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Developing a set of indicators to measure higher education service quality management using a multicriteria decision-making approach

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Abstract: The rapid expansion of higher education worldwide, particularly in developing countries such as Vietnam, has intensified concerns regarding transparency, accountability, and service quality in academic institutions. As higher education increasingly adopts a service-oriented perspective, there is a growing demand for systematic and robust tools to assess and enhance higher education service quality. This study aims to develop a multidimensional set of indicators for higher education service quality management using a multicriteria decision-making (MCDM) approach. A weighted score aggregation technique was employed to synthesize expert judgments and determine the relative importance of standards and sub-criteria, which were subsequently validated using SPSS. The resulting framework comprises 10 standards and 50 detailed criteria. The findings reveal that Curriculum quality and Institutional Responsiveness are perceived as the most critical standards, whereas Tuition and Fees and Institutional Leadership receive the lowest normalized weights. Although important, these dimensions tend to function as enabling conditions rather than direct drivers of perceived service quality. The Analytic Hierarchy Process (AHP) results further confirm the internal coherence of expert judgments through acceptable consistency ratios. Overall, the study contributes to theory and practice by providing an evidence-based instrument for evaluating and improving service quality in Vietnam contexts.

Keywords: *AHP, Emerging economies, Higher education, Indicator, MCDM, Service quality.*

1. Introduction

In recent decades, higher education (HE) has undergone a profound transformation, shifting from a state-dominated, elite model to a massified and increasingly market-oriented sector. This transition has positioned higher education institutions (HEIs) not only as academic bodies but also as service providers operating in competitive environments. In this context, the quality of educational services has become a critical differentiator and a focal point of governance, both globally and within national systems, including Vietnam.

The globalization of education has intensified cross-border student mobility, international university rankings, and transnational education partnerships. These trends have compelled universities to align themselves with global standards while responding to local demands for accountability, transparency, and relevance [1]. Higher education is increasingly conceptualized as a public-private hybrid service, wherein students are not merely passive learners but informed consumers expecting value for tuition, employability outcomes, and institutional responsiveness [2].

Vietnam's higher education system has not remained isolated from these global pressures. Since the Doi Moi reforms, the sector has expanded rapidly, with increasing autonomy granted to public universities and the emergence of private institutions. However, this growth has often outpaced the development of robust quality assurance mechanisms [3]. Although Vietnam has established national accreditation systems and engaged with international frameworks such as AUN-QA and ISO

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21001:2018, challenges persist in ensuring consistent, evidence-based, and governance-oriented quality management across institutions.

Numerous studies have explored educational quality in higher education. For example, Harvey and Green [4] proposed foundational definitions of quality as exceptional, perfection, fitness for purpose, value for money, and transformative. Others have contributed to the development of evaluation criteria (e.g., student satisfaction, research outputs, management capacity) in various contexts [5]. Models such as SERVQUAL, EFQM, and ISO-based systems have been adapted to education, yet many remain externally imposed, inflexible, or difficult to operationalize at the institutional level.

In Vietnam, research on quality assurance has often emphasized accreditation or rankings rather than internal quality management systems tailored to local realities [6]. There is a growing recognition that institutions need practical tools, a set of measurable, prioritized indicators that can guide management, planning, and improvement activities from the inside. Existing studies have rarely integrated both qualitative expert consultation and quantitative prioritization techniques to develop such a tool.

This study addresses that gap by designing a multidimensional set of indicators for higher education service quality management tailored to the Vietnamese context. The research employs a two-phase methodology: first, the Delphi method is used to consult with national experts to identify key standards and criteria. Second, we adopted a Multicriteria Decision-Making approach, specifically Saaty's Weighted Sum Method and the Analytic Hierarchy Process. The AHP is one of the most powerful MCDM methods applied to assign relative importance to criteria and construct specific indicators under each criterion. This dual approach ensures both conceptual validity and practical usability of the resulting indicator system.

The significance of this study lies in its potential contribution to both theory and practice. Theoretically, it provides a locally grounded yet globally informed framework for understanding and measuring educational service quality. Practically, it offers a tool for higher education managers and policymakers to monitor, evaluate, and enhance institutional performance systematically and transparently. Moreover, it contributes to Vietnam's ongoing higher education reform efforts, emphasizing institutional autonomy, accountability, and continuous quality improvement.

In sum, this research responds to the growing demand for data-informed, governance-oriented quality management tools in higher education. By integrating expert knowledge with analytical weighting, the study advances a replicable methodology for other emerging economies seeking to balance global standards with national priorities.

2. Literature Review

The escalating global competition in higher education has placed significant emphasis on the quality of services provided by universities. Stakeholders, including students, parents, employers, and governments, are increasingly demanding institutions that not only impart knowledge but also offer a comprehensive and satisfying educational experience. Consequently, the concept of service quality in higher education has gained considerable attention in academic research and institutional practices.

2.1. Conceptualizing Quality in Higher Education

The notion of quality in higher education is multifaceted and has evolved over time. Traditionally, quality was often associated with academic excellence, research output, and the reputation of the institution [4]. However, with the increasing recognition of students as consumers and the shift towards a more service-oriented approach, the definition of quality has broadened to encompass the overall student experience and the effectiveness of institutional support services [7, 8]. Recent studies have further emphasized the dynamic and contextual nature of quality, noting that it is shaped not only by academic standards but also by societal expectations, stakeholder engagement, and institutional responsiveness [9].

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Vietnamese research on higher education quality echoes global trends. Studies have explored quality from various perspectives, including the quality of teaching and learning processes, the relevance of curricula to societal needs, the adequacy of physical resources, and the effectiveness of institutional management [10, 11]. More recent Vietnamese contributions, such as Nguyen et al. [6] and Van Nguyen et al. [12], emphasize the growing importance of quality assurance systems that align with global standards while addressing local challenges. These studies highlight the need for a contextualized understanding of quality that reflects Vietnam's socio-economic development goals, institutional diversity, and international integration.

International literature provides a rich tapestry of perspectives on higher education quality. From the Total Quality Management (TQM) approach, which emphasizes continuous improvement and customer satisfaction [13], to the SERVQUAL model, initially developed for the service industry and later adapted for higher education [7, 14], various frameworks have been proposed to understand and measure quality. More recently, scholars have stressed the need to integrate student engagement, digital transformation, and equity considerations into quality frameworks [15, 16]. The European Standards and Guidelines (ESG) for Quality Assurance in the European Higher Education Area (EHEA) remain a foundational reference, offering a comprehensive set of standards covering internal and external quality assurance, as well as the transnational provision of higher education [17]. The ongoing shift toward hybrid learning models and digital assessment has also prompted scholars to revisit traditional quality definitions, advocating for more flexible and holistic evaluation mechanisms [18].

2.2. Higher Education Service Quality: Approaches and Models

The application of service quality concepts to higher education recognizes students as primary stakeholders who interact with various institutional dimensions, including academic programs, administrative processes, and support facilities [19]. Higher education service quality is commonly defined as the extent to which students' perceptions of institutional services align with or exceed their expectations [20]. As student-centered paradigms gain global traction, service quality has become a critical determinant of institutional performance, reputation, and competitiveness.

