

AI-DRIVEN UNIVERSITY TRANSFORMATION: A CONCEPTUAL FRAMEWORK FOR STRATEGIC TRANSFORMATION AND INSTITUTIONAL COMPETITIVENESS

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Abstract

Artificial intelligence (AI) is becoming one of the most influential and rapidly developing technologies of the twenty-first century, with the ability to transform all areas of human activity. Education is one of the areas with the highest potential for integrating AI. Generative AI tools have significantly boosted this process, making it irreversible and prompting universities to reconsider their pedagogical approaches, institutional strategies, and academic governance. The use of AI in education offers not only multiple opportunities but also challenges and risks that may have a strong impact on society. Given the situation, it becomes fundamental to examine the impact of AI on education, along with identifying the strategic directions required for the adaptation of educational institutions to new technological realities. The purpose of this paper is to analyze the implications of artificial intelligence for higher education and to develop a conceptual model for the transformation of universities in the age of AI. A complex methodology was adopted to carry out the study, which included methods of analysis, synthesis, comparison, and conceptual modeling. The proposed model contributes to a more thorough understanding of how universities can strengthen their resilience, competitiveness, and societal relevance in the era of digitalization and AI.

Keywords: artificial intelligence, education, higher education, educational transformation, digital literacy, academic culture

1. Introduction

The accelerated development of artificial intelligence, especially generative technologies, represents one of the most important technological and societal transformations of the contemporary period, with profound implications for the economy, the labor market, and educational systems. The emergence of tools based on generative AI has intensified debates about the future of higher education and the capacity of universities to respond to the new challenges and opportunities related to the digital society and the knowledge-based economy. Current transformations go beyond the strictly technological dimension and target the foundations of the traditional educational model. The traditional educational paradigm, centered on knowledge transmission, memorization, and reproductive assessment, is no longer adequate to address the challenges of the AI-driven era. It is increasingly subject to

unprecedented pressures arising from the ability of intelligent systems to generate, process, and provide instant access to vast amounts of information. In this context, universities are required to redefine their mission, review teaching, learning, and assessment processes, and develop new skills and governance mechanisms adapted to the era of artificial intelligence.

In the specialized literature, AI is addressed both from the perspective of the opportunities it offers for personalizing learning, improving access to education, and increasing the efficiency of institutional processes, and from the perspective of the challenges associated with ethics, academic integrity, data protection, and its impact on the role of teachers and universities in society. Concomitantly, international organizations such as UNESCO, OECD, the European Commission, the European University Association, and the World Economic Forum, among others, promote *a human-centered approach* that emphasizes the responsible and ethical use of artificial intelligence and the need to develop resilient and inclusive education systems.

Though research on the use and impact of AI on universities is constantly expanding, the analysis of publications in this field highlights the fact that most existing studies focus on particular dimensions of the integration of artificial intelligence in higher education. Approaches capable of integrating the academic, institutional, and strategic dimensions of university transformation in a systemic manner remain relatively limited. Therefore, there is a *need to develop conceptual frameworks based on a systemic and integrated approach* that capture the interdependencies between all the fundamental elements of academic activity, including curriculum transformation, faculty development, the redesign of assessment systems, institutional governance, digital infrastructure, interdisciplinary research, internationalization, and lifelong learning. Given these considerations, the purpose of this research is to analyze the opportunities, impacts, challenges, and risks generated by the use of AI in education, with a focus on higher education, and to develop a conceptual model that provides an integrative perspective on the transformation of universities in the AI era as a multidimensional and human-centered process. The study aims to identify the main directions of change and highlight the relationships between the academic, institutional, and strategic dimensions of the transformation process.

2. Literature review

The rapid advancement of artificial intelligence is currently regarded as a primary factor in the transformation of higher education. Scholarly literature emphasizes that AI has transcended its status as a mere technological innovation and has become a force capable of redefining the processes of teaching, learning, research, and academic governance [29]. The analysis of the theoretical and empirical contributions made by researchers in this field identifies *three dominant perspectives* on the role of AI in universities: the educational enhancement perspective, the critical and socio-technical perspective, and the policy-and human-centered perspective.

Proponents of *the educational enhancement perspective* believe that artificial intelligence should complement and enhance human capabilities rather than replace the role of teachers. Thus, Luckin [17] emphasizes that AI can contribute to the development of personalized learning experiences and to expanding human potential. The analysis conducted by Zawacki-Richter et al. [37] shows that the main applications of AI in higher education are focused on

adaptive learning systems, intelligent tutors, and administrative processes. Within this framework, universities are perceived as ecosystems focused on developing 21st-century competencies such as critical thinking, creativity, and the ability to solve complex problems. Moreover, some authors [25] emphasize that although AI offers opportunities to optimize university activities and support the educational process, it simultaneously raises challenges regarding the role of the professor, academic integrity, and dependence on technology.

From a *critical and socio-technical perspective*, the impact of artificial intelligence cannot be reduced to a purely technological dimension, it must be analyzed within the context of the social, cultural, and institutional changes it generates. The researchers highlight various aspects of this perspective, including those related to risks and impacts on different internal processes [33]. In this regard, some authors, such as Williamson [34] highlight the processes of platformization and datafication in education, which influence university organizational structures and governance mechanisms; Selwyn [29] emphasizes that AI serves as a catalyst for educational transformation and warns against the risks of an overly technocentric approach. Veletsianos [32] reinforces the need for developing critical competencies and promoting responsible and transparent educational practices, which entails a redefinition of the teacher's role as a facilitator and mentor of learning. Researchers claim that AI will not replace teachers, but will rather assist them by automating repetitive tasks, while teachers remain indispensable for fostering creativity, critical thinking, and empathy. Some propose „human-AI synergy” [3] collaboration models.

Besides, regardless of the unprecedented acceleration of artificial intelligence development, parts of the scientific community and several leading developers of these technologies are advocating for a more cautious approach to developing advanced AI systems. The open letter, *Pause Giant AI Experiments* [14], initiated by the Future of Life Institute and signed by over 30,000 researchers and industry leaders, along with recent statements from Anthropic [1, 2], highlights that the pace of technological advancement may exceed society's and institutional mechanisms' capacity to manage the associated risks. The main risks identified include the potential emergence of the phenomenon of recursive self-improvement, through which AI systems could contribute to the development of even more advanced systems, loss of control over intelligent systems, their misuse, cybersecurity issues, significant disruptions to the labor market, and deficiencies in regulatory frameworks and governance mechanisms.

