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DESIGNING A THREE-LEVEL KPI FRAMEWORK FOR RANKING-ORIENTED UNIVERSITY GOVERNANCE: INTEGRATING DIGITAL MONITORING AND RESOURCE OPTIMIZATION

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Abstract. University ranking systems have encouraged higher education institutions to adopt a wide range of strategic measures; however, the operational governance mechanisms needed to translate ranking methodologies into institutional management practices require further specification. This study presents an integrated governance framework comprising three components: a three-level key performance indicator (KPI) system aligned with the *Times Higher Education (THE) World University Rankings* methodology at the university, faculty, and department levels; a Digital Ranking Dashboard (DRD) platform for real-time performance monitoring; and an evidence-based resource allocation model designed to optimize investment in ranking strategies. The framework was developed through an analysis of New Uzbekistan University's institutional management system, benchmarking against four globally successful young universities, and economic modelling of investment requirements. The KPI system comprises 10 indicators mapped to the five THE ranking pillars, with clearly defined units of measurement, responsible departments, and monitoring frequencies. The DRD platform integrates six functional modules: scientific publications, citation tracking, international engagement, grant monitoring, a faculty-level KPI tracker, and budget–indicator linkages. It is proposed as a localized alternative to commercial platforms such as THE DataPoints and the QS Insight Suite. The resource allocation model distributes an estimated annual investment of USD 2.0–2.5 million across five strategic priorities: research quality (35%), international outlook (28%), research infrastructure (20%), digital monitoring (10%), and global branding (7%). The framework is complemented by an economic risk assessment covering five categories: macroeconomic, institutional and financial, operational, technological, and behavioral risks. The study contributes to the literature on higher education governance by demonstrating how ranking methodologies can be operationalized through actionable institutional management systems for emerging universities.

Keywords: KPI system, university rankings, digital dashboard, resource allocation, higher education governance, quality assurance, THE methodology.

Аннотация. Системы университетских рейтингов способствовали разработке высшими образовательными учреждениями широкого спектра стратегических мер; вместе с тем операционные механизмы управления, необходимые для интеграции рейтинговой методологии в практику институционального менеджмента, требуют дальнейшей конкретизации. В исследовании представлена интегрированная модель управления, включающая три компонента: трёхуровневую систему ключевых показателей эффективности (KPI), согласованную с методологией *Всемирного рейтинга университетов Times Higher Education (THE)* и охватывающую уровни университета, факультета и кафедры; платформу цифровой панели рейтингового мониторинга (DRD), предназначенную для отслеживания результативности в режиме реального времени; а также основанную на фактических данных модель распределения ресурсов, направленную на оптимизацию инвестиций в рейтинговую стратегию. Модель разработана на основе анализа системы институционального управления Университета «Новый Узбекистан», сравнительного анализа деятельности четырёх успешных молодых университетов мирового уровня и экономического моделирования инвестиционных потребностей. Система KPI

включает 10 показателей, соотнесённых с пятью блоками рейтинга THE, для которых определены единицы измерения, ответственные подразделения и периодичность мониторинга. Платформа DRD объединяет шесть функциональных модулей: научные публикации, мониторинг цитирования, международное взаимодействие, мониторинг грантов, KPI-трекер факультетского уровня и взаимосвязь бюджета с индикаторами. Платформа предлагается в качестве локализованной альтернативы таким коммерческим решениям, как THE DataPoints и QS Insight Suite. Модель распределения ресурсов предусматривает направление расчётного годового объёма инвестиций в размере 2,0–2,5 млн долларов США на пять стратегических приоритетов: качество исследований (35%), международную ориентированность (28%), исследовательскую инфраструктуру (20%), цифровой мониторинг (10%) и глобальный брендинг (7%). Модель дополнена системой оценки экономических рисков по пяти категориям: макроэкономические, институционально-финансовые, операционные, технологические и поведенческие риски. Исследование вносит вклад в научную литературу по управлению высшим образованием, демонстрируя возможности операционализации рейтинговой методологии посредством создания действенных систем институционального менеджмента для динамично развивающихся университетов.

Ключевые слова: система KPI, университетские рейтинги, цифровая панель мониторинга, распределение ресурсов, управление высшим образованием, обеспечение качества, методология THE.

INTRODUCTION

The proliferation of international university rankings has created an important governance priority for higher education institutions: translating complex, multidimensional ranking methodologies into operational management systems capable of guiding institutional decision-making (Hazelkorn, 2015). The *Times Higher Education World University Rankings (THE WUR) 2025* evaluates universities using 18 performance indicators grouped into five pillars: Teaching (29.5%), Research Environment (29%), Research Quality (30%), International Outlook (7.5%), and Industry (4%) (THE, 2025). For university administrators seeking to improve their institutions' ranking positions, the central task involves not only understanding these indicators but also creating governance systems that systematically monitor, manage, and optimize performance across all five dimensions.

