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INNOVATION-DRIVEN GOVERNANCE IN HIGHER EDUCATION INSTITUTIONS: A FRAMEWORK FOR ADAPTIVE DECISION-MAKING AND ORGANIZATIONAL PERFORMANCE

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Abstract *– Higher education systems that expand and devolve at the same time face a governance paradox: institutions receive new decision rights just as ratings and performance-based funding make poor decisions more visible. This article develops and tests an innovation-driven governance framework for higher education institutions (HEIs) that links governance architecture, adaptive decision-making and organizational performance. Uzbekistan is used as a case of rapid transition: the number of HEIs grew from 69 in 2015/2016 to 222 in 2024/2025 and declined to 215 in 2025/2026, while enrolment reached 1.535 million. The design combined (1) a content analysis of five regulatory acts adopted in 2021–2026, coded against the four autonomy dimensions of the European University Association scorecard; (2) conceptual modelling of a three-layer framework comprising a decision-rights architecture, an adaptive decision loop and a performance system; and (3) a Monte Carlo experiment with 10,000 replications comparing hierarchical, data-informed and innovation-driven adaptive decision regimes. The regulatory analysis reveals "steered autonomy": staffing and academic decision rights are largely devolved to financially independent HEIs, whereas executive appointments are centrally controlled and tuition fees are capped. In the simulation, data-informed selection raised the mean five-year performance gain by 42% relative to hierarchical decision-making and halved the share of harmful initiatives brought to full scale. Adaptive experimentation halved that share again and improved downside outcomes, but its expected-performance advantage emerged only under higher volatility or longer horizons, and piloting every initiative reduced the gain by 21%. The findings support explicit decision rights, proportional experimentation and leading indicators as design principles for HEI governance.*

Keywords: *innovation, governance, adaptivity, decision-making, performance, universities, autonomy, experimentation, simulation, Uzbekistan.*

INTRODUCTION

Universities are expected to deliver more with greater uncertainty. Digital transformation, competition for students and funding, international rankings and rapidly changing labour markets require institutions to make faster and better-founded choices about programmes, partnerships, services and investments (Benavides et al., 2020). Governance – the structures and processes through which such decisions are made and through which institutions are held to account – has therefore become a lever of organizational performance rather than a purely administrative matter (Shattock, 2006; de Boer et al., 2007). Yet many governance arrangements inherited from bureaucratic and collegial traditions were designed for stability, not for continuous adaptation (Kezar & Eckel, 2004).

Uzbekistan illustrates this tension in an unusually compressed form. According to official statistics, the number of HEIs grew from 69 in 2015/2016 to 222 in 2024/2025, and enrolment increased from 264.3 thousand to 1,432.8 thousand students (National Statistics Committee of the Republic of Uzbekistan, 2025; Qodirov et al., 2026). At the start of 2025/2026 the system contained 215 HEIs, of which 97 were non-state, and 1,535.0 thousand students (National Statistics Committee

of the Republic of Uzbekistan, 2026a, 2026b). In parallel, the state devolved decision rights. Two presidential resolutions of 24 December 2021 granted designated state HEIs academic, organizational and financial powers, including the right to approve curricula, structures and staffing, and to set tuition fees (President of the Republic of Uzbekistan, 2021a, 2021b); the list of financially independent institutions expanded from 35 to 41 (Qodirov et al., 2026). In 2026, performance steering intensified: a decree of 16 February introduced digital "green–yellow–red" monitoring of strategic targets, and a decree of 10 April established a national rating with tier-based incentive funding from 1 January 2027 while revising the procedure for appointing rectors (President of the Republic of Uzbekistan, 2026a, 2026b). By 2030 the system is expected to reach at least 50% enrolment coverage, place 10 HEIs in the global top 1,000 and obtain international accreditation for 200 programmes (Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan, 2026).

This combination creates a governance paradox. Institutions now hold decision rights that previously belonged to ministries, but the consequences of their decisions are increasingly translated into ratings and money. Evidence from performance-based funding shows that external metrics alone rarely improve outcomes and can trigger unintended responses when institutions lack internal capacity to act on them (Ortagus et al., 2020). National studies have examined the legal foundations of academic independence (G'oziyev, 2026) and approaches to assessing management quality (Temirov, 2025), but there is little guidance on how an HEI should organize its own decisions so that they are simultaneously innovative, accountable and robust to uncertainty.

