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Improvement of pedagogical personnel management through digital management models (on the example of higher educational institutions in uzbekistan)

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Annotatsiya. The rapid development of digital technologies is fundamentally transforming human resource management (HRM) systems in higher education institutions. In the context of globalization and the transition to a knowledge-based economy, digital transformation has become a key factor in improving institutional efficiency, academic staff performance, and overall competitiveness. This study examines the current state, challenges, and prospects of digital transformation in HRM within higher education institutions in Uzbekistan. The research identifies major issues, including limited digital infrastructure, lack of HR analytics, insufficient digital competencies among staff, and resistance to organizational change. Drawing on international best practices and the contributions of Uzbek scholars, the study proposes an integrated model of digital HRM that incorporates e-recruitment, performance analytics, digital learning platforms, and data-driven decision-making. The findings highlight that successful digital transformation requires not only technological adoption but also institutional autonomy, effective leadership, and strategic alignment with labor market demands. The study contributes to the theoretical and practical development of digital HRM in higher education systems, particularly in transition economies.

Keywords: digital transformation, human resource management, higher education, digital HR, HR analytics, institutional performance.

Совершенствование управления педагогическими кадрами посредством моделей цифрового менеджмента (на примере высших учебных заведений Узбекистана)

Аннотация. Быстрое развитие цифровых технологий существенно трансформирует системы управления человеческими ресурсами в высших учебных заведениях. В условиях глобализации и перехода к экономике знаний цифровая трансформация становится ключевым фактором повышения эффективности, качества работы академического персонала и конкурентоспособности университетов. В статье анализируются текущее состояние, проблемы и перспективы цифровой трансформации HRM в высшем образовании Узбекистана. Выявлены основные проблемы, включая недостаточную цифровую инфраструктуру, отсутствие HR-аналитики, низкий уровень цифровых

компетенций сотрудников и сопротивление организационным изменениям. На основе международного опыта и научных исследований узбекских ученых предложена интегрированная модель цифрового HRM. Сделан вывод о том, что успешная цифровая трансформация требует не только внедрения технологий, но и институциональной автономии, эффективного управления и согласованности с требованиями рынка труда.

Ключевые слова: цифровая трансформация, управление персоналом, высшее образование, цифровая HR, HR-аналитика, институциональная эффективность.

Raqamli menejment modellari orqali pedagogik kadrlar boshqaruvini takomillashtirish (O'zbekiston oliy ta'lim muassasalari misolida)

Annotation. Raqamli texnologiyalarning jadal rivojlanishi oliy ta'lim muassasalarida kadrlar boshqaruvi tizimlarini tubdan o'zgartirmoqda. Globallashuv va bilimlarga asoslangan iqtisodiyot sharoitida raqamli transformatsiya institutsional samaradorlikni oshirish, akademik xodimlar faoliyatini yaxshilash hamda raqobatbardoshlikni ta'minlashning muhim omiliga aylanmoqda. Mazkur maqolada O'zbekiston oliy ta'lim muassasalarida kadrlar boshqaruvining raqamli transformatsiyasi holati, muammolari va istiqbollari tahlil qilinadi. Tadqiqotda asosiy muammolar sifatida raqamli infratuzilmaning yetarli emasligi, HR analitika tizimlarining rivojlanmaganligi, xodimlarning raqamli kompetensiyalarining pastligi hamda o'zgarishlarga qarshilik holatlari aniqlangan. Xalqaro tajriba va o'zbek olimlari qarashlari asosida e-rekrutment, raqamli baholash tizimlari, onlayn o'qitish platformalari va ma'lumotlarga asoslangan boshqaruvni o'z ichiga olgan integratsiyalashgan model taklif etiladi. Tadqiqot natijalari shuni ko'rsatadiki, muvaffaqiyatli raqamli transformatsiya nafaqat texnologiyalarni joriy etish, balki institutsional mustaqillik, samarali rahbarlik va mehnat bozori bilan uyg'unlikni ham talab qiladi.