This governance priority is particularly relevant to emerging universities in developing countries. An analysis of New Uzbekistan University (NUU), established in 2021 as a flagship institution with the strategic objective of entering international rankings, revealed that ranking-related data are managed by several departments. Publication data are maintained by the Scientific Activity Department, international co-authorship information by the International Relations Department, student satisfaction indicators by the Quality Assurance Department, and financial data by the Finance Department (Mamajonova, 2025a). This decentralized structure highlights the opportunity to strengthen centralized coordination, facilitate comprehensive performance assessment, and accelerate strategic decision-making through an integrated ranking data management system.

The existing literature on university governance (Shattock, 2006; Clark, 1998) and the impact of rankings (Hazelkorn, 2015; Marginson, 2017) provides a strong theoretical foundation but offers relatively limited operational guidance on designing ranking-oriented management systems. Studies examining the implementation of KPIs in higher education (Kaplan & Norton, 2008) generally address overall institutional performance rather than ranking-specific governance. Similarly, although commercial platforms such as THE DataPoints and the QS Insight Suite provide advanced data analytics capabilities, their associated costs may present affordability considerations for universities in developing countries (OECD, 2019).

This study addresses this research need by presenting an integrated governance framework specifically designed for ranking-oriented management in emerging universities. The framework comprises three interconnected components: (1) a three-level KPI system aligned with THE methodology; (2) a Digital Ranking Dashboard for real-time performance monitoring; and (3) an evidence-based resource allocation model. The framework was developed through an analysis of NUU's management system, benchmarking against four globally successful young universities—Nanyang Technological University (NTU), Paris Sciences et Lettres University (PSL), King Abdullah University of Science and Technology (KAUST), and Pohang University of Science and Technology (POSTECH)—and economic modelling of investment requirements and risk factors.

LITERATURE REVIEW

The application of performance measurement systems to higher education governance has evolved significantly over the past two decades. Kaplan and Norton's Balanced Scorecard framework (2008) provided

an important conceptual foundation for translating institutional strategy into measurable performance indicators. In the context of higher education, this framework has been adapted to incorporate the perspectives of multiple stakeholders, including students, faculty members, administrators, and external partners (Dill, 2014). However, aligning institutional KPIs with external ranking methodologies introduces additional complexity because ranking indicators may not always fully correspond to an institution's strategic priorities.

Van Raan (2019) emphasizes the importance of bibliometric normalization in performance measurement, noting that meaningful cross-disciplinary comparisons require field-adjusted indicators. The THE methodology addresses this requirement through discipline-normalized citation indicators; institutional KPI systems should similarly account for disciplinary differences when establishing department-level targets. Designing KPI systems that simultaneously support internal management needs and external ranking requirements therefore remains an important area of academic research.

The concept of data-driven management in higher education has gained prominence with the growing availability of digital infrastructure and institutional data (OECD, 2019). Universities with advanced data analytics capabilities can respond more rapidly to performance changes, allocate resources more efficiently, and improve strategic planning outcomes. Globally ranked institutions such as Nanyang Technological University (NTU) have established dedicated mechanisms for monitoring bibliometric indicators across faculties, thereby creating continuous feedback loops between performance data and strategic decision-making (NTU, 2011).

The experience of internationally successful young universities confirms that digital management is an important factor influencing ranking outcomes. Real-time monitoring through dashboard systems enables institutions to identify areas for performance improvement promptly and reallocate resources in a timely manner (Mamajonova, 2025a). Nevertheless, the design specifications of such platforms, their integration into institutional governance structures, and their economic feasibility in developing-country contexts require further systematic examination.

The economics of ranking strategies has received comparatively limited scholarly attention. International benchmarking evidence indicates that young universities may allocate approximately USD 0.8–1.0 million annually to increasing the share of publications in Q1 and Q2 journals, USD 0.4–0.6 million to expanding the proportion of international faculty members, and USD 70,000–120,000 to implementing digital analytics platforms (Mamajonova, 2025a). Although the total investment required for a comprehensive ranking strategy varies considerably according to institutional circumstances, resources across ranking dimensions should be allocated through systematic optimization rather than through isolated decisions (Docampo, 2013).

Fombrun's (1996) work on organizational reputation provides a complementary theoretical perspective. A university's reputation, as reflected partly in its ranking position, functions as an intangible asset that influences resource flows, talent attraction, and partnership opportunities. From this perspective, ranking-oriented KPI systems serve not merely as performance measurement tools but also as reputation management instruments that systematically develop the institutional characteristics valued by ranking methodologies. The central objective is to design KPI systems that build genuine institutional capacity and promote quality management through indicators, rather than focusing exclusively on short-term indicator improvement.