The aim of this study is to develop and test a framework of innovation-driven governance that connects decision rights, adaptive decision processes and organizational performance in HEIs. Three research questions guided the work: (RQ1) Which decision rights do HEIs hold under the current regulatory framework, and where do the limits of their autonomy lie? (RQ2) How can governance architecture, adaptive decision processes and performance systems be integrated into a coherent institutional framework? (RQ3) Under which conditions does adaptive, experimentation-based decision-making improve organizational performance relative to hierarchical and data-informed regimes? The object of the study is the system of HEIs in Uzbekistan; the subject is the set of governance mechanisms that link decisions to performance. Two hypotheses were formulated: H1 – data-informed selection of initiatives increases expected performance; H2 – adaptive experimentation primarily reduces downside risk, and its advantage in expected performance grows with environmental volatility.

The scientific novelty is threefold: the autonomy dimensions of the European University Association are applied to a Central Asian transition system that includes the 2026 reforms; a three-layer framework is proposed that integrates decision rights, an adaptive decision loop and leading and lagging indicators; and the conditions under which adaptive governance pays off are quantified, yielding the principle of proportional experimentation.

LITERATURE REVIEW

Governance models. Classical organization theory portrays universities as "organized anarchies" with ambiguous goals, unclear technologies and fluid participation, in which decisions often emerge from the chance coupling of problems, solutions and participants (Cohen et al., 1972). Clark (1998) showed that institutions which transform successfully build a strengthened steering core and an expanded developmental periphery while keeping the academic heartland engaged. Comparative studies describe a shift from state regulation and academic self-governance towards managerial self-governance, stakeholder guidance and competition; the "governance equalizer" captures these five dimensions and shows that national systems combine them differently (de Boer et al., 2007). Shattock (2006) argued that good governance depends on a constructive balance between lay governing bodies, executive leadership and academic participation, while Kezar and Eckel (2004) concluded that formal structures explain governance effectiveness less than relationships, trust and leadership do.

Leadership and stakeholders. Innovation in universities increasingly depends on actors outside

the academic core. The triple helix model describes innovation as the outcome of interaction between universities, industry and government, which implies that external partners take part in shaping institutional priorities (Etzkowitz & Leydesdorff, 2000). Inside the institution, distributed leadership is often promoted as a way of mobilizing initiative across levels; however, a study of UK universities found that it frequently remains rhetorical unless roles, resources and accountability are made explicit (Bolden et al., 2009). Competitive pressure adds a further layer: Pucciarelli and Kaplan (2016) argue that intensifying competition, internationalization and digital disruption increase complexity and uncertainty in higher education, so that universities need clearer strategic choices and more flexible management. Together, these studies suggest that innovation-oriented governance requires both openness to external input and a precise allocation of internal decision rights.

Autonomy and accountability. The European University Association distinguishes four dimensions of institutional autonomy – organizational, financial, staffing and academic – and its latest scorecard reports that dual governance structures remain dominant in Europe, that financial autonomy is under pressure from targeted funding, and that staffing rules remain rigid in many systems (European University Association, 2023). Autonomy is typically accompanied by new accountability instruments, most prominently performance-based funding. A systematic synthesis of research on such funding in the United States found mostly null or modest effects on degree completion, together with unintended consequences such as restricted access for underrepresented students and strategic responses by institutions (Ortagus et al., 2020). For Uzbekistan, Qodirov et al. (2026) characterize the 2015–2025 reforms as state-designed marketization: the state retained control over market entry, base fees, price ceilings and membership of the financially independent group. G'oziyev (2026) emphasizes that the relationship between HEIs and regulators still needs to be adapted to the logic of academic independence.

Adaptive and agile governance. Research on complex systems defines adaptive governance as an arrangement that relies on learning, flexible institutions and multi-level networks to cope with uncertainty and change (Folke et al., 2005). In public administration, adaptive governance is framed as a balance between stability and responsiveness that values learning, decentralized decision-making and stakeholder involvement, while warning that flexibility can erode accountability (Janssen & van der Voort, 2016). Agile approaches translate these ideas into practice through iterative, user-centred and incremental delivery (Mergel et al., 2021). Organizational learning theory adds an important distinction: single-loop learning corrects actions within existing rules, whereas double-loop learning revises the rules and assumptions themselves (Argyris & Schön, 1978).

Innovation and experimentation. March (1991) showed that organizations face a persistent trade-off between exploiting existing competencies and exploring new possibilities, because the returns from exploration are uncertain, distant and often negative. Ambidextrous organizations manage both through structural and contextual mechanisms (O'Reilly & Tushman, 2013). Dynamic capabilities theory defines the ability of an organization to integrate, build and reconfigure competences in rapidly changing environments (Teece et al., 1997); its later formulation describes these capabilities as sensing, seizing and transforming and treats them as a workable management system (Teece, 2018). Business experimentation offers a concrete mechanism: controlled, low-cost tests reduce reliance on intuition, but they require infrastructure, leadership support and a culture that accepts failed tests (Thomke, 2020).