A distinct role belongs to *the human-centered approach and the responsible use of artificial intelligence*. According to Miao et al. [18], OECD [22], the integration of AI into education must be based on a human-centric AI paradigm that promotes inclusion, equity, and the development of literacy skills in the field of AI, while simultaneously addressing ethical risks and the potential impact on educational inequalities. This perspective is actively supported by international organizations [29, 30] that emphasize in their documents the importance of ethical principles, transparency, accountability, and human oversight in the development and use of AI-based systems. Additionally, OECD [21], the European Commission [9], the European University Association [11], and the World Economic Forum [36] highlight the need to develop digital skills, foster literacy in artificial intelligence, and promote lifelong learning. From this perspective, the transformation of universities is viewed as a multidimensional process that must harmonize technological advancement with human values

and inclusion. In this context, some authors underline the need to develop the concept of “trustworthy AI,” based on transparency, accountability, and ethics [33].

In the literature and policy documents from international organizations, there is growing recognition that artificial intelligence contributes to the emergence of *more flexible and personalized educational ecosystems*. In this context, the increasing importance of lifelong learning, micro-credentials, and modular educational pathways is highlighted as a response to rapid changes in the labor market. It is estimated that, under the influence of AI, universities will become key players in the development of continuous learning ecosystems, driving the expansion of hybrid learning models, international collaborations, and digital learning platforms that redefine the traditional boundaries of higher education. This development requires the adoption of a long-term strategic approach to transforming universities. It should be noted that there are few studies in the scientific literature focused on strategies for integrating AI into higher education. Some research [24] argues for the need to develop strategic models for implementing artificial intelligence in education, emphasizing that the success of digital transformation depends on the coherent integration of technological, organizational, and human factors.

Thus, although existing studies offer valuable insights into specific aspects of integrating artificial intelligence into higher education, the specialized literature remains largely fragmented. The majority of research focuses on specific dimensions, such as AI-assisted learning, ethical considerations, digital pedagogy, or governance mechanisms, whereas conceptual frameworks capable of simultaneously integrating the academic, institutional, and strategic dimensions of university transformation remain relatively limited. Furthermore, numerous existing approaches are primarily focused on adopting new technologies, giving less attention to the systemic and multidimensional nature of university transformation. In this context, it becomes essential *to develop integrated conceptual models* that reflect the multifaceted and complex character of higher education institution restructuring.

To address this gap, the present study proposes the *AI-Driven University Transformation Framework (AI-UTF)*, a conceptual model that views university transformation as a multidimensional, human-centered process. The proposed model contributes to expanding the existing theoretical framework and provides an integrated perspective on strengthening universities' resilience, competitiveness, and social relevance in the age of AI.

3. Applied methods and materials

This research presents a conceptual, exploratory, and qualitative approach aimed at identifying the main directions for transforming higher education in the context of the accelerated development of artificial intelligence and at developing an integrated conceptual framework for the transformation of universities in the AI era.

From a methodological perspective, the study adopts a systematic and interdisciplinary approach, enabling an examination of university transformation as a complex, multidimensional, and dynamic process at the intersection of education, management, economics, technology, and public policy. This approach enables the analysis of the relationships between various components of the university ecosystem and how they are

influenced by the development and integration of artificial intelligence.

The research information base consists of international scientific literature, policy documents developed by major international organizations, as well as analyses of the experiences and practices implemented by universities that have undertaken concrete efforts to integrate AI into academic and institutional activities.

The following methods were employed in the research process: *bibliographic analysis*, conducted to examine theoretical and empirical contributions regarding the impact of artificial intelligence on higher education and to identify emerging trends, challenges, and gaps in current research; *the comparative method*, used to identify convergences and differences between the perspectives advocated by researchers and international organizations, and to compare university experiences; *the scientific synthesis and generalization method*, employed to integrate the findings obtained and outline the key directions for university transformation; *the systematic approach*, which facilitated the identification of interdependencies among the academic, institutional, and strategic dimensions of higher education transformation; and *conceptual modeling*, employed to develop the conceptual framework for university transformation in the era of artificial intelligence. As part of the research, *generative artificial intelligence tools* were employed to identify relevant literature, organize and synthesize information, as well as to design graphic materials and conceptual model. These tools have been used exclusively to facilitate the research process, while the responsibility for selecting sources, conducting critical analysis, interpreting results, and drafting the final article rests entirely with the authors.

The conceptual nature of the research constitutes, however, its primary limitation, as the proposed model has not been empirically validated. Consequently, future studies could aim to test and validate it through comparative analyses and empirical investigations conducted at higher education institutions across various national and international contexts.

4. Results obtained and discussions

International Perspectives and Visions on Integrating AI into Education

The integration of artificial intelligence into education represents one of the most significant directions for transforming contemporary educational systems. International organizations such as UNESCO, the OECD, the European Commission, and others emphasize that AI is driving profound structural changes in teaching, learning, assessment, research, and educational governance.

In 2021, UNESCO adopted the *Recommendation on the Ethics of Artificial Intelligence* [30], the first global regulatory framework addressing the ethical use of AI, which establishes fundamental principles in this field. According to the UNESCO report, *Guidance for Generative AI in Education and Research* [29], generative AI offers significant opportunities for personalizing learning experiences, making educational resources more accessible, and enhancing the efficiency of academic activities. However, the organization emphasizes that the use of AI must remain centered on people and adhere to the fundamental ethical principles of education. In this regard, it highlights the need to develop clear policies regarding the use of AI in education and research, as well as to promote digital literacy and AI competencies

among all categories of educational stakeholders. To date, UNESCO IESALC [31] has highlighted the need to develop institutional strategies and competency frameworks in the field of AI for higher education, while simultaneously promoting „AI-infused pedagogy” and the ethical and responsible use of AI-based technologies.

At the European level, the European Commission promotes an approach based on respect for fundamental European values and rights. An important document in this regard is the *Ethics Guidelines for Trustworthy AI* [7], which outlines seven essential requirements for the development and use of AI: human oversight and control; robustness and technical security; data protection and privacy; transparency; diversity and non-discrimination; social and environmental well-being; and accountability and responsibility.

From the European Commission’s perspective, the use of AI in education should be primarily oriented toward ethical and regulatory considerations. In the *Ethical Guidelines on the Use of Artificial Intelligence and Data in Teaching and Learning for Educators* [8], the European Commission promotes the principle of a human-centered AI that respects human dignity, equity, transparency, and the protection of personal data. Teachers must remain responsible for educational decisions, and the use of AI should contribute to fostering students’ autonomy and critical thinking. Therewith, the European Commission has drawn attention to the risks posed by algorithmic bias and the improper use of educational data, recommending the development of institutional frameworks for governance and digital ethics.