The experience of internationally successful young universities provides empirical evidence of the potential effectiveness of indicator-based governance. Nanyang Technological University introduced strategic measures covering publication output, citation impact, international faculty participation, and doctoral student numbers. These measures contributed to its substantial advancement in international rankings, with NTU reaching 36th place in the THE World University Rankings 2023. POSTECH's research-driven model made scientific performance an important criterion in faculty incentive mechanisms, fostering a culture of academic entrepreneurship and contributing to improvements in its Industry indicator. Similarly, the consolidation of PSL's research centres and the introduction of unified KPI monitoring strengthened its research performance. These cases demonstrate that institutional restructuring combined with systematic KPI monitoring can support rapid and sustainable ranking improvement (Mamajonova, 2025a).

The Central Asian higher education context has distinctive institutional characteristics that should be considered when implementing KPI systems. Historically centralized governance structures are gradually evolving towards models based on distributed responsibility and accountability, making the phased introduction of three-level KPI systems particularly relevant. At the same time, the rapid pace of higher education reform in Uzbekistan creates strong institutional momentum for modernization and international competitiveness. In particular, Presidential Decree No. PF-5847 establishes the objective of including at least 10 higher education institutions in the world's top 1,000 universities, while Presidential Resolution No. PQ-151 supports the continued development of New Uzbekistan University. Understanding how KPI frameworks can align evolving governance traditions with ongoing reform priorities is therefore essential for designing effective institutional management systems in the region.

RESEARCH METHODOLOGY

This study employs a design-based research methodology that combines institutional analysis, international benchmarking, and economic modelling. The research was conducted between 2022 and 2025 using the following data sources: (1) institutional management documents and organizational structures of New Uzbekistan University (NUU); (2) THE World University Rankings datasets for 2014–2024 and institutional reports from the benchmark universities—NTU, PSL, KAUST, and POSTECH; (3) the Scopus and Web of Science databases for bibliometric analysis; (4) NUU's financial records and budget documents; and (5) national regulatory documents, including Presidential Decree No. PF-5847 and Presidential Resolutions Nos. PQ-151 and PQ-5158.

The three-level KPI system was developed through a three-stage process: (a) decomposing the THE methodology into measurable institutional indicators; (b) mapping the indicators to the responsible organizational units; and (c) defining measurement frequencies and target thresholds based on the performance levels of the benchmark universities. The architecture of the Digital Ranking Dashboard (DRD) platform was designed through a comparative analysis of commercial platforms, including THE DataPoints and the QS Insight Suite, and adapted to NUU's institutional requirements and available financial resources. The resource allocation model was derived from international benchmarking data on ranking-strategy investment patterns and calibrated to Uzbekistan's economic context.

The economic risk assessment framework was developed by analysing ranking-strategy implementation risks across five categories. Probability and impact ratings were assigned based on institutional analysis and expert consultations with university administrators and national specialists in education quality assurance. Figure 1 summarizes the integrated architecture of the proposed framework and illustrates the feedback loop through which performance-monitoring results inform subsequent KPI revisions (Figure 1).

