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**INTEGRATION OF ARTIFICIAL INTELLIGENCE IN THE STRATEGIC
MANAGEMENT OF UNIVERSITIES: A TRANSITION FROM CLASSICAL
MANAGEMENT TO INTELLECTUAL SYSTEMS**

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Açar sözlər: süni intellekt, strateji idarəetmə, universitet idarəçiliyi, rəqəmsal əkiz, sənaye inqilabı

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The modern world is living through a period of technological acceleration and digitalization brought by its Fourth Industrial Revolution. This revolutionary transformation has significantly changed the field of higher education, particularly the management of universities, as well as a number of other sectors. Universities have moved beyond being institutions that merely transmit knowledge or produce graduates who possess it, to becoming dynamic platforms that process big data and databases, and use this data strategically, as well as dynamic platforms that produce graduates with the soft and hard skills to analyze and use data analytically, not just as it is. The automation and digital connectivity brought by the Industrial Revolution and the global digital environment have also changed the structure of strategic university management. Thus, the strategic management of universities has shifted, or is shifting, from the “Classical Bureaucracy Model” to an “Agile Technology Model.” This transition, in turn, places a demand on university managers for new types of digital leadership skills and a strategic vision adapted to the technological environment. Traditional, i.e., classical, management models for universities are built on a bureaucratic and centralized structure based on the hierarchy principles of F. Taylor and H. Fayol [3; 6]. However, in the modern world, this approach has become ineffective, leading to the problem of “information asymmetry” in the higher education environment. Internal university data was scattered across various departments, and the collection, analysis, and synthesis of this distributed data took weeks, or even months. This is because in traditional management, institutional decisions were based almost entirely on outdated statistical data and the personal, subjective opinions and experiences of managers. This, in turn, led to a number of strategic challenges and delays. For example, from this perspective, one could say that by the time the processes of data analysis and budgeting optimization, and the making of critical decisions, were carried out in universities when establishing and opening new majors, the relevance of that decision could have already been

lost. In her research, Hanna stated that universities are the most resistant institutions to historical changes, but the digital age presents universities with two choices: either to strategically transform or to become irrelevant [4]. Therefore, it can be concluded that the disparity and mismatch between the statistical nature of the classical management approach and the dynamic demands of a digitalizing world is the greatest challenge for modern university administration. Using a qualitative method, the existing scientific literature was examined, and an answer was sought to the research question: “Does the integration of artificial intelligence into the strategic management of universities yield positive results?”

The integration of digitalization, particularly artificial intelligence, into university administration significantly expands and improves the strategic management of universities. In this world, which we call the age of digitalization and communication, the proper and efficient use of artificial intelligence tools can also yield very effective results in higher education. These results, of course, will serve as the fundamental basis for carrying out subsequent stages more advanced and effectively. Unlike in the past, universities will now make strategic decisions based on “knowledge filtered from data and processed by algorithms.” In this regard, artificial intelligence plays a supportive role for university managers in decision-making from a predictive and prospective perspective, and it acts as an intellectual agent in the strategic management of universities, speaking the language of data. The problem of “information asymmetry” in classical management theories is solved by the process of “democratization of information” that artificial intelligence offers to management. Thus, while in Fayolian management decisions were based on subjective experience, in modern management, they are based on real-time data analysis and predictive models. This transforms universities from static institutions based on subjective decisions into dynamic enterprises with self-regulating, strategic decision-making capabilities [7]. Research by Zawacki-Richter, reporting an expansion in the application of artificial intelligence in higher education, indicates that AI is not limited to just student support systems, indicating that the application of artificial intelligence in higher education is expanding beyond just student support systems, showing that AI serves as a predictive force in strategic and administrative decision-making processes, playing a crucial role in optimizing the institution's existing resources and conducting monitoring of academic activities. These new successes have replaced the “classic bureaucratic management” model with a “data-driven intellectual management” model [8]. Furthermore, one of the most advanced and effective uses of artificial intelligence in strategic management is the “Digital Twin” technology. Digital Twin technology, which creates a digital replica of objects or processes in real time, allows university administrators to test and analyze various strategic plans. In universities, it plays an invaluable role, especially in strategic budgeting, infrastructure management, and strategically managing sustainability in a competitive environment. This digital technology, which is extremely useful in minimizing “information asymmetry,” enhances the specificity and accuracy of management by eliminating or minimizing institutional uncertainty in decision-making [1]. Another study on the integration and benefits of artificial intelligence in university administration is the 10-year systematic literature review conducted by Morengo et al. on the academic value of artificial intelligence in higher education. This analysis shows that artificial intelligence is not just a teaching assistant in higher education, but has also become a fundamental strategic asset for universities. From this, it can be

