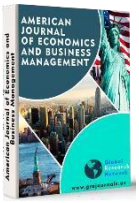

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Article

Digitalizing The Governance of Scientific Institutions in Uzbekistan: Policy Reforms, Platforms, And Performance

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Abstract: This article examines Uzbekistan's digitalization reforms in the governance of scientific institutions between 2017 and 2024. Unlike high-income economies, where information systems were gradually integrated, Uzbekistan represents a case where digitalization was used as a deliberate policy instrument. The study evaluates whether these reforms improved transparency and innovation capacity within the national science system. The research applies comparative–historical policy analysis to presidential decrees, national strategies, and reports of the Agency for Innovative Development, using international benchmarks such as the OECD Digital Government Index and the World Bank's GovTech Maturity Index for comparison. Findings show that reforms began with the establishment of the Ministry of Innovative Development in 2017, continued with platforms such as HEMIS, daraja.ilmiy.uz, interaktiv.oak.uz, and E-IJRO, and were accompanied by expanded state funding in 2024. Uzbekistan's position in the Global Innovation Index improved relative to 2015, although progress plateaued in 2024..

Keywords: Digitalization, E-Government, Innovation Policy, Higher Education, Scientific Enterprises

1. Introduction

The digital transformation of science governance has become central to how states organize knowledge production, allocate resources, and support innovation. In developed countries, digital systems in higher education and research were integrated over decades. In transition economies such as Uzbekistan, digitalization and institutional restructuring have proceeded simultaneously, making the process more compressed, more political, and more analytically revealing.

In Uzbekistan, reform accelerated after 2017, when the government created the Ministry of Innovative Development. This was more than an administrative reshuffle: it reflected the idea that science and innovation required a coherent governance framework supported by digital tools. In 2023, the ministry was transformed into the Ministry of Higher Education, Science and Innovation, while the Agency for Innovative Development was created to oversee implementation and performance monitoring. Together, these changes centralized authority and linked science governance more closely with higher education.

The rationale was clear. The state faced growing demands for accountability, performance monitoring, and better coordination across universities, research institutes, and innovation programs. Before 2017, science governance was fragmented, paper-based,

and weakly aligned with national priorities. Universities and institutes often operated in isolation, with limited transparency and weak ties to strategic development goals. In this context, digitalization was framed not as a by-product of modernization but as an instrument for reducing fragmentation, strengthening oversight, and increasing policy coherence.

This article addresses three questions: how legal and institutional reforms since 2017 have reshaped digital governance of scientific institutions; to what extent digital platforms have improved transparency, monitoring, and coordination; and which enabling conditions and barriers affect the sustainability of these reforms. The study contributes in three ways. Empirically, it systematizes the main reforms and platforms introduced between 2017 and 2024. Conceptually, it treats digitalization as a policy instrument that reduces information asymmetries between the state and institutions. Practically, it offers lessons for other transition economies seeking to adapt similar reforms.

The Uzbek case is important because official discourse consistently links digitalization with modernization, transparency, and efficiency. Yet implementation remains uneven. Human-resource constraints, limited institutional absorptive capacity, and top-down platform design complicate reform outcomes. These tensions between ambition and capacity define the analysis below.

Literature Review

Earlier studies of digitalization in higher education and research governance focused mainly on efficiency gains such as less paperwork, faster reporting, and better access to managerial data. More recent work treats digital systems as instruments of institutional change that reshape routines, incentives, and accountability relations across the state–university–industry nexus. This broader view is particularly relevant for transition economies, where digitalization is embedded in wider administrative and political reform.

A key theoretical shift is the move from New Public Management to Digital-Era Governance. Dunleavy et al. argue that digital governance is characterized by reintegration of fragmented processes, needs-based holism, and deep digitalization of workflows. In science governance, this means building integrated data infrastructures through which ministries and agencies can coordinate universities and research organizations more closely. A related perspective stresses public values: digital systems should not only improve efficiency, but also enhance transparency, fairness, responsiveness, and legitimacy. In research governance, this raises questions about how data are collected, linked, and used in evaluation.

The government-as-a-platform literature further argues that states create reusable digital components and interoperable standards that support broader ecosystems of governance and innovation. Janowski's evolutionary view of digital government similarly emphasizes a move from simple digitization toward sector-specific ecosystems adapted to particular policy needs. In the research sphere, this logic appears in Current Research Information Systems and institutional repositories, which make projects, outputs, funding, and affiliations visible and measurable. From this perspective, digitalization increases legibility: it makes research activity more governable for the state and for funders.

Agency theory offers an additional lens. Where principals and agents face information asymmetries, digital platforms expand observability, standardize reporting, and reduce monitoring costs. In science governance this strengthens the state's ability to connect projects, funding, staff, and outputs. At the same time, stronger monitoring can create new risks, including gaming, risk aversion, or excessive focus on measurable indicators.

