Оценка качества образования в университетах с различными институциональными культурами: статистический анализ взаимосвязей

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АННОТАЦИЯ

Проблема и цель исследования. Качество высшего образования остается критически важной проблемой для политиков и учреждений во всем мире, однако эмпирические межстрановые исследования, особенно в постсоветском пространстве, по-прежнему немногочисленны. Существующие исследования часто опираются на данные одного учреждения, ретроспективные методологии и традиционные показатели, игнорируя при этом такие факторы, как институциональная культура, лидерство и удовлетворенность студентов. Данное исследование восполняет эти пробелы, изучая два исследовательских вопроса: (1) существенно ли различаются показатели качества в зависимости от конкретных характеристик образовательного учреждения? и (2) какие конструкты качества обладают прогностической силой во взаимосвязи между институциональной культурой и удовлетворенностью студентов?

Методы исследования. Осуществлено эмпирическое исследование, в ходе которого были собраны данные от 719 студентов из четырех различных типов университетов России и Узбекистана: Казанского (Приволжского) федерального университета (КФУ), его филиала в Узбекистане (КФУДж), частного узбекского университета «Образовательный университет Ренессанс» (ОУР) и Национального университета Узбекистана им. Мирзо Улугбека (НУУз). Восемь латентных конструктов (институциональная культура, эффективность преподавания, качество преподавательского состава, цифровая компетентность, образовательные ресурсы, лидерство и политика, академическая устойчивость и удовлетворенность студентов) были измерены с помощью 35 пунктов по 5-балльной шкале Ликерта. Данные были проанализированы с использованием конфирматорного факторного анализа (CFA), однофакторного дисперсионного анализа (ANOVA) и моделирования структурных уравнений методом частичных наименьших квадратов (PLS-SEM) с 500 бутстрап-выборками.

Результаты. Модель измерения продемонстрировала отличное соответствие (CFI=0,999, RMSEA=0,022). Были обнаружены статистически значимые межинституциональные различия по всем восьми конструктам ($p<0,05$), при этом студенты НУУз и КФУ показали самый высокий общий уровень качества, а студенты КФУДж – самый низкий. Лидерство и политика оказалось наиболее сильным предиктором удовлетворенности студентов ($\beta=0,442$, $f^2=0,648$, $p<0,001$), за ними следуют эффективность преподавания ($\beta=0,202$), качество преподавательского состава ($\beta=0,141$) и академическая устойчивость ($\beta=0,138$). Образовательные ресурсы и цифровая компетентность показали только бивариантные корреляции с удовлетворенностью, но потеряли значимость в многомерной модели из-за мультиколлинеарности с лидерством.

Заключение. Данное исследование представляет собой подтвержденное межстрановое эмпирическое сравнение восьмипеременной модели оценки качества в постсоветском высшем образовании. Обосновано, что лидерство и политика, а не традиционные факторы, такие как ресурсы, являются наиболее мощным фактором удовлетворенности студентов. Эти результаты ставят под сомнение преобладающие модели качества, которые делают акцент на преподавательских ресурсах и материальной инфраструктуре, недооценивая при этом управление и адаптивные возможности студентов. Практические рекомендации включают: развитие управления, основанного на данных; внедрение методов практической педагогики; реализация программ наставничества для повышения академической устойчивости; осуществление стратегических реформ в области обеспечения качества. Для установления причинно-следственных связей и проверки инвариантности измерений в более широких институциональных типологиях необходимы дальнейшие лонгитюдные и многогрупповые исследования с использованием структурного моделирования.

КЛЮЧЕВЫЕ СЛОВА

качество высшего образования, межстрановое сравнение, удовлетворенность студентов, институциональная культура, лидерство, цифровая компетентность, эффективность преподавания

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Assessment of the Quality of Education in Universities with Different Institutional Cultures: Statistical Analysis of Relationships

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ABSTRACT

Introduction. The quality of higher education remains a critical concern for policymakers and institutions globally, yet empirical cross-national research, particularly in post-Soviet contexts, remains scarce. Existing studies often rely on single-institution data, retrospective methodologies, and traditional input-based indicators, while neglecting emergent determinants such as institutional culture, leadership, and student resilience. This study addresses these gaps by investigating two research questions: (1) Do quality indicators differ significantly depending on the specific characteristics of the educational institution? and (2) Which quality constructs have predictive power in the relationship between institutional culture and student satisfaction?

Research methods. A cross-sectional survey design was employed, collecting data from 719 students across four diverse universities in Russia and Uzbekistan: a large Russian federal university (KFU), its branch in Uzbekistan (KFUJ), a private Uzbek university (REU), and a national classical Uzbek university (NUU). Eight latent constructs (institutional culture, teaching effectiveness, academic staff quality, digital competency, educational resources, leadership and policy, academic resilience, and student satisfaction) were measured using 35 items on a 5-point Likert scale. Data were analyzed using confirmatory factor analysis (CFA), one-way ANOVA, and partial least squares structural equation modeling (PLS-SEM) with 500 bootstrap resamples.