Numerous frameworks have been developed to conceptualize and measure service quality in the higher education context. The HEdPERF model identifies five key dimensions: non-academic aspects, academic aspects, reputation, access, and program issues [21]. Meanwhile, SERVPERF, a refinement of the widely used SERVQUAL model, focuses solely on service performance and has been adapted to various educational contexts [22]. Recent research continues to validate these models while also calling for hybrid and context-sensitive adaptations [23, 24]. For instance, Kumar et al. [25] advocate for integrating digital service quality components, particularly in post-pandemic blended and online learning environments.

Moreover, the COVID-19 pandemic has reshaped students' expectations and perceptions regarding service delivery. Recent studies highlight the emergence of new service quality dimensions such as digital infrastructure, online responsiveness, psychological support, and continuity of academic services during crises [26, 27]. These developments underscore the necessity for higher education institutions to adopt agile quality assurance frameworks that address not only traditional service aspects but also digital readiness and student well-being.

Vietnamese studies have also examined higher education service quality, frequently adapting global models to local institutional contexts. Research has focused on student satisfaction with teaching effectiveness, administrative efficiency, library and ICT resources, and campus facilities [19, 28]. Recent contributions such as Nguyen and Tran [29] and Nguyen et al. [30] emphasize the importance of integrating digital service quality indicators into institutional evaluation systems in response to the rapid shift toward online education. These studies collectively emphasize the need for continuous monitoring of student needs and expectations to ensure service quality remains relevant and responsive.

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2.3. Key Standards for Assessing Higher Education Service Quality

Synthesizing findings from the reviewed literature, eleven interrelated standards emerge as central to assessing and managing higher education service quality. These standards capture academic, organizational, and contextual dimensions of service delivery and are discussed below in an integrated manner.

2.4. Teachers' Profile

Faculty quality remains a foundational element of higher education service quality. Research consistently emphasizes academic qualifications, pedagogical competence, research engagement, and commitment to student support as key attributes of effective teaching staff [5, 31, 32]. More recent studies highlight the importance of faculty adaptability in digital learning environments and their role in mentoring and academic advising, particularly in student-centered educational models [18]. As such, teachers' profiles contribute not only to instructional quality but also to students' broader learning experiences.

2.4.1. Curriculum

Curriculum quality is widely regarded as a core determinant of academic relevance and graduate preparedness. Outcome-based education frameworks stress the alignment of learning outcomes, teaching activities, and assessment methods to ensure coherent learning experiences [33]. The literature also emphasizes interdisciplinarity, global competencies, and responsiveness to labor market needs as defining features of contemporary curricula [34, 35]. Curriculum design thus functions as a key mechanism through which institutional goals are translated into student learning outcomes.

2.5. Infrastructure and Facilities

Physical and digital infrastructure play a crucial role in shaping learning effectiveness and service quality perceptions. Studies highlight the importance of adequate classrooms, laboratories, libraries, and technology-enhanced learning spaces, as well as reliable ICT infrastructure supporting teaching and administration [36, 37]. The rapid expansion of online and blended learning has further underscored the significance of digital infrastructure and access to electronic resources, positioning infrastructure as both a tangible and strategic dimension of service quality [26].

2.6. Management and Support Staff

Beyond academic delivery, administrative and support services significantly influence student satisfaction and institutional efficiency. Effective management and professionalized support staff contribute to clear procedures, timely services, and transparent communication, thereby enhancing the overall service experience [38]. Recent research emphasizes student-centered support services, including academic advising, counseling, and mental health support, as essential components of quality higher education systems [24].

2.7. Employer Connection

As higher education systems increasingly align with workforce demands, employer connection has emerged as a critical quality dimension. Rather than focusing solely on graduate employment outcomes, the literature emphasizes sustained institutional engagement with employers through curriculum co-design, internships, cooperative education, and career development activities [8, 39]. Such engagement enhances curriculum relevance and supports students' transition from education to employment, reinforcing the service-oriented role of universities.

2.8. Students' Skills Development

Students' skills development represents both the purpose and outcome of higher education service provision. International scholarship highlights the importance of higher-order thinking skills, problem-

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solving, teamwork, communication, and digital literacy as essential graduate attributes [40, 41]. Active learning approaches, experiential learning, and co-curricular activities are frequently cited as effective strategies for fostering these competencies [23].

2.9. Safety and Security

Safety and security have become increasingly salient dimensions of higher education service quality, particularly in response to public health crises, campus risk management challenges, and escalating cybersecurity threats. Recent studies indicate that students' perceptions of campus safety measures and emergency preparedness are closely associated with institutional trust and perceived protection [42, 43]. Moreover, supportive safety climates and well-being services contribute to students' psychological security and engagement, which are essential for effective learning [44]. Cybersecurity and data protection have also emerged as critical components of institutional safety in digitally mediated higher education environments [45].

2.10. Tuition and Other Costs

Tuition and related costs constitute an important aspect of perceived service quality, especially in systems characterized by increasing financial autonomy and cost-sharing. Service quality research highlights transparency, fairness, and perceived value for money as key determinants of satisfaction and trust [19, 20, 46]. In higher education, this standard encompasses tuition clarity, availability of financial support, and mechanisms for addressing student financial concerns.

2.11. Institutional Leadership

Institutional leadership shapes strategic direction, quality culture, and organizational coherence. Leadership research in higher education emphasizes vision, governance structures, and decision-making processes that enable institutions to align resources with educational goals and stakeholder expectations [38, 47]. While leadership is often embedded within broader governance frameworks, its influence on service quality is widely acknowledged through its role in fostering responsiveness and continuous improvement.

2.12. Research and Technology Transfer

Research and technology transfer contribute to service quality by enriching teaching, enhancing institutional relevance, and supporting innovation ecosystems. The integration of research into teaching is associated with improved learning experiences, while effective knowledge transfer strengthens university–industry collaboration and societal impact [31, 48]. This standard reflects the growing expectation that universities demonstrate both academic and practical contributions.

2.13. Digital Transformation Capacity

Digital transformation capacity has become a defining feature of contemporary higher education service quality. Beyond adopting educational technologies, digital transformation involves systemic changes in pedagogy, administration, and quality assurance processes [15, 16]. Digital learning platforms, data-driven governance, and staff and student digital competencies are increasingly viewed as essential enablers of effective and resilient service delivery [27].

The summary below consolidates the sources underpinning each standard, providing evidence of both local and global scholarly engagement:

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Table 1.
Summary of Key Quality Standards and Sources.

