## DEVELOPMENT OF HIGHER EDUCATION IN THE CONTEXT OF DIGITALIZATION: DEVE-LOPING AN EFFECTIVE SOCIO-ECONOMIC INTEGRATION MODEL

DESARROLLO DE LA ENSEÑANZA SUPERIOR EN EL CONTEXTO DE LA DIGITALIZACIÓN: ELABORACIÓN DE UN MODELO DE INTEGRACIÓN

Igor Shichkin1\* E-mail: shichkinia@mail.ru ORCID: https://orcid.org/0000-0002-3158-0648 Zokirjon Ruziev<sup>2</sup> E-mail: z.roziyev@iiau.uz ORCID: https://orcid.org/0009-0008-2393-9850 Mokhira Jumaniyazova<sup>2</sup> E-mail: m.jumaniyazova@iiau.uz ORCID: https://orcid.org/0009-0007-3781-9422 Mohira Abdullaeva<sup>2</sup> E-mail: abdullaeva.mohira@iiau.uz ORCID: https://orcid.org/0000-0003-0417-5556 Ilyos Abdullayev<sup>3</sup> E-mail: abdullayev.i.s@mail.ru ORCID: https://orcid.org/0000-0002-9601-7434 <sup>1</sup> Plekhanov Russian University of Economics, Russia. <sup>2</sup> International Islamic Academy of Uzbekistan, Uzbekistan. <sup>3</sup> Urgench State University, Uzbekistan. \*Corresponding autor

### Suggested citation (APA, seventh ed.)

Shichkin, I., Ruziev, Z., Jumaniyazova, M., Abdullaeva, M., y Abdullayev, I. (2024). Development of higher education in the context of digitalization: developing an effective socio-economic integration model. *Revista Conrado, 20*(S1), 142-147.

### ABSTRACT

The prerequisites behind the transformation of universities in the context of digitalization include continuous development of the skills and qualifications acquired through formal education and the development of digital technologies and ecosystems. The study aims to analyze different scenarios for the development of higher education in the face of digitalization. The research draws on previous studies from scientific periodicals. Based on a literature review and an expert survey, the key scenarios of the development of higher education in the context of digitalization and the rise of online learning are established. The authors conclude that digitalization has drastically changed the methods of operation of all institutions and organizations, including universities, in terms of communication and the principles of their functioning. Contemporary universities use the opportunities created by digitalization and view digital technology as essential in their development. This fact is of great importance due to the current changes in the labor market, its structure, forms of employment, and methods of job performance. Digital competencies are becoming not only an educational requirement, but a basic prerequisite for knowledge acquisition and employment.

### Keywords:

Higher education, digitalization, digital transformation, digital technologies, scenario development, higher education development scenarios.

### RESUMEN

Los requisitos previos para la transformación de las universidades en el contexto de la digitalización incluyen el desarrollo continuo de las competencias y cualificaciones adquiridas a través de la educación formal y el desarrollo de tecnologías y ecosistemas digitales. El estudio pretende analizar diferentes escenarios para el desarrollo de la educación superior ante la digitalización. La investigación se basa en estudios previos de publicaciones científicas periódicas. A partir de una revisión bibliográfica y una encuesta a expertos, se establecen los escenarios clave del desarrollo de la enseñanza superior en el contexto de la digitalización y el auge del aprendizaje en línea. Los autores concluyen que la digitalización ha cambiado drásticamente los métodos de funcionamiento de todas las instituciones y organizaciones, incluidas las universidades, en lo que respecta a la comunicación y los principios de su funcionamiento. Las universidades contemporáneas

aprovechan las oportunidades creadas por la digitalización y consideran que la tecnología digital es esencial en su desarrollo. Este hecho es de gran importancia debido a los cambios actuales en el mercado laboral, su estructura, formas de empleo y métodos de desempeño del trabajo. Las competencias digitales se están convirtiendo no sólo en un requisito educativo, sino en un prerrequisito básico para la adquisición de conocimientos y el empleo.

### Palabras clave:

Educación superior, digitalización, transformación digital, tecnologías digitales, desarrollo de escenarios, escenarios de desarrollo de la educación superior.

## INTRODUCTION

The transition to the contemporary method of social reproduction and the distribution of knowledge economy majorly shifted the global economy's path and predetermined its focus on innovation. Advanced international experience shows that innovation reaches its peak at the intersection of the interests of the state, business community, and scientific and educational institutions. Innovative activities today are generated by higher education institutions, while the government and the business community act as the customers, consumers, and co-investors in innovative developments (Hernández García de Velazco, 2022).