Results. The measurement model demonstrated excellent fit (CFI=0.999, RMSEA=0.022). Statistically significant inter-institutional differences were found across all eight constructs ($p<0.05$), with NUU and KFU students reporting the highest overall quality scores and KFUJ the lowest. Leadership and policy emerged as the strongest predictor of student satisfaction ($\beta=0.442$, $f^2=0.648$, $p<0.001$), followed by teaching effectiveness ($\beta=0.202$), academic staff quality ($\beta=0.141$), and academic resilience ($\beta=0.138$). Educational resources and digital competency showed only bivariate correlations with satisfaction but lost significance in the multivariate model due to multicollinearity with leadership.

Conclusion. The study provides the first validated cross-national empirical comparison of an eight-variable quality assessment model in post-Soviet higher education. Leadership and policy-not traditional inputs like resources-constitute the most powerful driver of student satisfaction. These findings challenge prevailing quality models that emphasize teaching inputs and physical infrastructure while downplaying governance and student adaptive capacities. Practical recommendations include investing in evidence-based governance, faculty development in active pedagogy, structured mentorship programs to build academic resilience, and strategic quality assurance reforms aligned with ESG 2015 standards. Future longitudinal and multi-group SEM research is needed to establish causality and test measurement invariance across broader institutional typologies.

KEYWORDS

quality of higher education; cross-national comparison; student satisfaction; institutional culture; leadership; digital competency; teaching effectiveness

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INTRODUCTION

Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all is a key initiative of UNESCO's Sustainable Development Goals [1]. At the same time, the International Association of Universities is promoting a shift from "transactional" models of transnational education (where universities and their affiliates earn money) to "collaborative" ones (based on mutual trust, shared value, and long-term commitments) [2].

Quality of higher education has become the key issue of concern among global policymakers, institutional heads and even students. The speed of digitalization, increased competition among universities, and increased stakeholder demands have put undying pressure on universities to indicate, quantify, and maximally enhance the quality of education [3; 4]. These pressures are especially severe in post-Soviet systems, with structural legacies and the implementation of reforms being unequal in distribution, and uneven in the distribution of resources, leads to heterogeneous quality landscapes [5; 6].

Although there is a volume of literature concerning the quality of higher education, there are still three gaps. To begin with, most of the empirical research is based on an individual-institution data, and it is not cross-institutional or cross-national [7]. Second, the prevailing methodological paradigms are retrospective and descriptive, which do not allow predicting the challenges (proactive quality management), as they should [8; 9]. Third, the traditional inputs, i.e., teaching effectiveness, staff qualification, physical resources, and the emergent quality determinants, i.e., digital competencies, institutional culture, services of leadership, and student resilience, are still underrepresented in conceptual frameworks [10; 11].

Post-Soviet countries, although sharing a common educational tradition dating back to the Soviet era, have approached higher education reforms differently. For example, Russia joined the Bologna Process as early as 2003, while in Uzbekistan, the key principles of the Bologna model of education began to be actively implemented in the country's higher education system only in 2017 [12]. In the early 2020s, Uzbekistan began to develop a private university sector, opening branches of foreign universities, concluding international agreements, and initiating programs to support international internships for faculty and students. Consequently, the study of quality assessment issues in these diverse institutional contexts has become a pressing issue. Researchers and practitioners have begun to focus on developing a dynamic organizational and managerial structure for a higher education quality management system based on fuzzy modeling rules [13].

The integration of national higher education systems into the global arena is accompanied by a search for optimal indicators and criteria for assessing the quality of education and the effectiveness of its activities. Traditionally, based on the stated goals and specific characteristics of the educational institution, these indicators are based on national and/or international rankings [14], licensing and accreditation indicators [15], total quality management (TQM) methodology indicators [14] and others. However, constant changes associated with ongoing socio-political, technological, and economic processes are forcing researchers and practitioners to seek new approaches to assessing the quality of higher education. Indicators such as the institutional culture of the educational institution, which represents a set of formal (rules, laws, instructions) and informal (traditions and values) norms governing the interactions between participants in the educational process, as well as satisfaction with education, which is manifested in a subjective assessment of the quality, significance, and conditions of the educational process, reflecting the degree to which expectations correspond with reality, are becoming relevant.

Based on the above, in this study we decided to answer the following questions:

- Do quality indicators differ depending on the specific characteristics of the educational institution (Q1)?
- Which quality constructs have predictive power in the relationship between institutional culture and student satisfaction (Q2)?

As traditional indicators for assessing the quality of higher education, we selected the effectiveness of teaching, the quality of academic staff, digital competence, educational resources, management policy, and academic sustainability.

Given the above theoretical framework, the following eight hypotheses are tested here:

H1: Institutional culture is positively related to student satisfaction.

H2: There is a positive relationship between teaching effectiveness and student satisfaction.

H3: Academic staff quality is positively related to student satisfaction.

H4: Digital competency is positively related to student satisfaction.

H5: Educational resources are positively associated with student satisfaction.

H6: Leadership and policy are positively related to student satisfaction.

H7: Academic resilience is positively related to student satisfaction.

H8: The measurement model demonstrates configural and metric invariance across institutional types.

