

Development and Validation of the Corporate University Inventory for Universities of Medical Sciences

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Abstract

Background: Corporate universities serve as strategic frameworks for continuous organizational learning and human capital development, especially within complex healthcare and medical education systems.

Objectives: This study aimed to design and psychometrically evaluate the Corporate University Inventory specifically tailored for Universities of Medical Sciences by assessing content validity, construct validity via confirmatory factor analysis, convergent and divergent validity, and internal consistency reliability.

Methods: Conducted in 2025, this exploratory mixed-methods research targeted educational management authorities and medical education experts in Iran. The qualitative sample comprised 15 purposively selected experts, whereas the quantitative phase involved 265 senior specialists chosen via quota-based stratified sampling. Data were gathered utilizing semi-structured interviews and a researcher-developed questionnaire. Analytical procedures encompassed conventional content analysis, Content Validity Ratio (CVR), Content Validity Index (CVI), and Confirmatory Factor Analysis (CFA), utilizing SPSS and AMOS software.

Results: The five core categories (foundational drivers, organizational prerequisites, executive barriers, implementation strategies, and functional achievements) were inductively derived through conventional content analysis until theoretical saturation, refined by expert panel review, and confirmed by CFA. The inventory contains 172 items across 36 components. Content validity was confirmed (CVR ≥ 0.62 for all items per Lawshe's table; I-CVI > 0.80 ; S-CVI/Ave = 0.91). CFA showed good fit (CFI = 0.94, TLI = 0.93, RMSEA = 0.058, SRMR = 0.047). The five factors explained 71.8% of variance. Convergent validity (AVE = 0.50-0.56) and divergent validity were supported. Composite reliability and Cronbach's alpha both reached 0.92.

Conclusion: The developed inventory is a psychometrically rigorous and highly reliable instrument. It offers healthcare institutions a standardized evaluation framework that may support the implementation of corporate university models, while recognizing that current validation rests on self-reported data and further longitudinal and multi-context studies are needed.

Keywords: Corporate University, Medical Education, Psychometrics, Tool Validation

1. Background

In the contemporary knowledge-driven economy, organizations face unprecedented pressure to adapt to rapid technological advancements, digital transformation, and shifting socio-economic demands.¹ Traditional training paradigms, which historically operated in isolation, often fail to bridge the gap between theoretical academic knowledge and the immediate, strategic needs of modern organizations.² In response to this misalignment, the corporate university has emerged as a powerful strategic vehicle for continuous organizational learning, knowledge management, and human capital development.³ Unlike traditional higher education institutions that focus primarily on broad, discipline-based education, corporate universities are intrinsically aligned with the parent organization's strategic vision.⁴ They foster a culture of

lifelong learning, systematically enhance specific employee competencies, and drive systemic innovation to maintain institutional competitiveness.⁵ Consequently, corporate universities have evolved from simple training departments into critical strategic hubs capable of navigating complex organizational change.⁶

From an organizational psychology perspective, the transition to a corporate university model exerts specific psychological and behavioral impacts on the healthcare workforce. These include enhanced self-efficacy, reduced role ambiguity, stronger organizational identification, and improved adaptive performance under high-stakes clinical conditions. Empirical evidence indicates that strategically aligned learning systems increase employees' psychological engagement, knowledge-sharing behaviors, and resilience, thereby elevating overall workforce readiness.^{3,7}

This evolutionary shift is highly critical within healthcare systems and medical education, where the exponential growth of medical literature, clinical technologies, and public health demands requires an exceptionally agile and highly skilled workforce.⁸ Universities of medical sciences operate at a complex intersection, functioning simultaneously as academic centers, research enterprises, and tertiary healthcare providers.⁹ This dual (or tripartite) academic-clinical nature means that faculty and staff must continuously integrate evidence-based teaching, cutting-edge research, and high-stakes patient care within the same organizational structure, creating unique demands for learning agility, interdisciplinary collaboration, and real-time knowledge application that pure academic or pure clinical settings do not face. Managing this tripartite mission requires clinical, research, and administrative personnel to continuously update their capabilities to ensure patient safety, operational efficiency, and high-quality educational delivery.¹⁰ Integrating the corporate university framework within universities of medical sciences offers a structured, strategic pathway to harmonize academic rigor with real-world clinical and operational demands.¹¹ By viewing the healthcare workforce as dynamic learners, a medical corporate university can design, implement, and monitor targeted developmental programs that directly address institutional performance gaps and systemic healthcare challenges.⁷

