

ANALYSIS OF THE IMPACT OF ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN MANAGEMENT PROCESSES IN UNIVERSITIES: ECONOMIC EFFICIENCY AND ORGANIZATIONAL ASPECTS

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Abstract. This article provides a comprehensive analysis of the implementation of artificial intelligence (AI) technologies in the management system of higher education institutions. It examines the theoretical foundations of digital transformation, analyzes specific areas of automation (scheduling, HR, finance, CRM), and evaluates the economic effect of their implementation. Particular attention is paid to the current state of the AI solutions market in the higher education sector of Uzbekistan and to comparing local developments with global counterparts.

Keywords: *Artificial Intelligence, University Management, Economic Efficiency, Digital Transformation, Process Automation, Resource Optimization, Predictive Analytics*

Introduction

The current stage of global economic development is characterized by the rapid digitalization of all spheres of public life. Higher education, being the foundation of human capital formation, finds itself at the epicenter of these changes. Traditional university management models based on rigid hierarchical structures and manual information processing methods are facing serious challenges today: the growing volume of data, the complexity of logistics chains and the increasing demands on the quality of service for students. In these conditions, artificial intelligence (AI) acts not just as an innovative tool, but as a strategic resource for increasing the competitiveness of an educational institution.

The relevance of this topic is due to the need to find ways to optimize administrative costs and increase the transparency of management processes. In a market economy, a university should function as an effective business system while maintaining its academic mission. The introduction of AI makes it possible to automate routine tasks, freeing up the intellectual potential of employees for strategic development and scientific work. The purpose of the article is to study the impact of AI on the economic efficiency and organizational structure of the university, as well as to determine the prospects for the development of these technologies in the Republic of Uzbekistan.

Theoretical foundations of the economic and organizational effectiveness of the introduction of AI in the management processes of universities

Artificial intelligence in the context of university management should be considered as a set of software and hardware solutions capable of simulating human cognitive abilities to solve multifactorial management tasks. Unlike simple automation, AI has the ability to learn from accumulated experience and adapt to changing environmental conditions. As S. Russell and P. Norvig point out, intelligent systems can minimize errors caused by the human factor, especially in situations requiring the analysis of large amounts of unstructured data. [2].

The digital transformation of the university is based on the economic law of reducing transaction costs. In the management of an educational institution, a significant part of the costs falls on the coordination of interaction between departments, deans, accounting departments and students. Automating these connections through a single AI platform allows you to realize

the network effect, when the value of the system increases in proportion to the number of users and the amount of accumulated data. Economic efficiency here is manifested in reducing time delays in decision-making and improving the accuracy of forecasting cash flows.

The classical bureaucratic management model described by Max Weber is being replaced by the "Data-Driven University" model in the digital environment. In this paradigm, the management vertical becomes more flexible, and decisions are made based on objective real-time analytics. AI plays the role of a "digital advisor" that helps the rector's office to see hidden patterns, such as the dependence of students' academic performance on the schedule of the educational process or the relationship between the workload of teachers and their scientific productivity.

Economic and organizational analysis of the impact of the introduction of AI in the management processes of universities

University management is a complex system that combines educational management, financial and economic planning, personnel management and marketing of educational services. A critical factor in the effectiveness of this system is the connectivity of all elements. For example, the suboptimal use of the classroom fund directly leads to an increase in utility costs and a decrease in student satisfaction, forced to wait for classes at inconvenient times. AI allows us to consider the university as a single ecosystem, where each management decision is evaluated in terms of its impact on the overall effectiveness of the organization.

The study identified four key areas where the introduction of AI brings the most tangible results:

1. Automation of schedules and classroom fund. Scheduling is a very difficult combinatorial task. The use of genetic algorithms and stochastic optimization methods allows you to create schedules that take into account not only the availability of classrooms, but also the logistics of moving between buildings, the specifics of equipment in laboratories, and individual student learning paths.
2. Personnel planning. Machine learning algorithms are able to analyze the current staff and predict the need for teachers based on the demographic data of applicants and trends in the labor market. This allows the university to prepare a reserve of personnel in advance and optimize the staffing table.
3. Budgeting and financial forecasting. AI systems help to build dynamic models of financial flows, analyze the risks of a shortage of paid forms of education and optimize the cost items for the operation of the campus.
4. Interaction with students. The introduction of chatbots based on neural networks allows you to automate responses to standard queries, accompany students throughout their entire life cycle (from applicants to graduates), which significantly increases loyalty.

The economic benefits of implementing the proposed innovations can be divided into direct and indirect ones. The direct effects include a reduction in administrative costs by reducing the number of employees engaged in routine data entry. Indirect effects include increased academic staff productivity, improved resource allocation (for example, energy savings through efficient use of facilities), and reduced student dropout rates through personalized support, which preserves income from the education of these students.

Prospects and directions for improving the management processes of universities in the context of the introduction of AI

Despite the active implementation of the Digital Uzbekistan 2030 strategy, the republic's educational sector is facing a number of specific challenges. Firstly, it is the fragmentation of existing information systems. Although the HEMIS system has been implemented in

universities, it mainly performs the functions of a database, without having built-in deep analytics and optimization tools based on AI. Secondly, there is a shortage of specialists with competencies in both higher education management and Data Science. Thirdly, the conservatism of management structures often slows down the adoption of innovations.

A hybrid model is proposed to ensure the sustainability of AI implementation. It includes the creation of a centralized data Warehouse, modular integration of AI tools, and mandatory staff training. The economic sustainability of the model is ensured through phased implementation: you should start with areas with the fastest return on investment (ROI), such as CRM automation and schedules.

In the future, theoretical research should focus on issues of AI ethics in education and data security. It is necessary to develop a methodology for assessing the social effectiveness of implementing algorithms that affect the careers and lives of teachers and students.

Conclusion

The introduction of artificial intelligence into university management is a powerful driver for improving economic and organizational efficiency. The study confirmed that automation of key processes (schedule, personnel, finance, CRM) allows not only to reduce administrative costs, but also to radically improve the quality of management through the use of data analytics.

A comparative analysis showed the following picture. At the global level, the idea of integrating AI into education is actively developing, but the market is still dominated by point solutions (individual bots or planning systems). There is practically no full-fledged universal product that seamlessly integrates all management functions into a single AI core, which leaves a niche open. At the Uzbek level, there is an almost complete absence of local commercial analogues focused on integrated university management. Existing government automation systems are static and do not use the predictive potential of AI. Thus, the creation of a domestic intellectual university management platform is a promising task that can transform the academic landscape of the country.

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