Taken together, the literature suggests four propositions relevant to Uzbekistan. First, digitalization in science governance tends to integrate formerly separate systems. Second, success cannot be judged only by efficiency; legitimacy also depends on

transparency and fairness. Third, platform architectures matter because they shape ecosystems of oversight and knowledge circulation . Fourth, digitalization functions as a policy instrument by redistributing discretion between the state and institutions through better information and stronger monitoring.

Table 1. Analytical lenses in the literature

Lens	Core idea	Relevance to Uzbekistan
Government-as-a-platform	State builds digital infrastructure enabling integration of MIS, RIMS, CRIS	Explains how platforms such as HEMIS and daraja.ilmiy.uz act as nodes in a broader ecosystem
Data-driven state	Decision-making relies on continuous, standardized data	Highlights the role of real-time KPI monitoring for funding and oversight
Algorithmic accountability	Digital decisions must remain transparent and auditable	Shows risks of opacity in interaktiv.oak.uz and E-IJRO
Institutional isomorphism	States converge on similar models under global pressures	Clarifies why Uzbekistan emulates OECD templates while adapting to postSoviet legacies

Sources: O'Reilly (2011); Janowski (2015); Dunleavy et al. (2006); Mergel et al. (2019); Bannister & Connolly (2014); Eisenhardt (1989).

These lenses also help situate Uzbekistan internationally. OECD and World Bank frameworks emphasize digital-by-design government, platform integration, data-driven administration, and user orientation. Such frameworks do not simply describe reforms; they also create external pressure. For countries like Uzbekistan, digitalization becomes partly a signaling device addressed to donors, investors, and international organizations.

Comparative cases sharpen this point. Estonia demonstrates how interoperability and legal consistency can support a trusted digital state . Singapore shows the effectiveness of long-term, centralized strategic planning backed by human-capital investment [1]. South Korea highlights the value of combining state leadership with strong public–private partnerships [2]. Kazakhstan provides the closest regional parallel: it shows that post-Soviet administrations can make substantial digital progress, but also face persistent problems of digital literacy, uneven access, and bureaucratic inertia [3]. Georgia illustrates that even successful reforms remain vulnerable where institutional continuity is weak. These examples suggest that platform deployment alone is insufficient; durable progress depends on capacity, trust, and institutional resilience.

A gap remains in the literature on digitalization of science governance as a policy instrument in transition economies. Many studies examine learning platforms or internal university management, but fewer connect legal reforms, fiscal commitments, digital infrastructures, and accountability systems. Uzbekistan offers a useful case because digitalization there has been explicitly embedded in decrees, strategies, and administrative restructuring rather than emerging only from institutional experimentation[4].

2. Materials and Methods

This study uses comparative–historical policy analysis. Such a design is appropriate because reforms in Uzbekistan were cumulative: decrees, strategies, institutional restructuring, and platforms appeared sequentially and built on one another. The aim is not to analyze software technically, but to understand how digital tools were embedded in governance frameworks.

The source base includes four groups. First, legal and policy documents, especially Presidential Decree No. UP-5264 (2017), Decree No. UP-165 (2022), and Resolution No. PP-200 (2023), provide the legal architecture of reform . Second, official reports of the Agency for Innovative Development supply data on projects, allocations, and implementation outcomes . Third, international indices from the OECD, World Bank, and UN provide comparative benchmarks [5]. Fourth, academic literature offers conceptual frameworks for interpreting digital transformation [6].

The analysis proceeded through structured reading and coding of documents. Each text was examined for three dimensions: declared objectives, implementation mechanisms, and stated or reported outcomes. Objectives included integration of registers, commercialization, performance monitoring, or human-capital development. Mechanisms included creation of ministries and agencies, rollout of digital platforms, funding programs, and reporting systems. Outcomes included claims about transparency, faster processing, better coordination, or improved competitiveness.

A light process-tracing logic was then applied. I examined how goals, mechanisms, and outcomes aligned over time, whether reforms were sequenced coherently, and where implementation gaps appeared. I also used a crosswalk that mapped Uzbek reforms onto broader digital-government categories such as platform orchestration, data-driven steering, and public-value safeguards. This was interpretive rather than numeric: the goal was to assess qualitative alignment, not to assign scores.

The study has limitations. It relies heavily on official documents, which may overstate success; it does not include surveys or interviews with users of the platforms; and international indices are only partial proxies for domestic institutional change. Still, comparative–historical analysis remains appropriate because the object of study is institutional reform rather than a narrow technical variable.