concluded that the primary value created by artificial intelligence is not limited to academic achievements; AI is also a catalyst that causes a fundamental qualitative difference in the institutional value of university management. Furthermore, one of the greatest strategic goals facing universities during the transition from classical systems to intelligent models is to ensure an ethical balance between digital technologies and the human factor [5]. Therefore, one of the most important pillars of integration in governance is the collaborative model formed between humans and artificial intelligence. The primary goal of this collaboration is to enhance human capabilities rather than automation (the replacement of humans). Although AI acts as an intellectual partner in the management process, performing 75%–90% of the preparatory stage for strategic tasks, the ultimate decision-making, creativity, and ethical responsibility remain entirely with management. In this collaboration, the fusion of experience with AI literacy becomes a key resource that enhances management efficiency. Experts, rejecting the concept of an “Agentic CTO” (an autonomous AI leader), emphasize the importance of human-centric oversight. This is because while AI is powerful in tactical matters, it still cannot fully replace human intelligence when it comes to deeply understanding the essence and context of a strategic goal. The integration of artificial intelligence into management is not just the automation of operational tasks, but the evolution of strategic thinking. For successful integration, organizations must invest in data governance, a hybrid talent model, and fostering an environment of trust based on transparency. The integration of artificial intelligence into management does not diminish the strategic role of humans; rather, it liberates them for higher-level judgment, creativity, and ethical leadership. The successful management model of the future is based on the combination of AI's analytical precision with human contextual intelligence [2].

Taking all this into account, the development of corporate governance, the transition from traditional models to intelligent systems, and the interplay between technological autonomy and human judgment during this transition can be analyzed in four main stages:

- Assisted Systems. Automation of routine tasks;
- Augmented Management. Human-machine synergy;
- Automated Systems. Delegation of authority;
- Agentic (Autonomous) Systems. Replacement of human agency.

Assisted Systems. Automation of routine tasks: These systems are characterized by the full dominance of the human factor in management. At this level, artificial intelligence systems do not directly influence the decision-making process or the fundamental principles of management. Their primary function is to execute low-level, repetitive administrative tasks such as report generation, document search, automated translation, and drafting meeting minutes. At this stage, artificial intelligence reduces the administrative burden on managers, allowing them to focus on higher-level management functions. The human remains the primary decision-maker and the sole party accountable, while artificial intelligence serves only as an auxiliary executive tool.

Augmented Decision-Making (Augmented Management). Human and machine synergy: This stage is considered one of the most practical and effective approaches for corporate management. At this level, artificial intelligence not only plays a supportive role but also enhances analytical decision-making. Through machine learning and advanced data

visualization, artificial intelligence provides management systems with forecasts, target simulations, and strategic recommendations. However, the ultimate authority for decision-making and legal responsibility remain firmly with human leadership. This stage primarily enhances the quality of governance by strengthening strategic oversight and monitoring functions, while preserving a human-centric management structure.

Automated Systems. Delegation of authority: This stage represents a higher technological maturity in management and the partial transfer of decision-making authority to artificial intelligence systems. In this stage, the board delegates the execution of certain low-risk or routine decisions directly to AI systems. As a result, the human role transforms from a direct decision-maker to a manager and guide. However, this transition faces significant legal and institutional constraints. Existing corporate law does not permit the full transfer of the duty of conscientious, informed, and responsible decision-making to non-human entities. For this reason, the model of shared responsibility remains legally undeveloped and contested.