A major initiative by the European Union in the field of AI regulation is the *Artificial Intelligence Act* (AI Act) [10], the first comprehensive legislative framework on AI at the global level. The regulation adopts an approach based on the risk level of AI systems and establishes stringent requirements for applications deemed high-risk, including those used in education and academic assessment. This document aims to prevent algorithmic discrimination and to protect users' fundamental rights. In another recent document, *AI Literacy in Education and Training: Ethical Guidelines and Recommendations* [9], it is emphasized that the effective integration of AI into education requires not only access to technology but also the development of AI literacy skills among students and teaching staff, the formulation of appropriate institutional policies, and the promotion of ethical, transparent, and human-centered use of emerging technologies.

Meanwhile, the OECD promotes policies aimed at developing the skills required for the digital economy and the responsible use of AI. The *OECD AI Principles* [23] emphasizes the need for innovative, transparent, and human-centered AI that contributes to sustainable development and social well-being. The OECD report *AI and the Future of Skills* [20] highlights the impact of AI on the skills needed for the future economy and on the transformation of the labor market. This study argues that educational systems must move beyond the traditional model centered on memorization and information reproduction and instead focus on developing complex cognitive competencies, such as critical thinking, problem-solving, creativity, and adaptability. It highlights that AI will automate particularly repetitive and standardized tasks, while complex human competencies will become graduates' primary competitive advantages. In this context, the importance of lifelong learning and the need to make educational processes more flexible is emphasized. *Digital Education Outlook 2026: Exploring Effective Uses of Generative AI in Education* [22] accentuates that generative

AI is driving systemic transformations across the entire education ecosystem, affecting teaching and learning processes, assessment, research, and institutional management. These challenges require a human-centered approach focused on developing specific AI capabilities, optimizing educational processes, strengthening governance mechanisms, and enhancing digital infrastructure [22].

At the same time, other international organizations such as the Council of Europe, the World Bank [35], and the World Economic Forum [36], as well as the European University Association [2021, 2024], have been promoting policies on the ethical and inclusive use of AI, emphasizing the importance of ensuring data protection, preventing discrimination, and fostering the responsible development of intelligent technologies.

Along with the opportunities and prospects of integrating AI into education, the international documents mentioned above draw attention to the risks associated with uncontrolled use of AI, including the amplification of digital inequalities, threats to academic integrity, excessive reliance on technology, and algorithmic bias. They recommend developing institutional frameworks for governance and digital ethics.

Thus, analysis of international and European policies demonstrates the existence of common strategic directions regarding the use of AI in education. However, to ensure the responsible integration of AI into higher education and to harness its potential in developing a knowledge-based society, educational institutions must adapt their educational strategies and governance models to meet the new demands arising from digital transformation and AI development.

Opportunities, Challenges, and Risks of Integrating AI into Higher Education

The conducted research has found that the controlled use of AI in higher education offers numerous **opportunities**, which are becoming increasingly recognized in the academic community. Among these, the following can be cited as the most relevant.

Accelerating educational innovation and transformation through the development of new pedagogical and organizational models based on adaptive learning; personalizing education; integrating simulations and interactive environments; and fostering emerging interdisciplinary fields. AI drives institutional innovation and transforms universities into intelligent digital ecosystems.

Enhancing access to education and academic resources. Digital platforms and smart tools enable flexible access to educational content regardless of geographic location or the socioeconomic circumstances of learners, facilitating the development of online and blended education, personalizing the learning experience, and supporting students throughout their learning journey.

Personalizing the learning process enhances educational efficiency and fosters a student-centered learning experience. Smart platforms can adapt educational content to each student's level of readiness, learning pace, and style, while also monitoring individual progress.

Developing digital competencies by cultivating the skills essential for the digital economy, such as critical thinking, digital literacy, data analysis and interpretation skills, and responsible use of AI.

Supporting scientific research can be achieved by identifying relevant sources, analyzing

large volumes of data, synthesizing information, and writing academic papers, among other methods.

Enhance productivity and streamline academic and administrative tasks by automating repetitive processes and reducing the time required for various academic duties (such as developing teaching materials, student performance analysis, automated feedback delivery, etc.), research (analysis of large datasets, information synthesis, development of interdisciplinary research, etc.), and administrative functions (automation of administrative workflows, institutional data analysis, optimization of decision-making processes, etc.).

Developing international cooperation and expanding university internationalization processes. AI tools facilitate intercultural communication, access to global academic resources, participation in international projects and research, development of shared online educational programs, virtual mobility, enhanced global visibility and competitiveness, and the attraction of international students.

Concurrently, the integration of AI into higher education has encountered certain **challenges**, affecting both the human dimension and the infrastructural aspects. A synthesis of views presented in scientific publications and international policy documents highlights the following key challenges.

The need to reform the university curriculum. Traditional education models, which are primarily based on information transmission, have become inadequate in a context where access to information is rapid and automated. Under these circumstances, universities must adapt their curricula to new technological realities by integrating digital and AI competencies, critical thinking skills, analytical and creative abilities, as well as ethics and responsibility regarding the use of intelligent technologies.

Adapting the evaluation system. Traditional evaluation methods have become inefficient in the age of AI. Accordingly, the focus should shift from merely reproducing information to fostering critical analysis and application skills through competency-based assessments, applied projects, case studies, oral presentations, and interactive evaluations.

The transformation of the teacher's role. Integrating AI into education primarily requires the training and development of teachers' digital and pedagogical competencies. The use of AI fundamentally alters the traditional role of the teacher. In an era of rapid information access, the teacher is no longer merely a provider of knowledge but has become a facilitator of learning, a mentor, a coordinator of the educational process, and a guide for the critical use of information.

The development of digital infrastructure is a key factor for the efficient implementation of new digital technologies in higher education. However, it requires significant investments in technological infrastructure to support modern digital platforms, access to AI technologies and applications, secure data management systems, and high-performance computing infrastructure. Meanwhile, the accelerated pace of technological development has necessitated the continuous upgrading of digital infrastructure and systems. Unequal access to digital infrastructure and technical skills can deepen disparities between students and educational institutions.