LITERATURE REVIEW

The quality of higher education is a constructed and controversial concept. Harvey & Green [17] have established five conceptualizations, which include exceptionality, perfection, fitness of purpose, value of money, and transformative change; that are the priorities of various stakeholder groups. Later research developed these models to include process and outcomes oriented, noting that quality is created in the interaction between students and the institution, and organizational capacity [18].

The current theoretical trends focus on student-centred learning, constructive alignment, and organizational quality cultures [19]. Russian quality assurance reforms have been influenced by the Bologna Process integration and Uzbek reforms by presidential decree to create structurally different yet reform-oriented systems and are suitable to be compared. In this regard, in modern conditions, the most relevant constructs of the quality of higher education are the following, which we took as a basis in this study.

Institutional culture (IC) is considered as a system of shared values, norms and practices that influence quality assurance and the pedagogical process [20]. The best institutional performance has been associated with quality cultures, in which there are shared goals, constant improvement and involving stakeholders [21].

Teaching Effectiveness (TE) refers to the following aspects; clarity of learning objectives, participatory methods, timely feedback delivery, fair assessment, and the development of conducive learning environments [22]. These dimensions are always linked to the student achievement and satisfaction in the international settings.

Academic Staff Quality (AS) is based on faculty expertise, involvement of research, and professional standards. The UNESCO and TALIS (Teaching and Learning International Survey) models define the quality of the academic staff using the competence, professional growth, and ethical behavior [23].

Digital competency (DC) is an informed capability of students to find and analyze digital information, communicate digitally and keep pace with new technologies [24]. Digital skills are also consistently associated with engagement, achievement, and satisfaction in a technology-enhanced learning environment through empirical studies [25].

Educational resources (ER) include physical and digital infrastructure, library access, IT equipment, and online learning platforms [26]. They provide the material foundation for a quality educational experience.

Leadership and policy (LP) ensures a positive organizational climate, teacher motivation, and pedagogical innovations associated with transformational and distributed leadership models [27]. The important elements of this construct are institutional strategic planning and evidence based governance.

Academic resilience (AR) demonstrates students' ability to maintain motivation, overcome obstacles, and perceive challenges as learning opportunities [26]. It is a reliable predictor of academic achievement, especially in the face of systemic disruptions such as the COVID-19 pandemic.

Student Satisfaction (SS) is considered an outcome measure that combines subjective assessments of all quality dimensions that have been established before [29]. It involves general satisfaction, institutional perceived responsiveness and recommendation intentions.

Thus, in today's environment, the quality of higher education is a multidimensional and dynamic construct, evolving from traditional models toward process-oriented and student-centered approaches, where quality is created through the interaction between students and the institutional environment. Key relevant quality constructs include institutional culture, teaching effectiveness, academic staff quality, digital competence, educational resources, leadership and policy, academic sustainability, and student satisfaction, which is an outcome indicator.

METHODOLOGY

The empirical part of the study used a cross-sectional survey design. Data were collected in the 2024–2025 academic year; the sample consisted of students from four universities: National University of Uzbekistan (NUU), Kazan (Volga Region) Federal University (KFU), the KFU branch in Jizzakh Uzbekistan (KFUJ), Renaissance Educational University (REU). These institutions represent a variety of university types – a large Russian federal university, a foreign branch of a Russian university, a private university, and national classical universities of Uzbekistan. This ensured institutional variability, which was important for our cross-national comparison. The total sample consisted of N=719 respondents. Demographic characteristics are presented in Table 1.

Table 1 Institutional demographic Characteristics of participants

Characteristic	KFU (n=184)	KFUJ (n=137)	REU (n=239)	NUU (n=159)	Total (N=719)
Gender					
Female	140 (76,1%)	80 (58,4%)	110 (46,0%)	130 (81,8%)	460 (64,0%)
Male	44 (23,9%)	57 (41,6%)	129 (54,0%)	29 (18,2%)	259 (36,0%)
Study Level					
1st year	36 (19,6%)	57 (41,6%)	125 (52,3%)	97 (61,0%)	315 (43,8%)
2nd year	48 (26,1%)	37 (27,0%)	23 (9,6%)	12 (7,5%)	120 (16,7%)
3rd year	77 (41,8%)	22 (16,1%)	29 (12,1%)	19 (11,9%)	147 (20,4%)
4th year	13 (7,1%)	16 (11,7%)	0 (0%)	5 (3,1%)	34 (4,7%)
Senior year, master's, doctoral degree	10 (5,4%)	5 (3,6%)	62 (25,9%)	26 (16,4%)	103 (14,3%)
Study Mode					
Full-time / Evening	173 (94,0%)	132 (96,4%)	177 (74,1%)	109 (68,6%)	591 (82,2%)
Part-time	11 (6,0%)	5 (3,6%)	62 (25,9%)	50 (31,4%)	128 (17,8%)

There were eight latent constructs measured by a total of 35 items on a 5-point Likert scale (1=Strongly Disagree; 5=Strongly Agree) in the survey instrument. Questions were developed in Uzbek and revised by a panel of bilingual academic experts and pilot-tested before the entire data collection. Table 2 summarises the constructs, number of items, source frameworks and observed Cronbach's alpha reliability coefficients.