Independent Artificial Intelligence Systems (Agentic Systems). Replacement of Human Agency: The final and most significant stage involves autonomous systems where artificial intelligence completely replaces human leadership or assumes a leadership role on an equal footing with them. In this stage, characterized in the scientific literature as “autonomous” and ‘autopoietic’ intelligence, artificial intelligence independently formulates and executes strategic and operational decisions without human intervention. This approach envisions the emergence of “algorithmic organizations.” However, this stage is still speculative and is considered unlikely to be realized in the near future. The main reason for this is that artificial intelligence lacks the necessary “will” to perform the responsibilities of ethical judgment, empathy, sensitivity in a social context, and trust-based accountability. These transitional phases encompass the developmental stages that artificial intelligence has gone through and will continue to go through in university administration. Considering the information mentioned above, the key stages of the transformative transition and the functions and roles these stages play, the technological capabilities it holds from an organizational perspective, and the role and responsibility of the human factor in light of these technologies can be clearly shown in a comparative manner in **Table 1:**

Transformative transition stages	Main functions and roles	Technological capabilities	The human factor and responsibility
Assisted Systems	Routine administrative tasks (report, search, protocol)	Artificial intelligence does not influence the decision.	Complete authority. The sole decision-making and accountable party
Augmented Management	Enhancing analytical reasoning, forecasts, and strategic recommendations	Artificial intelligence provides forecasts and scenarios, but does not make decisions.	Human-machine synergy. The final decision and legal responsibility are with the human.

Automated Systems	Partial delegation of authority, transferring low-risk decisions to artificial intelligence	Artificial intelligence independently executes routine decisions. Technical support begins.	Transition from an exceptional decision-maker to a Coach and Mentor role.
Independent artificial intelligence systems	Replacement of human agency, emergence of algorithmic organizations	Full autonomy. Strategic and operational decisions are made independently.	A person is either fully replaced or remains on an equal status.

Table 1. Key development stages of intellectual systems in corporate governance

It is also clear from the table that although artificial intelligence has significant impacts and opportunities in the strategic management of universities, in some cases, it is not considered a primary subjective factor in university administration. In some respects, it is not fully accepted due to the human factor, the aspects of emotion and trust, and in other respects, due to ethical and legal sensitivities.

A review of the scientific literature and conducted research leads to the conclusion that artificial intelligence plays an exceptional role in the strategic management of universities. Unlike traditional approaches, digital tools objectively utilize the results of real data analysis for the development of higher education, considering the institutions' long-term development. While past management models were based more on managers' subjective opinions and experience, modern integration features strategic forecasting for universities' future goals and objectives in a competitive environment. Furthermore, there are also a number of challenges in integrating artificial intelligence into university administration, which largely depend on the ethical and legal framework.

Actuality of the problem. Against the backdrop of the technological acceleration brought about by the Fourth Industrial Revolution, traditional and bureaucratic management models of higher education institutions are struggling to meet the demands of the modern digital environment. In this regard, the integration of artificial intelligence tools into strategic management is an inevitable and urgent necessity for universities to maintain their global competitiveness and form operational decision-making mechanisms.

Scientific novelty of the problem. The study scientifically substantiates that artificial intelligence is not just a technical assistant in education, but also an independent "strategic agent" that transforms the management environment into a data-based dynamic ecosystem. In order to ensure a smooth transition from traditional hierarchical principles to intelligent systems, a new four-stage transition model (Assisted, Augmented, Automated, Agentic) reflecting different levels of autonomy has been proposed. Also, for the first time, it has been systematized how university managers' digital leadership skills, "Digital Twin" and predictive

analytics technologies gain a scientific-theoretical structure within the human-machine synergy.