Kalit so'zlar: raqamli transformatsiya, kadrlar boshqaruvi, oliy ta'lim, digital HR, HR analitika, institutsional samaradorlik.

INTRODUCTION

The rapid advancement of digital technologies has fundamentally reshaped the structure and functioning of modern economies, leading to the emergence of a knowledge-based society in which information, innovation, and human capital play a central role. In this context, higher education institutions are increasingly expected to serve not only as centers of knowledge transmission but also as dynamic systems capable of generating innovation, developing human capital, and responding to the evolving demands of the labor market. As a result, the effectiveness of these institutions largely depends on the quality and management of their human resources. Human resource management (HRM) in higher education has traditionally been characterized by administrative routines, rigid structures, and limited integration with institutional strategy. However, the ongoing wave of digital transformation is challenging these traditional approaches, creating new opportunities and requirements for managing academic and administrative staff. Digital technologies such as artificial intelligence, big data analytics, cloud computing, and digital platforms are enabling institutions to redesign HRM processes, making them more efficient, transparent, and data-driven. In the global context, digital transformation of HRM has become a strategic priority for higher education institutions seeking to enhance their competitiveness and performance. Universities in developed countries have already begun to implement digital HR systems,

including e-recruitment platforms, performance management systems based on data analytics, and digital learning environments for continuous professional development. These innovations not only improve operational efficiency but also contribute to better decision-making and more effective utilization of human capital. At the same time, digital transformation is not merely a technological process but a complex organizational and cultural change. It requires institutions to rethink their management practices, develop new competencies among staff, and create an environment that supports innovation and adaptability. In this regard, the role of leadership, governance, and institutional autonomy becomes particularly important. In Uzbekistan, higher education has undergone significant reforms in recent years, aimed at improving quality, expanding access, and increasing international competitiveness. These reforms have also emphasized the importance of digitalization, including the introduction of information systems, online learning platforms, and digital administrative tools. However, the digital transformation of HRM systems remains at an early stage and faces several challenges. Among the key challenges are the limited development of digital infrastructure, insufficient integration of HR analytics into decision-making processes, and the lack of digital competencies among academic and administrative staff. Furthermore, resistance to change and the persistence of traditional management practices hinder the effective implementation of digital HR solutions. These issues are compounded by the lack of a comprehensive and integrated approach to digital transformation, resulting in fragmented and inconsistent reforms.

The works of Uzbek scholars provide valuable insights into these challenges. Researchers such as Abdullaeva emphasize the importance of human capital development in the context of economic modernization, while Rakhimov highlights the role of education in supporting economic growth. Kurbanov focuses on the impact of digital technologies on educational systems, and Nizamova examines the relationship between education quality and labor market demands. However, despite these contributions, there is a lack of comprehensive studies that specifically address the digital transformation of HRM in higher education. This gap in the literature highlights the need for a systematic analysis of the current state, challenges, and prospects of digital HRM in higher education institutions in Uzbekistan. Such an analysis is essential for developing effective strategies and models that can guide the transformation process and ensure its alignment with national development goals. The main objective of this study is to examine the digital transformation of human resource management in higher education institutions and to propose an integrated model that enhances the effectiveness of HRM systems. To achieve this objective, the study focuses on several key tasks: analyzing the theoretical foundations of digital HRM, identifying the main challenges in the national context, and developing a conceptual framework that integrates technological, organizational, and strategic dimensions. The novelty of the study lies in its integrated approach, which combines international theoretical perspectives with the specific characteristics of the Uzbek higher education system. By doing so, the research not only contributes to the academic literature but also provides practical recommendations for policymakers and institutional leaders. In addition, the study adopts a systemic perspective, viewing digital HRM as a dynamic and interconnected process that influences multiple aspects of institutional performance. This perspective allows for a deeper understanding of how digital transformation can be leveraged to improve teaching quality, research productivity, and overall organizational effectiveness.