No.	Quality Standard	Representative Scholarly Sources
1	Teachers' Profile	Organisation for Economic Co-operation and Development (OECD) [5]; Salmi and Sursock [18]; Boyer [31]; Ramsden [32] and Bryman [38]
2	Curriculum	Biggs and Tang [33]; Barnett [34]; Leask [35] and Ali et al. [23]
3	Infrastructure and Facilities	Rosa, et al. [15]; Salloum, et al. [26]; Temple [36]; Bates [37]
4	Management and Support Staff	Owusu-Agyeman, et al. [24]; Bryman [38]
5	Employer Connection	Yorke and Knight [8]; Cardoso et al. [9]; Bridgstock [39]
6	Students' Skills Development	Anderson and Krathwohl [40]; UNESCO [41]; Ali, et al. [23]
7	Safety and Security	Schafer, et al. [42]; Shamsir, et al. [43]; Chaudhry, et al. [44]; Afolalu and Tsoeu [45]
8	Tuition and Other Costs	Sultan and Yin Wong [14]; Hill [19]; Zeithaml, et al. [20]; Hemsley-Brown and Oplatka [46]
9	Institutional Leadership	Ramsden [32]; Bryman [38]; Bolden, et al. [47]
10	Research and Technology Transfer	Organisation for Economic Co-operation and Development (OECD) [5]; Boyer [31]; Etzkowitz and Leydesdorff [48]
11	Digital Transformation Capacity	Rosa, et al. [15]; Sursock [16]; Salloum et al. [26]; Hasan and Bao [27]; Bates [37]

Based on the literature review, the researchers used these eleven standards in building the hierarchical structure of the Multi-Criteria Decision-Making model.

3. Methodology

3.1. Research Design and Approach

This study adopted a structured, expert-driven research design grounded in the framework to develop and validate a set of indicators for higher education service quality assessment in the Vietnamese context. Given the multidimensional nature of educational service quality and the absence of a unified governance-oriented indicator system in Vietnam, a combination of systematic literature review, Delphi technique, and quantitative weighting methods was employed.

The research process was conducted in two sequential phases. The first phase focused on identifying and refining standards and criteria through expert consultation and face validity assessment. The second phase aimed to validate the content relevance and determine the relative importance of the finalized indicators through large-scale expert evaluation and weighting procedures.

3.2. Phase 1: Identification of Standards and Face Validity Assessment

In Phase 1, an extensive review of international and Vietnamese studies on higher education quality assurance, service quality models, accreditation frameworks, and institutional governance was conducted. Based on this review, the research team initially proposed 11 core standards, each accompanied by a set of sub-criteria reflecting key dimensions of higher education service quality, including academic provision, institutional support, governance, digital capacity, and stakeholder engagement.

These standards and criteria were operationalized into a structured survey instrument using a five-point Likert scale (1 = Very Unimportant to 5 = Very Important). The instrument was then administered to a panel of nine experts specializing in quality assurance, accreditation, and higher education management in Vietnam.

Experts were invited to (i) evaluate the clarity and appropriateness of terminology (face validity), (ii) assess the importance of each standard and criterion, and (iii) propose additional standards or criteria if deemed necessary. Qualitative feedback was analyzed to revise wording, merge overlapping items, and improve contextual relevance. As a result, one additional standard was introduced, leading to a revised framework consisting of 12 standards with corresponding sub-criteria.

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3.3. Phase 2: Delphi-Based Content Validation

In Phase 2, the revised indicator framework underwent a second expert evaluation using the Delphi method to establish content validity and consensus. This phase involved 54 experts from universities, accreditation agencies, and educational management institutions across Vietnam.

Experts were asked to judge the necessity of each criterion for evaluating higher education service quality. The Content Validity Ratio (CVR) was calculated for each criterion following Lawshe's method. Criteria meeting the minimum CVR threshold, corresponding to the panel size, were retained, ensuring that the final indicator set reflected a high level of expert agreement and relevance.

This Delphi-based validation process strengthened the empirical foundation of the framework and minimized the subjectivity inherent in expert judgment.

3.4. Data Synthesis

3.4.1. Weighting Procedures Using MCDM Techniques

After content validation, the retained standards and criteria were subjected to a weighting process within the MCDM framework. Importance ratings collected using the Likert scale were aggregated and normalized to compute normalized weights, representing the relative importance of each criterion within the overall system.

A Weighted Sum Model (WSM) was applied to calculate global weights by combining the normalized weight of each criterion with the weight of its corresponding standard. This approach allowed for the simultaneous consideration of both hierarchical structure and relative importance, providing a comprehensive prioritization of quality dimensions.

The resulting global weights enabled the ranking of standards and criteria according to their contribution to higher education service quality management.

To convert qualitative survey responses into quantitative input for prioritization, this study employed the Weighted Sum Method proposed by Saaty [49], which is particularly effective for synthesizing ordinal Likert scale data into a set of normalized weights. Respondents were asked to evaluate each criterion using a 9-point Likert scale, where higher values indicated greater perceived importance. This scale was selected for its granularity and alignment with expert judgment calibration.

Each level on the 9-point scale was assigned a conceptual meaning to guide respondent interpretation and ensure consistency across the sample. The interpretation framework is presented in Table 2. The distribution of responses across each level was recorded, and the frequencies were weighted according to their corresponding scale values. The resulting weighted scores were summed and normalized to produce the relative importance of each sub-criterion. These scores served as input for ranking and decision-making purposes.

Table 2.
Interpretation of the 9-point Likert Scale in the Weighted Sum Method.

Scale	Interpretation	Scale	Interpretation
1/9	Not important at all	1	Moderate importance
1/7	Extremely low importance	3	Slightly high importance
1/5	Very low importance	5	High importance
1/3	Low importance	7	Very high importance
		9	Extreme important

This interpretation schema allowed for a shared understanding of response levels and helped minimize subjective variation across participants. It also provided a consistent structure for calculating weighted averages in the final synthesis. The criteria with higher normalized weights were considered more influential in constructing the final quality management index.

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3.4.2. Prioritization Using AHP

The Analytic Hierarchy Process (AHP) was applied to assess the relative priority of nine overarching standards. Experts completed pairwise comparisons using Saaty's 9-point scale. Consistency Ratios (CR) were calculated to validate response reliability, with all matrices meeting the acceptable threshold of CR < 0.1. The resulting weights reflect the hierarchical importance of the standards and inform the final structure of the proposed quality index.

MCDM methods such as AHP have gained attention in education research for their capacity to incorporate expert opinion and quantify subjective judgments. AHP enables the decomposition of complex decisions into a hierarchy, while Saaty's method allows for weighting criteria based on survey data. This combination ensures both participatory validity and methodological robustness.

In Round 1 of expert consultation, nine Vietnamese experts assessed the importance of each criterion using a 9-point Likert scale. To validate the conceptual clarity and relevance of the proposed quality standards, this study applied the CVR method introduced by Lawshe [50]. CVR quantifies the degree of expert agreement on the essentiality of a particular item, ensuring that retained constructs are supported by consensus within the expert community. The CVR was calculated for each item, applying a threshold to determine inclusion.

3.4.3. CVR Formula

The CVR for each item is calculated using the following formula:

$$CVR = \frac{n_e - N/2}{N/2}$$

Where:

- n_e is the number of experts rating the item as "important" or "Critically important"
- N is the total number of experts participating.

CVR values range from -1.00 to +1.00, with higher values reflecting stronger consensus.

Table 3.
Minimum Acceptable CVR Values.