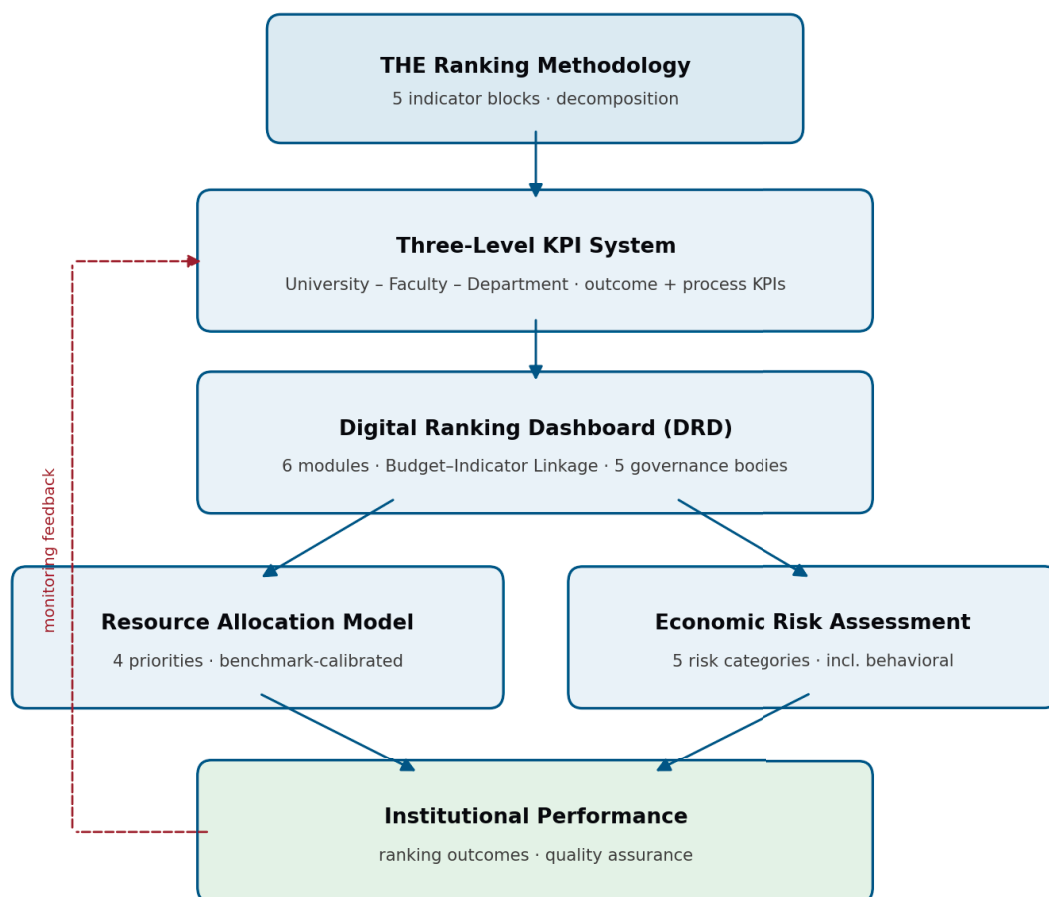


Figure 1. Integrated governance framework: from ranking methodology decomposition to institutional performance, with the monitoring feedback loop¹

¹ author's development

ANALYSIS AND RESULTS

The three-level KPI system, comprising the university, faculty, and department levels, was developed in alignment with THE methodology, thereby ensuring a clear relationship between institutional performance indicators and the corresponding ranking dimensions. Table 1 presents the complete KPI framework, including the relevant THE pillars, units of measurement, responsible departments, and monitoring frequencies (Table 1).

Table 1. Three-Level KPI System Aligned with THE Ranking Methodology

THE Block	KPI Name	Unit	Responsible Dept.	Frequency
Research Quality	Share of publications in Q1/ Q2 journals	%	Scientific Activity Dept.	Quarterly
Research Quality	International co-authorship share	%	R&I Committee	Quarterly
Research Environment	Grants portfolio volume	USD	Grants Department	Quarterly
Research Environment	Doctoral pipeline efficiency	%	PhD Office	Annual
Citations	Citation growth index	%	Scientific Department	Semi-annual
Teaching	Student satisfaction score	Score	Quality Assurance Dept.	Annual
Teaching	International faculty share	%	International Office	Quarterly
International Outlook	International students share	%	IPB	Semi-annual
International Outlook	Number of joint scientific projects	Units	IPB	Quarterly
Industry Income	Commercialization income	USD	Innovation Hub	Semi-annual

Source: author's development based on decomposition of THE World University Rankings methodology.

The KPI system operates at three hierarchical levels. At the university level, aggregate KPIs correspond directly to THE pillar scores, providing strategic oversight for senior management. At the faculty level, KPIs are disaggregated to reflect discipline-specific performance expectations and account for natural variations across academic fields. At the department level, the indicators are further decomposed into targets for individual researchers and research teams, creating a clear chain of accountability from academic staff members to institutional ranking outcomes. This three-level architecture ensures that the ranking strategy is integrated throughout the institutional governance structure.

The KPI system incorporates a results-based financing mechanism under which faculties receive 5–15% in additional funding according to their level of KPI fulfilment. This mechanism creates direct financial incentives for faculty-level engagement with ranking indicators while providing sufficient flexibility to accommodate disciplinary differences in publication and citation practices. The annual KPI incentive fund was estimated at UZS 3.5 billion, equivalent to approximately USD 272,374. This substantial allocation reflects the principle that human capital engagement, supported through faculty incentive mechanisms, represents one of the most important determinants of ranking-strategy effectiveness.

The monitoring frequency framework requires particular attention. Publication-related Research Quality and International Outlook KPIs are monitored quarterly, reflecting the dynamic nature of research output and international collaboration. Citation and Industry Income indicators are monitored semi-annually, in line with the longer periods required for citations to accumulate and commercialization outcomes to become measurable. Teaching quality indicators, including student satisfaction, and doctoral pipeline efficiency are assessed annually in accordance with academic calendar cycles. These differentiated monitoring frequencies ensure that managerial attention is aligned with the temporal characteristics of each indicator while avoiding unnecessary administrative workloads for academic and administrative staff.