The questionnaire was conducted using Google Forms[a] and sent through institutional email lists and course management systems. The involvement was both voluntary and anonymous. The ethics committees of all institutions involved gave ethical approval. Electronic informed consent was obtained before the completion of the survey. The average response rate was 78,5 percent.

Prior to testing the structural relationships, the psychometric properties of the measurement instrument were assessed using Confirmatory Factor Analysis (CFA). Unlike Exploratory Factor Analysis, CFA is a theory-driven approach that tests whether the hypothesized factor structure – in this case, eight a priori constructs (IC, TE, AS, DC, ER, LP, AR, SS) – is consistent with the observed data. CFA was employed because the constructs and their constituent items were derived from established theoretical frameworks and prior literature, making it appropriate to confirm rather than explore the factor structure.

[a] https://forms.gle/pZsBwzrjbHDW9Gw49

Table 2 Instrument Constructs, Sources, Reliability (a, CR) and Convergent Validity (AVE, Loadings) N=719

Construct	Code	Items	Source Framework	α	CR	AVE	Load, range
Institutional Culture	IC	5	Schein (2010)	0,908	0,931	0,731	0,834–0,877
Teaching Effectiveness	TE	5	Student Evaluation of Teaching (SET)	0,925	0,943	0,769	0,864–0,895
Academic Staff Quality	AS	4	UNESCO UIS / TALIS-adapted	0,926	0,948	0,819	0,892–0,922
Digital Competency	DC	5	DigComp 2,1 / DigCompEdu	0,912	0,934	0,739	0,832–0,879
Educational Resources	ER	3	EUROSTUDENT VII (eurostudent,eu)	0,851	0,910	0,771	0,860–0,893
Leadership and Policy	LP	4	Transformational Leadership Model	0,929	0,950	0,825	0,891–0,920
Academic Resilience	AR	4	Academic Resilience Scale (ARS-30)	0,895	0,927	0,761	0,854–0,894
Student Satisfaction	SS	5	EUROSTUDENT VII (eurostudent,eu) / Standard Items	0,943	0,957	0,815	0,868–0,924
Total	–	35	–	–	–	–	–

Model fit was evaluated using four complementary indices. The Comparative Fit Index (CFI) assesses how much better the hypothesized model fits the data compared to a null model in which all variables are assumed to be uncorrelated; values≥0,95 indicate acceptable fit [30]. The Root Mean Square Error of Approximation (RMSEA) estimates the degree of misfit per degree of freedom, penalizing model complexity; values≤0,06 indicate close fit and values≤0,08 indicate acceptable fit, with the 90% Confidence Interval (CI) reported to convey estimation precision. The Standardized Root Mean Square Residual (SRMR) represents the average difference between observed and model-implied correlations; values≤0,08 are considered acceptable. These indices were selected in combination because no single fit statistic is universally sufficient: CFI reflects incremental fit, RMSEA penalizes parsimony violations, and SRMR captures absolute residual magnitude, thus providing a comprehensive and mutually complementary picture of model adequacy.

Convergent validity was assessed through standardized factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). AVE values exceeding 0,50 indicate that each construct explains more variance in its indicators than measurement error does, while CR values exceeding 0,70 confirm the reliability of each latent factor [31].

Discriminant validity – the degree to which constructs are empirically distinct from one another – was assessed using the Heterotrait-Monotrait (HTMT) ratio. The HTMT ratio compares the average correlations between indicators of different constructs (heterotrait correlations) to the average correlations among indicators of the same construct (monotrait correlations). A ratio substantially below 1,0 indicates that the constructs are sufficiently distinct. The conventional threshold of HTMT<0,85 is recommended for constructs that are theoretically distinct, while HTMT<0,90 is considered acceptable in nomologically proximate domains (Henseler et al., 2015). The HTMT criterion was preferred over the traditional Fornell-Larcker criterion because it has been shown to be more sensitive and accurate in detecting discriminant validity failures, particularly in reflective measurement models with high inter-construct correlations [32].

Finally, measurement invariance across the four universities was tested to ensure that the constructs carry the same meaning across institutional and national contexts – a prerequisite for valid cross-national comparison. Configural invariance (same factor structure across groups) was tested first, followed by metric invariance (equivalent factor loadings across groups). Establishing at least partial metric invariance is necessary to justify meaningful comparison of latent mean differences across institutions.

Each construct in each university was calculated using the descriptive statistics (means and standard deviations). Cronbach's alpha was used in order to evaluate internal consistency. The between-subjects ANOVA (Analysis of Variance) was a one-way test conducted to find statistically significant inter-institutional differences on each quality construct. Where significant results had been obtained in ANOVA, the Tukey HSD (Honestly Significant Difference) post-hoc examination was used. Each construct was given a composite score as the mean of its constituent items. PLS-SEM (Partial Least Squares Structural Equation Modelling) with 500 bootstrap resamples was utilized to identify the relative contribution of each quality construct (IC, TE, AS, DC, ER, LP, AR) to Student Satisfaction (SS). All analyses were conducted using Python.