Decision rights, data and performance measurement. Clarity about who recommends, agrees, decides, performs and provides input is associated with faster and better decisions, whereas ambiguous roles create bottlenecks (Rogers & Blenko, 2006). The balanced scorecard links strategy to a set of leading and lagging indicators so that managers can act before outcomes deteriorate (Kaplan & Norton, 1996). In higher education, the adoption of analytics has been shown to be primarily a leadership challenge that requires both administrative and adaptive functions (Tsai et al., 2019); decision-support systems remain underused because of inconsistent data and the need to adapt solutions to each institution (Gaftandzhieva et al., 2023). Temirov (2025) recommends combining internal efficiency indicators with outcome indicators such as graduate competitiveness, research

output and rankings.

Modelling decision regimes. Computational modelling has a long tradition in organization theory. Both the garbage can model (Cohen et al., 1972) and the analysis of exploration and exploitation (March, 1991) were developed through simulation, which makes it possible to examine theoretical mechanisms under controlled assumptions when field experiments are impossible. This tradition is relevant to university governance because the same initiative cannot be implemented under different decision regimes in a real institution, and because the effects of governance choices unfold over several years. Simulation does not replace empirical evidence, but it can clarify the conditions under which a governance mechanism is likely to add value and thereby guide subsequent empirical research.

Research gap. These literatures rarely meet at the level of the individual institution. Governance and autonomy studies describe the distribution of authority between the state and universities; adaptive governance and innovation studies describe how organizations learn; performance measurement studies describe indicators. An integrated framework that connects internal decision rights, adaptive decision processes and performance indicators under conditions of steered autonomy is missing, especially for transition systems in Central Asia. Moreover, claims that adaptive governance improves performance are mostly conceptual; the conditions under which it does so have rarely been quantified. This study addresses both gaps.

METHODOLOGY

The study followed a mixed-method, design-oriented approach in three stages: a qualitative analysis of the regulatory framework (RQ1), the development of a conceptual framework (RQ2) and a computational experiment (RQ3). Uzbekistan was selected as a critical case because it combines rapid expansion, devolution of decision rights and the introduction of rating-based steering within a short period.

Data. Official statistics on the number of HEIs, non-state HEIs and students were taken from the National Statistics Committee (2025, 2026a, 2026b); the 2015/2016 figures were taken from a study based on the same official series (Qodirov et al., 2026). Five regulatory acts adopted in 2021–2026 were retrieved from the national legislation database lex.uz: presidential resolutions PQ-60 and PQ-61 of 24 December 2021, Cabinet of Ministers Resolution No. 419 of 1 August 2022, and presidential decrees PF-21 of 16 February 2026 and PF-58 of 10 April 2026 (President of the Republic of Uzbekistan, 2021a, 2021b, 2026a, 2026b; Cabinet of Ministers of the Republic of Uzbekistan, 2022). Ministry reports were used for system-level information and targets (Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan, 2025, 2026).

Regulatory analysis. Provisions of the five acts were coded against the 21 indicators of the four autonomy dimensions used by the European University Association (2023). Each indicator was assigned one of four codes: H – the HEI decides within general legislation (score 1); P – the HEI decides within limits set by the state or subject to state approval (score 0.5); L – state bodies decide (score 0); n/s – not specified in the analysed acts (excluded from scoring). A dimension score was calculated as the mean of the coded indicators. The coding refers to state HEIs with financial independence and was carried out by the author; the scores are indicative and are not comparable with the weighted scores of the European scorecard.

Framework development. The framework was derived by synthesising the reviewed theories with the regulatory findings, so that each of its elements corresponds to a legal power or obligation identified in the regulatory analysis.

Computational experiment. A stylised Monte Carlo model represented an HEI that, in each year t of a horizon of T years, receives N candidate initiatives (for example, new programmes, digital services or partnerships). Initiative i has a latent net annual effect on an organizational performance index, $\theta_i \sim N(0, \sigma_\theta^2)$, which drifts over time as $\theta_{i,t+1} = \theta_{i,t} + \eta$, $\eta \sim N(0, v^2)$, where v represents environmental volatility. At most K initiatives can be brought to full scale each year. Three decision regimes were compared. In the hierarchical regime (R1), managers observe a judgement signal $s = \theta$

+ ε with ε ~ N(0, σ_J^2) and adopt the top K initiatives with s > 0 at full scale, without subsequent review. In the data-informed regime (R2), the signal is produced by analytics with lower noise σ_D at an annual cost c_D; the adoption rule is the same. In the innovation-driven adaptive regime (R3), the analytics signal is converted into a Bayesian posterior; initiatives whose posterior mean exceeds z^* posterior standard deviations are fast-tracked, up to P promising but uncertain initiatives are piloted for one year at scale α and cost c_P, and pilot results update the posterior before scaling decisions in the following year. Scaled initiatives are reviewed annually with monitoring noise σ_M and cost c_R, and are terminated when the observed effect is negative.