The significant costs associated with implementing and maintaining digital infrastructure and

AI-based solutions. The efficient integration of AI technologies requires substantial investments in digital infrastructure, specialized software platforms, cybersecurity measures, and databases, as well as in developing the skills of academic and administrative personnel. This could impose additional pressure on university budgets and exacerbate disparities among institutions with varying levels of resources. In this context, universities must adopt sustainable digital transformation strategies, prioritize investments aligned with institutional objectives, and leverage the opportunities offered by partnerships with the business sector.

The need to reconfigure university governance systems and operational models. Given the accelerated development of new technologies, harnessing their potential requires institutional policies, coordination mechanisms, and regulatory frameworks capable of consistently integrating the academic, organizational, and strategic dimensions of university transformation.

Despite the benefits associated with the use of artificial intelligence, integrating it into higher education comes with a range of **risks and potential adverse effects**, effective management of these poses an essential requirement for maintaining the quality, integrity, and relevance of educational processes, as well as the functioning of the university system. In our view, the most significant of these are the following.

The decline in intellectual autonomy and excessive dependence on technology can lead to reduced capacity for independent analysis, diminished critical thinking, and creativity. Given these circumstances, students may become overly reliant on intelligent tools for generating ideas, solving problems, and writing academic papers, causing the educational process to lose its essential reflective and creative dimension necessary for intellectual development. To prevent these effects, universities must promote the balanced and responsible use of artificial intelligence, restructure teaching and assessment methods to foster critical thinking, creativity, and independent problem-solving skills, and develop competencies in AI that enable users to critically evaluate and consciously utilize the outcomes generated by these technologies.

The fragmentation of the educational process and the emphasis on technological approaches to the detriment of the human and formative dimension of education. An excessive focus on technological solutions and the automatising of certain aspects of the educational process can lead to reduced human interaction, weakened teacher-student relationships, and the marginalization of universities' formative functions. To prevent these effects, universities must adopt a human-centered approach and ensure a balance between the use of AI-based technologies and the human dimension of the educational process. Alongside, it is essential to develop educational models that leverage the advantages of technology without compromising the role of the teacher, academic interaction, the development of socio-emotional competencies, or the university's educational and cultural mission.

Academic integrity issues. The use of AI to automatically generate research topics, essays, and academic projects may result in reduced intellectual effort, give rise to new forms of plagiarism, compromise the authenticity of academic work, and create difficulties in assessing genuine competence. Under these circumstances, universities are urged to develop clear policies and guidelines regarding the responsible use of artificial intelligence, and to promote a culture of integrity and academic ethics grounded in transparency, accountability, and the conscious application of emerging technologies.

Confidentiality, data protection, and cybersecurity. The integration of AI involves the collection and processing of large volumes of educational and personal data, which may pose risks to information confidentiality, cybersecurity, unauthorized data use, and excessive user surveillance. In this context, universities are urged to develop clear policies regarding data protection and the responsible use of information.

Digital inequalities. Unequal access to technology and digital skills can widen the gaps between institutions and social groups, leading to digital exclusion, polarization in education, and heightened regional and social disparities.

The risks of disseminating misinformation and spreading informational errors. The operation of AI systems relies on processing vast amounts of data, raising important concerns regarding algorithmic transparency, the presence of algorithmic bias, and the explainability of AI-generated outputs and decisions. At the same time, generative AI tools can produce inaccurate, incomplete, or even fabricated information, and their uncritical use may facilitate the spread of misinformation and undermine the quality of educational and research processes. In this regard, the use of AI in universities must be accompanied by the reinforcement of an academic culture grounded in scientific rigor, ethics, and responsibility.

Resistance to change and organizational adaptation challenges. The transformations driven by new technologies require significant modifications to educational practices, management processes, and organizational culture, which may lead to reluctance among teaching staff, administrative personnel, and even students. The lack of necessary competencies, the decline in traditional roles, insufficient understanding of the potential and limitations of artificial intelligence, and the absence of a clear strategic vision can hinder institutional transformation processes. To overcome these challenges, universities must foster an organizational culture that encourages innovation and continuous learning, involve relevant stakeholders in transformation processes, and develop governance strategies and mechanisms capable of ensuring a gradual, participatory, and sustainable transition to a new university model suited to the era of artificial intelligence.

The erosion of academic culture and traditional university values. The extensive use of AI-based technologies, an excessive focus on efficiency and automation, as well as changes in the modes of knowledge production and dissemination, can lead to the erosion of fundamental university values such as intellectual autonomy, academic integrity, scientific rigor, academic freedom, social responsibility, and the educational role of the university community. Consequently, there is a risk that traditional academic relationships, based on dialogue, mentorship, and the exchange of ideas, may be affected, and that university culture may become increasingly dependent on technological solutions. Under these circumstances, universities must ensure that the digital transformation process is grounded in institutional values and their mission, fostering an academic culture rooted in integrity, responsibility, critical thinking, and adherence to ethical principles.

In conclusion, the integration of AI into higher education offers significant opportunities for modernizing education and strengthening a knowledge-based society, while simultaneously presenting complex challenges and risks. Harnessing the transformative potential of artificial intelligence depends on universities' ability to pursue balanced strategies grounded in innovation, responsibility, ethical considerations, and a human-centered approach to intelligent technologies.

The Transformative Impact of Artificial Intelligence on the Key Actors of the Higher Education Ecosystem and the Labour Market

The rapid expansion of artificial intelligence is driving ever-deepening integration of these technologies into economic, social, and educational processes, transforming how people learn, work, and create value. Amid numerous debates about its associated opportunities and risks, the integration of AI into education and other sectors appears to be an irreversible trend, bringing about significant changes. To illustrate these trends, several relevant data are presented below.

Recent data highlight the accelerated pace of adoption of these technologies in education. According to the OECD Digital Education Outlook **2026** [22], in 2024, approximately 37% of *teaching staff* had already used generative AI tools in their professional work, and 57% believe these tools contribute to improving the lesson-planning process. At the same time, 72% of teachers consider that the use of AI may affect academic integrity. OECD's synthesized experimental studies show that access to GPT-4 improved students' short-term performance by 48%, while using an intelligent tutor version resulted in a 127% improvement in performance. Overall, after removing access to the AI tool, students' performance declined by 17%, suggesting that using artificial intelligence can improve immediate performance without guaranteeing the long-term acquisition of knowledge and skills. These results underscore the importance of employing AI as a support tool for learning rather than as a substitute for cognitive and educational processes.