A key design feature of the KPI system is the inclusion of both outcome indicators, such as the number of publications in Q1 and Q2 journals and the citation growth index, and process indicators, such as the number of grant applications submitted and international co-authorship proposals initiated. This dual structure recognizes that academic and organizational activities precede measurable outcomes. Monitoring outcomes alone may create delayed feedback, whereas process indicators make it possible to identify performance trends at an early stage and implement timely management measures.

The Digital Ranking Dashboard (DRD) was designed as a centralized digital platform comprising six integrated functional modules, each corresponding to specific THE ranking dimensions. Table 2 presents the platform's modular architecture and data integration specifications (Table 2).

Table 2. DRD Platform: Functional Modules and Data Integration

Module	THE Block	Data Source	Key Functions
Scientific Publications Panel	Research Quality	Scopus API	Quartile classification, co-authorship mapping
Citation Tracking	Citations	Scopus / WoS	Citation dynamics, h-index trends, field normalization
International Engagement	Intl Outlook	HR & Admissions	Faculty/student nationality tracking, mobility
Grants & Startups Monitor	Research Env.	Finance & Innovation	Grant pipeline, startup portfolio, funding flows
Faculty-Level KPI Tracker	All blocks	Aggregated	Cross-module dashboards, inter-faculty comparison
Budget-Indicator Linkage	All blocks	Finance Dept.	Cost-per-indicator analysis, ROI tracking

Source: author's development.

The most distinctive feature of the Digital Ranking Dashboard (DRD) platform is its Budget–Indicator Linkage module, which directly connects financial resource allocation with performance across ranking indicators. This module enables university administrators to evaluate the cost-effectiveness of investments in different ranking dimensions and identify efficient resource allocation patterns. For example, it can calculate the marginal cost of increasing the share of publications in Q1 and Q2 journals by one percentage point, thereby enabling evidence-based comparisons with alternative investments, such as recruiting international faculty members or improving digital infrastructure.

The platform is integrated into the institutional management architecture through five governance bodies: the Strategic Governance Council, responsible for setting priorities based on THE indicators and strategically allocating resources; the Research and Innovation Committee, responsible for publication policy and the coordination of international co-authorship; the International Partnerships Board, responsible for visiting professors, joint programmes, and international student recruitment; the Ranking Analytics Centre, responsible for continuous monitoring and data submissions to THE; and faculty-level management units, responsible for the operational implementation of KPIs. The DRD serves as the central information infrastructure connecting these bodies and transforms ranking monitoring from periodic reporting into a continuous, data-informed governance process.

The resource allocation model was developed through international benchmarking and calibrated to NUU's institutional context. The total annual investment required to implement the ranking strategy was estimated at approximately USD 2.0–2.5 million. This amount is distributed across five strategic priorities, as presented in Table 3.

Table 3. Ranking Strategy Resource Allocation Model

Strategic Priority	Allocation (%)	Est. Annual (K USD)	Key Investments
Research Quality	35-40%	700-1,000	Q1/Q2 publication support, research grants, peer review
International Outlook	25-30%	500-750	International faculty recruitment, visiting professors
Industry Income	15-20%	300-500	Technology transfer, industry partnerships, startups
Teaching & Infrastructure	15-20%	300-500	Digital infrastructure, DRD platform, quality assurance

Note. Estimates based on international benchmarking: young universities spend 0.8-1.0M USD annually on Q1/Q2 publication enhancement, 0.4-0.6M USD on international faculty recruitment, and 70-120K USD on digital analytics platforms.

The allocation model prioritizes Research Quality and Research Environment, with a planned allocation of 35–40%, based on two considerations. First, the Research Environment and Research Quality pillars collectively account for 59% of the THE methodology. Second, benchmarking analysis indicates that the share of publications in Q1 and Q2 journals represents the largest performance difference between NUU and the benchmark universities. International Outlook receives the second-largest allocation of 25–30%, despite accounting for 7.5% of the THE methodology, because international engagement generates complementary benefits across other indicators. These benefits include expanded international co-authorship, broader citation networks, stronger research performance, and additional opportunities for partnership-based commercialization within the Industry pillar.

The investment structure of the institutional management architecture was analysed in detail. Under the three-year implementation plan, resources are distributed as follows: UZS 265 million for the Strategic Governance Council, UZS 450 million for the Research and Innovation Committee, UZS 530 million for the International Partnerships Board, UZS 630 million for the Ranking Analytics Centre, and UZS 1.05 billion for the DRD platform. The total cost of implementing the management architecture is estimated at UZS 2.925 billion. The DRD platform accounts for the largest share—35.9% of the architecture's total cost—reflecting its role as the technological foundation of the governance system. Annual implementation and operating costs gradually decrease over the three-year period, from UZS 1.2 billion in Year 1 to UZS 935 million in Year 2 and UZS 790 million in Year 3, as initial establishment costs are absorbed and the system reaches operational maturity.