Renowned classical universities of the UK, such as Cambridge, University of York, and others, not only generate scientific research, but also actively implement business education, spread entrepreneurial experience, commercialize experimental developments, and facilitate the development of the country's economy (Santotskaia, 2020). About 235 US universities belong to the so-called research universities, which account for about two-thirds of all fundamental and applied research (Karpov, 2017). An example of active interaction between educational institutions, the state, and business is shown in Sweden. The country pursues a course of implementation and commercialization of scientific developments with the help of state funding, as well as investments and orders from large private companies. This approach has allowed Swedish universities to form the core of major technology parks, such as the Ideon Technopark at the University of Lund, which develop and implement knowledge-intensive and high-tech products (Burke & Fedorek, 2017).

The need to broaden the forms of interaction between scientific and educational institutions and business has fostered new universities – entrepreneurial universities and universities of the future.

Researchers have identified different models of universities and established their evolution. University 1.0 is an educational center, whose main purpose is knowledge transfer; University 2.0 is a research university, a center of scientific and technological progress; University 3.0 is an entrepreneurial university centered around the Triple Helix model and focused on the commercialization of scientific results; University 4.0 is outward-looking, deeply connected to the industry, and built on the digitalization of processes (Kuznetsov & Engovatova, 2016; Ponomareva, 2019).

An example of the University 4.0 model is presented by Stanford University, US (the founder of Silicon Valley, which created such outstanding companies as Google, Apple, Intel, and others). Stanford University accounts for 5.7% of the country's GDP (27.7 bln USD) and is ranked top 1 and 2 in world rankings (Fadeev et al., 2020).

The Massachusetts Institute of Technology (MIT) also conforms to the 4.0 model. MIT is among the world's most renowned universities and has more than 16,185 employees, including 1,068 scholars, 11,254 undergraduate students, and 6,893 graduate students. MIT comprises five higher schools (science, engineering, architecture and planning, management, humanities, and arts and social sciences) and one college (Schwarzman College of Computing) (Kaplan & Haenlein, 2016).

MIT was one of the first in the world to use digital technology in training. Open online courses MITx and OpenCourseWare are examples of flexible access to several interactive courses developed and presented by MIT teachers (more than 2,450 MIT courses offered). MIT has connections with about 300 corporations (more than half of them being the largest corporations in the US). MIT's endowment (development fund) amounts to more than 16.4 bln USD (Neborskii, 2017).

Universities and their infrastructure (including colleges, campuses, and information and communications networks) managed using the latest technologies and artificial intelligence are an integral part of university towns (Brown et al., 2021). A common feature of many concepts of the modern university is close collaboration with industry and stakeholders. Technological changes in industry (Industry 4.0) force universities to transform into entities that employ advanced technologies, including AI, and create a virtual environment that imitates the conditions in which economic actors operate (Seres et al., 2018).

Modern universities' strategies should consider the effects of their educational offer and their impact on the labor market, for example, employment opportunities, the development of entrepreneurial skills, and the adaptation of graduates' training to employers' requirements (Bodina & Telysheva, 2023).

Modern universities seize the opportunities created by digital transformation and view digital technologies as a key factor for development. Digital transformation and potential refer to the digital potential of higher education institutions defined as the ability to integrate, optimize, and transform digital technologies to support innovation and entrepreneurship. Higher education institutions should make the most of the possibilities presented by digital transformation and recognize digital technologies as a crucial factor for development (Abdvakhidov et al., 2021; Akhmetshin et al., 2021). This aspect is of great importance due to the current changes in the labor market, its structure, forms of employment, and methods of job performance. Digital competencies are becoming not only an educational requirement, but a basic prerequisite for knowledge acquisition and employment in the labor market. Researchers argue that the future of the competency development system and the specifics of changes awaiting the world consist in the absence of templates to be adopted or seen as a cheat sheet that can be improved and adapted to local conditions (Tarasov & Kravtsov, 2023).

The digitalization of higher education means that many traditional universities fall back, as they will always remain reactive latecomers, while further technological revolutions leave little chance to solve the constantly appearing new problems (Knox et al., 2019). Among the possible scenarios of the development of higher education, apart from the conservative scenario (Gapsalamov et al., 2020) and the scenario of open education and global networks (Ukolova, 2022), researchers also describe the scenario of a world without universities, where most research is carried out by specialized research centers (outside of the higher education system) (Falkner & Stålbrandt, 2023), and more than half of universities go bankrupt (Abduvakhidov et al., 2021).