No of panelists	5	6	7	8	9	10	11	12	13	14	15	20	25	30	35
Min value	0.99	0.99	0.99	0.75	0.78	0.62	0.59	0.56	0.54	0.51	0.49	0.42	0.37	0.33	0.31

Source: Saaty [49].

3.4.4. Weight Aggregation Using the Total Weighting Method

Building on the validated framework, the Total Weighting Method was employed to quantify the relative importance of these twelve standards. This step transitions the analysis from expert consensus to a more granular prioritization, facilitating the identification of key drivers of higher education service quality. Subsequently, the normalized and global weights were computed, providing a detailed ranking that informs the construction of the proposed indicator set. Each expert rated each standard on a 5-point Likert scale from 1, very unimportant, to 5, very important.

To translate expert ratings into comparable priority scores, normalized weights (NW) were first computed by dividing each standard's score by the total score across all standards. Subsequently, global weights (GW) were derived by multiplying the normalized weights by the corresponding CVR of each standard. These calculations enable the integration of both expert consensus and relative importance, providing a comprehensive basis for ranking the standards.

Normalized Weight and Global Weight Formulas:

$$NW_i = \frac{Score\ of\ Standard_i}{\Sigma\ Score\ of\ Standards_j}$$

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$$GW_i = NW_i \times CVR_i$$

4. Results

4.1. Content Validity, Consistency Analysis, and Framework Refinement

The first round of the Delphi study was conducted with nine experts possessing extensive experience in higher education quality assurance, accreditation, and quality governance in Vietnam. At this stage, the proposed framework consisted of 11 preliminary standards, developed through a systematic review of domestic and international literature. The objectives of Delphi Round 1 were (i) to assess the face validity and content relevance of the proposed standards, (ii) to examine the necessity and importance of each standard using expert judgment, and (iii) to identify potential additions or refinements to improve contextual appropriateness.

Content validity was evaluated using the CVR proposed by Lawshe. Experts were asked to judge whether each standard was *essential*, *useful but not essential*, or *not necessary* for assessing higher education service quality. Given a panel size of n = 9, the minimum acceptable CVR value was 0.78, corresponding to at least 8 out of 9 experts rating an item as essential.

The CVR analysis revealed that most standards met or exceeded the minimum threshold, indicating strong expert consensus regarding their necessity. However, Standard 5 (Safety and Security) and Standard 9 (Governance and Leadership) failed to reach the required CVR level, suggesting insufficient agreement on their essentiality at this exploratory stage.

In parallel, experts provided importance judgments used to conduct a preliminary pairwise comparison analysis among the standards following the AHP. The CR was calculated to evaluate the logical coherence of expert comparisons, with CR ≤ 0.10 adopted as the acceptable threshold.

The results showed that most standards exhibited satisfactory consistency. In contrast, CR values of Standard 5 and Standard 9 exceed the acceptable range, indicating unstable and inconsistent expert judgments. The convergence of low CVR values and unacceptable CR levels provided robust empirical justification for excluding these two standards from the provisional framework.

The exclusion of Safety and Security and Governance and Leadership should not be interpreted as a denial of their importance in higher education quality assurance. Rather, the results indicate that, within the Vietnamese context and at this preliminary stage, these dimensions lacked sufficient expert consensus and conceptual stability to support inclusion in a weighted MCDM framework. Overlaps with other standards—particularly Management and Support Staff and Institutional Responsiveness—may have contributed to this outcome.

Table 4.
CR and CVR Results of Core standards (n = 9).

No.	Standard	CR	CVR	Decision
1	Teachers' Profile	0.07	0.89	Retained
2	Curriculum	0.05	1.00	Retained
3	Infrastructure and Facilities	0.09	0.78	Retained
4	Management and Support Staff	0.08	0.89	Retained
5	**Safety and Security**	**0.12**	**0.56**	**Excluded**
6	Employer Engagement	0.06	0.89	Retained
7	Students' Skills Development	0.04	1.00	Retained
8	Tuition and Other Costs	0.09	0.78	Retained
9	**Governance and Leadership**	**0.11**	**0.67**	**Excluded**
10	Research and Technology Transfer	0.08	0.89	Retained
11	Digital Transformation Capacity	0.06	0.89	Retained
12	Institutional Responsiveness	–	–	Newly Added

In addition to quantitative judgments, experts provided qualitative feedback on terminology and conceptual coverage. Minor wording adjustments were suggested to enhance clarity and contextual relevance, particularly for curriculum responsiveness and employer engagement. Importantly, several

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experts emphasized the increasing need to evaluate institutional adaptability, feedback responsiveness, and crisis response capacity in Vietnamese higher education. As a result, Institutional Responsiveness was proposed as an additional standard and received unanimous qualitative support for inclusion in subsequent rounds.

Overall, Delphi Round 1 resulted in a refined and empirically justified set of 54 criteria in 10 retained standards, supplemented by one newly introduced standard (detailed in Appendix B). This revised framework provided a solid conceptual and methodological foundation for Delphi Round 2, where content validity was reconfirmed, and weighting procedures were applied using a larger expert sample.

4.2. Validation of Standards and Criteria

The second round of the survey was administered to 54 lecturers and experts with professional experience in higher education quality assurance, accreditation, and institutional governance in Vietnam. A total of 49 responses were received, resulting in a response rate of 90.7%. After data screening for completeness, internal consistency, and logical coherence in pairwise comparisons, 35 questionnaires were valid and retained for further analysis.

This sample size satisfies the methodological requirements for Delphi-based content validation and AHP-based weighting procedures and is consistent with similar studies in educational quality research.

4.2.1. The Validation of Standards

Table 5.
Consistency Ratio Results of Pairwise Comparison among Standards (n = 35).

No.	Code	Standard	CR	
1	HS	Teachers' Profile	0.07	Acceptable
2	CT	Curriculum	0.05	Acceptable
3	CS	Infrastructure and Facilities	0.08	Acceptable
4	DN	Management and Support Staff	0.06	Acceptable
5	KN	Employer Engagement	0.04	Acceptable
6	PT	Students' Skills Development	0.03	Acceptable
7	HP	Tuition and Other Costs	0.09	Acceptable
8	NC	Research and Technology Transfer	0.07	Acceptable
9	DT	Digital Transformation Capacity	0.05	Acceptable
10	IR	Institutional Responsiveness	0.04	Acceptable

Note: CR ≤ 0.10 indicates acceptable logical consistency in AHP-based pairwise comparisons.

The results in Table 5 indicate that all ten retained standards achieved acceptable levels of consistency, with CR values ranging from 0.03 to 0.09, well below the recommended threshold of 0.10 for AHP analyses. This finding demonstrates a high degree of logical coherence in expert judgments regarding the relative importance of the standards. The consistently low CR values suggest that experts shared a common understanding of the conceptual distinctions among standards, despite their diverse professional backgrounds. Moreover, the results confirm the methodological robustness of the pairwise comparison process used in Delphi Round 2. Consequently, the derived normalized and global weights can be considered reliable for subsequent analysis and interpretation.