The currency and inflation risk buffer was set at UZS 550 million, representing approximately 7.5% of the investment base used in the calculation. This amount reflects the exposure of international components—including visiting professor contracts, database subscriptions, and digital platform licences—to exchange-rate movements. The buffer supports the continuity of planned activities during short-term currency fluctuations and strengthens the financial resilience of the ranking strategy. The allocation for international expertise and auditing amounts to UZS 375 million, or approximately 5.1% of the relevant investment base. It covers external evaluations of KPI system effectiveness, audits of the DRD platform, and periodic consultations with international ranking methodology experts to maintain alignment with evolving THE standards.

The economic risk assessment framework classifies ranking-strategy risks into five categories according to their sources, probability, and potential impact on ranking outcomes. Table 4 summarizes the proposed framework.

Table 4. Five-Category Economic Risk Assessment for Ranking Strategy

Risk Category	Description	Probability	Impact	Mitigation
Macroeconomic	Currency volatility, inflation	Medium	High	Phased investment, risk-buffer fund
Institutional-financial	Grant shortfalls, revenue gaps	Medium	Medium	Diversification, grant portfolio expansion
Operational	Authority overlap, coordination delays	Medium	Medium-High	Clear mandates, KPI matrix, DRD monitoring
Technological	Data errors, cyber threats	Low-Medium	High	Data governance, audit, backup systems
Behavioral	Metric gaming, quantity over quality	Medium	Medium-High	Quality KPIs, ethics code, DRD early warning

Source: author's development based on institutional analysis and expert consultation with university administrators.

The behavioral risk category requires particular attention because its effects may be significant despite being less immediately visible. When KPI-based performance management creates excessive pressure, the risk of indicator manipulation may arise, including prioritizing publication quantity over quality or focusing on easily achievable indicators while giving less attention to dimensions that are more difficult to measure. The proposed mitigation strategy includes designing quality-oriented KPIs that measure impact rather than output alone, adopting an institutional code of ethics for research assessment, and integrating early-warning mechanisms into the DRD platform to identify anomalous patterns that may indicate indicator-oriented behavior.

Elements of the proposed framework have been adopted at multiple levels within Uzbekistan's higher education system. The ranking-oriented KPI system, based on the decomposition of THE methodology, was adopted by the National Quality Assurance Agency for Education under the Administration of the President

of the Republic of Uzbekistan to support the development of the national ranking indicator system and the methodological and functional model of the national ranking platform. This implementation is documented in Official Implementation Certificate No. 03/18-144, dated 16 December 2025.

The Benchmarking–Gap Analysis model was applied by New Uzbekistan University (NUU) to identify priority areas for institutional development. In addition, scientific proposals concerning the formation of ranking-oriented strategic management systems were implemented at Chirchik State University and Jizzakh State Pedagogical University to improve the coordination of strategic management processes. These applications across multiple institutions demonstrate the adaptability of the framework to different types of universities within the national higher education system.

The certificate identifies four areas in which the framework was applied in the Agency's activities: improving the structure of national ranking indicators; developing data collection and analysis mechanisms; generating ranking results through data-driven methods; and designing the methodological and functional model of the national ranking platform.

The certificate also records the application of three specific components of the dissertation. The first is the three-level strategic KPI system—comprising the university, faculty, and department levels—which is aligned with THE methodology and based on the principles of vertical alignment, results-based incentives, process transparency, and quality assurance. The second is the Digital Ranking Dashboard (DRD) concept, designed as an integrated platform for monitoring and forecasting ranking indicators and supporting managerial decision-making. The third is the Rankings and Institutional Research Unit model, proposed as a permanent organizational mechanism for continuously monitoring indicators and facilitating data-driven strategic decision-making.

Furthermore, the certificate identifies three of the author's published articles whose analyses were used in the Agency's analytical and methodological activities.

The integrated governance framework presented in this study addresses an important gap between research on ranking methodologies and institutional management practice. Although the literature on university rankings has extensively examined indicator systems and their effects on higher education (Hazelkorn, 2015; Marginson, 2017; Docampo, 2013), comparatively less attention has been devoted to the operational question of how institutions can translate these indicators into functional governance systems. The proposed three-component framework—comprising a KPI system, the Digital Ranking Dashboard (DRD), and a resource allocation model—provides a practical response to this question.