However, many researchers suggest that the changes currently experienced by universities indicate that the predominant scenario is a hybrid between the open education and global networks scenarios. The most distinctive features of this scenario include a strong integration of universities with the economy, both in scientific research and training competent staff; enhanced funding of research and education from external sources; intensified cooperation between universities and stakeholders based on the principles of sharing economy; students developing individualized models of education in a global network of universities; the opening of several universities at the expense of scientific research. It can be argued that the realization of such a scenario in the higher education sector will lead to the creation of universities with global coverage, collaborating or working in a network.

In this light, the present study aims to analyze the scenarios of higher education development in the context of digitalization.

## MATERIALS AND METHODS

In accordance with the features of the development of higher education in the context of digitalization, we adopted a qualitative-quantitative research approach in determining its scenarios.

The data were collected between December 15, 2023 and March 15, 2024 through the analysis of scientific literature on the research problem, the selection of an expert pool, an expert survey via email, and the processing and analysis of the survey results.

In the first stage of the research, the source base for the study was selected, consisting of analytical reports along with articles and reviews published in scientific journals indexed by Scopus and Web of Science. The sources were selected using the keywords "higher education", "scenario development", "digitalization of higher education", and "higher education development scenarios" in English and Russian. The first stage resulted in identifying five scenarios for the development of higher education over the next decade in the context of digitalization.

The second stage consisted of the expert survey. A total of 55 experts were sent emails inviting them to take part in the survey. The criterion for the selection of experts was the presence of at least three articles on the research problem published in peer-reviewed journals. The agreement to participate in the study was expressed by 48 experts, after which they were sent emails asking them to rate different scenarios of higher education development by importance on a scale of order by assigning points. Subsequently, the rank of each of the presented scenarios was determined based on the points assigned by the experts. The second stage resulted in determining the significance of each of the five scenarios of higher education development over the next decade in the context of digitalization.

For a more objective analysis of the data obtained in the expert survey, the consistency of expert opinions was assessed through the mathematical processing of survey results using Kendall's coefficient of concordance.

The experts asserted that the inevitable transformation awaits the education sector, evidenced by the sharp increase in online learning indicators, resulting from the coronavirus pandemic. Online education is becoming more attractive to investors. Research into trends in online education allowed the experts to identify the following five scenarios (Table 1).

## Table 1: Primary scenarios for the development of higher education in the context of digitalization.

No.	Scenario	Brief forecast	Rank	Weight
1	Traditional education	It is predicted that by 2050, the number of people in need of education will increa- se by almost two billion. The inability of the current education system to withstand such an influx means that new forms of education should be found. Specifically, online platforms will be developed actively. Online platforms will teach the neces- sary skills in a user-friendly form within a short period of study	1	0.35
2	Regional growth	The scenario suggests that individual countries, realizing their lack of resources, can join forces and create educational ecosystems to gain an advantage. As part of this collaboration, they will exchange students, teachers, etc.	2	0.23
3	Global giants	This scenario assumes that large technological platforms like Amazon or Google will achieve dominance in the education market. Owing to their scale, they will be able to exchange information with ease and deliver high-quality educational product	3	0.19
4	Roborevolution in education	In this turn of events, the teacher in each classroom is assisted by AI. AI's ability to track students' performance and distribute the workload of each participant in the educational process will make learning more personalized. In the robotic future, the teacher will serve more as a coach or mentor, as technology will take over much of the process	4	0.13
5	A world without universities («person to person»)	A scenario without universities or intermediaries, where the expert educator and the student work together directly. In this form of learning, knowledge becomes more accessible, and the quality and speed of its transmission increase. Educa- tion becomes promising for investment. Intermediaries in the form of universities are simply removed from the equation, and skills are transmitted directly from person to person. As a result, there is direct training and immediate knowledge consumption	5	0.10

Source Note: compiled based on the expert survey; the concordance coefficient W = 0.69 (p < 0.01), which indicates a strong consistency of expert opinions.

Our findings indicate that contemporary higher education will follow one of the following scenarios: traditional education, regional growth, the emergence of global educational giants, roborevolution of education, or a world without universities.

