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THE IMPACT OF SMART MANAGEMENT SYSTEMS ON INSTITUTIONAL DEVELOPMENT

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Abstract: The article analyses how smart management systems – digital platforms that integrate data collection, analytics, process automation and elements of artificial intelligence – influence the development of public and educational institutions. Based on a review of the literature on digital transformation and on the experience of Uzbekistan, including the Digital Uzbekistan – 2030 strategy, the my.gov.uz public services portal and the HEMIS higher education information system, four channels of impact are identified: data-driven decision-making, process efficiency, transparency and accountability, and user-oriented services. The study also examines organisational, human and ethical barriers and proposes a staged model for assessing institutional readiness for smart management.

Keywords: smart management systems, digital transformation, institutional development, e-government, artificial intelligence, data-driven governance, higher education management, Uzbekistan.

AQLLI BOSHQARUV TIZIMLARINING INSTITUTSIONAL RIVOJLANISHGA TA’SIRI

Annotatsiya: Maqolada ma’lumot yig‘ish, tahlil, jarayonlarni avtomatlashtirish va sun’iy intellekt elementlarini birlashtiruvchi aqlli boshqaruv tizimlarining davlat va ta’lim muassasalari rivojiga ta’siri tahlil qilinadi. Raqamli transformatsiyaga oid adabiyotlar hamda O‘zbekiston tajribasi – “Raqamli O‘zbekiston – 2030” strategiyasi, my.gov.uz portali va HEMIS axborot tizimi asosida ta’sirning to‘rt yo‘nalishi aniqlanadi: ma’lumotlarga asoslangan qaror qabul qilish, jarayonlar samaradorligi, shaffoflik va hisobdorlik, foydalanuvchiga yo‘naltirilgan xizmatlar. Tashkiliy, kadrlar va axloqiy to‘siqlar ko‘rib chiqilib, muassasaning tayyorligini baholash modeli taklif etiladi.

Kalit so‘zlar: aqlli boshqaruv tizimlari, raqamli transformatsiya, institutsional rivojlanish, elektron hukumat, sun’iy intellekt, oliy ta’limni boshqarish, O‘zbekiston.

ВЛИЯНИЕ СИСТЕМ УМНОГО УПРАВЛЕНИЯ НА ИНСТИТУЦИОНАЛЬНОЕ РАЗВИТИЕ

Аннотация: В статье анализируется влияние систем умного управления, объединяющих сбор данных, аналитику, автоматизацию процессов и элементы искусственного интеллекта, на развитие государственных и образовательных учреждений. На основе литературы о цифровой трансформации и опыта Узбекистана – стратегии «Цифровой Узбекистан – 2030», портала my.gov.uz и информационной системы HEMIS – выделены четыре канала влияния: принятие решений на основе данных, эффективность процессов, прозрачность и подотчётность, ориентация

услуг на пользователя. Рассмотрены организационные, кадровые и этические барьеры, предложена поэтапная модель оценки готовности учреждения.

Ключевые слова: системы умного управления, цифровая трансформация, институциональное развитие, электронное правительство, искусственный интеллект, управление высшим образованием, Узбекистан.

INTRODUCTION

Over the past decade, the question facing public and educational institutions has shifted from whether to digitalise to how digital systems actually change the way institutions work. Electronic document flow, online services and information portals are now common, yet experience in many countries shows that the presence of technology does not by itself make an institution more effective, transparent or responsive. Smart management systems – platforms that combine data collection, analytics, automation of routine processes and, increasingly, elements of artificial intelligence – promise a deeper change: they are meant to alter how decisions are made and how organisations learn. Whether this promise turns into genuine institutional development depends on factors that go well beyond software.

Uzbekistan offers an instructive case. In the United Nations E-Government Survey 2024 the country ranked 63rd out of 193 states with an E-Government Development Index of 0.7999, up from 69th place in 2022, and for the first time entered the group of countries with a very high level of e-government development [4]. This progress followed a deliberate policy course formalised in the Digital Uzbekistan – 2030 strategy approved in October 2020 [5]. Rapid quantitative growth, however, raises qualitative questions: how far have digital systems changed institutional practices, and what conditions are needed for this change to be sustainable?