The three-level KPI architecture contributes to the performance measurement literature by demonstrating how external ranking indicators can be cascaded through institutional hierarchies while maintaining measurement validity at each level. The distinction between outcome and process KPIs addresses the time lag between ranking-related activities and their measurable results, a challenge widely recognized in the performance management literature (Kaplan & Norton, 2008). Process KPIs function as leading indicators, enabling proactive management responses before performance gaps become evident in outcome indicators.

The DRD platform represents a significant practical contribution for universities in developing countries. Commercial analytics platforms such as THE DataPoints and the QS Insight Suite provide advanced capabilities; however, their cost structures may limit accessibility for some institutions. With an estimated annual implementation cost of USD 70,000–120,000, the DRD offers a cost-efficient solution that provides core functionalities tailored to ranking-oriented management needs. Its Budget–Indicator Linkage module is a distinctive feature that enables cost-effectiveness analysis and supports evidence-based resource allocation.

The resource allocation model's prioritization of Research Quality and Research Environment, with a planned allocation of 35–40%, is consistent with the empirical evidence obtained from the benchmark universities. NTU's systematic KPI monitoring and PSL's research consolidation both prioritized the quality of research output as a key mechanism for ranking improvement. This approach is consistent with the combined 59% weight of the Research Environment and Research Quality pillars in THE methodology. The allocation of 25–30% to International Outlook reflects the benchmarking finding that international engagement generates complementary benefits across several ranking dimensions and functions as a multiplier rather than as an isolated component.

The proposed percentage ranges were derived through three stages rather than assigned solely through expert judgment. First, the initial shares were established in proportion to the corresponding THE pillar weights. The combined 59% weight of Research Environment and Research Quality provides the basis for the 35–40% research allocation range. Second, these proportional shares were adjusted according to their marginal potential for improvement. Citation-related indicators generally respond to investment over a multiyear period, whereas International Outlook indicators may improve within one or two ranking cycles. This difference supports a relatively greater allocation to internationalization than would be derived from strict proportionality alone. Third, the adjusted ranges were reconciled with the observed expenditure patterns of the benchmark

young universities reported in the notes to Table 3. The use of allocation ranges rather than fixed values reflects the remaining uncertainty in the calibration and is intentional: the model establishes strategic priorities rather than prescribing individual budget items.

The economic risk assessment introduces an important dimension that remains relatively underrepresented in the existing literature on university rankings. The identification of behavioral risks, particularly indicator manipulation and a reduced emphasis on quality, reflects concerns raised by Dill (2014) regarding the unintended effects of performance measurement in higher education. Integrating risk monitoring into the DRD platform through early-warning algorithms capable of identifying anomalous publication or citation patterns represents a governance innovation that addresses these considerations proactively.

The multi-institutional application of the framework's components provides evidence of its external validity beyond the NUU context. The adoption of the KPI methodology by the National Quality Assurance Agency for Education, as documented in Certificate No. 03/18-144 dated 16 December 2025, indicates that the framework is aligned with national policy priorities and can be applied at both institutional and system levels. Its implementation at Chirchik State University and Jizzakh State Pedagogical University further demonstrates its applicability across different types of higher education institutions. These applications support the framework's relevance within Uzbekistan's ongoing higher education reforms, including those established under Presidential Decree No. PF-73.

The synergy among the three components of the framework deserves particular emphasis. A KPI system without the DRD platform would provide measurement but not continuous monitoring; the DRD without KPIs would generate data without clearly defined evaluation criteria; and resource allocation without KPI targets and monitoring infrastructure would lack strategic direction and systematic feedback. Integrating all three components creates a functional governance system capable of translating ranking methodology into sustainable institutional improvement. This systemic design principle distinguishes the proposed framework from isolated measures, such as publication incentive schemes or international recruitment programmes, which address individual indicators without establishing the institutional infrastructure required for comprehensive ranking management.

The economic efficiency of the proposed framework also requires further consideration. The three-year investment in the institutional management architecture amounts to UZS 2.925 billion, while the annual KPI incentive fund totals UZS 3.5 billion. Additional allocations include a currency and inflation risk buffer of UZS 550 million, representing 7.5% of the initial investment package, and UZS 375 million for international expertise and auditing, accounting for 5.1%. When the three-year architecture cost is combined with one year of KPI incentives and the two additional allocations, the initial investment package totals UZS 7.35 billion, equivalent to approximately USD 571,985 at the exchange rate used in the 2024 calculations.

Although this amount represents a substantial institutional commitment, it remains considerably lower than the expenditure levels reported for benchmark universities such as KAUST, with an annual research budget exceeding USD 500 million, and NTU, with expenditure exceeding USD 300 million. The proposed framework therefore offers a governance-intensive and economically feasible pathway to ranking improvement for universities in developing countries, particularly where capital-intensive approaches require phased implementation.

