of digitalization to drive prosperity and progress.

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Nino PAPACHASHVILI,
Ph.D., Professor,
Institute for Development Studies
Sulkhan-Saba orbeliani University, Georgia
ORCID 0000-0001-8111-9887
n.papachashvili@sabauni.edu.ge

ARTIFICIAL INTELLIGENCE AND HIGHER EDUCATION CHALLENGES: SCIENTIFIC RESEARCH EMPHASIS

Abstract. The paper presents the results of the analysis of scientific articles published on the Scopus database. The challenges arising in the higher education system due to the development of artificial intelligence are identified in the results of scientific research; the summary is given in the form of a SWOT analysis; the focuses of further research are determined; and recommendations are offered. Artificial intelligence is revealed to be an important enabling mechanism for expanding teaching and learning opportunities, administering the educational process, and enhancing research potential. Higher education institutions can harness the transformative potential of artificial intelligence by using it responsibly and effectively. It is critical to address ethical issues, reduce the potential for the digital divide, and prioritize human-centered learning experiences.

Keywords: AI, Artificial Intelligence, Higher Education.

Introduction. There is great scientific interest in artificial intelligence, as its development affects many aspects of human life. It fundamentally changes the mechanisms of knowledge accumulation and transfer and thus affects the education system. Artificial Intelligence (AI) makes it easier to recognize existing information and create new knowledge through massive data analysis. By using the energy saved from conducting multidisciplinary research and collaborating across disciplines, it also has a synergistic effect.

The *purpose* of the paper is to identify the challenges arising in the higher education system due to the development of artificial intelligence in the results of scientific research, summarize them in the form of SWOT analysis, define further research focuses, and develop recommendations. This small study focuses on studies in the fields of business and management.

To achieve the goal of the paper, a literature review of the scientific articles published in the Scopus database, SWOT analysis, and synthesis with recommendations, was chosen as a *methodological tool*.

Literature review. An analysis of scientific publications using the key terms "Artificial Intelligence" and "Higher Education" on the Scopus database showed that 1107 scientific articles were published from 2000 to 2024. The majority of these papers were published between 2019 and 2024, reaching a peak in 2023. The stimulating role of Covid-19 in stimulating scientific interest in artificial intelligence is clearly visible (Fig. 1).

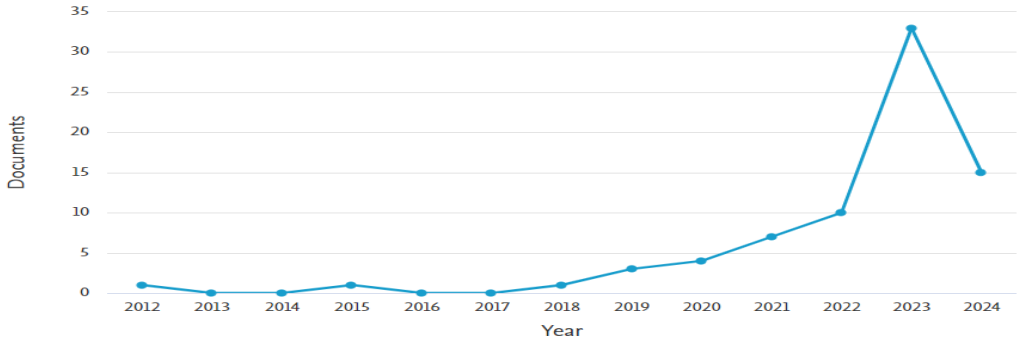

Figure 1 – Scientific publication dynamics by the key terms "artificial intelligence" and "higher education" in the Scopus database, 2000–2024

About 28% of published publications come from social sciences, 18% from computer sciences, 13% from medicine, 4% from business and management, etc. (Fig. 2).

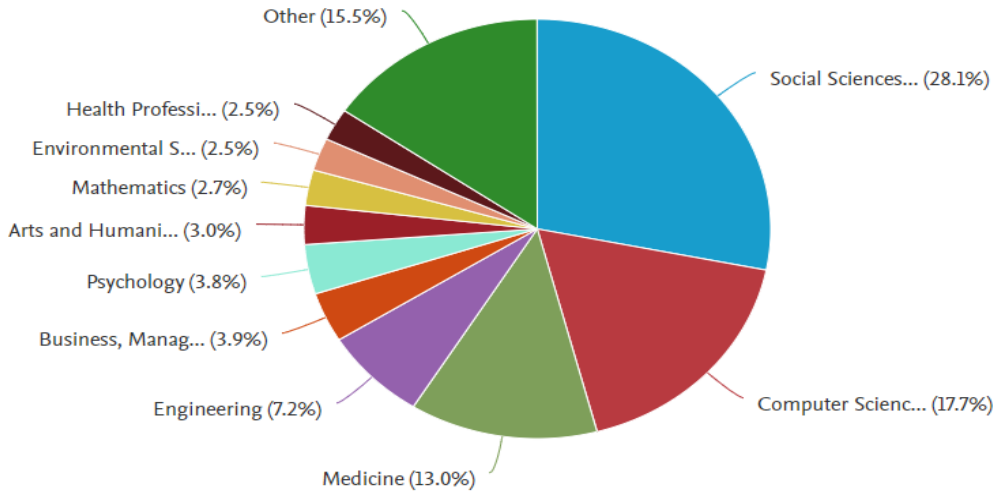

Figure 2 – Distribution of scientific articles published in the Scopus database by field (key terms "artificial intelligence" and "higher education"), 2000–2024.