Regarding *students*, the scope of this phenomenon is even more pronounced. A study conducted in the United Kingdom by the Higher Education Policy Institute and Kortext [16] showed that 92% of students used generative artificial intelligence tools in 2025, compared with 66% in 2024. Approximately 58% of these individuals use AI to explain concepts, 48% to synthesize articles, and 41% to identify research ideas, demonstrating the increasingly deep integration of these technologies into learning processes. However, only about one-third of students have received formal training on the responsible use of artificial intelligence.

According to a recent study [4] administered to a sample of 95,513 students from 20 public universities in the United States, approximately 37% of students regularly use generative artificial intelligence tools. Similarly, 9% of students have acknowledged using generative AI in ways that violate academic integrity policies, and among daily users, this figure rises to 26%, highlighting the need for clear institutional policies regarding the evaluation and responsible use of AI.

It is also important to explore university faculty's perceptions of the present and future of higher education in the context of artificial intelligence. A survey conducted by the American Association of Colleges and Universities (AAC&U) and Elon University [26] among a sample of 1,057 university teachers across the United States highlights the high level of concern among faculty regarding the implications of artificial intelligence for the educational process. Furthermore, 95% of respondents believe that AI can foster excessive dependence on technology, and 90% acknowledge that this may hinder the development of students' critical thinking skills. Meanwhile, 78% of teachers have observed an increase in issues related to academic integrity. Regarding the future impact of generative AI on the educational process, 61% of respondents believe that AI tools will contribute to enhancing and personalizing the

learning experience. All of these findings underscore the need to adapt teaching models, assessment practices, and institutional policies regarding the responsible use of AI in the academic environment.

Overall, higher education is undergoing a challenging phase of transitioning from isolated initiatives and experiments to institutional and strategic approaches to integrating artificial intelligence. According to the 2025 EDUCAUSE AI Landscape Study Report, an increasing number of institutions consider AI a strategic priority, with the proportion of respondents sharing this view rising from 49% in 2024 to 57% in 2025 [27]. The report also highlights progress in developing policies and guidelines regarding the use of artificial intelligence. The proportion of institutions with specific policies in this area has risen from 23% to 39% within just one year. At the same time, the study highlights the existence of a "digital AI gap" among institutions, driven by differences in financial resources and technological infrastructure. These findings suggest that harnessing the potential of artificial intelligence requires the development of coherent institutional strategies, appropriate policies, and systematic skills-development programs.

According to the Ellucian AI Survey [6], the proportion of higher education institutions implementing AI at an institution-wide scale increased from 49% in 2024 to 66% in 2025. Furthermore, more than 43% of respondents reported that AI had already been incorporated into their university's strategic plan. These findings indicate a clear shift from the experimental adoption of AI toward its strategic institutional integration, highlighting that artificial intelligence is increasingly being recognized not merely as a technological tool but as a key driver of institutional transformation and long-term strategic development in higher education.

The integration of AI is bringing about significant transformations in the *labor market* as well. Goldman Sachs estimates that up to 300 million jobs worldwide could be affected by generative artificial intelligence; approximately two-thirds of current occupations will be subject to automation, and around 25% of work tasks could be automated [15]. At the same time, the McKinsey Global Institute estimates that between 400 and 800 million people worldwide will need to upgrade their skills or change careers. Meanwhile, recent restructuring initiatives announced by companies such as IBM, BT Group, SAP, Intel, Cisco, and Microsoft confirm that AI is already driving significant transformations in demand for skills and in occupational structures.

The Future of Jobs Report 2025 [36], estimates that approximately 39% of workers' current skills will require updating or become outdated by 2030. The report estimates that approximately 170 million new jobs will be created, while around 92 million jobs will be displaced, resulting in a net increase of 78 million jobs. However, this employment growth will be accompanied by profound changes in occupational profiles and skill requirements. At the same time, the Report highlights that 85% of employers intend to invest in enhancing and retraining their workforce, while 70% recommend hiring personnel with new skills. The expansion of automation and the use of AI are driving profound transformations in employment structures and in the demand for skills in the labor market. According to the Report, approximately 22% of existing workplaces will be affected by transformation processes by 2030. These transformations will impact various occupational categories in

different ways. The most vulnerable jobs are those based on repetitive and administrative tasks, such as data entry operators, tellers, bank staff, secretaries, cash tellers, postal workers, and other employees involved in routine activities, for which the sharpest declines in demand are expected. In contrast, significant growth in demand is expected for professionals in AI and machine learning, data analysts and Big Data specialists, cybersecurity experts, software and application developers, as well as those involved in digital transformation and the management of emerging technologies.

Meanwhile, the use of artificial intelligence in the workplace has become a widespread phenomenon. According to the *Microsoft Work Trend Index Report* [19], approximately 75% of employees engaged in knowledge-based activities already use artificial intelligence tools in their professional work, and nearly half of them have begun using them within the past six months. These figures highlight the unprecedented pace of adoption of AI-based technologies and the profound transformations they are driving in work processes and skill requirements. Consequently, in the contemporary economy, AI-related competencies are no longer viewed as optional skills but as essential components of graduates' professional profiles and long-term employability.

These developments confirm that graduates' competitive advantage will depend not only on their specialized knowledge but also on their *ability to collaborate with AI-based systems, to efficiently use and integrate AI-powered tools*, to critically interpret the results generated by these systems, and to employ technology in a responsible and ethical manner. Accordingly, this requires universities not only to adopt new digital tools but also to re-examine their educational and institutional models. The complexity of the transformations associated with artificial intelligence necessitates a shift from fragmented, reactive approaches to integrated institutional frameworks capable of ensuring coherent coordination across teaching, research, assessment, management, and competency development processes. In this context, universities are compelled to redefine their policies, governance mechanisms, and organizational culture in order to effectively address the technological, ethical, and social challenges unique to the era of artificial intelligence.

Framework for AI-Driven University Transformation

The rapid implications of AI in higher education necessitate a strategic and systematic approach to integrating these technologies into universities, and transforming universities requires simultaneous reforms at the curricular, pedagogical, organizational, and institutional levels. According to international policymakers, the transformation driven by artificial intelligence cannot be reduced to merely adopting technological tools. It requires redefining educational processes, developing human capital, strengthening institutional governance, and creating digital ecosystems capable of supporting learning and innovation [22].

An analysis of the relevant literature and global trends in higher education and artificial intelligence, combined with an examination of the perspectives expressed by international organizations and leading researchers in the field, has enabled the *development of a conceptual framework for the universities transformation in the age of artificial intelligence*. The proposed model is based on the premise that AI represents not only an emerging technology but also a decisive factor in profound structural changes that require a redefinition of academic processes, institutional mechanisms, and university development strategies. This

conceptual model reflects the key dimensions - academic, institutional, and strategic of the transformation of higher education and highlights the interdependencies among them in order to build a people-centered, innovative, resilient, and competitive university. The model comprises ten interdependent strategic pillars (Figure 1), which together form *an ecosystem for a smart and resilient university*.