RESULTS

Based on Table 2, the results of the measurement showed the perfect conformity to the model as follows: CFI=0,999, RMSEA=0,022 [90%, CI=0,018, 0,026], SRMR=0,041, χ^2/df=1,35. Discriminant validity was measured through HTMT ratios, the highest HTMT was 0,937 (ER-LP) and 3 out of 28 pairs had an HTMT of over 0,90 – which is also consistent with the nomologically saturated nature of the higher education quality constructs (r=0,692-0,843). Configural invariance was also confirmed (CFI=0,999, RMSEA=0,022), and metric invariance was proven for IC, AS, LP and SS (loadings range<0,10), which confirms a stable relationship between the indicators of higher education quality.

Table 3 shows descriptive statistics of all the constructs in the four universities. All the subscales had a high internal consistency with the range of Cronbach alpha between α=0,851 (Educational Resources) and α=0,943 (Student Satisfaction), which is above the acceptable level of 0,70. In general, the best quality scores were reported by NUU and KFU students (overall quality means of M=4,22 and M=4,19, correspondingly), with the worst quality scores reported by students at KFU Branch (M=3,81). Renaissance University had a middle profile of quality (M=3,91).

Table 3 Institution and Construct Descriptive Statistics (M=Mean, SD=Standard Deviation)

Construct	KFU (n=184)		KFUJ (n=137)		REU (n=239)		NUU (n=159)	
	M	SD	M	SD	M	SD	M	SD
Institutional Culture (IC)	4,18	0,81	3,69	1,06	3,80	1,08	4,18	0,96
Teaching Effectiveness (TE)	4,29	0,81	3,89	1,01	3,94	1,09	4,30	0,93
Academic Staff Quality (AS)	4,34	0,82	3,93	1,03	3,87	1,11	4,32	0,94
Digital Competency (DC)	4,21	0,72	3,97	0,93	3,98	1,01	4,15	0,96
Educational Resources (ER)	4,05	0,87	3,59	1,07	3,89	1,08	4,11	1,07
Leadership and Policy (LP)	4,06	0,94	3,73	1,10	3,92	1,06	4,20	0,96
Academic Resilience (AR)	4,24	0,76	3,85	0,95	4,01	1,02	4,25	0,97
Student Satisfaction (SS)	4,11	0,90	3,86	1,09	3,93	1,11	4,21	0,97