The implications for higher education governance theory extend beyond Uzbekistan. The framework demonstrates that ranking methodologies can be operationalized within institutional management systems through a systematic decomposition process: ranking pillars are converted into KPIs; KPIs are translated into departmental targets; departmental targets are transformed into individual performance expectations; and individual performance is monitored through digital infrastructure that provides feedback for strategic decision-making. This decomposition chain offers a general model for universities seeking to translate external evaluation criteria into internal governance mechanisms, regardless of the specific ranking system or institutional context.

The behavioral risk dimension also requires particular attention from both theoretical and practical perspectives. "Gaming the metrics," whereby institutions or individuals optimize measured indicators without producing corresponding improvements in underlying quality, is a recognized challenge in performance management systems across sectors. In universities, this risk may take the form of publishing in insufficiently verified journals, manipulating citation patterns, establishing formal international agreements without substantive collaboration, or prioritizing research quantity over quality.

The DRD's early-warning capabilities, combined with quality-oriented KPI design that emphasizes journal quartiles and research impact rather than publication counts alone, provide proactive safeguards against such practices. Nevertheless, the most effective safeguard is a strong institutional culture. When ranking improvement is understood as a process of genuine capacity building, academic quality enhancement, and sustainable institutional development, incentives for indicator-oriented behavior are substantially reduced.

Several limitations of the study should be acknowledged. First, the framework was developed primarily on

the basis of the NUU case; therefore, its applicability to diverse institutional contexts requires further validation. Second, the DRD platform remains at the conceptual design stage, and its full technical implementation and evaluation in terms of improving the quality of managerial decision-making represent areas for future research. Third, the resource allocation model is based on international benchmarking and may require further adjustment as NUU-specific cost data become available during implementation. Fourth, the risk assessment framework provides a structured classification of risks but does not currently incorporate quantitative risk modelling based on probability distributions.

Future research should focus on conducting a longitudinal assessment of the framework's effectiveness following its full implementation, developing quantitative models that link KPI performance to changes in ranking positions, and comparatively applying the framework across several Central Asian universities. Such research would make it possible to evaluate the framework's transferability and identify the adaptations required for different institutional environments.

The methodology also included an analysis of the institutional investment structure required to implement the framework. Using the exchange rate adopted in the calculation—USD 1 = UZS 12,850—and a projected annual inflation rate of 10%, the economic model was calibrated to generate realistic investment estimates for Uzbekistan's institutional context. Investment requirements were divided into four components: establishment of the institutional management architecture—UZS 2.925 billion over three years; the KPI incentive fund—UZS 3.5 billion annually; the currency and inflation risk buffer—UZS 550 million; and international expertise and auditing costs—UZS 375 million.

When the three-year management architecture cost is combined with one year of KPI incentive funding and the two additional allocations, the initial strategy package totals UZS 7.35 billion. If the annual KPI incentive fund is maintained throughout the full three-year implementation period, the total three-year investment requirement will amount to UZS 14.35 billion.

CONCLUSION AND RECOMMENDATIONS

This study presents an integrated governance framework for ranking-oriented university management, comprising a three-level KPI system, a Digital Ranking Dashboard (DRD), an evidence-based resource allocation model, and an accompanying economic risk assessment framework. It addresses the operational gap between the analysis of ranking methodologies and institutional management practices by providing actionable governance instruments specifically designed for emerging universities in developing countries.

The three-level KPI system ensures that the ranking strategy is integrated throughout the institutional hierarchy rather than concentrated solely at the senior management level. The DRD platform provides cost-effective digital infrastructure for real-time performance monitoring by integrating existing data collection processes into a unified, data-driven governance system. The resource allocation model offers evidence-based guidance for prioritizing investments, while the risk assessment framework supports the achievement of ranking objectives with appropriate consideration of economic and behavioral risks.

For policymakers and university administrators in Central Asia and other regions with comparable higher education systems, the proposed framework offers a transferable governance model that can be adapted to diverse institutional contexts. The principal finding is that effective ranking-oriented governance requires not only strategic objectives but also systematic operational infrastructure, including clearly defined KPI chains, digital monitoring capabilities, evidence-based resource allocation, and proactive risk management.

Accordingly, universities are recommended to introduce vertically aligned KPI systems at the university, faculty, and department levels; establish integrated digital platforms for continuous performance monitoring; link resource allocation decisions to measurable ranking indicators; and regularly assess economic, operational, technological, and behavioral risks. Investment in this governance infrastructure will support sustainable improvements in university rankings while strengthening institutional capacity, academic quality, transparency, and long-term competitiveness.

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