The top ten geographical affiliations of the authors of scientific publications are made by the United States, China, the United Kingdom, Australia, India, Saudi Arabia, Germany, Canada, Spain, and Malaysia. It should be noted that most of the publications are supported by the scientific funds of the respective countries.

Cluster publications in business and management (along with accounting) related to higher education comprised 75 units in the mentioned period. The publishing dynamics repeat the general dynamics we mentioned and reach their peak in 2023 (Fig. 3). Publications in this field are highly correlated with the social sciences, economics and economic policy, engineering and computer science, decision-making studies, and psychology. Within the framework of this study,

we reviewed and analyzed 75 articles. Among them, we filtered and highlighted those articles with which more correlation was revealed. Due to the limitations of the text format, we will mention only a few of them.

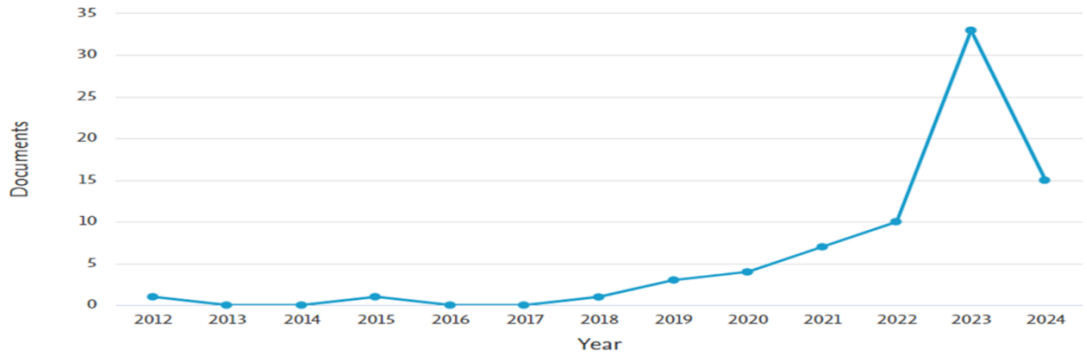

Figure 3 – Scientific publication dynamics by the key terms “artificial intelligence” and “higher education” in the Scopus database in the field of business, management, and accounting, 2000–2024.

Studies focus a lot on how the teaching-learning process is changing. For instance, research on students' practical application of generative artificial intelligence has shown facets of their understanding as well as the benefits and drawbacks of this technology. Researchers [1] created a generative AI literacy framework, which can then be used to inform both institutional policy and instructor support. The framework can be used by educational developers to encourage teacher dialogue, advance AI literacy, and improve instructors' capacity to impart AI literacy to students. Universities can also use the AI framework's aspects to drive policy and offer specific examples that direct teaching and learning activities.

In a significant part of the studies, the topic of the usage of ChatGPT, its benefits and drawbacks, the opportunities for customization and ethical use in teaching and learning is leading. Studies show that ChatGPT and other generative artificial intelligence systems have become important resources for higher education. Questions concerning the advantages of incorporating this technology into learning processes and its effect on academic outcomes persist, despite the potential advantages of academic help. For instance, researchers [2] on the example of empirical study of Chinese business students using the Wenjuanxing platform, demonstrated that the incorporation of this technology into the learning process has a positive effect on business students' motivation, including their learning desires, self-efficacy, and future beliefs, which ultimately leads to improved learning outcomes. Other research findings [3] also indicate that despite students' and lecturers' different perceptions of risks and weaknesses, intentions to use GenAI technologies significantly and positively influence their adoption of such tools. While ChatGPT's tailored and interactive elements improve learning-assessment experiences, academic integrity, and pedagogical innovation, they also pose significant risks like reduced interpersonal skill development and plagiarism [4]. There are several obstacles to the mainstream application of AI techniques. The rise of fraud and plagiarism is highlighted in some research outcomes. Scholars also indicate that higher education institutions need to take responsibility for elaborating guidelines for the equitable, inclusive, and ethical application of AI in order to prevent academic misconduct. Enhancing the AI literacy of educators and students is essential. It expands the possibility of equitable access to technology, thereby mitigating the issue of the digital divide [5].

The contemporary environment of the simultaneous development of Industry 5 and Industry 4 and fundamental changes in the future of work are challenges that are strategically important for higher education institutions to address [6]. Artificial intelligence has the potential to revolutionize teaching and learning in higher education, but there are drawbacks as well, like

employment displacement and ethical issues [7].

Studies of the impact of AI cover the fields of teaching and learning, research, and administration in higher education. The reviewed research results allowed us to identify the strengths, weaknesses, opportunities, and threats of the impact of artificial intelligence.