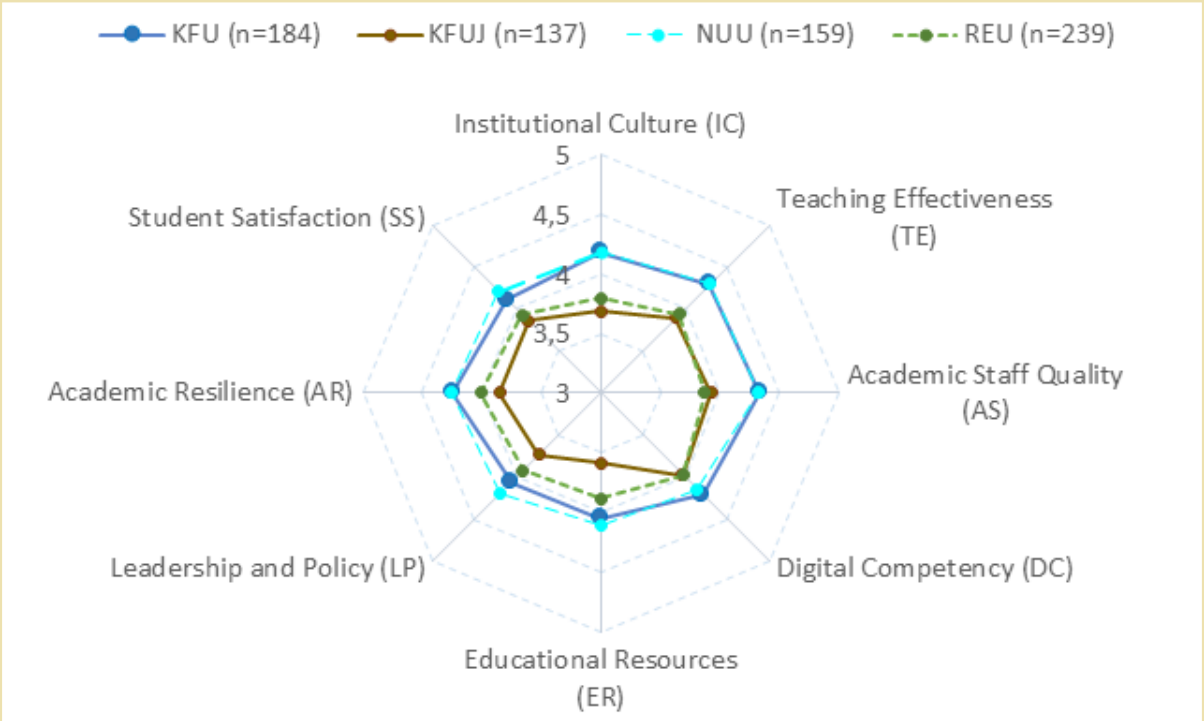


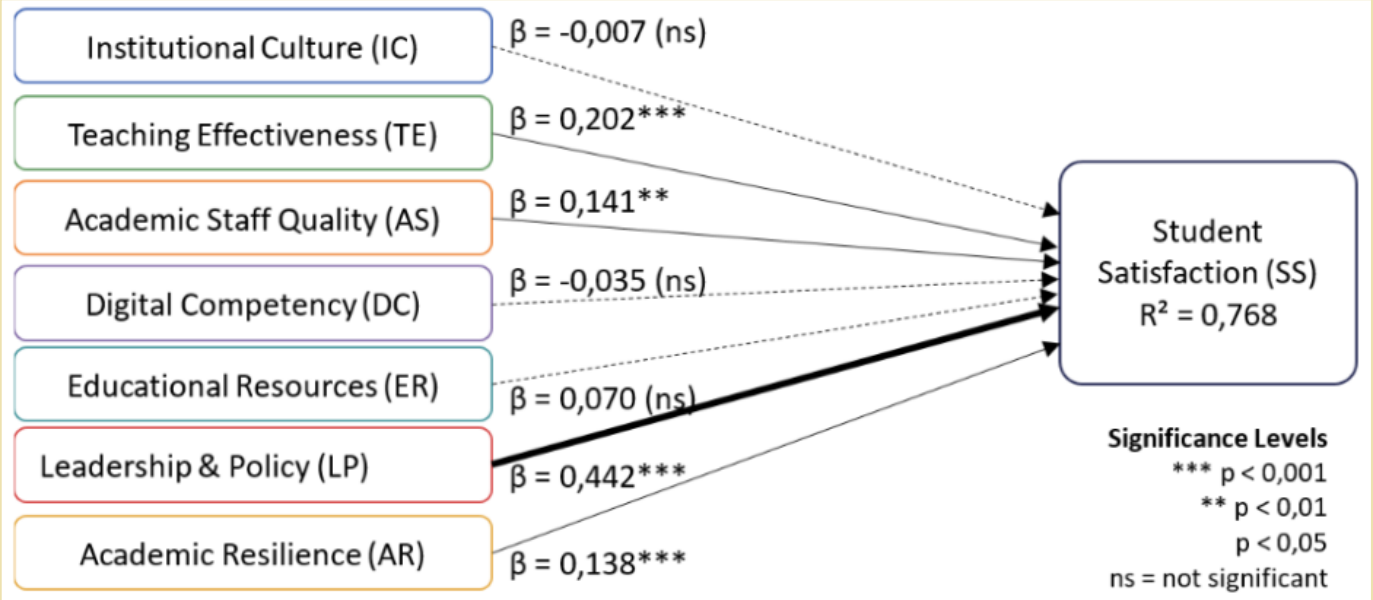
Figure 1 Quality Profile Radar Chart by Institution
Mean scores (M) across eight quality constructs. Scale: 1 (min) – 5 (max). N = 719.

Q1 was measured using one-way ANOVA, Q2 were measured using PLS-SEM with 500 bootstrap resamples. Table 4 combines both of these sets of results. The results of ANOVA indicated that statistically significant inter-institutional differences were found on all eight constructs (all p<0,05). The PLS-SEM structural model had a high explanatory power (R^2=0,768) and high predictive relevance (Q^2=0,752).

Table 4 ANOVA Inter-Institutional Differences and PLS-SEM Structural Paths (N=719; Bootstrap=500; R^2=0,768; Q^2=0,752)

Construct	F (3,715)	p	β (std)	t	95% CI	f^2	p (H)	H
Institutional Culture (IC)	11,29	<,001	−0,007	−0,15	[−0,092, 0,096]	0,000	0,884	H1: ns
Teaching Effectiveness (TE)	8,91	<,001	0,202	3,96	[0,099, 0,306]	0,135	<0,001	H2: √
Academic Staff Quality (AS)	12,03	<,001	0,141	2,69	[0,038, 0,237]	0,066	0,007	H3: √
Digital Competency (DC)	3,14	0,025	−0,035	−0,87	[−0,112, 0,049]	0,004	0,384	H4: ns
Educational Resources (ER)	7,69	<0,001	0,070	1,45	[−0,028, 0,166]	0,016	0,146	H5: ns
Leadership and Policy (LP)	5,97	<0,001	0,442	6,88	[0,303, 0,565]	0,648	<0,001	H6: √
Academic Resilience (AR)	6,64	<0,001	0,138	3,76	[0,065, 0,212]	0,063	<0,001	H7: √
Student Satisfaction (SS)	4,07	0,007	– (outcome)	–	–	–	–	–

Figure 2 presents the structural path model, illustrating the relative contribution of each predictor to Student Satisfaction:



(PLS-SEM Standardized Path Coefficients, N = 719)

AS (F=12,03), IC (F=11,29) and ER (F=7,69) all had the largest ANOVA effects. DC (F=3,14, p=0,025) indicated the least significant ANOVA effect, which was the increased cross-institutional convergence on the self-assessed digital skills of students. According to the structural model, the significant predictor was LP (β=0,442, f2=0,648, p<0,001), as well as TE (β=0,202) and AS (β=0,141). Multicollinearity between H1 (IC) and H4 (DC) with LP (r=0,789 and r=0,763, respectively) reduced their independent predictive contribution in the multivariate model, but they bivariately correlated with SS (r=0,732 and r=0,711). H5 (ER) was not significant (p=0,146), and this implied that although there is an association between physical and digital infrastructure and satisfaction at the bivariate level (r=0,771), it does not predict satisfaction independently when the governance and teaching quality is controlled.