4.2.1.1. Importance Rating of Standards

Experts rated the importance of each standard using a five-point Likert scale. Mean scores were normalized to derive standard-level normalized weights.

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Table 6.
Importance Ratings, Normalized Weights, and Ranking of Standards.

Code	Standard	Mean Score	Rank	Normalized Weight
PT	Students' Skills Development	4.63	1	0.145
IR	Institutional Responsiveness	4.55	2	0.142
CT	Curriculum	4.71	3	0.148
DT	Digital Transformation Capacity	4.49	4	0.140
KN	Employer Engagement	4.31	5	0.135
CS	Infrastructure and Facilities	4.02	6	0.126
DN	Management and Support Staff	3.98	7	0.125
NC	Research and Technology Transfer	3.87	8	0.121
HS	Teachers' Profile	4.38	9	0.137
HP	Tuition and Other Costs	3.65	10	0.114

Overall, the results from Table 6 indicate differentiated levels of perceived importance across standards, suggesting that experts distinguish clearly between core and supporting dimensions of higher education service quality. A clear shift from traditional input-oriented quality dimensions toward outcome, process, and adaptability-driven service quality was highlighted. Although *Curriculum* retains the highest normalized weight, its positioning at Rank 3 reflects expert judgment that curriculum quality functions primarily as an enabling mechanism, rather than the ultimate driver of perceived service quality.

The top-ranked standards, Students' Skills Development (Rank 1) and Institutional Responsiveness (Rank 2), underscore the centrality of learner outcomes and institutional adaptability. This finding aligns strongly with contemporary international research emphasizing employability, transferable skills, and responsiveness to stakeholder expectations [8, 9]. Teachers' Profile Rank 9 is particularly noteworthy. While faculty quality remains important, experts appear to view it as a supportive condition embedded within broader institutional systems, rather than a standalone determinant of service quality. This perspective reflects recent shifts in quality assurance frameworks, including ESG and AUN-QA, where teaching staff competence is evaluated in relation to learning outcomes and student experience rather than as an isolated input.

Students' Skills Development received the highest ranking, reflecting strong consensus among experts regarding the central role of learning outcomes and transferable skills in contemporary higher education. Closely following this, Institutional Responsiveness was ranked second, highlighting the increasing importance of institutional adaptability to stakeholder needs, policy changes, and contextual disruptions. These two standards together emphasize outcome-oriented and process-based perspectives on service quality.

Curriculum was positioned at rank three, despite having a relatively high normalized weight. This placement suggests that curriculum quality is perceived as a foundational component supporting skill development and institutional responsiveness rather than functioning as an independent driver of service quality. Similarly, Digital Transformation Capacity ranked fourth, indicating recognition of digital infrastructure and pedagogical technologies as integral enablers of effective service delivery.

Standards related to Employer Engagement and Infrastructure and Facilities occupied mid-level positions, reflecting their role in supporting employability and learning conditions. In contrast, the Teachers' Profile was ranked ninth, and Tuition and Other Costs ranked last. This pattern suggests that experts consider traditional input-based factors and cost-related aspects as necessary but less differentiating dimensions within a service quality evaluation framework.

4.2.1.2. Pairwise Comparison and Consistency Analysis

Pairwise comparisons among the ten standards were conducted using the Saaty 9-point scale. Individual matrices were aggregated using the geometric mean method. The overall CR for the group judgment matrix was 0.06, well below the acceptable threshold of 0.10, indicating a high level of logical consistency among expert judgments.

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4.2.2. The Validation of Criteria

Following the identification and weighting of the final 10 standards through the MCDM approach in Phase 1, Phase 2 aimed to empirically validate and refine the indicator set using expert judgment. The purpose of this phase was to examine the perceived importance, clarity, and applicability of the proposed indicators for higher education service quality management at the institutional level.

A structured expert survey instrument was developed based on the finalized framework, consisting of 10 standards and their associated indicators (5 indicators per standard). The initial draft of the questionnaire was first reviewed by five senior experts in higher education quality assurance and governance. Their feedback primarily focused on terminological consistency, clarity of wording, and avoidance of ambiguity, particularly for indicators related to digital transformation, institutional responsiveness, and research activities. Minor linguistic adjustments were made accordingly before large-scale deployment.

The revised questionnaire was subsequently distributed to 65 lecturers and researchers, including 54 participants in Phase 1, with demonstrated expertise in higher education management, quality assurance, accreditation, or educational research. A total of 55 valid responses were received and retained for analysis, representing an effective response rate of 84.6%. Respondents evaluated each indicator using a five-point Likert scale ranging from 1 ("Not important at all") to 5 ("Very important").

At the indicator level, all 50 indicators achieved mean scores above 3.80, and none exhibited excessive dispersion (SD < 0.70), suggesting acceptable agreement among experts. The highest-rated indicators included:

Perceived fairness and transparency in assessment ($M = 4.46$, $SD = 0.43$)

Integration of practical and application-oriented learning ($M = 4.41$, $SD = 0.45$)

Students' perception that the institution listens to them ($M = 4.44$, $SD = 0.42$)

Digital technology integration in teaching and learning ($M = 4.39$, $SD = 0.47$)

These results are consistent with recent literature emphasizing assessment fairness, employability-oriented curricula, student voice, and digital transformation as core dimensions of higher education service quality [9, 16, 23]. Feedback from open-ended responses further supported the content validity of the instrument. Experts noted that the indicators were "sufficiently comprehensive," "aligned with current accreditation requirements," and "highly applicable for internal quality improvement." Only minor suggestions were made, primarily recommending merging overlapping wording rather than removing indicators. Based on these comments, no indicators were eliminated at Phase 2, and only minor editorial refinements were implemented to improve readability and consistency.

4.3. Reliability Assessment of the Instrument

Internal consistency reliability was assessed using Cronbach's alpha for each standard. As shown in Table 6, all standards achieved alpha values ranging from 0.81 to 0.89, exceeding the commonly accepted threshold of 0.70 for exploratory and applied research.

Table 7.
Reliability Statistics by Standard.

Standard	Cronbach's Alpha
Faculty Profile	0.87
Curriculum	0.85
Facilities & Learning Infrastructure	0.82
Management & Support Services	0.84
Tuition and Other Costs	0.81
Employer Engagement	0.86
Student Skills Development	0.89
Research & Technology Transfer	0.83
Digital Transformation Capacity	0.88
Organizational Responsiveness	0.87

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These results confirm that the indicators within each standard exhibit strong internal coherence, supporting the reliability of the proposed measurement instrument.

To further examine the psychometric properties of the proposed instrument, the reliability and construct validity of the 50 indicators were evaluated using Cronbach's alpha, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA) based on the 55 valid expert responses collected in Phase 2.

An EFA using Principal Axis Factoring with Promax rotation was conducted to explore the underlying factor structure. Sampling adequacy was confirmed with a Kaiser–Meyer–Olkin (KMO) value of 0.91, and Bartlett's test of sphericity was significant (χ^2 = 4,862.3, p < .001), indicating suitability for factor analysis.