Practical significance and application of the problem. The four-phase strategic roadmap presented in the study provides university administrators with directly applicable guidance for budget planning, infrastructure optimization, and reducing institutional uncertainty. AI courses and ethical framework guidelines for university leaders and department heads serve to increase the effectiveness of human-AI collaboration in practical management. These proposed practical recommendations not only ensure the globally competitive performance of universities, but also serve as a practical basis for future pedagogical and strategic management research.

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A.M. Aliyev

Integration of artificial intelligence in the strategic management of universities: a transition from classical management to intellectual systems

Summary

This is a qualitative study that explores the mechanisms of the transition from classical bureaucratic models to artificial intelligence-based intellectual systems in the strategic management of universities. Hierarchical principles, established during the Industrial Revolution, face challenges of “information asymmetry” and institutional inertia in the modern environment. The article argues for the necessity of replacing traditional subjective decision-making methods with data-driven dynamic ecosystems. The optimization of universities'

strategic assets through “Digital Twin” and predictive analytics, as well as the impact of human-machine synergy on management efficiency, is analyzed. The study proves that artificial intelligence plays not just a technical role, but that of a fundamental strategic agent. During the research, existing scientific literature was reviewed, and studies by various authors were analyzed. Ultimately, a strategic roadmap is presented, reflecting a four-stage intellectual transition model that maintains an ethical balance to enhance the global competitiveness of universities.

A.M. Əliyev

Universitetlərin strateji idarəçiliyində süni intellektin integrasiyası: klassik idarəçilikdən intellektual sistemlərə keçid
Xülasə

Bu, universitetlərin strateji idarəçiliyində klassik bürokratik modellərdən süni intellekt əsaslı intellektual sistemlərə keçidin mexanizmlərini araşdıran keyfiyyət tədqiqatıdır. Sənaye İnqilabı dövründə formalaşan iyerarxik prinsiplər müasir mühitdə “informasiya assimetriyası” və institusional inersiya problemləri ilə üzləşir. Məqalədə ənənəvi subyektiv qərar qəbul etmə üsullarının məlumat əsaslı dinamik ekosistemlərlə əvəz olunmasının zəruriliyi vurğulanır. “Rəqəmsal əkiz” və proqnozlaşdırıcı analitika vasitəsilə universitetlərin strateji aktivlərinin optimallaşdırılması, eləcə də insan-maşın sinergiyasının idarəetmə səmərəliliyinə təsiri təhlil edilir. Tədqiqat sübut edir ki, süni intellekt yalnız texniki rol oynamır, eyni zamanda əsas strateji agent funksiyasını yerinə yetirir. Tədqiqat zamanı mövcud elmi ədəbiyyat nəzərdən keçirilib və müxtəlif müəlliflərin tədqiqatları təhlil olunub. Nəticədə universitetlərin global rəqabət qabiliyyətini artırmaq üçün etik tarazlığı qoruyan dörd mərhələli intellektual keçid modelini əks etdirən strateji yol xəritəsi təqdim olunur.

A.M. Алиев

Интеграция искусственного интеллекта в стратегическое управление университетами: переход от классического управления к интеллектуальным системам
Резюме

Данное исследование является качественным трудом, изучающим механизмы перехода от классических бюрократических моделей к интеллектуальным системам на базе искусственного интеллекта в стратегическом управлении университетами. Иерархические принципы, сформировавшиеся в эпоху промышленных революций, в современных условиях сталкиваются с проблемами «информационной асимметрии» и институциональной инерции. В статье подчеркивается необходимость замены традиционных субъективных методов принятия решений динамичными экосистемами, основанными на данных. Анализируется оптимизация стратегических активов университетов посредством технологий «цифровых двойников» и прогностической аналитики, а также влияние синергии человека и машины на эффективность управления. Исследование доказывает,

что искусственный интеллект играет не только техническую роль, но и выступает в качестве ключевого стратегического агента. В ходе работы был проведен обзор существующей научной литературы и проанализированы исследования различных авторов. В результате представлена стратегическая дорожная карта, отражающая четырехэтапную модель интеллектуального перехода с сохранением этического баланса, направленная на повышение глобальной конкурентоспособности университетов.

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