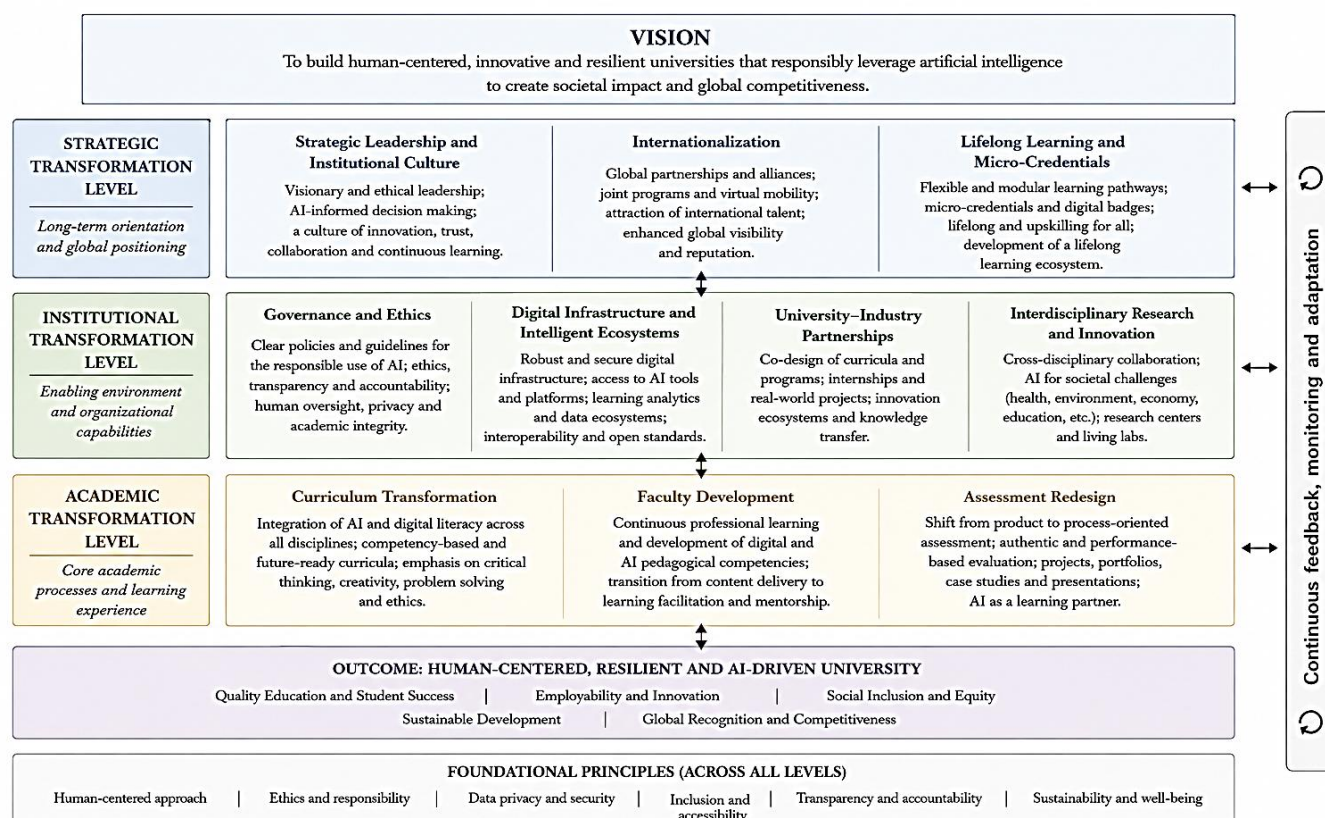


Figure 1. AI-Driven University Transformation Framework (AI-UTF): A Human-Centered Model for Higher Education in the Age of Artificial Intelligence

Source: Developed by the authors based on an analysis of international policy documents, research on the integration of AI into higher education, evaluation methodologies, and support from AI tools

Building on the proposed conceptual framework, we consider that the transformation of universities in the AI era should represent a complex and multidimensional process, capable of involving simultaneous changes at the academic, institutional, and strategic levels. Each of the ten pillars of the model represents an essential dimension of transformation, and their interaction determines the capacity of higher education institutions to meet the demands of a knowledge-based society and economy. These pillars are interdependent and mutually reinforcing, contributing to the development of a *human-centered, innovative, resilient, and competitive university*.

To further elaborate on the proposed conceptual framework, the defining characteristics of each pillar and their implications for educational policies and university management are further analyzed. Although each dimension and pillar is characterized by distinct features and objectives, they operate in an integrated manner, generating cumulative effects on institutional competitiveness, sustainability, and resilience.

The level of academic transformation denotes the foundation of the proposed model, as it reflects the necessary changes at the core of key educational processes. Curriculum adaptation, the development of, and the redefinition of assessment methods are essential requirements for cultivating competitive graduates and maximizing the potential of AI in higher education.

The level of academic transformation is the foundation of the proposed model, as it reflects the changes needed at the level of the main educational processes. Adapting the curriculum, developing the teaching staff competencies and redefining assessment methods are essential conditions for training competitive graduates and for capitalizing on the potential of AI in higher education.

Curriculum transformation represents the cornerstone of universities' adaptation to the digital and AI-driven economy. Academic programs must foster the development of AI competencies and digital literacy across all fields of study. This requirement is outlined in educational policy documents developed by international organizations. Overall, the focus must shift from knowledge transmission to fostering critical thinking, creativity, and the ability to solve complex problems. The "AI for All" principle thus becomes a fundamental component of curriculum reform. In this regard, artificial intelligence should complement and enhance human capabilities rather than replace essential cognitive processes.

Faculty Development. Strengthening human capabilities by enhancing digital skills and AI literacy among academic staff is essential for the responsible, human-centered implementation of AI technologies. In this context, higher education institutions have to institutionalize permanent professional development programs aimed at strengthening digital teaching competencies and efficiently integrating AI-based tools into teaching, learning, and assessment processes. Beyond that, digital transformation entails redefining the role of the teacher, which has evolved from the traditional status of information provider to that of facilitator, mentor, and designer of learning experiences. Equally important is fostering an organizational culture rooted in innovation, continuous learning, and adaptability, one capable of supporting the transformation of teaching roles and harnessing the potential of smart technologies within the educational process.

