DESIGNING GAMING-RESISTANT KPI SYSTEMS FOR RANKING-ORIENTED UNIVERSITY GOVERNANCE: A BEHAVIORAL RISK PERSPECTIVE

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Abstract. *Key performance indicator (KPI) systems translate international ranking methodologies into institutional management practice, but the performance-measurement literature has long warned that indicators used for high-stakes decisions induce behavioural responses that can corrupt the very processes they monitor. This paper isolates the behavioural risk category from a five-category economic risk framework developed for ranking-oriented university governance, and asks how a KPI architecture can be designed to resist metric gaming from the outset rather than police it after the fact. Drawing on the design of a three-level (university-faculty-department) KPI system aligned with the Times Higher Education (THE) World University Rankings methodology, developed for New Uzbekistan University and adopted in the practice of the National Quality Assurance Agency for Education (implementation certificate No. 03/18-144 of 16 December 2025), the paper identifies four design features with gaming-resistant properties: the pairing of outcome KPIs with process KPIs at every level; quality-weighted rather than count-based publication indicators; differentiated monitoring frequencies matched to indicator dynamics; and transparent cascading of indicators to responsible units. The behavioural risk category is argued to be the most underestimated yet most consequential threat in ranking strategy implementation: unlike macroeconomic or technological risks, it is generated by the management system itself. The paper contributes a design-stage treatment of a risk that the rankings literature typically discusses only as an observed pathology.*

Keywords*: KPI design; metric gaming; behavioural risk; university rankings; performance management; higher education governance*

1. Introduction

The performance-measurement literature contains one of the most reliable warnings in social science: when a measure becomes the basis of consequential decisions, behaviour reorganises around the measure, and the correspondence between the measure and the underlying activity degrades [1], [3]. Campbell formulated the

mechanism for social indicators generally [1]; Strathern condensed it for the audit context [2]; and the sociology of rankings has documented it in higher education, where institutions restructure themselves around the logic of league tables [4], [5], [7].

University KPI systems built on ranking methodologies sit precisely in the danger zone this literature describes. They exist to make an external measure consequential internally: to attach monitoring, incentives and resources to indicators derived from a ranking methodology. Done naively, such a system does not merely risk gaming; it manufactures the conditions for it. Done deliberately, however, the same system can be designed so that the cheapest way to move an indicator is to do the underlying work. The design question, rather than the post-hoc detection question, is the subject of this paper.

The empirical basis is the integrated governance framework developed by the author for New Uzbekistan University: a three-level KPI system aligned with the THE World University Rankings methodology [8], a digital monitoring platform, and an economic risk assessment across five categories (macroeconomic, institutional-financial, operational, technological and behavioural). Elements of the framework have been adopted in the practice of the National Quality Assurance Agency for Education, as documented in implementation certificate No. 03/18-144 of 16 December 2025 [9]. This paper isolates the behavioural category and reads the KPI architecture through it.

The argument proceeds in three steps. Section 2 defines the behavioural risk category and establishes its distinguishing property, endogeneity, against the other four categories of the framework. Section 3 presents the four design features of the KPI architecture that carry gaming-resistant properties, each stated as a definitional choice available at specification time rather than a control imposed afterwards. Section 4 discusses the design philosophy, its limits, and the consequences of the framework's adoption at national level, where indicator architectures propagate their incentive properties across every institution evaluated through them.

2. The behavioural risk category

Within the five-category risk framework, behavioural risk denotes threats generated by the management system's own incentive effects: prioritisation of publication quantity over quality when output indicators are count-based; concentration of effort on measured activities at the expense of unmeasured ones; reporting distortions when units are evaluated on self-supplied data; and the erosion of intrinsic academic motivation when external indicators saturate internal evaluation [10], [11]. Its distinguishing property is endogeneity. Macroeconomic risk arrives from outside; technological risk from infrastructure; behavioural risk is produced by the very act of managing through indicators, and it scales with the stakes attached to them.

The category is also the most underestimated in practice. Implementation planning for ranking strategies routinely budgets for currency risk and platform costs, while the incentive structure of the KPI system itself, the largest single determinant of whether reported improvements are real, is treated as a technical detail. The framework analysed here assigns behavioural risk explicit probability and impact ratings alongside the other four categories, forcing it into the same governance conversation as financial exposure.

Theoretically, the endogeneity of behavioural risk connects the framework to organisation theory as much as to measurement theory. Institutions do not respond to indicator systems only instrumentally; they respond ceremonially, adopting the visible forms of compliance while decoupling daily practice from them [12], and they respond strategically, along a repertoire that runs from full acquiescence to active manipulation [13]. A KPI architecture that ignores this repertoire selects for its worst elements, because ceremonial and manipulative responses are cheaper than substantive ones whenever indicator definitions permit. The design features presented in the next section can be read, in these terms, as attempts to reorder the repertoire's cost structure so that acquiescence through genuine activity becomes the least expensive response available.

Table 1. Five-category economic risk framework for ranking strategy implementation (condensed).