The aim of this article is to analyse the impact of smart management systems on institutional development, to identify the main channels through which this impact occurs, and to outline the barriers and conditions that determine its depth, using the public administration and higher education sectors of Uzbekistan as examples.

LITERATURE REVIEW AND METHODOLOGY

The study uses theoretical analysis of the literature on digital transformation, comparative analysis of international frameworks and a case study of Uzbek practice based on official documents and data. The central concept of the research, digital transformation, has been defined in several influential works.

G. Vial reviewed 282 publications in information systems research and described digital transformation as a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication and connectivity technologies [2]. His framework emphasises that technology first creates disruptions, organisations then respond strategically, and value creation paths are reshaped only when structural and organisational barriers are addressed. This model is useful for institutions because it treats technology as the beginning of change rather than its result.

For the public sector, I. Mergel, N. Edelmann and N. Haug developed a definition based on expert interviews and proposed a framework that distinguishes the reasons for digital transformation, the processes through which it unfolds and its expected outcomes [1]. A key distinction in their work is between digitisation of existing services and a more fundamental transformation that changes service

delivery, organisational culture and relationships with citizens. Many institutions remain at the first level: they move paper procedures online without rethinking them.

The role of artificial intelligence, the most advanced component of smart management systems, was examined by B.W. Wirtz, J.C. Weyerer and C. Geyer, who compiled an integrated overview of AI applications and related challenges in the public sector [3]. They noted that public organisations are experimenting with AI, but its use remains less widespread than in the private sector, and that technical, legal, ethical and societal challenges must be addressed together. At the international level, the OECD Digital Government Index assesses countries' progress towards a mature digital state, including whether governments are data-driven, user-driven and proactive [8]. Together these sources provide a framework for evaluating not only the scale of digital tools, but also their institutional effect.

RESULTS AND DISCUSSION

The analysis allows four main channels to be distinguished through which smart management systems influence institutional development. The first is data-driven decision-making. When information about operations, resources and outcomes is collected in a unified system, managers can base decisions on current evidence rather than on periodic reports and intuition. This changes the internal logic of an institution: planning becomes more precise, problems are detected earlier and the effects of decisions can be monitored. The OECD treats such use of data as one of the defining dimensions of a mature digital government [8].

The second channel is process efficiency. Automation of routine operations – registration, document approval, reporting – reduces processing time, the number of errors and the opportunities for informal practices. The Uzbek public services portal illustrates the scale of this shift: by August 2026 the number of services available on my.gov.uz had reached 905 [7]. Each service moved online represents a procedure that no longer requires personal visits and paper documents. Yet, as Mergel and colleagues warn, efficiency gains remain limited if an outdated procedure is simply transferred to a digital form without being redesigned [1].

The third channel is transparency and accountability. Digital systems leave a trace of every operation, which makes it easier to monitor deadlines, compare performance and identify irregularities. In higher education, this effect is visible in the Higher Education Management Information System (HEMIS), introduced in Uzbekistan in accordance with Cabinet of Ministers Resolution No. 346 of 3 June 2021 [6]. A unified system for student records, academic performance and staff data reduces the space for manipulation of records and provides the ministry and universities with comparable information for quality assurance. Here the institutional effect goes beyond convenience: the rules of interaction between students, faculty and administration become more formalised and verifiable.

The fourth channel is user orientation. Smart systems make it possible to design services around the needs of citizens or students rather than around the internal structure of the institution. Proactive services, in which the state offers a service when a life event occurs instead of waiting for an application, are an example of this approach and are considered by the OECD as a sign of a mature digital government [8]. The rise of Uzbekistan's position in the UN survey, including its inclusion in the very high EGDI group, reflects progress in online service provision and telecommunications infrastructure [4].

These channels, however, do not operate automatically. The analysis reveals several barriers that limit the institutional impact of smart management systems. The first is organisational resistance. Vial

stresses that structural and organisational barriers determine whether technological disruption leads to new value or remains superficial [2]. In practice, staff may keep parallel paper records, duplicate digital procedures with traditional ones or use new systems only formally. The second barrier is the shortage of digital competences, not only among ordinary employees but among managers, who need to interpret data and change processes rather than merely operate software.