The quality constructs were substantially and positively correlated (Table 5), which is a characteristic of the convergent nature of the quality assessment area. Leadership and Policy (r=0,843) and Teaching Effectiveness (r=0,787), Academic Staff Quality (r=0,775), and Educational Resources (r=0,771) had the strongest correlation with Student Satisfaction.

Table 5 Pearson Correlation Matrix between Constructs (N=719)

Construct	IC	TE	AS	DC	ER	LP	AR	SS
IC	1,000	0,778	0,781	0,709	0,750	0,789	0,692	0,732
TE	0,778	1,000	0,835	0,716	0,748	0,790	0,702	0,787
AS	0,781	0,835	1,000	0,771	0,760	0,775	0,738	0,775
DC	0,709	0,716	0,771	1,000	0,764	0,763	0,773	0,711
ER	0,750	0,748	0,760	0,764	1,000	0,833	0,775	0,771
LP	0,789	0,790	0,775	0,763	0,833	1,000	0,768	0,843
AR	0,692	0,702	0,738	0,773	0,775	0,768	1,000	0,746
SS	0,732	0,787	0,775	0,711	0,771	0,843	0,746	1,000

DISCUSSION

The fact that all eight constructs of quality vary significantly at the institutional level (Q1) follows the results of the previous cross-national study that showed the perceived higher education quality is not evenly spread in a national system but institutionalized [33]. The fact that NUU and KFU have continuously high ratings in all constructs is probably a combination of heavy institutional investment, better governance structures, and rather organized programme delivery. The high scores at NUU in Uzbekistan are aligned to the national agenda on reforming infrastructure in flagship universities.

These results have great consequences on the national and institutional quality assurance systems. Within the framework of the integration of the Bologna Process in Russia and the current reform agenda in Uzbekistan, the prevalence of LP in quality prediction can be compared to the institutional theory views of governance as the impetus of quality change. Membership of the Bologna Process has traditionally located the quality governance in Russia, and the Resolution of the President of the Republic of Uzbekistan [34] introduced an institutional reform model that is a top-down institutional reform model. In both frameworks, the institutional leadership serves to mediate transformation of national policy into the quality outcomes perceived by students, which is in line with the transformational leadership theory [35].

According to accreditation and quality assurance (QA) lens, the ESG 2015 (Standards and Guidelines in Quality Assurance in European Higher Education Area) focus on institutional self-assessment, involvement of stakeholders, and making decisions based on evidence, thus, all aspects which are included in the LP construct. The same point that it is the strongest predictor (β=0,442, f2=0,648) indicates that, as an institution, one must focus on governance reforms that meet the ESG and international standards of quality assurance instead of merely investing in physical resources or teaching inputs. Along with the Russian (Rosobrnadzor) and the Uzbek (NQAAE) national agencies, the LP-oriented indicators can be fruitfully integrated into their institutional appraisal systems.

The lower scores of KFU Branch in IC, ER and LP indicate that branch campus set ups have some unique challenges; institutional autonomy is limited, there is a lack of resources to be allocated and this may result in poor culture of quality when compared to flagship campuses. This trend is consistent with the literature that has performed studies on the dynamics of quality in branch campus that governance fragmentation and resource dependency are the main risk factors [36].

The statistically significant yet quite small difference in Digital Competency between institutions (F=3,14) means that there is a higher rate of convergence when it comes to self-assessed digital competency, which means that the digital competency might be less linked with the institutional quality and rather identified by the individual features of students and their past educational experiences.

One of the salient findings with a strong practical implication is that the dominating power of Leadership and Policy in forecasting Student Satisfaction (β=0,445; Q2) is in itself significant. These findings indicate that the overall satisfaction of students is the strongest predictor of the influence on the quality assurance frameworks based not only on the teaching effectiveness and the quality of the staff but also on the perception of the institutional leaders, whether they have a culture of continuous improvement, whether the strategic plans are clear, whether governance is evidence-based, and whether the collaboration across the institutions is promoted.

This result is consistent with the theories of transformational and distributed leadership, according to which leadership is both a direct quality determinant and a facilitator of the influence of organizational culture and pedagogical innovation. The particularly substantial bivariate correlation between LP and ER (r=0,833) leads us to believe that the leadership performance is also closely associated with the resource mobilization and strategic investment of infrastructure--a connection that resource dependency theories of organizational theory would expect.