3. Results

Uzbekistan's current model of science governance began with Presidential Decree No. UP-5264, which created the Ministry of Innovative Development and elevated innovation policy to ministerial level [7]. This reform also established a dedicated innovation fund and signaled that science and innovation were being repositioned as instruments of national development. The next major step came with administrative reforms adopted in late 2022. From January 2023, the Ministry of Innovative Development was dissolved, its functions were transferred to the newly created Ministry of Higher Education, Science and Innovation, and the Agency for Innovative Development was established under the new ministry . Resolution No. PP-200 (2023) further consolidated this model and explicitly called for a unified digital ecosystem for data collection, monitoring, and reporting [8]. Overall, the trajectory was clear: Uzbekistan moved from a fragmented structure toward centralized, digitally enabled governance.

This shift was reinforced by two Innovation Development Strategies. The 2019–2021 strategy emphasized integration of education, science, and entrepreneurship and launched initiatives such as Innoweek.uz. The 2022–2026 strategy introduced quantitative targets, including growth in the number of innovation-active enterprises, and stressed human-capital development and intellectual-property management. The two strategies demonstrate continuity: early initiatives were not abandoned, but expanded and incorporated into a broader policy framework.

The most visible manifestation of reform was the deployment of digital platforms. HEMIS became the core management information system for higher education, covering admissions, academic records, human resources, finance, and elements of performance monitoring [9]. daraja.ilmiy.uz standardized postgraduate admissions and PhD candidate reporting [10]. interaktiv.oak.uz digitized key procedures of academic attestation and degree recognition, reducing opacity in a previously closed area [11]. E-IJRO introduced

electronic document flow, improving traceability and shortening administrative response times [12]. Together, these systems reduced paper-based procedures, aligned reporting standards, and narrowed information asymmetries between the state and scientific institutions [13].

Official financial data indicate growing state support for science. In 2023, 266 new projects were funded with UZS 146 billion and 674 projects under state programs received UZS 327 billion [14]. In 2024, 291 new projects received UZS 161.5 billion and 719 projects under state programs were supported with UZS 356 billion [15]. This growth represents both a fiscal expansion and a policy signal that science and innovation are being treated as instruments of modernization. At the same time, the funding model remains overwhelmingly state-centered compared with OECD systems where private R&D plays a larger role [16].

International performance indicators show partial progress. According to WIPO, Uzbekistan improved its Global Innovation Index ranking from 122nd in 2015 to 93rd in 2020, 86th in 2021, and 82nd in 2022–2023, before slipping slightly to 83rd in 2024.

Table 2. Uzbekistan's GII Rank (2015-2024)

Year	Uzbekistan's GII Rank
2015	122
2020	93
2021	86
2022	82
2023	82
2024	83

The pattern suggests that reforms generated visible gains, especially in the first phase, but that momentum weakened by 2024[17]. Improved governance infrastructure and higher public funding have not yet translated fully into stronger commercialization, higher-impact publications, or internationally competitive innovation outputs[18].

In summary, the reforms produced four main achievements: centralization of governance under MHESI and AID , creation of nationwide digital platforms improving transparency and monitoring , expansion of public funding for science and improvement in international innovation rankings relative to the pre-reform period[19]. The main limitations were also clear: dependence on state funding, capacity gaps in institutions, plateauing international performance, and persistent top-down design with weak user feedback.

4. Discussion

The Uzbek case shows that digitalization can reshape science governance rapidly when it is framed as a state-led policy choice. Since 2017, Uzbekistan has moved from fragmented administration toward more centralized coordination supported by digital platforms. This is an important achievement in a system historically marked by bureaucratic inertia and weak institutional coordination.

Yet Uzbekistan's trajectory differs from many international leaders. In Estonia, digitalization is closely tied to interoperability, legal trust, and citizen-centered service delivery [20]. In Singapore, state-led digitalization is paired with long-term planning and sustained investment in human capital [21]. South Korea shows the additional value of public–private collaboration in generating innovation [22]. Compared with these cases, Uzbekistan's reforms remain more centralized, more administrative, and less participatory. Platforms were generally designed and deployed from above, with limited

consultation of end-users. This has helped speed implementation, but it also creates usability problems and may weaken institutional ownership.

The comparison with Kazakhstan is especially relevant. Both countries inherited post-Soviet administrative traditions and have improved their standing in digital-government and innovation rankings [23]. In both, however, reform quality is constrained by uneven digital literacy, regional inequalities, and bureaucratic culture. Georgia offers another cautionary lesson: visible reform gains can be fragile if institutional continuity weakens. These cases suggest that sustainability depends not only on technology and decrees, but on adaptive institutions and capable personnel.

Uzbekistan's reforms have clear strengths. First, institutional centralization reduced duplication and created a clearer chain of authority under MHESI and AID. Second, digital infrastructure now provides a common framework for higher education and science management . Third, rising fiscal allocations show that the state has backed digital governance with financial commitment [24]. Fourth, international rankings improved markedly from the mid-2010s baseline . For a transition economy, building this architecture in less than a decade is a significant accomplishment.