Strengths: AI enables individualized and independent learning based on individual student's requirements and preferences; Extensive use of AI automation enables the optimization of administrative duties, assessment and course management, thereby freeing up staff time and resources; The use of AI analytical technologies to analyze large data sets creates a prerequisite for informed decision-making and is expected to help decision-makers in making informed decisions from alternatives in relation to issues related to teaching-learning and scientific work.

Weaknesses: AI raises ethical concerns privacy, data security, copyright, transparency challenges are just a small list of ethical challenges that may deepen as the use of AI expands; Over-reliance on artificial intelligence can lead to a loss of personalized learning experiences and human connection.

Opportunities: Technological developments, including the enhancement of artificial intelligence, will create even more opportunities for personalized learning and customized offerings tailored to each student's needs and preferences. The processing of large arrays of textual and other types of information will expand informed administrative decisions.

AI algorithms identify students with certain problems, allowing for targeted interventions to improve student achievement. Artificial intelligence facilitates big data analysis to identify knowledge that already exists, thus assisting in the research process and generating new knowledge.

Threats: AI automation may result in the loss of jobs held by professors and educational support personnel; AI poses ethical questions about algorithmic bias, privacy, data security, and transparency; Over-reliance on artificial intelligence could result in a loss of human connection.

The digital divide that currently exists globally and within countries, related to access to technology and digital resources, could be further deepened by the use of artificial intelligence; It is a debatable issue, but the quality of traditional educational experiences and information processed by AI can differ, which can lead to ineffective learning outcomes; The lag caused by rapid changes compared to the pace of knowledge accumulation may lead to resistance among teachers to technological advances; However, adapting teaching practices to effectively integrate artificial intelligence also requires obtaining appropriate qualifications and developing skills on the part of knowledge transmitters, which leads to changing teaching strategies, which is not an easy process. The quality of educational experiences and information powered by AI may differ, resulting in less than ideal learning results.

Conclusions. Higher education institutions can take advantage of AI's transformative potential to improve research, teaching, learning, and institutional success by utilizing it responsibly and effectively. Even if AI development offers many chances for innovative and better student results in higher education programs, it is crucial to address ethical issues, reduce the possibility of digital inequality, and give human-centered learning experiences priority.

The following issues were identified as significant issues for future research: the impact of AI on teaching and learning; evaluation systems in the era of artificial intelligence; issues of the ethical and social impact of artificial intelligence in education; increasing the readiness and adaptability of educational institutions to artificial intelligence technologies; and developing the skills of faculty and students to work with these tools. At the same time, we can consider all the issues that have been highlighted in the threats as an actual subject of research.

The modern task of higher education institutions is to introduce the ethical issues to students, to organize workshops to strengthen the potential of research using artificial intelligence, to develop and strengthen the skills of navigating large arrays of information and, in general, digital skills, to expand informed decisions for the improvement of digital administration on the basis of artificial intelligence, and at the same time, to make all groups aware of the dangers and disadvantages of using AI. The strategic vision of higher education institutions should include

overcoming the lagging of modern systems of knowledge accumulation from the real development of processes, and issues of competition, including from the LLL systems.

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Наталія ГОЛІОНКО,
канд. екон. наук, доцент, доцентка кафедри менеджменту
Київський національний економічний університет імені Вадима Гетьмана, Україна
ORCID 0000-0003-3755-1562
Holionko.Nataliia@kneu.edu.ua

ЦИФРОВА ТРАНСФОРМАЦІЯ У ВИЩІЙ ОСВІТІ: ПРИКЛАД УНІВЕРСИТЕТУ

Анотація. Цифровізація як проникнення ІКТ й інноваційних цифрових технологій докорінно змінює діяльність та життя більшості громадян. Процеси цифрових трансформацій охопили сьогодні переважну більшість сфер діяльності та галузей економіки. Не є виключенням й освітня сфера. Цифровізація у вищій освіті як процес впровадження цифрових технологій та інновацій у навчальний процес допомагає підвищити якість навчання, зробити його більш доступним та ефективним. У роботі описані можливі етапи цифрової трансформації ЗВО та особливості її реалізації.

Ключові слова: цифрова трансформація, ЗВО, цифрові технології, ІКТ, університет

Актуальність. Останніми роками ми всі спостерігаємо динамічні процеси цифровізації та виклики, які з ними пов’язані. Зростання технологічних можливостей, зміни на ринку праці та потреби у нових цифрових знаннях і навичках вимагають змін у різних сферах бізнесу, зокрема, у освітній та навчальній сферах. Наразі впровадження цифрових інструментів та платформ у навчальний процес дедалі збільшується. Певним каталізатором таких процесів стала пандемія COVID-19, а надалі повномасштабна війна Росії проти України, під час якої перехід до дистанційного навчання підкреслив необхідність цифрової трансформації університетів для забезпечення неперервності навчання. Впливовими для цифровізації університетів є запити здобувачів на оновлення навичок, пов’язаних з роботизацією й автоматизацією, що спостерігаються на глобальних ринках праці. Зміна підходів до навчання у бік індивідуалізації освіти, а також потреба