Category	**Source**	**Typical manifestation**	**Design response**
Macro-economic	External environment	Currency and inflation exposure of international components	Risk buffer in investment plan
Institutional-financial	Funding structure	Volatility of result-based financing flows	Capped incentive share (5-15%)
Operational	Implementation capacity	Data quality gaps, staffing of analytics functions	Defined responsible units, cascading
Technological	Infrastructure	Platform continuity, integration failures	Localized platform, sovereign data
Behavioral	The management system itself	Metric gaming, quantity-over-quality drift	Four design features (Section 3)

3. Four gaming-resistant design features

First, outcome-process pairing. At every level of the three-level system, outcome KPIs (Q1/Q2 publications, citation growth, international co-authorship share) are

paired with process KPIs (grant applications submitted, co-authorship proposals initiated, datasets deposited) [6]. Outcome indicators alone reward whatever produces the number, including its cheapest simulacrum; process indicators anchor the outcome to the activity that legitimately generates it. A unit that inflates outcomes without corresponding process activity becomes visible as an anomaly rather than a success.

Second, quality weighting. Publication indicators are defined on quality-weighted counts (quartile-weighted output shares) rather than raw counts [14]. This single definitional choice removes the dominant gaming channel documented in the literature, volume maximisation in low-selectivity venues, by making it unprofitable inside the indicator itself rather than prohibited outside it.

Third, differentiated monitoring frequency. Research quality and international engagement indicators are monitored quarterly, citation and industry-income indicators semi-annually, reflecting the response dynamics of each. Frequency matched to dynamics reduces the pressure to show movement in indicators that cannot legitimately move within a reporting cycle, which is precisely the pressure under which cosmetic responses emerge.

Fourth, transparent cascading. Every indicator is mapped to a named responsible unit with a defined measurement basis, and faculty-level allocations of the result-based financing component (5-15% of additional funding) are computed from the same published definitions. Opacity is a precondition of most gaming; a cascade in which every unit can reproduce every number directed at it removes the informational asymmetry on which distortion depends.

4. Discussion

The four features share a design philosophy: they do not attempt to detect gaming after the fact, they alter the cost structure of gaming before it starts. Detection-based approaches accept the adversarial frame and invest in surveillance; design-based approaches make the honest path the cheap path. For emerging universities implementing ranking strategies under resource constraints, the distinction is practical: surveillance scales in cost with the number of units monitored, while design features are paid for once, at specification time.

The approach has limits, and stating them is part of the argument. No indicator architecture eliminates behavioural response; it redirects it, and periodic review of indicator definitions remains necessary as response patterns evolve. Quality weighting depends on the integrity of the underlying classification systems. And the framework's incentive component deliberately caps result-based financing at a moderate share of funding, on the explicit reasoning that behavioural risk scales with stakes: an indicator system strong enough to matter but not strong enough to dominate is the calibrated target, not maximal incentive power.

The system-level adoption of the KPI methodology documented in certificate No. 03/18-144 extends the relevance of these design choices beyond a single institution: indicator architectures adopted into national rating practice propagate their incentive properties, for better or worse, across every institution evaluated through them. Gaming-resistance is therefore not an institutional luxury but a property of national measurement infrastructure.

A comparative note situates the argument within the wider debate. The rankings literature has documented gaming primarily at the level of institutions responding to external league tables: selective reporting, indicator-driven restructuring, and presentational optimisation. The design problem addressed here is one level deeper and one step earlier: it concerns the internal measurement systems that institutions build in response, where the institution is simultaneously the regulator and the regulated. At that level, the useful question shifts from whether behaviour responds to measurement, which is settled, to which behavioural responses a given indicator definition makes cheap. Reading every proposed KPI through that single question, what is the cheapest way to move this number, proved in the framework's development to be the most productive design discipline available, and it requires no additional infrastructure, only the willingness to red-team one's own indicators before attaching stakes to them.

Finally, the design perspective clarifies the division of labour between institutional and national levels. An institution controls its indicator definitions, monitoring frequencies and incentive shares; a national agency controls the corresponding parameters of the national rating. The four features travel across that boundary without modification, and the national stakes are higher: a gameable indicator in one university distorts one institution's behaviour, while a gameable indicator in a national rating linked to differentiated funding distorts fifty institutions' behaviour simultaneously, and does so with the force of budgetary consequence. The forthcoming linkage of the national rating to funding from 2027 [15] makes this more than a theoretical concern, and it makes the red-team discipline proposed above, asking of every indicator what its cheapest movement would be, a due-diligence requirement for national measurement infrastructure rather than an academic exercise.

5. Conclusion

Behavioural risk is the endogenous risk of ranking-oriented governance: created by the management system, scaled by its stakes, and largely absent from implementation planning. The KPI architecture analysed here treats it as a design constraint rather than a policing problem, through outcome-process pairing, quality weighting, dynamics-matched monitoring frequency and transparent cascading. The general lesson for university governance in emerging systems is that the question is not whether indicator management induces behaviour, it always does, but whether the

induced behaviour and the intended activity coincide, and that coincidence is decided at the design stage.

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