Ultimately, the significance of this study extends beyond the education sector. By improving the management of human resources in higher education, digital transformation can contribute to the development of a highly skilled workforce, which is essential for sustainable economic growth and social development. Therefore, the findings of this research have important implications for both educational policy and national development strategies.

LITERATURE REVIEW AND METHODOLOGY

The concept of digital transformation in human resource management (HRM) is rooted in broader theories of strategic HRM, human capital development, and technological innovation. Traditional HRM models emphasize the alignment of human resources with organizational strategy, focusing on recruitment, training, performance evaluation, and motivation. However, the emergence of digital technologies has significantly expanded the scope and capabilities of HRM systems. According to Armstrong, modern HRM is increasingly characterized by the integration of digital tools that enhance efficiency and decision-making processes. Similarly, Ulrich argues that HR functions must evolve from administrative roles to strategic partners by leveraging digital technologies and data analytics. This shift is particularly important in knowledge-intensive sectors such as higher education. Human capital theory, as developed by Becker and Schultz, provides a foundational framework for understanding the role of human resources in economic and organizational development. These scholars emphasize that investments in education and skills development are critical for enhancing productivity and competitiveness. In the context of digital transformation, this theory highlights the importance of developing digital competencies among academic staff. Furthermore, the knowledge-based view of organizations, as proposed by Nonaka, underscores the role of knowledge creation and sharing in organizational success. Digital technologies facilitate these processes by enabling the storage, dissemination, and analysis of large amounts of information. As a result, digital HRM systems can support more effective knowledge management within higher education institutions.

The digital transformation of higher education has been widely discussed in international literature. Scholars such as Altbach and Marginson argue that universities are undergoing significant changes due to globalization, technological innovation, and increasing competition. These changes require institutions to adopt new management approaches, including digital HRM systems. Digital transformation in higher education encompasses various dimensions, including online learning, digital administration, and data-driven decision-making. In the context of HRM, digital transformation involves the use of technologies such as e-recruitment systems, learning management systems, performance analytics, and artificial intelligence. OECD and World Bank reports highlight that digitalization can improve the efficiency and transparency of educational institutions. For example, digital HR platforms enable real-time monitoring of staff performance, facilitate communication between management and employees, and support evidence-based decision-making. However, the literature also emphasizes that digital transformation is a complex process that requires not only technological infrastructure but also organizational change. Resistance to change, lack of digital skills, and inadequate leadership are among the main barriers identified in various studies.

One of the key components of digital HRM is the use of HR analytics. HR analytics involves the collection, analysis, and interpretation of data related to human resources in order to improve decision-making processes. According to Becker and Huselid, data-driven HRM systems can significantly enhance organizational performance by providing insights into employee behavior, performance, and development needs. Kaplan and Norton's Balanced Scorecard approach also supports the integration of HR metrics into strategic management systems. In higher education, HR analytics can be used to evaluate teaching effectiveness, research productivity, and staff engagement. However, the adoption of HR analytics in many developing countries remains limited due to technical and organizational constraints.

The development of digital HRM in Uzbekistan has been explored by several national scholars, although the topic remains relatively under-researched. Abdullaeva emphasizes the

importance of human capital development in the context of economic modernization and highlights the need for innovative approaches to managing educational institutions. Rakhimov focuses on the relationship between education and economic growth, arguing that improving the quality of human resources is essential for national development. Kurbanov examines the impact of digital technologies on the education system, noting that digitalization can significantly improve the efficiency of management processes. However, he also points out that the lack of digital infrastructure and competencies remains a major challenge. Nizamova analyzes the relationship between education quality and labor market demands, emphasizing the need for alignment between educational outcomes and employer expectations. Her work indirectly supports the argument that digital HRM systems can help bridge this gap by providing more accurate and timely information about staff performance and competencies. Despite these contributions, there is a lack of comprehensive studies that integrate digital transformation, HRM, and higher education in a single framework. This gap highlights the need for further research in this area.