Table 1

Parameters of the computational experiment

Parameter	Symbol	Baseline	Sensitivity values
Decision horizon, years	T	5	8; 10
Candidate initiatives per year	N	8	–
Full-scale adoptions per year (capacity)	K	2	–
Dispersion of initiative effects	σ_θ	1.0	–
Environmental volatility (annual drift)	v	0.25	0; 0.5; 0.75; 1.0
Noise of managerial judgement (R1)	σ_J	1.5	–
Noise of analytics signal (R2, R3)	σ_D	0.75	–
Annual cost of analytics (R2, R3)	c_D	0.10	–
Pilots per year / pilot scale (R3)	P / α	3 / 0.2	–
Noise of pilot observation (R3)	σ_P	0.4	–
Cost per pilot (R3)	c_P	0.05	0.15; 0.30
Fast-track threshold, posterior z-score (R3)	z^*	1.0	0.5; 1.5; ∞ (pilot all)
Monitoring noise / review cost per initiative-year (R3)	σ_M / c_R	0.3 / 0.02	–

The outcome was the cumulative performance gain over the horizon, measured in index points as the sum of the annual effects of active initiatives (pilots at scale α) minus decision costs. The indicators reported were the mean, standard deviation, 5th and 95th percentiles, the probability of a negative cumulative gain and the share of scaled initiatives whose initial true effect was negative (harmful scaling). Each scenario was run with 10,000 replications using common random numbers, so that regimes were compared on identical sets of initiatives; paired differences are reported with their standard errors. The parameters (Table 1) are stylised assumptions chosen to represent plausible relative magnitudes; they were not calibrated to a specific HEI, so the results are interpreted comparatively. All calculations were performed in Python with the NumPy library (random seed 2026).

ANALYSIS AND RESULTS

Regulatory autonomy profile. The coding of the five regulatory acts is summarized in Table 2. Of the 21 indicators, 18 could be coded; borrowing, ownership of buildings and staff promotions are not regulated by the analysed acts.

Table 2

Decision rights of financially independent state HEIs by autonomy dimension

Dimension (score)	Indicator	Code	Regulatory basis
Organizational (0.50)	Selection of the rector	L	From 1 September 2026, appointment on the recommendation of the supervising ministry or agency, agreed with the Presidential Administration and the Cabinet of Ministers (PF-58)
	Dismissal and term of the rector	L	Same procedure; the Ministry may impose disciplinary measures on rectors (PF-58)
	External members in governing bodies	P	Supervisory board with at least 70% external members; composition approved by the ministry (PQ-60)

	Academic structures	H	Structure and staff numbers approved regardless of standard norms (PQ-60, PF-58)
	Creating legal entities	H	May create self-financed units and commercial or non-commercial organizations (PQ-60)
Financial (0.63)	Length and type of public funding	P	Per-student normative funding under an annual agreement; funds credited to the extra-budgetary account (No. 419)
	Keeping a surplus	H	Year-end balances remain at the disposal of the HEI (PQ-61, No. 419)
	Borrowing money; owning buildings	n/s	Not regulated in the analysed acts
	Tuition fees, national students	P	Set by the HEI, capped at three times the base fee (PQ-61)
	Tuition fees, international students	P	Contract admission of foreign citizens; admission terms set by the HEI on the "Study in Uzbekistan" platform; fee rules not specified (PQ-60, PF-58)
Staffing (1.00)	Recruitment procedures	H	Own procedures for hiring and rotation (PQ-60)
	Salaries	H	Pay and incentives set on the basis of KPIs (PQ-61)
	Dismissals	H	Own dismissal procedures (PQ-60)
	Promotions	n/s	Not regulated in the analysed acts
Academic (0.75)	Overall student numbers	P	State admission commission retains powers; contract admission parameters set by the supervisory board; doctoral admission beyond the quota (PQ-60, PQ-61, PF-58)
	Selecting students	P	Domestic admission through the state system; terms for international applicants set by the HEI (PF-58)
	Introducing and terminating programmes	H	Programmes opened and closed according to labour market needs (PQ-60)
	Language of instruction	H	Language and form of study set by the HEI (PQ-60)
	Quality assurance mechanisms	P	Internal QA mechanisms set by the HEI; national rating methodology set by the national quality assurance agency (PQ-60, PF-58)
	Content of degree programmes	H	Curricula and programmes approved on the basis of professional standards (PQ-60)