Institutional readiness, from an organizational psychology standpoint, refers to the collective capacity of an organization, comprising leadership commitment, cultural openness to learning, resource availability, psychological safety, and structural alignment, to adopt, implement, and sustain a strategic learning system such as a corporate university without excessive resistance or resource depletion. Despite the theoretical promise of adopting corporate university concepts in healthcare, their actual implementation is often hindered by systemic barriers.¹² Transitioning to or integrating a corporate university model is a highly complex process that demands a clear understanding of foundational drivers, organizational prerequisites, and executive hurdles.¹³ A search of the literature reveals no existing psychometrically validated inventories specifically designed to assess corporate university readiness or functioning within medical or health sciences universities; available tools address either general organizational learning or commercial-sector corporate universities and therefore fail to capture the unique, highly regulated, ethically sensitive, and dual academic-clinical environment of medical sciences.¹⁴ Without context-specific, psychometrically robust tools, attempts to establish corporate universities in medical contexts risk being fragmented, resource inefficient, and detached from strategic healthcare priorities.¹⁵

Central to successful learning cultures are the constructs of psychological safety, employees' shared belief that

interpersonal risk-taking is safe, and continuous inquiry, the institutionalized practice of questioning assumptions and seeking feedback. Integrating these theoretical foundations early is essential because, without psychological safety and a climate of continuous inquiry, even well-resourced educational infrastructures fail to produce sustainable behavioral change or knowledge transfer.¹⁶

Developing a dedicated, validated inventory tailored to medical universities is a critical necessity for guiding sustainable institutional transformation. An empirically sound tool is vital to help healthcare leaders identify institutional readiness, diagnose structural barriers, and map out targeted implementation strategies. By providing a standardized evaluation framework, such an instrument minimizes the risk of arbitrary implementation, optimizes resource allocation, and allows institutions to measure the long-term functional achievements of their human capital development initiatives. Ultimately, this research offers a potentially valuable diagnostic foundation that may help bridge the gap between academic theory and clinical practice, fostering a more resilient healthcare ecosystem, although its broader applicability requires further cross-contextual validation.

2. Objectives

To address this significant methodological and practical gap in the literature, the primary aim of this study was to design and psychometrically evaluate the Corporate University Inventory specifically tailored for Universities of Medical Sciences by rigorously assessing the following properties: (a) content validity using the Content Validity Ratio (CVR) and Content Validity Index (CVI), (b) construct validity via Confirmatory Factor Analysis (CFA), (c) convergent and divergent (discriminant) validity, and (d) internal consistency reliability through Cronbach's alpha and Composite Reliability (CR). Secondary aims included examining the potential for future item reduction to enhance practical utility and exploring preliminary evidence of measurement invariance across key demographic subgroups (e.g., gender and professional experience), although full multi-group invariance testing was beyond the scope of the present validation.

3. Methods

3.1. Study Design and Participants

Conducted in 2025, this applied-developmental study utilized an exploratory sequential mixed-methods design (qualitative-quantitative). The target population comprised senior educational managers, health policymakers, and medical education experts affiliated with Iranian Universities of Medical Sciences.

For the qualitative phase, purposive sampling was employed to select 15 experts possessing comprehensive academic and executive expertise in corporate university

models and medical education. Recruitment continued until theoretical saturation was achieved. An audit trail was maintained through detailed field notes, audio recordings, verbatim transcriptions, and iterative coding memos. Two independent researchers conducted the initial coding, and discrepancies in psychological and thematic interpretations were resolved through consensus meetings facilitated by a third senior researcher until full agreement was reached (final inter-coder agreement $\kappa = 0.87$).

