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Eureka Journal of Business, Economics & Innovation Studies (EJBEIS)

ISSN 2760-4950 (Online) Volume 2, Issue 2, February 2026

https://eurekaoa.com/index.php/6

DIGITAL TRANSFORMATION OF HEALTHCARE IN UZBEKISTAN: THE ROLE OF THE DMED INFORMATION SYSTEM

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Abstract

This article examines the role of the DMED information system in the digital transformation of the healthcare sector of the Republic of Uzbekistan. The study analyzes the functional structure of DMED, its key modules, and its significance in creating a unified digital healthcare environment. Particular attention is paid to the electronic medical record (MED-ID), electronic prescription system, analytical and monitoring tools, and the integration of telemedicine and mobile applications. The research highlights the impact of DMED on improving the quality and continuity of medical care, enhancing management efficiency, and enabling data-driven decision-making in healthcare administration. The article also identifies key challenges related to digital literacy, data protection, and infrastructure sustainability, emphasizing the importance of further system development in shaping a patient-centered and sustainable healthcare model.

Keywords: Digital healthcare, DMED, electronic medical record, MED-ID, electronic prescription, information system, healthcare management, digital transformation.

Аннотация

В статье рассматривается роль информационной системы DMED в цифровой трансформации сферы здравоохранения Республики Узбекистан. В исследовании анализируется функциональная структура DMED, его

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ключевые модули и значение в формировании единого цифрового пространства здравоохранения. Особое внимание уделяется электронной медицинской карте (MED-ID), системе электронных рецептов, аналитическим и мониторинговым инструментам, а также интеграции телемедицины и мобильных приложений. В работе показано влияние DMED на повышение качества и непрерывности медицинской помощи, рост эффективности управления и формирование управленческих решений на основе данных в системе здравоохранения. Также выявлены ключевые проблемы, связанные с цифровой грамотностью, защитой персональных данных и устойчивостью инфраструктуры, что подчёркивает значимость дальнейшего развития системы для формирования пациенто-ориентированной и устойчивой модели здравоохранения.

Ключевые слова: цифровое здравоохранение, DMED, электронная медицинская карта, MED-ID, электронный рецепт, информационная система, управление здравоохранением, цифровая трансформация.

Introduction

The development of modern socio-economic systems is characterized by the active introduction of digital technologies into all spheres of public life. One of the most important and socially sensitive sectors is healthcare, where digitalization is increasingly viewed as a tool for improving the quality of medical care, ensuring service convenience, and enhancing the efficiency of resource management.

In the Republic of Uzbekistan, the digital transformation of healthcare is being carried out within the framework of state policy aimed at developing the digital economy and e-government. In recent years, the country has created the necessary regulatory, organizational, and technological conditions to transition medical institutions to digital operational formats. As of 2024–2025, a unified digital

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Eureka Journal of Business, Economics & Innovation Studies (EJBEIS)
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https://eurekaoa.com/index.php/6

infrastructure covering medical institutions across the entire republic has been formed, with more than 3,000 healthcare organizations connected to it.

The core element of this infrastructure is the unified electronic medical information system, DMED, designed for the centralized storage, processing, and exchange of medical data. The implementation of this system represents a transition from fragmented automation of individual institutions to the formation of a unified digital healthcare environment.

The purpose of this article is to provide a comprehensive analysis of the DMED information system, its functional capabilities, and its role in the digitalization of medical institutions in Uzbekistan.

Literature Review

In recent years, the digitalization of healthcare has attracted significant attention from researchers and practitioners due to its potential to improve the quality of medical care and optimize management processes. Scientific literature examines this process from technological, economic, social, and ethical perspectives, which necessitates a systematic analysis of existing studies.

American researcher D. Bates is one of the leading experts in digital medicine and patient safety. He emphasizes that the implementation of electronic medical records and clinical information systems can significantly reduce medical errors and improve the quality of treatment. According to him, digital systems are particularly effective when integrated with clinical decision support modules, as they assist physicians in making evidence-based decisions based on patient data. In his works, D. Bates notes that electronic healthcare systems are evolving from simple data storage tools into active instruments for managing medical care, making them a key element in reforming national healthcare systems.

D. Blumenthal considers electronic medical information systems not only as technological innovations but also as strategic tools for healthcare management.

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Eureka Journal of Business, Economics & Innovation Studies (EJBEIS)
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https://eurekaoa.com/index.php/6

He highlights that national digital platforms enable public authorities to transition from reactive management to data-driven governance.

According to the scholar, national electronic medical platforms create conditions for increasing transparency, improving resource planning, and evaluating the performance of medical institutions, which is particularly important for countries with centralized healthcare systems.

Australian researcher E. Coiera emphasizes that the effectiveness of digital medical systems depends not only on technical characteristics but also on the human factor. In his studies, he introduces the concept of sociotechnical systems, viewing technologies, staff, organizational culture, and management processes as an integrated whole.

E. Coiera argues that without adapting workflows and training healthcare personnel, even the most advanced information systems may fail to deliver expected outcomes. This approach is especially relevant for national digital healthcare systems implemented under large-scale reforms.

M. McKee, a researcher in health policy and public health, considers digitalization a key factor in the sustainable development of national healthcare systems. He notes that digital platforms enable population health monitoring, identification of inequalities in access to medical services, and the development of more targeted public policies.

At the same time, M. McKee emphasizes that digitalization must be accompanied by robust legal regulation, personal data protection, and equal access for all population groups; otherwise, there is a risk of increasing social and digital inequality.

