K., Stankevich A.A. [17], Sudarushkin I.V., Stefanov N.A. [18], Alekseev I.V. [19], Vasilenko N.V. [20].

It can be concluded that the above mentioned authors agree that digital economy is a specific part of economic relationships based on information technology.

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Among the investigations in the sphere of digital education we can emphasize the scientific contribution of Zavyalova I.V. [21], Lukashenko D.V. [22], Andaev D.O., Gubin E.I., Alenova A.N. [23].

#### 4 Setting the Objective

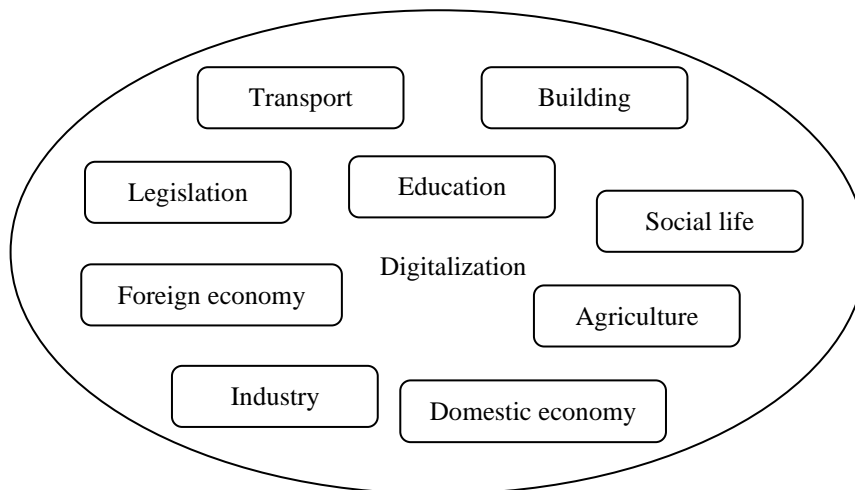
The main objective of the present research is to investigate the influence of digital economy on the development of online education under contemporary conditions. For that purpose the authors have analysed the main development trends of online education market, studied its strong and weak points, and gave definition to the concept of “digitalization of education”.

#### 5 Theoretical Part

The scientists have not reached agreement of opinion concerning the interpretation of the concept of “digital economy”. Besides, Russian scholars in their papers often substitute the following synonyms for this term: “API economy”, “the new technological structure of the world”, “electronic economy”, “applications economy”, “creative economy”.

We consider that digital economy is a complex of technological, informational and communications technologies, which can be effectively updated and adjusted due to constantly changing factors under the conditions of economy globalization and the development of online environment.

Digitalization of all the social spheres of life takes a great deal of effort. For example, digitalization is a hot button issue at many economic forums, and large-scale governmental programs are devoted to this theme.



**Fig. 1.** The influence of digitalization on all the fields of activity.

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As it has been stated above, the digitalization relates to absolutely all the fields of activity, which is shown in Figure 1.

Nowadays, under the conditions of global digitalization, the role of universities in educational sphere is rapidly changing. Higher educational institutions of the whole world are actively competing for the best teachers, students, research grants, and minor educational programs.

The world digitalization makes it important to transfer to the new system of education, which includes active application of information and communications resources.

We consider that the first prerequisites of digitalization of the Russian education were the implementation of several thousands of the first Soviet personal electronic computing machines into educational sphere in 1985 and implementation of the general course on Informatics and Computer Hardware Basics in secondary schools.

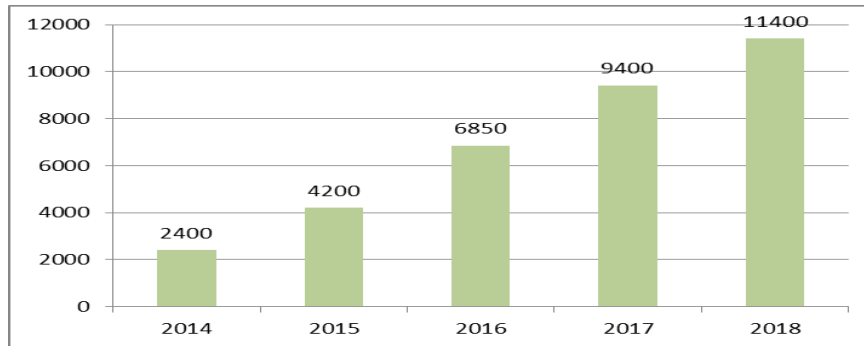
The digitalization of economy makes it necessary for employers and employees to adapt to the new conditions, namely to constantly improve their skills, knowledge and abilities. Thus, every employee strives for self-improvement and training in order to get more advantages at an extremely competitive job market. Consequently, successful functioning and development of digital economy demands that the system of education and retraining must provide the economy with specialists who meet the requirements of the digital age.

The authors have come to the conclusion that the countries, which will be able to adjust their educational infrastructures for the new requirements, will be able to significantly strengthen their economic position at the world market during the transit to the digital economy. Therefore Russia stands a good chance to maintain its competitiveness by upgrading educational system and the system of retraining of workers. [21]