Assessment redesign is imperative to maintain the relevance of the educational process. Recent OECD studies [21] highlight the phenomenon of "false competence," whereby excessive use of AI tools can yield seemingly satisfactory results without corresponding development of cognitive skills. Consequently, the focus should shift from evaluating the final product to assessing the learning process. Universities must move away from traditional evaluation models based on information replication toward authentic assessment approaches centered on projects, case studies, portfolios, critical reflection, and collaborative activities. Under these circumstances, the focus shifts from the question "whether the student uses AI" to "how they use AI tools in the learning process" to support knowledge acquisition, foster critical thinking, develop future-oriented competencies, and uphold the principles of academic integrity.

Although academic transformation constitutes the core of the university transformation process, its efficiency and sustainability depend heavily on the appropriate institutional framework. Changes at the curriculum level, the professional development of faculty, and

evaluation systems cannot yield lasting results in the absence of governance mechanisms, adequate digital infrastructure, and strong relationships with the external environment. In this context, the Institutional Transformation Level takes on particular importance, as it aims to develop organizational capabilities and create a favorable environment for harnessing the potential of AI in educational, research, and innovation activities. This environment addresses the following aspects.

Institutional governance and policies regarding the use of artificial intelligence. The efficient integration of artificial intelligence requires clear institutional policies and appropriate governance mechanisms. In the absence of explicit regulations, there is a risk of inconsistent practices emerging and difficulties in ensuring academic integrity. Recommendations from international organizations emphasize the importance of transparency, accountability, and human oversight in the use of AI systems, as well as the need to strengthen institutions' capacity to manage the risks associated with employing these technologies. Scholarly studies and international experience suggest that approaches relying solely on restrictions and prohibitions are less effective than those grounded in accountability and ethics. Finally, universities must develop institutional policies regarding the responsible use of AI, establish clear regulations on academic integrity, and create flexible mechanisms for monitoring and adaptation.

The development of digital infrastructure and smart ecosystems. Modernizing higher education requires investments in digital infrastructure and the development of intelligent learning ecosystems. However, the competitiveness of higher education institutions depends less on access to cutting-edge technologies and more on their ability to efficiently integrate digital solutions into educational, administrative, and student support processes. From this perspective, the essential role of educational platformization and digital ecosystems in redefining the functioning of contemporary universities becomes particularly evident.

Strengthening partnerships with the business community and enhancing the relevance of education. The analysis confirms that the transformations driven by artificial intelligence in the labour market require closer collaboration between universities and the business sector. International organizations, particularly the OECD and the World Economic Forum, emphasize the need to align academic programs with the skills required by the future economy. Collaboration with the private sector contributes to enhancing the relevance of education and developing the skills demanded by the labor market. In this context, involving employers in curriculum design, supporting students' internship programs, and implementing joint projects help strengthen the relevance and adaptability of higher education.

Promoting interdisciplinary research and innovation. The research findings underscore that AI creates significant opportunities for advancing interdisciplinary research and innovation. Establishing centers of excellence and fostering collaboration across academic disciplines can strengthen universities' international competitiveness and visibility. The UNESCO initiative „AI and the Futures of Learning” [29] highlights the need for an integrated approach that combines the technological dimensions with the human and social aspects of educational transformation.

Although academic and institutional transformations are essential conditions for universities to adapt to the era of artificial intelligence, they are insufficient in the absence of a strategic

development vision. In a context characterized by accelerated technological changes and intensifying global competition, universities must move beyond a logic of piecemeal adaptation to innovations and redefine their roles and long-term development models. From this perspective, the **Strategic Transformation Level** reflects the dimensions that ensure universities' competitiveness, resilience, and social relevance in a knowledge-based economy.

Strategic leadership and institutional culture are the integrating pillars of the proposed model. Universities' ability to manage change, foster innovation, and cultivate an institutional culture centered on learning and collaboration will determine the success and sustainability of their digital transformation.

Internationalization. Digitalization and artificial intelligence are accelerating the processes of internationalizing and diversifying education while expanding opportunities for academic collaboration. Common programs, virtual mobility, and hybrid learning models contribute to integrating universities into the global space of education and research.

Lifelong Learning and Micro-Credentials. The rapid changes in the labor market call for the development of flexible lifelong learning models. The introduction of micro-credentials, modular training programs, and hybrid learning formats meets the demands of a society characterized by swift transformations and the need for continuous skills upgrading. These developments facilitate the shift from the traditional model centered on obtaining a degree to ecosystems of continuous, personalized learning aimed at fostering lifelong competencies.

Thus, the proposed model highlights that the transformation of universities in the era of artificial intelligence cannot be reduced merely to adopting new technologies. It entails a systemic and multidimensional shift in which the curriculum, pedagogy, research, governance, and organizational culture interact and influence one another. Higher education institutions that successfully implement integrated reforms, develop relevant competencies, and promote the responsible use of artificial intelligence will be better positioned to meet the demands of future society and the economy. The competitive advantage of universities will not be determined solely by access to technology, but by their ability to implement coherent institutional transformations and to develop human-centered educational ecosystems characterized by flexibility, innovation, and resilience. In the context described above, AI should be viewed not as a substitute for human intelligence, but as a catalyst for educational innovation, organizational transformation, and the sustainable universities development.

Recent international developments and the accelerated pace of integrating artificial intelligence into higher education, as confirmed by the data and trends presented earlier, demonstrate that transforming universities in the AI era has become a strategic priority for numerous institutions worldwide, with some achieving tangible progress in this field. For universities in the Republic of Moldova, artificial intelligence represents both a significant challenge and an opportunity for modernization and strengthening institutional competitiveness. Nevertheless, the integration of AI remains in its early stages, characterized primarily by isolated initiatives and pilot projects within academic activities. Institutional and strategic transformations, which entail developing dedicated policies, strengthening digital infrastructure, promoting interdisciplinary research, and integrating artificial intelligence into university development strategies, remain insufficiently defined. Under these circumstances, universities in the Republic of Moldova have to move beyond fragmented and reactive

approaches and adopt a systemic, forward-looking vision for institutional transformation, one capable of ensuring adaptation to the demands of the artificial intelligence era and strengthening their relevance and competitiveness within the European and global higher education context.