However, four structural constraints remain. The first is human capacity. Digital systems require not only hardware and software, but trained administrators, researchers, and technical staff able to use them effectively. The second is design logic. Because most platforms were developed centrally, feedback loops are weak and user needs are not always fully incorporated. The third is funding structure. Heavy dependence on public finance makes the system vulnerable and limits incentives for stronger private-sector participation in R&D. The fourth is outcome quality. The plateau in 2024 suggests that additional platforms and decrees alone will not automatically produce internationally competitive science [25].

These findings imply several policy lessons. Uzbekistan needs to move from quantity to quality: from counting platforms and funded projects toward evaluating research outputs, commercialization, and international visibility. Capacity-building must become a central component of reform, especially for university staff and platform administrators. Greater private-sector participation in research and innovation funding would diversify the ecosystem and reduce fiscal dependence. Platform design should also become more user-centered so that digital systems function not only as instruments of upward control but as tools that improve the everyday work of researchers, students, and administrators. Finally, regional and international learning remain valuable, but benchmarking should not become an end in itself .

At the theoretical level, the Uzbek case reinforces the argument that digitalization is not merely technical modernization. It is a governance instrument that alters principal–agent relations by making institutional behavior more visible and therefore more controllable [26]. In Uzbekistan, digital platforms have clearly reduced information asymmetries and strengthened state oversight. What they have not yet done is fundamentally rebalance power toward greater institutional autonomy. Thus, digitalization has improved transparency and coordination, but has so far reinforced state capacity more than it has transformed the underlying hierarchy between the state and scientific institutions.

5. Conclusion

The trajectory of Uzbekistan's digitalization reforms between 2017 and 2024 provides an illustrative example of how a transition economy can embed digital technologies into the governance of science. The case demonstrates that digitalization, when framed as deliberate state policy rather than as a side effect of modernization, can lead to visible improvements in transparency, coordination, and accountability within a relatively short time.

Several achievements stand out. The establishment of the Ministry of Innovative Development in 2017, and its subsequent transformation into the Ministry of Higher Education, Science and Innovation in 2023, signaled a decisive institutional consolidation. The creation of the Agency for Innovative Development provided a dedicated structure for program monitoring and evaluation. Digital platforms such as HEMIS, daraja.ilmiy.uz, interaktiv.oak.uz, and E-IJRO represent practical tools that align institutional processes with state objectives. Funding levels have grown, and Uzbekistan has improved its position in the Global Innovation Index compared to 2020.

At the same time, persistent challenges remain. Heavy reliance on state funding limits diversification and risks fiscal vulnerability. Institutional capacity is uneven, with many universities struggling to fully use the digital platforms provided. The top-down design of reforms, while efficient in rollout, risks undermining user trust and long-term sustainability. Moreover, the plateauing of international rankings in 2024 suggests that further progress will require deeper structural changes, not only additional platforms or decrees.

From a theoretical perspective, the Uzbek case enriches the debate on digital government by highlighting the role of digitalization as a policy instrument. It shows how digital tools are used not only for efficiency gains but also for reconfiguring the relationship between state and institutions. In transition economies, where institutional legacies are often fragmented, digitalization can become a mechanism for centralization and control. This raises questions about whether digital governance inherently strengthens autonomy or reinforces state dominance.

For policymakers, the key lesson is that digitalization must move from breadth to depth. Uzbekistan has achieved wide coverage of digital platforms, but the real test is whether these systems deliver high-quality outcomes: better research, stronger commercialization, more international publications and higher innovation capacity. Investment in human capital is crucial: without skilled administrators and researchers, platforms risk becoming symbolic rather than transformative. Furthermore, encouraging private sector participation is essential for balancing the current state-dominated funding model.

This study has clear limitations. It relies heavily on official documents and reports, which may overstate successes and underreport failures. Empirical surveys of university staff, researchers, and students would provide a more grounded perspective on how platforms function in practice. Comparative quantitative studies could also shed light on how Uzbekistan's reforms align with those of other transition economies in Eastern Europe, the Caucasus, and Central Asia. Future research should also examine the role of international donors and development organizations, whose influence is often indirect but significant.

In conclusion, Uzbekistan's experience demonstrates that digital governance reforms in science are possible even in resource-constrained environments, provided there is strong political will and clear institutional design. Yet, sustainability depends on moving beyond centralization toward inclusiveness, from state-led control to balanced partnerships, and from rapid rollout to continuous adaptation. For other transition economies, the Uzbek case offers both inspiration and caution: digitalization can deliver fast gains, but without institutional depth and societal trust, those gains may remain fragile.

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