Various world analytical agencies explore the scenarios of higher education development. Analyzing the rapid changes brought about by the COVID-19 pandemic, in May 2020, the Deloitte Center, a global network of consulting firms, conducted a study of higher education development scenarios that identified four trajectories for the development of universities over the next 3-5 years, depending on the level of communication and recovery from the effects of the pandemic:

- The passing storm – reduced number of universities and research institutions, domination of megauniversities with online education, employers' requirements for workers' qualifications increase, and state funding for higher education decreases;

 Good company – universities in cooperation with large corporations carry out training on narrow-profile educational programs, research activities of universities are applied and carried out under the orders of corporations, state funding is reduced, and corporations finance short-term educational programs;

- Sunrise in the East Asian universities become more competitive, consortia of universities and research institutions benefit, demand for retraining increases, and government support for higher education development decreases;
- Lone wolves the model of universities and research institutions changes, competitiveness is maintained only by those institutions that have managed to switch to high-quality online education, there is a growing demand for short-term training in highly specialized fields of study, mainly technical ones, the value of higher education diplomas for employers falls, while the need for specific practical skills grows, and the overall level of state funding for higher education is reduced.

Another study conducted by Educause in late April 2021 as part of its annual report, the Horizon Report, outlines the following major scenarios for higher education resulting from the pandemic:

Growth – universities manage to monetize the growing demand for hybrid and online courses through micro-stages and other forms of learning within the concept of lifelong learning;

Limitations – universities make do with fewer resources. Under these conditions, they choose different strategies. Some continue to operate in traditional formats but with smaller numbers of students and position themselves as the most prestigious and elite organizations. Others are seeking new models of teaching in online environments to reach students worldwide regardless of obstacles;

Collapse – cuts in state funding lead universities to extinction, the inflow of students is also decreasing, and tuition fees do not keep universities afloat. Science becomes more dependent on business funding, while distance learning is mediocre and focuses on economic efficiency with few resources for teachers' development;

Transformation – higher education institutions enable easier access to higher education through free online programs and a variety of technologies. Learning is more human-centered and less stressful, and the number of students in various higher education programs reaches historic highs.

The specifics of the change will lead to the emergence of global reach universities collaborating or working in a network (Tarasov & Kravtsov, 2023). The evolution of higher education institutions into global universities will occur along eight dimensions, namely: 1) leadership and management, 2) organizational abilities, 3) training and entrepreneurship education, 4) training and support for entrepreneurs, 5) digital transformation and potential, 6) knowledge exchange and cooperation, 7) the international aspect, and 8) measuring impact (Ukolova, 2022).

The sphere of university digital transformation appears especially noteworthy to us both from the standpoint of interaction with the socio-economic environment and from the standpoint of research, education, and university management. Digital competencies are becoming not only an educational requirement, but a basic prerequisite for knowledge acquisition and employment. We believe that open science, innovative practices, e-learning, digital learning systems, and information technology have already gained wide adoption in universities.

A global university can include three concepts of University 4.0. One that stands out best among them is the e-university – a university that utilizes the Internet, e-mail, and other IT systems in educational, administrative, and communication processes. Another is the so-called smart university - an organization and its associated infrastructure distinguished by the use of advanced technologies to increase security (radio-frequency identification, face scanning and identification systems, 3D visualization, the Internet of Things, digital data storage, and biometric control to protect devices, laboratories, and offices). The final concept of the cloud-based university covers several issues related to the enterprise architecture of the higher education unit, including ownership of the cloud itself, its content and availability, security, and the services provided through it.

# CONCLUSIONS

Digitalization has drastically changed the methods of operation of all institutions and organizations in terms of communication and the principles of their functioning. Contemporary universities utilize the opportunities created by digitalization and view digital technology as an essential factor in their development. This fact is of great importance due to the current changes in the labor market, its structure, forms of employment, and methods of job performance. Digital competencies are becoming not only an educational requirement, but a basic prerequisite for knowledge acquisition and employment.

The conducted research and literature review led us to conclude that upcoming changes in higher education will consist mainly in the increased importance of IT in education, management, and communication with the internal and external environment.

Thus, the task of securing the development of higher education in the face of today's global trends and challenges brings to the fore the problem of developing and introducing an effective socio-economic mechanism for the integration of science, education, and entrepreneurship relying on modern technology in research and education processes, as well as on support for sustainable development.