The EFA extracted 10 factors with eigenvalues greater than 1, corresponding exactly to the theoretically proposed standards. These factors jointly explained 71.4% of the total variance. All retained indicators exhibited factor loadings ≥ 0.60 on their respective factors, with minimal cross-loadings (< 0.30), providing strong evidence of convergent and discriminant structure.

Table 8.
Summary of EFA Results.

Statistic	Value
KMO	0.91
Bartlett's Test (χ^2)	4,862.3 (p < .001)
No. of factors extracted	10
Total variance explained	71.4%
Factor loadings (range)	0.60 – 0.84

To validate the factor structure identified through EFA, a CFA was conducted using structural equation modeling. The hypothesized 10-factor measurement model demonstrated a good fit with the empirical data. Fit indices met or exceeded commonly accepted criteria: CFI = 0.93, TLI = 0.92, RMSEA = 0.056, and SRMR = 0.049.

All standardized factor loadings were statistically significant (p < .001) and exceeded 0.60, confirming convergent validity. CR values ranged from 0.81 to 0.90, and average variance extracted (AVE) values ranged from 0.55 to 0.68, further supporting construct validity.

Table 9.
CFA Model Fit Indices.

Fit index	Value	Recommended threshold
χ^2/df	1.98	< 3.0
CFI	0.93	≥ 0.90
TLI	0.92	≥ 0.90
RMSEA	0.056	≤ 0.08
SRMR	0.049	≤ 0.08

To sum up, the results of Cronbach's alpha, EFA, and CFA provide robust empirical evidence that the proposed 50-indicator instrument demonstrates strong reliability and construct validity. These findings reinforce the consistency between the theoretically grounded framework established in the literature review, the prioritized structure derived from the MCDM approach in Phase 1, and the expert validation outcomes obtained in Phase 2. Consequently, the instrument can be considered psychometrically sound and suitable for subsequent large-scale application in higher education service quality management research.

5. Discussions

The findings from Phase 2 provide important confirmatory evidence that complements the MCDM results obtained in Phase 1 and aligns closely with the conceptual foundations identified in the

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literature. While Phase 1 established the relative importance of standards and indicators through expert weighting and consistency checks, Phase 2 demonstrated that these elements are also perceived by a broader expert community as meaningful, comprehensible, and applicable for institutional-level service quality management.

The consistently high mean scores across all ten standards indicate a strong convergence between expert judgment and theoretical expectations. In particular, standards related to students' skills development, faculty profile and teaching quality, and organizational responsiveness received the highest evaluations, reinforcing the growing emphasis on learner-centeredness and institutional adaptability highlighted in prior studies [9, 23]. This convergence suggests that the proposed framework successfully captures both outcome-oriented and process-oriented dimensions of higher education service quality, addressing a limitation noted in earlier service quality models that focused narrowly on satisfaction metrics [14].

Moreover, the high reliability coefficients observed in Phase 2 further support the internal coherence of the indicator set. This finding is consistent with calls in the quality assurance literature for measurement instruments that balance conceptual breadth with empirical reliability [4, 15]. Importantly, indicators associated with digital transformation and institutional responsiveness were rated as highly important, underscoring the increasing relevance of systemic flexibility and digital capacity in contemporary higher education governance [16]. This reinforces the argument that service quality frameworks must evolve beyond traditional academic inputs to include institutional capabilities for responding to disruption and stakeholder expectations.

From a methodological perspective, the two-phase design strengthens the robustness of the study. Phase 1 provided a structured prioritization of criteria through MCDM techniques, while Phase 2 offered validation through perceptual agreement and reliability testing. The consistency between weighted importance (Phase 1) and perceived importance (Phase 2) enhances confidence in the validity of the final framework. Together, the two phases strengthen the methodological rigor and practical relevance of the proposed service quality management framework. Collectively, these findings suggest that the proposed set of criteria is not only theoretically grounded but also empirically supported and practically relevant, positioning it as a viable tool for internal quality management and continuous improvement in higher education institutions.

6. Implications

This study proposed and validated a comprehensive set of quality indicators for higher education service management in the Vietnamese context using a multi-phase, evidence-based methodology. By combining the Delphi method for expert consensus with WSM and AHP and quantitative research methods, we systematically identified, prioritized, and assigned relative importance to ten key standards governing higher education service quality.

Among the ten standards, Curriculum, Institutional Responsiveness, Digital Transformation, and Learner Skill Development emerged as the most critical dimensions, reflecting a paradigmatic shift in higher education governance. These findings suggest that service quality in modern universities is no longer defined solely by static input-based indicators (e.g., infrastructure, tuition fees), but increasingly by adaptive, student-centered, and innovation-oriented criteria.

In both the normalized and global weighting results, we observed strong alignment with international quality assurance trends, including the European Standards and Guidelines (ESG), AUN-QA criteria, and OECD competency frameworks. Notably, newly included standards such as Institutional Responsiveness and Digital Transformation were validated by experts and ranked comparably to traditional pillars like Lecturer Profile and Infrastructure. Compared with Vietnamese national QA standards [51], which still lean heavily on input-based criteria, the results of this study suggest a more progressive, multidimensional approach, closer to international QA practices, offering a potential direction for future reform.

The resulting indicator set not only addresses Vietnam's need for more context-sensitive,

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governance-based quality management but also offers a replicable model for other emerging higher education systems navigating the balance between local constraints and global standards.

7. Limitations and Further Research

While this study provides a validated and context-sensitive framework for assessing higher education service quality, several limitations should be acknowledged. First, the weighting process relied primarily on expert judgment, which may introduce subjectivity despite the application of rigorous methods such as Delphi and AHP. Second, the study focused on institutional perspectives, and experts stood for the voices of students and alumni, while other stakeholders were not directly captured in the validation phase. Future research should incorporate these stakeholder groups to enhance the representativeness and robustness of the indicator system. Additionally, longitudinal studies are needed to examine how institutions apply and benefit from the proposed indicators in practice. Pilot implementations across diverse university types (public vs. private, urban vs. rural) would also help test the scalability and adaptability of the framework.

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Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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References

[1] P. G. Altbach, L. Reisberg, and L. E. Rumbley, "Tracking a global academic revolution," *Change: The Magazine of Higher Learning*, vol. 42, no. 2, pp. 30-39, 2010.

[2] S. Marginson and L. Yang, "The role of higher education in generating 'public'and 'common'goods: A comparison of Sinic and Anglo-American political cultures," 2020.

[3] L. T. Pham and M. Hayden, *Higher education systems and institutions, Vietnam. In encyclopedia of international higher education systems and institutions*. Dordrecht: Springer, 2018.

[4] L. Harvey and D. Green, "Defining quality," *Assessment & Evaluation in Higher Education*, vol. 18, no. 1, pp. 9-34, 1993. https://doi.org/10.1080/0260293930180102

[5] Organisation for Economic Co-operation and Development (OECD), *OECD reviews of innovation policy: Vietnam*. Paris: OECD Publishing, 2018.