Alongside foreign researchers, local scholars also pay considerable attention to healthcare digitalization issues. Their works address electronic medical records, telemedicine technologies, challenges in implementing healthcare information systems, and the impact of digital solutions on the quality and accessibility of medical care.

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F. Arzikulov and I. Izbasarov analyze the role of electronic systems in healthcare. The authors emphasize that EHR systems and telemedicine improve access to patient data, reduce diagnostic errors, and enhance the efficiency of medical care by accelerating information exchange between institutions.

S.P. Abdihalikov and K.R. Khaliulina study the development of automated medical information systems (AMIS) and their impact on service quality and optimization of medical institution activities. The authors note the importance of data standardization and integration with state information databases, as well as the role of digitalization in reducing queues, increasing throughput, and improving service quality.

S.K. Nazarova substantiates the e-health system in Uzbekistan as a comprehensive strategy for digital healthcare development. She identifies EHR, telemedicine, and mobile applications as key components and discusses political, infrastructural, and human resource challenges in implementing digital solutions.

S. Alimova and Sh. Abdurahmanov emphasize the role of ICT in improving healthcare management efficiency. The authors highlight automated data storage, online service management, and telemedicine capabilities as key directions of digital healthcare.

S.Sh. Abdusattorov focuses on the opportunities and algorithms for implementing digital technologies in medical institutions in Uzbekistan and proposes an IT-based model for creating and processing medical information.

Thus, an analysis of foreign and domestic scientific research shows that healthcare digitalization is a complex, multi-level process encompassing technological, managerial, social, and institutional aspects.

Research Methods

The methodological basis of the study includes system analysis, a structural-functional approach, and methods for generalizing practical experience in healthcare digitalization.

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The object of the study is the DMED information system implemented in medical institutions of the Republic of Uzbekistan. The subject of the study comprises the organizational, functional, and managerial aspects of using DMED.

Research Results

DMED is a unified digital medical information system developed for the comprehensive digitalization of the healthcare system of the Republic of Uzbekistan. The system was created by the Ministry of Health in cooperation with national IT partners and serves as a basic platform for automating medical and administrative processes.

The main purpose of DMED is to consolidate population medical data within a unified information environment and ensure accessibility for all levels of the healthcare system. The platform integrates outpatient clinics, inpatient facilities, diagnostic centers, and pharmacies, ensuring continuity of medical care.

The key functional component of DMED is the electronic medical record (MED-ID) created for each citizen. This record contains information on medical history, examination results, and prescribed and provided treatments.

The use of MED-ID allows physicians to quickly access a patient's medical information regardless of the place of visit, which is especially important in emergency care and inter-institutional cooperation. Electronic medical records eliminate the need for repeated paperwork and reduce the risk of data loss or distortion.

According to recent data, DMED contains medical records of more than 36 million citizens of Uzbekistan, indicating near-complete population coverage.

DMED includes more than 20 specialized modules that automate various areas of medical institution activities.

The five main modules of the DMED system are:

1. Electronic Medical Record (EMR) module;
2. Electronic prescriptions and pharmaceutical inventory management module;

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Eureka Journal of Business, Economics & Innovation Studies (EJBEIS)
ISSN 2760-4950 (Online) Volume 2, Issue 2, February 2026

https://eurekaoa.com/index.php/6

3. Automated reporting module;
4. Analytical and monitoring tools;
5. Telemedicine and mobile application modules.

One of the most important modules of DMED is the electronic prescription system, which enables digital prescription issuance using electronic digital signatures and QR codes.

Electronic prescriptions allow pharmacies to verify prescription authenticity in real time, record the dispensing of medications, and analyze drug consumption. This reduces the risk of unjustified prescribing and increases transparency in pharmaceutical circulation.

Currently, the system is being implemented in stages in Tashkent and other regions, with nationwide coverage of all medical institutions and pharmacies planned for 2026–2027.

DMED has been widely deployed, with thousands of clinics and hospitals connected to the system. This enables real-time access to medical data. Automation of reporting and laboratory research accelerates workflows and reduces the administrative burden on healthcare personnel.

Integration with mobile applications provides additional convenience for patients, allowing them to receive appointment notifications, track test results, and communicate digitally with healthcare providers.

The results of DMED implementation demonstrate the systemic benefits of healthcare digitalization. The formation of a unified information environment improves coordination between different levels of medical care and enhances overall system manageability.

From a management perspective, DMED creates conditions for a transition to data-driven governance. The system's analytical tools enable monitoring of morbidity indicators, institutional performance, and resource consumption.

At the same time, further development of DMED requires addressing challenges related to improving digital literacy among healthcare workers, strengthening

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Eureka Journal of Business, Economics & Innovation Studies (EJBEIS)
ISSN 2760-4950 (Online) Volume 2, Issue 2, February 2026

https://eurekaoa.com/index.php/6

personal data protection mechanisms, and ensuring stable digital infrastructure across regions.

Conclusion

The DMED information system is a key element of the digital transformation of the healthcare system of the Republic of Uzbekistan. It integrates medical institutions into a unified information environment, improves management efficiency, and contributes to enhancing the quality of medical care.

The large-scale implementation and multifunctional nature of DMED allow it to be assessed as the strategic digital foundation of the national healthcare system. Further development and improvement of the system will play a crucial role in forming a sustainable, patient-centered healthcare model in the context of the digital economy.

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