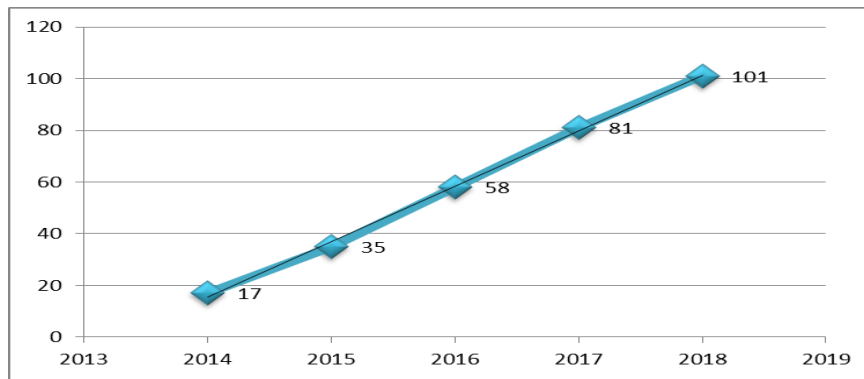
We can point out the main areas of digitalization in educational sphere, the are:

1. Reforming in the sphere of education (fixing the norms and opportunities of applying online teaching);
2. Creating and development of research centers for conducting fundamental investigations;
3. Retraining academic staff and their additional training with the purpose of successful development and implementation of online teaching;
4. Fulfilling priority tasks of digital development of education;
5. Development of digital infrastructure.

It is worth mentioning that thanks to the activities being conducted, the digitalization of online education is getting more and more popular every year. That can be proved by the data, shown in Figures 2 and 3.



**Fig. 2.** The number of courses available at open educational platforms.



**Fig. 3.** The number of users of open educational platforms, mln. people.

However in spite of the world tendency towards the development of online education, the authors state that this system has both its advantages and disadvantages (Table 1).

**Table 1.** Strong and weak points of online education.

№	Strong points of online education	Weak points of online education
1	Flexible schedule for students	Not all the subjects can be turned into online course
2	Remote education for disabled people and people on the job	No possibility to get the instant explanation of the necessary information from the teacher
3	Studying at any higher institution of the world	No personal development in social environment
4	Opportunity to get several professions simultaneously	Difficulties in control over the students' self-study
5	Using video and audio content of online courses allows students to perceive more information	Need for regular updating of online courses
6	Increase in number of students	Rise of unemployment due to reduction

		of academic staff, because guiding online courses requires less number of employees
7	Additional money inflow in higher educational institutions due to increase in number of students	Online communication with students requires more time resource
8	Convenient work schedule for teachers	Students are getting limited thinking due to standard ways of assessment of their progress in a subject
9	An opportunity to take retraining courses and advanced training courses on the job at any educational institution of the world	Need for special training of staff and purchase of the equipment and software.
10	The access to online lessons is not limited in time (possibility to study the material several times)	Decrease in quality of teaching subjects and, consequently, loss of the competitive edge by graduates

Therefore, an educational institution must comprehensively assess and investigate the possibilities of implementation of online teaching, and try to develop high-grade digital courses, striving for their quality, not quantity.

On the basis of the conducted analysis, presented above, the authors give the following definition to the concept of “digitalization of education”: it is the process of transition to the digital platform of teaching by means of applying online courses and leading technology, and on the basis of educational standards and competency building patterns, with correct and timely interaction among all the subdivisions of an educational institution.

In conditions of digital economy, the job market is dramatically changing, we often witness the process of robotic application (replacement of human resource by a robot, computer technology and so on). Thus, people are beginning to attach significance to the concept of lifetime education, which is based on online education and which is continuous (studying at any moment of time, possibility to take additional courses on the job). But for the lifetime education to become a norm of social life, we must skilfully build up the structure of online education and foster digital literacy in the society.

Also, one of the tasks of the effective employment of human capital in conditions of digitalization of economy is involvement of the bigger circle of people in productive activity, considering the levels of their education, qualification, mobility and other factors. That will provide for the flexible forms of employment (part time job, flexible hours, side work). We can refer the following people to the human capital: students, pensioners, women on a child rearing leave, disabled people.

That is why digital economy demands not only “digitalization” of some materials, courses, and books from online education, but also the changes in complex approach which must set new goals, modernize the structure and content of educational process.

## **6 Practical Relevance**

In conditions of contemporary life, in order to understand the economic and social effect from digital technology for business and society, it is necessary to develop adaptability and study skills of workers. The capacity for constant study and readiness to get new knowledge by means of modern technology are becoming the main competence. That is the key factor for a successful and professional growth in a contemporary digital world. A good worker today is a confident user of various gadgets, a user who has necessary competence for efficient activity in conditions of digital economy (including the spheres of education, culture, research, defence and security), a user who refers to the digital environment and digital tools in his/her activity as a student and as a professional.

The influence of digital economy on the sphere of education provides everyone with individualization, personalization, availability and effectiveness of education, including the following:

- educational results achievable by any citizen, including people with reduced capabilities;
- motivation for every student;
- providing with educational elements offering an opportunity to unlock individual abilities and talents to the maximum.

## **7 Conclusions**

Digital economy is not only the spread of digital technology, the changes connected with it are much more profound. For example, there develop new online services (insurance, enhanced features of internet banking, opportunity to do online shopping from any place of the world), there appears an opportunity for people on the job to get education at any university of the world.

Nowadays the sphere of digital education is rapidly developing. A lot of higher educational institutions are turning to digital resources, developing their sets of lectures and courses and switching to the mode of “electronic education”. As any project, online education has its strong and weak points. It is worth mentioning that one of the biggest advantages of such education is process continuity, even in force majeure circumstances (today’s bright example of that is imposing lockdown in many countries due to the large-scale spread of coronavirus disease). Besides, the level of applying information and communications resources by today’s students shows that educational process must move with the time, meaning that the transition to online education is inevitable.

The authors hold an opinion that the process of digitalization of education is definitely connected with digitalization of economy in general, but it has its particular features. The correct development of online education cannot accept a trial-and-error method, because teachers work with the main capital – human resource. For economy the main losses are expressed in money, whereas for educational process the main loss is the loss of knowledge.

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