Staffing autonomy received the highest score (1.00): recruitment, dismissal and pay are decided by the institution, with pay explicitly linked to KPIs. Academic autonomy scored 0.75: programme content, language and the opening and closing of programmes are devolved, whereas student numbers, selection of domestic students and external quality assurance remain shared with state bodies. Financial autonomy scored 0.63: HEIs keep surpluses, but public funding follows a per-student norm and domestic tuition fees are capped at three times the base fee. Organizational autonomy scored lowest (0.50): HEIs may design their academic structures and create legal entities, but from 1 September 2026 the appointment and dismissal of rectors are subject to central agreement, and the composition of supervisory boards is approved by the ministry. The overall indicative score was 0.69 (12.5 of 18 coded indicators). At the same time, PF-58 links institutional incentives to the national rating from 1 January 2027: within each category of HEIs, the top 20% form Tier 1 and receive an incentive equal to 20% of per-student funding if they are financially independent (10% of budget funding for traditionally funded HEIs), Tier 2 receives 10% (5%), and Tier 3 receives no incentive.

Innovation-driven governance framework. On the basis of the literature synthesis and the regulatory profile, a three-layer framework was developed (Figure 1).

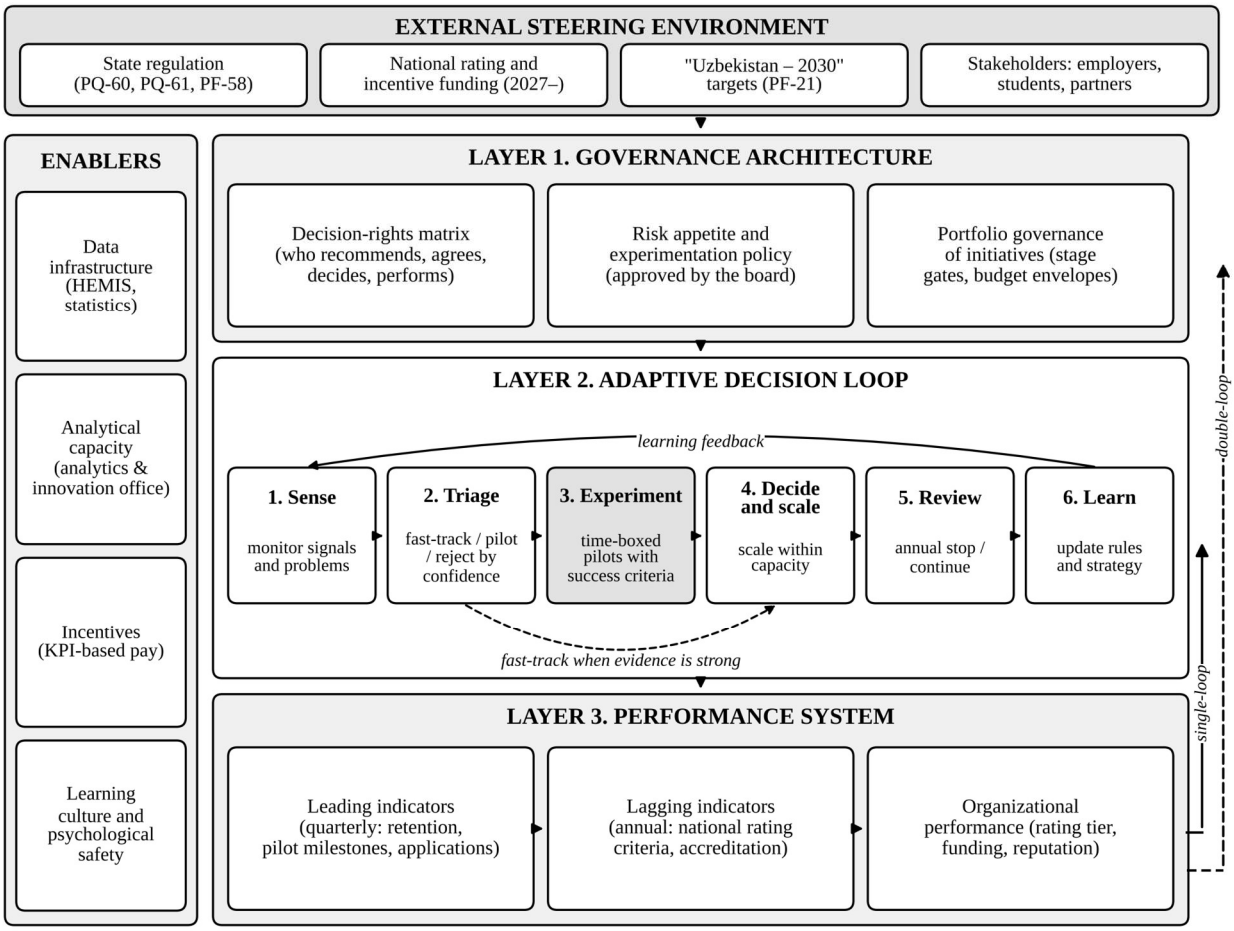


Figure 1. Innovation-driven governance framework for HEIs

The first layer, governance architecture, defines who decides what. It comprises a decision-rights matrix, a risk appetite and experimentation policy approved by the supervisory board, and portfolio governance of initiatives with stage gates and budget envelopes. The second layer is an adaptive decision loop of six steps: sense (monitoring of signals and problems), triage (fast-tracking initiatives with strong evidence, piloting uncertain ones and rejecting weak ones), experiment (time-boxed pilots with predefined success criteria), decide and scale (within capacity), review (an annual stop-or-continue decision) and learn. The third layer is a performance system that connects quarterly leading indicators with the annual lagging indicators of the national rating and, ultimately, with organizational performance in terms of rating tier, funding and reputation. Feedback from the third layer operates as single-loop learning when it corrects decisions within the second layer, and as double-loop learning when it revises the rules of the first layer. Four enablers support the framework: data infrastructure based on the HEMIS information system and official statistics, an analytics and innovation office, KPI-based incentives and a learning culture. The decision-rights matrix is presented in Table 3.

Table 3

Decision-rights matrix for innovation-driven governance of an HEI

Decision type	Supervisory board	University council	Rector	Analytics and innovation office	Faculty or department	Stakeholder panel
Strategy, KPI targets and risk appetite	D	A	R	I	I	I
Business plan and major investments	D	I	R	I	P	–
Tuition pricing within	D	–	R	I	–	I

the regulatory cap						
Opening or closing degree programmes	I	D	A	I	R, P	I
Launching pilots within an approved envelope	–	–	D	A	R, P	I