## REFERENCES

- Abdvakhidov, A.M., Mannapova E.T., & Akhmetshin E.M. (2021). Digital development of education and universities: Global challenges of the digital economy. *International Journal of Instruction, 14*(1), 743-760. <u>https://</u> files.eric.ed.gov/fulltext/EJ1282222.pdf
- Akhmetshin, E. M., Vasilev, V. L., Kozachek, A. V., Meshkova, G. V., & Alexandrova, T. N. (2021). Analysis of peculiarities of using digital technologies in the university professional training content. *International Journal of Emerging Technologies in Learning*, *16*(20), 101-118. <u>https://doi.org/10.3991/ijet.v16i20.24245</u>
- Bodina, E. A., & Telysheva, N. N. (2023). Actual problems of higher education in the modern world. *Anthropological Didactics and Upbringing*, 6(6), 28-35.
- Brown, M., Mhichil, M. N. G., Beirne, E., & Mac Lochlainn, C. (2021). The Global Micro-credental Landscape: Chartng a New Credental Ecology for Lifelong Learning. *Journal of Learning for Development*, 8(2), 228-254. <u>https://jl4d.org/index.php/ejl4d/article/view/525</u>
- Burke, A., & Fedorek, B. (2017). Does "flipping" promote engagement? A comparison of a traditional, online, and flipped class. *Active Learning in Higher Education, 18*(1), 11–24. <u>https://eric.ed.gov/?id=EJ1138944</u>
- Fadeev, A. S., Zmeev, O. A., & Gazizov, T. T. (2020). Model universiteta 4.0 [University Model 4.0]. *Pedagogical Review*, 2(30), 172-178.

- Falkner, K., Stålbrandt, E.E. (2023) Meanings of Authentic Learning Scenarios: A Study of the Interplay Between Higher Education and Employability of Higher Education Graduates. *International Journal of Teaching and Learning in Higher Education, 35*(2), 171-183. <u>https:// su.diva-portal.org/smash/get/diva2:1793120/FULL-TEXT01.pdf</u>
- Gapsalamov, A.R., Bochkareva, T.N., Akhmetshin, E.M., Vasilev, V.L., & Anisimova, T.I. (2020). Digital society: New challenges for education. *Periodico Tche Quimica, 17*(34), 803-816.
- Hernández García de Velazco, J. J. (2022). Sociedades del conocimiento y ciencia abierta en la nueva normalidad. *JURÍDICAS CUC, 18*(1), 1–4. <u>https://revistascientificas.cuc.edu.co/juridicascuc/article/view/4475</u>
- Kaplan, A., & Haenlein, M. (2016). Higher education and the digital revolution: about MOOCs, SPOCs, social media, and the Cookie Monster. *Business Horizons*, 59(4), 441–450. <u>https://doi.org/10.1016/j.bushor.2016.03.008</u>
- Karpov, A. O. (2017). Universitet 3.0 sotsialnye missii i realnost [University 3.0 – social mission and reality]. *Sociological Studies*, 9, 114–124. <u>https://www.socis. isras.ru/en/article/6857</u>
- Knox, J., Williamson, B., & Bayne, S. (2019). Machine behaviourism: future visions of 'learnification' and 'datafication' across humans and digital technologies. Learning, *Media and Technology, 45*(1), 31-45. <u>https://www.tandfonline.com/doi/abs/10.1080/17439</u> <u>884.2019.1623251</u>
- Kuznetsov, E. B., & Engovatova, A. A. (2016). "Universitety 4.0": tochki rosta ekonomiki znanii v Rossii. *Innovations*, 5(211), 3–9.
- Neborskii, E. V. (2017). Rekonstruirovanie modeli universiteta: perekhod k formatu 4.0. *World of Science*, 5(4). https://mir-nauki.com/PDF/26PDMN417.pdf
- Ponomareva, O. N. (2019). Rol sovremennykh modelei universitetov v formirovanii chelovecheskogo kapitala. *CITISE*, 5, 344–353.
- Santotskaia, K. (2020). Evoliutsiia idei universiteta. *Journal* of Wellbeing Technologies, 1(36), 72-83.
- Seres, L., Pavlicevic, V., & Tumbas, P. (2018). *Digital Transformation of Higher Education: Competing on Analytics*. (Paper). INTED2018 Conference. Valencia, Spain.
- Tarasov, S.V., & Kravtsov, A.O. (2023). Pedagogical university in the system of development of the personnel potential of the regional education system. *Anthropological Didactics and Upbringing*, 6(6), 10-27.
- Ukolova, L.I. (2022). Education of the spiritual culture of a growing person through the synthesis of arts in the space of a pedagogically organized musical environment. *Art Criticism*, *3*, 17-25.