The review of international and national literature reveals several important gaps:

- Limited integration of digital transformation and HRM in higher education research
- Lack of empirical and conceptual studies focusing on Uzbekistan
- Insufficient attention to the role of HR analytics and digital competencies
- Absence of integrated models linking digital HRM with institutional performance

These gaps indicate the need for a comprehensive and systemic approach to studying digital HRM in higher education.

In summary, the literature demonstrates that digital transformation has the potential to significantly improve HRM systems in higher education. However, its successful implementation requires a combination of technological, organizational, and strategic factors. The contributions of Uzbek scholars provide valuable insights into the national context but need to be integrated with international theories to develop a more comprehensive understanding. This study addresses this gap by proposing an integrated model of digital HRM that considers both global trends and local specificities.

This study employs a qualitative-analytical research design combined with elements of comparative and conceptual analysis to investigate the digital transformation of human resource management (HRM) in higher education institutions. The choice of this design is обусловлен the complex and multi-dimensional nature of digital HRM, which involves technological, organizational, and strategic components.

The qualitative approach allows for an in-depth interpretation of institutional practices, policy frameworks, and theoretical perspectives. At the same time, comparative analysis enables the identification of differences and similarities between international best practices and the current situation in Uzbekistan.

In addition, the study adopts a conceptual modeling approach, which serves as a basis for developing an integrated framework of digital HRM in higher education.

The research is based on a combination of primary and secondary data sources, ensuring a comprehensive and reliable analysis.

Primary Sources

- National strategies and policy documents on digitalization and higher education reforms in Uzbekistan
- Regulatory frameworks related to human resource management

Secondary Sources

- Academic publications in HRM and education management
- Reports from international organizations (OECD, World Bank, UNESCO)
- Research works of Uzbek scholars (Abdullaeva, Rakhimov, Kurbanov, Nizamova)

The integration of multiple data sources enhances the validity and depth of the research.

The study utilizes several analytical methods: Comparative Analysis This method is used to compare digital HRM practices in developed countries with those in Uzbekistan, identifying key gaps and opportunities.

System Analysis, HRM is analyzed as an interconnected system that includes recruitment, evaluation, training, and performance management. This approach allows for identifying systemic inefficiencies.

Content Analysis policy documents and academic literature are analyzed to extract key themes related to digital transformation and HRM.

Logical Synthesis different theoretical perspectives and empirical findings are integrated into a unified conceptual framework.

The conceptual framework of the study is based on the relationship between digital HRM systems, academic staff competence, and institutional performance.

Core Model: Digital HRM → Academic Competence → Institutional Performance

This framework suggests that the implementation of digital HR tools directly influences the competencies of academic staff, which in turn determine institutional outcomes.

Key Components of Digital HRM: E-recruitment systems, HR analytics and performance monitoring, Digital learning platforms, Data-driven decision-making.

Moderating Factors: Institutional autonomy, Leadership and governance, Digital infrastructure, Organizational culture.

RESULTS AND DISCUSSION

The analysis of the digital transformation of human resource management (HRM) in higher education institutions in Uzbekistan reveals a number of interrelated structural, functional, technological, and strategic challenges. These findings demonstrate that while digitalization processes have begun, they remain fragmented and insufficiently integrated into institutional management systems.

One of the primary findings of this study is that the digital transformation of HRM is constrained by existing institutional structures. Many higher education institutions continue to operate within centralized governance frameworks, which limit flexibility and slow down the adoption of digital solutions. Although recent reforms have aimed to increase institutional autonomy, decision-making processes related to HRM remain highly regulated. This restricts universities' ability to independently implement digital HR tools such as e-recruitment systems, automated performance evaluation, and HR analytics platforms. Furthermore, HR departments in many institutions are still viewed as administrative units rather than strategic partners. As a result, digital transformation initiatives are often not aligned with institutional strategies, reducing their effectiveness.

The study also identifies several functional inefficiencies in HRM processes that hinder digital transformation.

Recruitment Systems. Traditional recruitment processes are still dominant in many universities, relying on manual procedures and formal criteria rather than digital platforms and competency-based assessments. The absence of e-recruitment systems limits transparency and efficiency.