Scaling or terminating initiatives after review	I	A	D	R	P	I
Course-level and operational academic decisions	–	–	–	I	D, P	I

The matrix assigns a single decider to each decision type, separates the right to recommend from the right to decide, and gives the analytics and innovation office an "agree" role for pilots, so that every experiment has a predefined design and success criteria. The performance system translates the five criteria of the national rating into leading indicators that can trigger decisions within a quarter rather than after the annual rating (Table 4).

Table 4

Leading and lagging indicators aligned with the criteria of the national rating

Rating criterion (PF-58)	Lagging indicator (annual)	Leading indicator (quarterly)	Example of a decision trigger
Academic	Share of internationally accredited programmes; graduate learning outcomes	First-year retention; course pass rates; student satisfaction	Retention more than 5 p.p. below plan → programme review in the triage step
Research	Indexed publications; research income	Grant applications submitted; milestones of funded projects	Project misses its annual KPI → stop-or-continue review
International activity	Share of international students and staff; joint programmes	Applications through "Study in Uzbekistan"; active partner agreements	Applications below target for two quarters → pilot of a new recruitment channel
Digitalization	Share of services delivered digitally	HEMIS data completeness; usage of e-services	Data error rate above threshold → corrective action by the analytics office
Graduate employment	Employment within six months; employer evaluation	Internship placements; courses co-designed with employers	Placements below plan → pilot of dual-format modules

Results of the computational experiment. Table 5 reports the baseline results for a five-year horizon and moderate volatility (v = 0.25).

Table 5

Performance of the three decision regimes (baseline, 10,000 replications)

Indicator	R1 Hierarchical	R2 Data-informed	R3 Adaptive
Mean cumulative gain, index points (SE)	18.97 (0.10)	26.89 (0.09)	26.74 (0.08)
Standard deviation	9.88	8.85	8.49
5th / 95th percentile	2.71 / 34.98	12.42 / 41.44	13.22 / 41.11
Probability of a negative gain, %	2.61	0.06	< 0.01
Harmful scaling (share of scaled initiatives with negative initial effect), %	23.8	11.1	5.5
Initiatives scaled / piloted / terminated per run	9.80 / – / –	9.80 / – / –	8.85 / 9.95 / 1.36
Paired difference vs R1 (SE)	–	+7.92 (0.08)	+7.77 (0.08)
Paired difference vs R2 (SE)	–	–	−0.15 (0.04)

Moving from hierarchical to data-informed selection increased the mean cumulative gain by 7.92 index points (41.8%), raised the 5th percentile from 2.71 to 12.42 and halved harmful scaling

from 23.8% to 11.1%. The adaptive regime halved harmful scaling again to 5.5%, terminated 1.36 initiatives per run after review and produced the highest 5th percentile (13.22) and the lowest dispersion (standard deviation 8.49). Its mean gain, however, was 0.15 points (SE 0.04) lower than that of the data-informed regime, because piloting delays the full-scale implementation of uncertain initiatives by one year and consumes resources.

The sensitivity analysis showed that this result depends on volatility and horizon (Figure 2).