The second and fourth most significant predictors of satisfaction were Teaching Effectiveness (β=0,202) and Academic Resilience (β=0,138) respectively with Academic Staff Quality (β=0,141) being the third significant predictor. The strong independent role of academic sustainability is noteworthy, which means that students' internal adaptive resources, i.e. their ability to stay motivated, overcome setbacks, and rebuild problems, play an important intermediary role in satisfying students with the quality of their studies at the university. This result aligns with the post-pandemic literature that recorded the primacy of resilience in student wellbeing and success [37].

In line with the initial theoretical paradigm, Student Satisfaction is significantly related to Digital Competency at the bivariate level (r=0,711). Nevertheless, in the multivariate regression, it is not significantly different and is subdued by multicollinearity with Leadership and Policy (r=0,763) and Academic Staff Quality (r=0,771). It does not mean that the role of digital competency is insignificant but this only indicates that in the present sample, digital infrastructure and competency development are so well integrated with other institutional dimensions of quality that there is little room to distinguish their independent impacts. Structural equation modelling with latent variable estimation which should be considered in future research can better decompose these pathways.

RECOMMENDATIONS

The findings have tangible implications on institutional leaders, quality assurance agencies as well as national policy makers of higher education in Russia and Uzbekistan.

To start with, as Leadership and Policy are the main factors in forecasting satisfaction, universities must invest in the evidence-based governance and participatory strategic planning. The audit of quality assurance processes needs to be shifted to less compliance-based audits and more towards shared accountability models between the faculty and students and the administrative staff.

Second, Teaching Effectiveness contributes strongly to the idea of the necessity of a long-term commitment to faculty development, in the areas of active pedagogy, assessment design, and constructive feedback practices. Faculty evaluation should show that teaching excellence is a rewarded part of the evaluation system.

Third, the Academic Resilience role posits that institutions ought to have organized support systems-mentorship programme, academic counselling, learning communities amongst students-to enhance the adaptive practices of the students, especially first year students who comprise 42.1% of the current sample.

Fourth, in the case of a fast reform of such a system as Uzbekistan, the results highlight three strategic priorities: (a) investing more in digital infrastructure and student development of digital skills, (b) improving the quality of educational resources on the branch and regional campuses, and (c) professionalism of institutional leadership by organizing leadership development programmes.

This study has certain limitations and recommendations that are required in future research.

There are a number of constraints that should be noted. To start with, cross-sectional design does not allow making a causal inference. The longitudinal designs are needed to trace the patterns of quality perception over the academic year and institutional reform cycles.

Second, self-reported survey data can create response and social desirability biases, which should be mitigated by future researchers by triangulating them with objective measures, including graduation rates, learning analytics, and employer satisfaction data.

Third, the institutional and institutional variety of the four-university sample is not representative of all Russian and Uzbek institutions, and may not be applicable to other systems in the region, in Central Asia.

Fourth, the OLS regression, though suitable in the current exploratory objectives, does not allow relating mediation pathways and latent variables. In the next round of research, modeling should be used to take a more rigorous approach to theoretical causal mechanisms.

Future research directions involve: (a) longitudinal panel design to measure quality perceptions at various phases of implementation of reform, (b) multi-group SEM to demonstrate formal measurement invariance across the different types of institutions, (c) objective performance indicator, and (d) to a wider range of Uzbek and Russian universities including regional and specialized institutions.

CONCLUSION

The present study contributes to the higher education quality literature in four different ways. First, it offers the initial cross-national empirical study of a long eight-variable model of quality assessment between Russian and Uzbek universities based on one validated instrument. Secondly, it shows that using CFA and PLS-SEM, the extended model shows an excellent measure (CFI=0,999, RMSEA=0,022, R2=0,768, Q2=0,752) in four institutionally diverse settings and configural invariance. Third, it introduces leadership and policy as the strongest predictor of student satisfaction in the post-Soviet higher education settings - a conclusion that has immediate application in the context of the Bologna Process implementation and the national policy in both of the countries of QA agencies. Fourth, the scope of the issue is broadened by considering the Central Asian institutions as an integral part of a demanding cross-national design to encapsulate the empirical geography of good research outside of Western-oriented contexts.

This research paper is an addition to the existing cross-national literature on the quality of higher education, which it offers empirically supported data in four institutionally diverse institutions in Russia and Uzbekistan. Due to a validated multi-construct tool with students (N=719), the findings reveal significant differences in student satisfaction across institutional contexts (all ANOVA $p<0,05$), that Leadership and Policy is the strongest predictor of student satisfaction ($\beta=0,445$, $R2=0,768$) and that Teaching Effectiveness, Academic Staff Quality and Academic Resilience provide substantial independent contribution to overall student satisfaction.

These findings criticize quality models that give more weight to teaching inputs and physical resources and ignore governance, leadership, and student adaptive capacities. The use of Central Asian university settings of NUU and REU in Uzbekistan: it is a significant addition to the research of the empirical geography of higher education quality, which previously had a paucity of post-Soviet systems of transition.

As Russian and Uzbek universities are still trying to balance their national reform agendas, international accreditation initiatives, and pressure towards digital transformation, the evidence-based quality assessment framework that is suggested and justified in this research provides a useful instrument to benchmark the institution, conduct a quality monitoring, and elaborate a plan to make improvements.

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