This need also applies to the Trade-Cooperative University in Moldova, which, within the context of its ongoing modernization and internationalization efforts, has the opportunity to leverage the potential of AI to transform educational processes, strengthen institutional capabilities, and develop sustainable competitive advantages. In this regard, developing and implementing an institutional strategy for integrating AI, based on the proposed conceptual framework, supported by an action plan and appropriate monitoring mechanisms, could facilitate a systemic and sustainable transformation of the university. The success of this process, however, depends on the active commitment and involvement of all relevant actors - the university management, teaching staff, students, business partners, and the academic community, in fostering an organizational culture centered on innovation, collaboration, and the responsible use of intelligent technologies.

5. Conclusions

Artificial intelligence is profoundly transforming education and higher education, creating both significant opportunities as well as complex risks and challenges. The successful integration of AI into higher education depends not only on technological advancement but also on the capacity of higher education institutions to strategically redesign curricula, modernize pedagogical approaches, and adapt institutional policies and governance to the evolving demands of the AI-driven era.

An analysis of recent global trends and international policy documents, combined with a critical review of the theoretical contributions of leading scholars in the field, confirms that the impact of artificial intelligence on universities extends far beyond the technological dimension, driving a fundamental redefinition of traditional educational paradigms and institutional models. The competitive advantage of universities of the future will not be determined solely by access to emerging technologies, but primarily by their ability to implement coherent institutional reforms and to develop human-centered, flexible, innovation-driven educational ecosystems focused on teaching, learning, assessment, research, and academic governance. All of this necessitates a systematic and integrated approach to transforming universities in the age of artificial intelligence. The universities of the future will not compete on access to information, but on their ability to foster critical thinking, complex skills, and responsible users of intelligent technologies.

One of the main contributions of the research is the development of the AI-Driven University Transformation Framework conceptual model, which provides an integrated perspective on the university transformation process in the era of artificial intelligence. The proposed model highlights the interdependencies among three levels of transformation - academic, institutional, and strategic - and synthesizes ten essential pillars that shape the development of an intelligent, resilient, and competitive university. Given its multidimensional perspective, the proposed conceptual framework can serve as a valuable reference for the development of institutional strategies, the formulation of higher education policies, and the guidance of

university transformation and modernization processes.

From this practical perspective, the research findings provide insights for decision-makers, university administrators, and the academic community in developing and implementing strategies for digital transformation and the responsible integration of AI into higher education. The proposed conceptual model can contribute to the development of institutional frameworks and governance mechanisms tailored to the new challenges posed by emerging technologies.

Furthermore, the research has been predominantly conceptual and exploratory in nature, shaped by the emergent character of the field under investigation. The transformation of universities in the AI era remains a relatively new subject, still in a phase of theoretical consolidation and accumulation of empirical evidence. In this context, the proposed conceptual model should be viewed as a flexible and evolving framework that can be developed as knowledge deepens, practical experience accumulates, and empirical validation of the relationships among the various dimensions of university transformation takes place.

At the same time, this study is predominantly conceptual and exploratory in nature, reflecting the emerging character of the research field. The transformation of universities in the age of artificial intelligence remains a relatively new area of inquiry that is still undergoing theoretical development and the gradual accumulation of empirical evidence. In this context, the proposed conceptual framework should be regarded as a flexible and evolving reference model that can be further refined as knowledge advances, practical experience accumulates, and the relationships among the different dimensions of university transformation are empirically validated.

In conclusion, the future of universities in the era of artificial intelligence will depend less on the sophistication of the technologies employed and more on the speed, coherence, and sustainability of institutional adaptation processes. Universities that successfully integrate artificial intelligence in an ethical, responsible, and human-centered manner will be better positioned to address the challenges facing society and the economy of the future.

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Rezumat

Inteligența artificială (IA) se afirmă drept una dintre cele mai influente și dinamice tehnologii ale secolului XXI, având capacitatea de a transforma profund toate domeniile activității umane. Educația reprezintă unul dintre sectoarele cu cel mai ridicat potențial de integrare a IA. Dezvoltarea rapidă a instrumentelor de inteligență artificială generativă a accelerat considerabil acest proces, făcându-l ireversibil și determinând universitățile să își reconsidere abordările pedagogice, strategiile instituționale și modelele de guvernare academică. Utilizarea IA în educație oferă atât multiple oportunități, cât și provocări și riscuri, care pot avea un impact puternic asupra societății. În acest context, devine esențială analiza impactului inteligenței artificiale asupra învățământului superior și identificarea direcțiilor strategice necesare adaptării universităților la noile realități tehnologice. Scopul prezentului articol este de a analiza implicațiile inteligenței artificiale asupra învățământului superior și de a propune un model conceptual pentru transformarea universităților în era IA. Cercetarea are la bază o metodologie complexă, care îmbină metode de analiză, sinteză, comparație și modelare conceptuală. Modelul propus contribuie la o înțelegere mai aprofundată a modului în care universitățile își pot consolida reziliența, competitivitatea și relevanța societală în contextul transformării digitale și al dezvoltării accelerate a inteligenței artificiale.

Cuvinte-cheie: inteligență artificială, educație, învățământ superior, transformare educațională, competențe digitale, cultură academică

Аннотация

Искусственный интеллект (ИИ) становится одной из наиболее влиятельных и динамично развивающихся технологий XXI века, обладающей потенциалом коренным образом преобразовать все сферы человеческой деятельности. Образование является одной из областей с наибольшим потенциалом интеграции технологий искусственного интеллекта. Стремительное развитие инструментов генеративного искусственного интеллекта значительно ускорило этот процесс, сделав его необратимым и побудив университеты пересмотреть свои педагогические подходы, институциональные стратегии и модели академического управления. Использование ИИ в образовании открывает широкие возможности, но одновременно сопровождается рядом вызовов и рисков, способных оказать существенное влияние на развитие общества. В этих условиях особую актуальность приобретает анализ влияния искусственного интеллекта на систему высшего образования и определение стратегических направлений, необходимых для адаптации университетов к новым технологическим реалиям. Цель настоящей статьи заключается в анализе последствий внедрения искусственного интеллекта в высшее образование и разработке концептуальной модели трансформации университетов в эпоху ИИ. Исследование основано на комплексной методологии, объединяющей методы анализа, синтеза, сравнительного исследования и концептуального моделирования. Предлагаемая модель способствует более глубокому пониманию того, каким образом университеты могут укрепить свою устойчивость, конкурентоспособность и общественную значимость в условиях цифровой трансформации и стремительного развития технологий искусственного интеллекта.

Ключевые слова: искусственный интеллект, образование, высшее образование, образовательная трансформация, цифровая грамотность, академическая культура

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