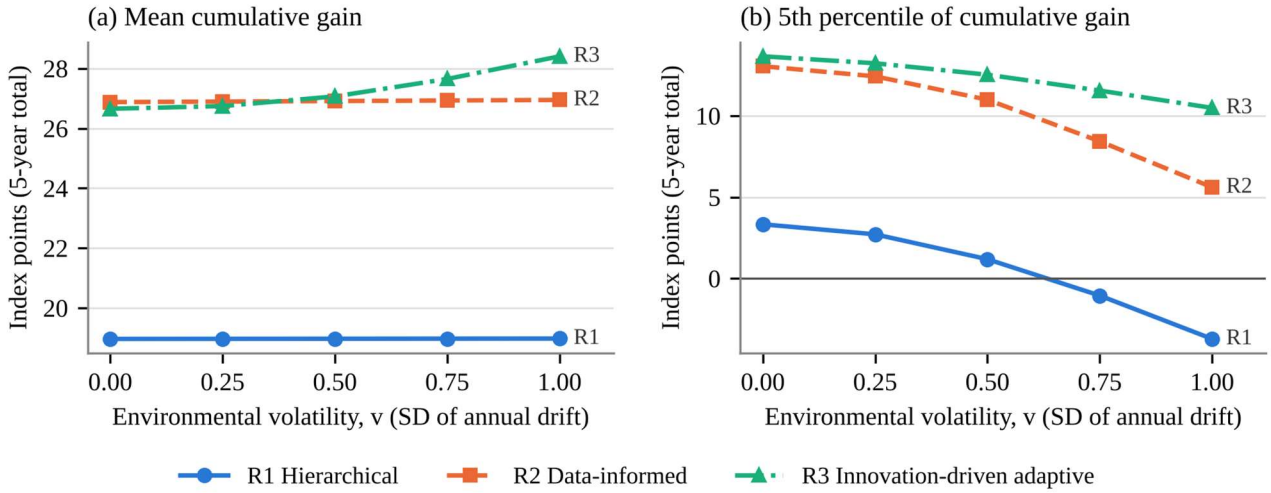


Figure 2. Mean and 5th percentile of the cumulative gain by environmental volatility

Without volatility, the adaptive regime trailed the data-informed regime by 0.22 points (SE 0.04). The difference turned positive at v = 0.5 (+0.15; SE 0.05) and grew to +0.72 (SE 0.06) at v = 0.75 and +1.46 (SE 0.08) at v = 1.0. Downside protection increased even faster: at v = 1.0 the 5th percentile was 10.48 for R3, 5.60 for R2 and −3.71 for R1, and the probability of a negative cumulative gain was 0.1%, 1.8% and 8.5%, respectively. Extending the horizon at baseline volatility also favoured the adaptive regime, with paired differences relative to R2 of +0.62 (SE 0.09) for eight years and +1.45 (SE 0.13) for ten years.

The cost and scope of experimentation were decisive. Raising the cost per pilot from 0.05 to 0.15 and 0.30 changed the difference relative to R2 to −1.15 and −2.64 points. Lowering the fast-track threshold to $z^* = 0.5$ made the adaptive regime marginally better than R2 (+0.05; SE 0.03) at the price of more harmful scaling (8.1%), whereas raising it to 1.5 reduced the mean gain (−1.14) and harmful scaling (4.2%). When every promising initiative was piloted ($z^* = \infty$), the mean gain fell to 21.05 points, 21.3% below the baseline adaptive regime, even though harmful scaling declined to 4.0%.

DISCUSSION

The results answer the three research questions and partly confirm the hypotheses. With regard to RQ1, the regulatory profile shows that autonomy in Uzbekistan is real but uneven. Decisions on staff and academic matters have largely moved to financially independent HEIs, financial autonomy is bounded by formula funding and fee caps, and executive leadership remains under central control, which the 2026 reform reinforced. This pattern is consistent with the description of state-designed marketization (Qodirov et al., 2026) and with the European observation that formal autonomy coexists with strong external steering (European University Association, 2023). The distinctive feature of the Uzbek case is timing: operational autonomy, central control of leadership appointments and rating-based incentives intensify at the same time. Accountability therefore runs upward through metrics, and the quality of internal decision-making becomes the main instrument through which an HEI can influence its rating tier and funding.

With regard to RQ2, the framework adds an internal dimension to system-level governance models. The governance equalizer (de Boer et al., 2007) describes how authority is shared between

the state, stakeholders, academics and managers; the proposed decision-rights matrix specifies how that authority is exercised inside the institution. Explicit roles respond to the observation that relationships and leadership matter more than formal structures (Kezar & Eckel, 2004) by reducing ambiguity about who decides (Rogers & Blenko, 2006), and they impose order on the fluid participation characteristic of organized anarchies (Cohen et al., 1972) without centralizing every decision. The adaptive loop operationalizes dynamic capabilities: sensing and triage correspond to sensing, experimentation and scaling to seizing, and review and learning to transforming (Teece, 2018). The two feedback paths institutionalize single- and double-loop learning (Argyris & Schön, 1978).