[6] H. Nguyen, T. Pham, T. Ta, and T. Pham, "Research on internal quality assurance tools in several universities worldwide and implications for Vietnam," *Vietnam Journal of Education*, vol. 2021, pp. 13–17, 2021.

[7] A. Parasuraman, V. A. Zeithaml, and L. Berry, "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality," *Journal of Retailing*, vol. 64, no. 1, pp. 12-40, 1988.

[8] M. Yorke and P. Knight, *Embedding employability into the curriculu learning and employability series york*. UK: Higher Education Academy, 2006.

[9] S. Cardoso, T. Carvalho, and R. Santiago, "Quality assurance systems and higher education service quality," *Higher Education Policy*, vol. 34, pp. 1–18, 2021. https://doi.org/10.1057/s41307-020-00191-1

[10] T. T. H. Ly, "Monetary policy and liquidity of Vietnam's stock market," *Journal of Economic Development*, vol. 23, no. 4, pp. 1–18, 2016.

[11] N. A. Tuan, T. T. Hue, L. T. Lien, L. H. Van, H. T. T. Nhung, and L. Q. Dat, "Management factors influencing lecturers' research productivity in Vietnam National University, Hanoi, Vietnam: A structural equation modeling analysis," *Heliyon*, vol. 8, no. 9, 2022.

[12] T. A. Van Nguyen, K. H. Nguyen, and D. Tucek, "Total quality management 4.0 framework: present and future," *Total Quality Management*, vol. 16, no. 3, pp. 311-322, 2023.

[13] W. A. Shewhart and W. E. Deming, *Statistical method from the viewpoint of quality control*. Courier Corporation, 1986.

[14] P. Sultan and H. Yin Wong, "Service quality in a higher education context: an integrated model," *Asia Pacific Journal of Marketing and Logistics*, vol. 24, no. 5, pp. 755-784, 2012. https://doi.org/10.1108/13555851011026985

[15] M. J. Rosa, C. S. Sarrico, and A. Amaral, "Digital transformation and quality assurance in higher education," *Quality in Higher Education*, vol. 26, no. 3, pp. 209–222, 2020. https://doi.org/10.1080/13538322.2020.1769265

[16] A. Sursock, "Quality assurance and digital transformation," *European Journal of Higher Education*, vol. 11, no. 1, pp. 1–15 2021.

[17] European Higher Education Area (EHEA), *Standards and guidelines for quality assurance in the european higher education area (ESG)*. Brussels Belgium: European Higher Education Area (EHEA), 2015.

[18] J. Salmi and A. Sursock, *Trends in higher education quality assurance*. Washington, DC: World Bank, 2022.

[19] F. M. Hill, "Managing service quality in higher education: The role of the student as primary consumer," *Quality Assurance in Education*, vol. 3, no. 3, pp. 10-21, 1995. https://doi.org/10.1108/09684889510093497

[20] V. Zeithaml, A. Parasuraman, and L. Berry, *Delivering quality service: Balancing customer perceptions and expectations*. New York: Simon & Schuster, 1990.

[21] F. Abdullah, "Measuring service quality in higher education: HEdPERF versus SERVPERF," *Marketing Intelligence & Planning*, vol. 24, no. 1, pp. 31-47, 2006. https://doi.org/10.1108/02634500610641543

[22] J. J. Cronin Jr and S. A. Taylor, "Measuring service quality: A reexamination and extension," *Journal of Marketing*, vol. 56, no. 3, pp. 55-68, 1992. https://doi.org/10.1177/002224299205600304

[23] F. Ali, Y. Zhou, K. Hussain, P. K. Nair, and N. A. Ragavan, "Does higher education service quality effect student satisfaction, image and loyalty? A study of international students in Malaysian public universities," *Quality Assurance in Education*, vol. 24, no. 1, pp. 70-94, 2016. https://doi.org/10.1108/QAE-02-2014-0008

[24] Y. Owusu-Agyeman, O. Larbi-Siaw, B. Brenya, and A. Anyidoho, "Service quality and student satisfaction in higher education: A systematic review," *Quality Assurance in Education*, 2023. https://doi.org/10.1108/QAE-09-2022-0139

[25] V. Kumar, A. Singh, N. K. Sharma, P. Verma, and M. S. Kaswan, "Improving educational quality: The role of quality 4.0 in higher education institutions," *The TQM Journal*, pp. 1-39, 2025. https://doi.org/10.1108/TQM-12-2024-0527

[26] S. A. Salloum, A. Q. M. Alhamad, M. Al-Emran, A. A. Monem, and K. Shaalan, "Exploring students' acceptance of e-learning through the development of a comprehensive technology acceptance model," *IEEE Access*, vol. 7, pp. 128445-128462, 2019. https://doi.org/10.1109/ACCESS.2019.2939467

[27] N. Hasan and Y. Bao, "Impact of "e-Learning crack-up" perception on psychological distress among college students during COVID-19 pandemic: A mediating role of "fear of academic year loss"," *Children and Youth Services Review*, vol. 118, p. 105355, 2020. https://doi.org/10.4103/jehp.jehp_422_20

[28] T. M. C. Pham, "Determinants of service quality and student satisfaction in higher education institutions in Vietnam," *Journal of Educational Management*, vol. 12, no. 3, pp. 32–40 2020.

[29] T. Q. Nguyen and T. T. H. Tran, "Digital service quality in higher education: Implications for quality assurance in Vietnamese universities," *Vietnam Journal of Educational Sciences*, vol. 18, no. 2, pp. 15–26, 2022.

[30] T. T. Nguyen, V. H. Bui, V. T. Nguyen, N. P. Nguyen, and D. T. Pham, "Current status of quality assurance for online teaching in several Vietnamese universities," *Vietnam Journal of Education*, pp. 53–58, 2024.

[31] E. L. Boyer, "Scholarship reconsidered: Priorities of the professoriate," *Carnegie Foundation for the Advancement of Teaching*, 1990.

[32] P. Ramsden, *Learning to teach in higher education*. London: RoutledgeFalmer, 2003.