Performance Evaluation. Performance evaluation systems are often based on quantitative indicators such as teaching hours and publication counts. However, these metrics do not fully capture the quality of academic work. Moreover, the lack of digital monitoring tools makes it difficult to conduct continuous and objective evaluation.

Professional Development. Digital learning platforms for staff development are not widely implemented. Training programs are often irregular and not aligned with the needs of digital transformation. This results in a gap between required and actual competencies.

Technological constraints represent one of the most critical barriers to digital HRM.

First, the level of digital infrastructure varies significantly across institutions. While some universities have implemented basic information systems, many lack integrated HR platforms that can support data-driven decision-making.

Second, the use of HR analytics is minimal. Data related to staff performance, training, and development is often fragmented and not systematically analyzed. This limits the ability of institutions to make informed decisions.

Third, there is a shortage of digital competencies among academic and administrative staff. Many employees are not sufficiently trained to use digital tools, which reduces the effectiveness of implemented technologies.

Digital transformation is not only a technological process but also an organizational and cultural one. The study finds that resistance to change is a significant barrier in many higher education institutions. Employees may be reluctant to adopt new technologies due to a lack of understanding, fear of increased workload, or concerns about performance monitoring. Additionally, organizational cultures that emphasize stability over innovation may hinder the adoption of digital HR practices. Leadership also plays a crucial role. In institutions where leadership supports innovation and digitalization, transformation processes are more successful. Conversely, weak leadership limits the implementation of digital initiatives. Another important finding is the mismatch between HRM systems and labor market demands. Digital transformation requires new competencies, including digital literacy, data analysis skills, and innovative thinking. However, current HRM systems do not adequately address these requirements. Recruitment and training processes are not fully aligned with the needs of the digital economy, resulting in a gap between staff competencies and institutional demands. This issue has broader implications for the quality of education and the employability of graduates, as academic staff play a key role in shaping learning outcomes.

PROPOSED MODEL OF DIGITAL HUMAN RESOURCE MANAGEMENT

The results of the study demonstrate that the current state of digital transformation in human resource management (HRM) within higher education institutions is fragmented, inconsistent, and largely administrative in nature. These limitations highlight the need for a systemic and integrated model that combines technological innovation with strategic and organizational reforms. The proposed model is grounded in the principles of digital transformation, strategic HRM, and human capital theory, while also incorporating the specific characteristics of higher education systems in transition economies such as Uzbekistan. The central idea of the model is that digital HRM should not be viewed merely as the introduction of technological tools, but as a comprehensive transformation of HR processes, organizational culture, and decision-making mechanisms.

The increasing importance of digital technologies in higher education necessitates the development of an integrated framework that captures the relationship between digital HRM practices and institutional performance. In this regard, the conceptual model proposed in this study provides a systematic representation of how digital HR tools influence academic staff competencies and, ultimately, organizational outcomes. The framework incorporates key components of digital HRM, including e-recruitment, HR analytics, digital performance management, and online professional development, while also considering the role of moderating factors such as institutional autonomy, leadership, governance, and digital infrastructure. The conceptual framework of the study is presented in Figure 1.