The third barrier concerns data quality and security. A smart system is only as good as the data it contains; incomplete or inconsistent information leads to wrong decisions that look objective because they come from a computer. Concentration of personal data in unified platforms also increases the risks of leaks and misuse. The fourth barrier is ethical and legal, especially where artificial intelligence is involved. Wirtz and colleagues point out that questions of responsibility for algorithmic decisions, fairness and public acceptance must be resolved together with technical issues [3]. For institutions in developing digital ecosystems, these questions often arise faster than the corresponding regulations.

Comparing the international frameworks with the Uzbek case suggests that the country has made considerable progress at the level of infrastructure and service digitisation, as confirmed by its UN ranking and the expansion of my.gov.uz [4; 7]. The Digital Uzbekistan – 2030 strategy, developed with the participation of ministries, business and academia, provides a coherent policy framework [5]. The next stage, which is more difficult, is the transition from digitisation to transformation in the sense used by Mergel and colleagues [1]: redesigning processes, building analytical capacity within institutions and changing management culture.

To support this transition, a staged model for assessing institutional readiness for smart management can be proposed. At the first stage, an institution digitises its core records and services and ensures data reliability. At the second, it integrates its systems with each other and with national platforms, eliminating duplicate data entry. At the third, managers begin to use analytics systematically for planning and monitoring, which requires training and clear responsibility for data. At the fourth stage, the institution applies predictive tools and elements of artificial intelligence under transparent rules and ethical oversight. Each stage should be completed before moving to the next; attempts to introduce advanced AI tools without reliable data and analytical culture tend to produce disappointing results.

For universities, including the National University of Uzbekistan, this model implies specific steps: full use of HEMIS data for internal quality management rather than only for reporting to the ministry, development of dashboards for faculty and department heads, training programmes in data literacy for administrative staff, and internal policies on the ethical use of student data. For public agencies, the priorities include redesigning services before digitising them, measuring outcomes for citizens rather than the number of services launched, and strengthening cybersecurity and personal data protection.

CONCLUSION

Smart management systems influence institutional development through four main channels: data-driven decision-making, process efficiency, transparency and accountability, and user-oriented services. The experience of Uzbekistan, reflected in its rise to 63rd place in the UN E-Government Survey 2024, the expansion of the my.gov.uz portal to 905 services and the introduction of HEMIS in higher education, shows that a consistent state policy can rapidly expand digital infrastructure.

At the same time, the literature and the Uzbek case demonstrate that technology alone does not guarantee institutional development. Its effect depends on overcoming organisational resistance, building

digital and analytical competences, ensuring data quality and security, and establishing ethical rules for the use of artificial intelligence. The proposed staged readiness model can help institutions move consistently from digitisation to genuine transformation. Further research could test this model empirically by measuring the relationship between the level of smart system adoption and indicators of institutional performance in Uzbek universities and public agencies.

REFERENCES

1. Mergel I., Edelmann N., Haug N. Defining digital transformation: Results from expert interviews // Government Information Quarterly. – 2019. – Vol. 36, No. 4. – Article 101385. DOI: 10.1016/j.giq.2019.06.002
2. Vial G. Understanding digital transformation: A review and a research agenda // Journal of Strategic Information Systems. – 2019. – Vol. 28, No. 2. – P. 118–144.
3. Wirtz B.W., Weyerer J.C., Geyer C. Artificial Intelligence and the Public Sector – Applications and Challenges // International Journal of Public Administration. – 2019. – Vol. 42, No. 7. – P. 596–615.
4. United Nations, Department of Economic and Social Affairs. E-Government Survey 2024: Accelerating Digital Transformation for Sustainable Development. – New York: United Nations, 2024. https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/186-Uzbekistan
5. Decree of the President of the Republic of Uzbekistan No. PF-6079 of 5 October 2020 “On approval of the Digital Uzbekistan – 2030 Strategy and measures for its effective implementation”. https://lex.uz
6. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 346 of 3 June 2021 on the introduction of the information system for managing higher education processes (HEMIS). https://lex.uz
7. Ministry of Digital Technologies of the Republic of Uzbekistan. Number of services on My.gov.uz reaches 905. – 2026. https://gov.uz/en/digital/news/view/210220
8. OECD. 2023 OECD Digital Government Index: Results and Key Findings. – Paris: OECD Publishing, 2024.