The framework also clarifies the role of external stakeholders and of faculties. The triple helix perspective (Etzkowitz & Leydesdorff, 2000) suggests that employers and partners should shape institutional priorities; in the matrix they provide input into all major decisions and co-design pilots in the graduate employment domain, but they do not hold decision rights, which keeps accountability within the statutory bodies. The matrix also gives distributed leadership a concrete form: faculties recommend and perform most initiatives and decide on operational matters, which addresses the risk that the distribution of leadership remains rhetorical (Bolden et al., 2009). In a competitive environment characterized by complexity and uncertainty (Pucciarelli & Kaplan, 2016), such clarity shortens the time between identifying a problem and acting on it.

With regard to RQ3, hypothesis H1 was confirmed: better information produced the largest improvement in expected performance, supporting investment in analytics and data infrastructure (Tsai et al., 2019; Gaftandzhieva et al., 2023). Hypothesis H2 was confirmed in its first part and qualified in its second. Adaptive experimentation acted primarily as a risk-management device: it halved harmful scaling and protected the lower tail of outcomes in every scenario. Its advantage in expected performance appeared only when volatility or the horizon was large enough to outweigh the delay and cost of piloting. This is consistent with the argument that exploration pays off over longer horizons and under uncertainty (March, 1991) and with the emphasis of adaptive governance on turbulent environments (Folke et al., 2005; Janssen & van der Voort, 2016).

The most practical finding concerns proportional experimentation. Piloting everything reduced the mean gain by about one fifth, and expensive pilots eliminated the benefit of the adaptive regime. Experimentation should therefore be targeted at uncertain and consequential decisions, while well-evidenced initiatives are fast-tracked; pilots must be cheap, time-boxed and governed by stop rules, which echoes the view that low-cost experiments are the foundation of an experimentation culture (Thomke, 2020). For HEIs, this means that an experimentation policy approved by the supervisory board should specify thresholds for fast-tracking and piloting rather than a general commitment to innovation.

Several implications follow for HEIs preparing for the national rating in 2027. First, supervisory boards can adopt a decision-rights matrix and an experimentation policy as part of the strategic development programme they already approve. Second, an analytics and innovation office can turn HEMIS data into leading indicators and pilot designs. Third, leading indicators aligned with the five rating criteria allow corrective decisions within a quarter. Fourth, equity indicators should be monitored alongside rating indicators, because performance-based funding can produce unintended effects on access (Ortagus et al., 2020).

The study has limitations. The regulatory coding was carried out by a single coder, covers only financially independent state HEIs and reflects acts that are still being implemented; the scores are indicative and not comparable with European scorecard values. The simulation is stylised: its parameters were not calibrated, initiative effects were assumed to be normally distributed and independent, and the performance index is abstract. The results therefore indicate the direction and conditions of effects rather than their size in a real institution. Future research should calibrate the model with institutional data from the national rating after 2027, use several coders to establish reliability and test the framework through case studies in pilot HEIs.

CONCLUSION

The study developed and tested a framework of innovation-driven governance for higher education institutions.

First, the regulatory framework in Uzbekistan provides steered autonomy: staffing and academic decision rights are largely devolved to financially independent HEIs, financial autonomy is bounded by formula funding and fee caps, and leadership appointments remain centrally controlled, while rating-based incentives will link institutional decisions to funding from 2027.

Second, the proposed framework integrates three layers – a governance architecture with explicit decision rights and an experimentation policy, an adaptive decision loop of six steps and a performance system of leading and lagging indicators – supported by data, analytical capacity, incentives and a learning culture.

Third, the computational experiment showed that data-informed decision-making delivers the largest gain in expected performance, whereas adaptive experimentation mainly reduces the risk of scaling harmful initiatives and becomes superior in expected terms when volatility is high or the horizon is long. Experimentation pays off only when it is proportional and inexpensive, so pilots should be reserved for uncertain and consequential decisions.

Fourth, aligning quarterly leading indicators with the five criteria of the national rating allows HEIs to act on early signals instead of waiting for annual rating results, while equity indicators help to prevent unintended effects of rating-based funding.

The practical significance of the study lies in a set of instruments – a decision-rights matrix, an experimentation policy with fast-track and pilot thresholds, and a system of leading indicators – that supervisory boards and rectors can introduce before the first national rating. Further research should calibrate the model with empirical data, test the framework in pilot institutions and extend the analysis to traditionally funded and non-state HEIs.

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