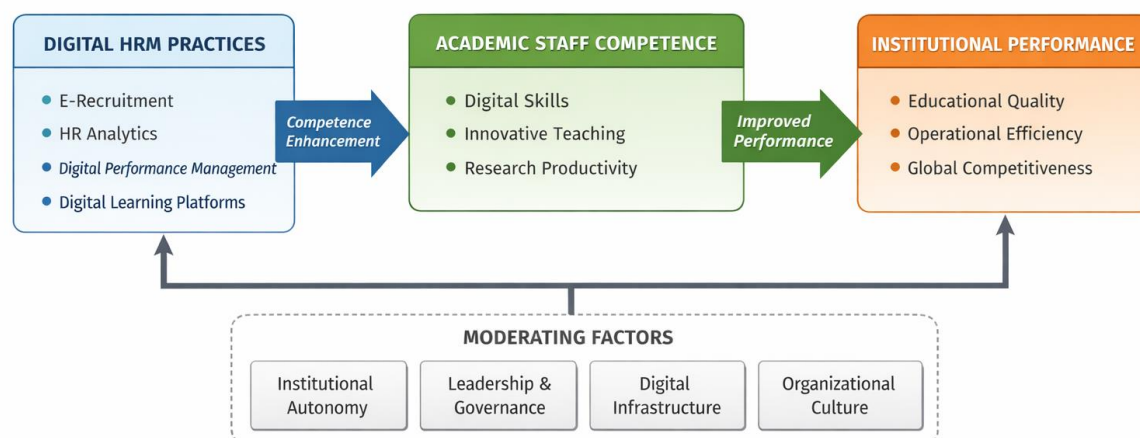


Figure 1. Conceptual model of digital human resource management in higher education

The proposed model, illustrated in Figure 1, demonstrates the systemic relationship between digital HRM practices, academic staff competencies, and institutional performance. It highlights that the successful implementation of digital HR tools leads to the development of key competencies, which in turn enhance institutional effectiveness. The model also emphasizes the critical role of moderating factors such as autonomy, governance, leadership, and digital infrastructure in shaping the outcomes of digital transformation. The findings of this study and the proposed model of digital human resource management (HRM) have significant implications at multiple levels, including policy, institutional governance, academic practice, and future research. At the national level, the study highlights the need for a comprehensive policy framework that supports the digital transformation of HRM in higher education institutions.

First, policymakers should prioritize the development of national digital HR standards, which define clear requirements for recruitment, performance evaluation, training, and data management. These standards should be aligned with international best practices while considering the specific context of Uzbekistan.

Second, the government should invest in the development of digital infrastructure, ensuring that all higher education institutions have access to modern technologies and platforms. This includes cloud-based systems, integrated HR databases, and secure data management tools.

Third, there is a need to promote digital competencies among academic and administrative staff through national training programs and professional development initiatives. Without adequate skills, the implementation of digital HR systems will remain ineffective.

Fourth, policymakers should strengthen institutional autonomy, allowing universities to independently implement digital HR solutions and adapt them to their specific needs. Increased autonomy can significantly enhance flexibility and innovation. Finally, policy reforms should focus on strengthening the link between higher education and the labor market, ensuring that HRM systems support the development of relevant competencies.

At the level of higher education institutions, the study provides several practical recommendations. Universities should transition from traditional administrative HRM to strategic digital HRM, integrating human resource practices with institutional development strategies. This requires a shift in mindset, where HR departments are seen as key contributors to organizational success.

The implementation of digital HR platforms is essential. These platforms should support e-recruitment, performance management, training, and HR analytics. Integrated systems can significantly improve efficiency and transparency. Institutions should also focus

on developing competency-based HR frameworks, ensuring that recruitment, evaluation, and training processes are aligned with institutional goals and labor market needs. Continuous professional development should be supported through digital learning environments, enabling staff to acquire new skills and adapt to technological changes.

CONCLUSION

The digital transformation of human resource management represents a critical step in the modernization of higher education systems. In the context of Uzbekistan, where significant reforms are underway, the effective integration of digital technologies into HRM processes is essential for enhancing institutional performance and competitiveness. This study has provided a comprehensive analysis of the current state of digital HRM in higher education institutions, identifying key challenges related to structure, functionality, technology, and organizational culture. The findings indicate that while digitalization efforts have begun, they remain fragmented and insufficiently integrated into institutional strategies. The research highlights that digital transformation is not merely a technological process but a complex organizational change that requires strategic vision, strong leadership, and supportive governance structures.

In conclusion, the digital transformation of HRM is not only a technological necessity but also a strategic imperative for higher education institutions. Its successful implementation can enhance the quality of education, improve institutional performance, and contribute to the broader goals of economic and social development.

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