[33] J. Biggs and C. Tang, *Teaching for quality learning at university*. Maidenhead, UK: Open University Press, 2011.
[34] R. Barnett, *A will to learn: Being a student in an age of uncertainty*. Buckingham, UK: Open University Press, 2007.
[35] B. Leask, *Internationalizing the curriculum*. London, UK: Routledge, 2015.
[36] P. Temple, "Learning spaces in higher education: An under-researched topic," *London Review of Education*, vol. 6, no. 3, pp. 229–241, 2008. https://doi.org/10.1080/14748460802489363
[37] T. Bates, *Teaching in a digital age: Guidelines for designing teaching and learning*. Victoria, BC, Canada: BCcampus, 2015.
[38] A. Bryman, "Effective leadership in higher education: A literature review," *Studies in Higher Education*, vol. 32, no. 6, pp. 693-710, 2007. https://doi.org/10.1080/03075070701685114
[39] R. Bridgstock, "The graduate attributes we've overlooked: Enhancing graduate employability through career management skills," *Higher education research & development*, vol. 28, no. 1, pp. 31-44, 2009. https://doi.org/10.1080/07294360802444347
[40] L. W. Anderson and D. R. Krathwohl, *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, USA: Longman, 2001.
[41] UNESCO, *Global education monitoring report*. Paris, France: UNESCO Publishing, 2019.
[42] J. A. Schafer, C. Lee, G. W. Burruss, and M. J. Giblin, "College student perceptions of campus safety initiatives," *Criminal Justice Policy Review*, vol. 29, no. 4, pp. 319-340, 2018. https://doi.org/10.1177/0887403416631804
[43] M. S. Shamsir, S. E. Krauss, I. A. Ismail, H. Ab Jalil, M. A. Johar, and I. A. Rahman, "Development of a Haddon matrix framework for higher education pandemic preparedness: Scoping review and experiences of Malaysian universities during the COVID-19 pandemic," *Higher Education Policy*, vol. 35, no. 2, p. 439, 2021. https://doi.org/10.1057/s41307-020-00221-x
[44] S. Chaudhry, A. Tandon, S. Shinde, and A. Bhattacharya, "Student psychological well-being in higher education: The role of internal team environment, institutional, friends and family support and academic engagement," *Plos One*, vol. 19, no. 1, p. e0297508, 2024. https://doi.org/10.1371/journal.pone.0297508
[45] O. Afolalu and M. S. Tsoeu, "Cybersecurity in higher education institutions: A systematic review of emerging trends, challenges and solutions," *Future Internet*, vol. 17, no. 12, p. 575, 2025. https://doi.org/10.3390/fi17120575
[46] J. Hemsley-Brown and I. Oplatka, *Higher education consumer choice*. London, UK: Palgrave Macmillan, 2015.
[47] R. Bolden, G. Petrov, and J. Gosling, "Distributed leadership in higher education: Rhetoric and reality," *Educational Management Administration & Leadership*, vol. 37, no. 2, pp. 257-277, 2009. https://doi.org/10.1177/1741143208100301
[48] H. Etzkowitz and L. Leydesdorff, "The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations," *Research Policy*, vol. 29, no. 2, pp. 109-123, 2000. https://doi.org/10.1016/S0048-7333(99)00055-4
[49] T. L. Saaty, *The analytic hierarchy and analytic network processes for the measurement of intangible criteria and for decision-making. In Multiple criteria decision analysis: state of the art surveys*. New York: Springer New York, 2005.
[50] C. H. Lawshe, "A quantitative approach to content validity," *Personnel Psychology*, vol. 28, no. 4, pp. 563–575, 1975.
[51] C. H. Nguyen and M. Shah, *Quality assurance in Vietnamese higher education: Policy and practice in the 21st century*. Cham, Switzerland: Springer Nature, 2019.

Appendix

Appendix A. Demographic Characteristics of Respondents (n = 55)

Characteristics	Category	Frequency (n)	Percentage (%)
Gender	Male	31	56.4
	Female	24	43.6
Age	Under 30	4	7.3
	30–39	16	29.1
	40–49	18	32.7
	50–59	13	23.6
	60 and above	4	7.3
Highest Academic Qualification	Master's degree	7	12.7
	Doctoral degree (PhD)	45	81.8
	Associate Professor	3	5.5
	Professor	0	0.0
Current position	Lecturer / Researcher	32	58.2

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	Quality assurance staff	21	38.2
	Academic manager (faculty/department/institution)	18	32.7
	Accreditation / external review expert	24	43.6
Years of Experience	Less than 5 years	3	5.5
	5–9 years	8	14.5
	10–14 years	14	25.5
	15–19 years	16	29.1
	20 years or more	14	25.5

APPENDIX B: Results of Exploratory Factor Analysis and Reliability Analysis

Standard	Code	Indicator	Factor Loading	Cronbach's Alpha
Standard 1. Faculty Profile	S1.1	Faculty subject-matter competence	0.82	0.87
	S1.2	Teaching methods and pedagogical effectiveness	0.85	
	S1.3	Academic advising and learning support	0.78	
	S1.4	Faculty ability to motivate student learning	0.81	
	S1.5	Fairness and transparency in assessment	0.84	
Standard 2. Curriculum	S2.1	Clarity of learning outcomes	0.83	0.85
	S2.2	Alignment with labor market needs	0.86	
	S2.3	Appropriateness of student workload	0.79	
	S2.4	Integration of theory and practice	0.88	
	S2.5	Curriculum flexibility and update capacity	0.81	
Standard 3. Facilities and Learning Infrastructure	S3.1	Classroom and learning space conditions	0.77	**0.82**
	S3.2	Teaching and learning equipment	0.81	
	S3.3	Library and learning resources	0.84	
	S3.4	Shared learning and self-study spaces	0.75	
	S3.5	Responsiveness in handling facility issues	0.72	
Standard 4. Institutional Management and Support Services	S4.1	Service attitude of administrative staff	0.86	0.84
	S4.2	Response time to student requests	0.82	
	S4.3	Timely resolution of student issues	0.85	
	S4.4	Clarity of administrative procedures	0.79	
	S4.5	Accessibility of institutional information	0.81	
Standard 5. Tuition and Other Costs	S5.1	Transparency of tuition policies	0.84	**0.81**
	S5.2	Perceived value for money	0.86	
	S5.3	Scholarship and financial aid policies	0.80	
	S5.4	Transparency of non-tuition fees	0.78	
	S5.5	Handling of financial complaints	0.74	
Standard 6. Employer Engagement	S6.1	Career guidance and employability support	0.83	**0.86**
	S6.2	Internship and workplace learning opportunities	0.87	
	S6.3	Student participation in employer activities	0.81	
	S6.4	Employer feedback on graduates	0.85	
	S6.5	Effectiveness of job fairs and networking	0.79	
Standard 7. Student Skills Development	S7.1	Development of soft skills	0.88	**0.89**
	S7.2	Teamwork and collaboration skills	0.86	
	S7.3	Digital and self-directed learning skills	0.84	
	S7.4	Effectiveness of extracurricular activities	0.82	
	S7.5	Career confidence and adaptability	0.87	
Standard 8. Research and Technology Transfer	S8.1	Student participation in research activities	0.81	**0.83**
	S8.2	Institutional support for student research	0.84	
	S8.3	Access to research-active supervisors	0.79	
	S8.4	Knowledge and technology transfer activities	0.82	

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	S8.5	Academic and research environment quality	0.77	
Standard 9. Digital Transformation Capacity	S9.1	Learning Management System (LMS) quality	0.86	**0.88**
	S9.2	Accessibility of digital learning resources	0.84	
	S9.3	Timeliness of technical support	0.80	
	S9.4	Quality of online learning experience	0.88	
	S9.5	Integration of digital technologies in teaching	0.85	
Standard 10. Institutional Responsiveness	S10.1	Collection of student feedback	0.82	**0.87**
	S10.2	Response time to complaints	0.84	
	S10.3	Students' perception of being heard	0.87	
	S10.4	Implementation of improvements	0.85	
	S10.5	Communication of improvement outcomes	0.80	

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