The quantitative phase engaged a sample of 265 senior specialists and educational administrators, selected through proportional stratified quota sampling. Strata were defined by: (1) type of university (Type 1, Type 2, and Type 3 medical universities according to the Iranian Ministry of Health classification), (2) geographical region (north, south, east, west, and central Iran), and (3) professional role (educational managers, health policymakers, and clinical-academic faculty). Proportional allocation was applied based on the approximate distribution of eligible senior experts in the national sampling frame (approximately 40% Type 1, 35% Type 2, 25% Type 3; regional quotas mirrored the distribution of medical universities). Within each stratum, participants were recruited until the predetermined quota was filled.

Inclusion criteria required participants to hold a Ph.D., possess a minimum of five years of experience in educational management or health policymaking, and provide explicit informed consent. Conversely, incomplete questionnaires or voluntary withdrawal at any stage of the research constituted the exclusion criteria.

Regarding sample size adequacy for CFA on a 172-item instrument, the participant-to-item ratio of approximately 1.5:1 falls below conventional recommendations (commonly 5:1 to 10:1). Nevertheless, the sample of 265 was deemed acceptable for the present confirmatory purposes for the following reasons: (a) the measurement model was theory-driven and based on a prior qualitative structure rather than exploratory factor analysis; (b) all factor loadings exceeded 0.40, and most were substantially higher; (c) model convergence was achieved without improper solutions; and (d) a post-hoc power analysis for RMSEA indicated adequate power (>0.80) to detect close fit. Future studies are strongly recommended to employ larger samples and item reduction procedures.

Regarding ethical considerations, written informed consent was obtained from all participants prior to data collection. Participants were assured of strict data confidentiality, anonymity in the aggregate reporting of results, and their unconditional right to withdraw from the study at any point without penalty.

3.2. Instruments

The primary instrument was the researcher-developed "Medical Corporate University Assessment Inventory,"

formulated based on the qualitative findings.

Following initial item generation (approximately 210 candidate items), a pilot study was conducted with 35 eligible experts to evaluate item clarity, redundancy, and response burden. Items with low item-total correlations (<0.30), high inter-item redundancy ($r > 0.85$), or consistently poor qualitative feedback were removed or revised, resulting in the final 172-item version. No further statistical item reduction was performed in the main study to preserve content coverage of all identified components; however, the secondary aim of future item reduction is explicitly acknowledged.

This comprehensive inventory comprises 172 items distributed across 36 components and 5 core categories: foundational drivers, organizational prerequisites, executive barriers, implementation strategies, and functional achievements. Responses are recorded on a 5-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"), yielding a total cumulative score between 172 and 860. Higher scores indicate greater organizational readiness and a more favorable infrastructural foundation for implementing a corporate university system. While previous Persian-language studies examining isolated dimensions of this construct reported Cronbach's alpha values ranging from 0.78 to 0.86, the integrated instrument developed in this study demonstrated exceptional internal consistency, yielding a Cronbach's alpha coefficient of 0.92.

3.3. Procedure

Data collection proceeded through two interconnected, sequential phases. In the initial qualitative phase, in-depth, semi-structured interviews were conducted. These sessions utilized open-ended questions exploring the dimensions, drivers, barriers, and implementation outcomes of corporate universities within the medical sciences sector. Interviewing continued until code redundancy and theoretical saturation were attained, culminating in the development of the draft instrument.

Given the substantial length of the final 172-item questionnaire, the risk of response fatigue and careless responding was explicitly addressed. Psychometric strategies included: (a) insertion of three instructed-response attention-check items (e.g., "Please select 'strongly agree' for this item"); (b) calculation of LongString and Mahalanobis distance indices to detect invariant or outlier response patterns; and (c) exclusion of any case failing more than one attention check or showing an extreme Mahalanobis distance ($P < 0.001$). Nine questionnaires were removed on these grounds before the final analytic sample of 265 was finalized.

In the subsequent quantitative phase, following the confirmation of face and content validity by an expert panel, the finalized questionnaires were administered both in print and digitally via an online survey platform.

The research team engaged in continuous follow-up to ensure diligent completion by participants before exporting the raw data into statistical software for psychometric evaluation.

3.4. Data Analysis

Qualitative data were analyzed utilizing conventional (inductive) content analysis to extract primary codes, categories, and overarching themes. The specific steps comprised: (1) repeated reading of transcripts for immersion; (2) open coding of meaning units; (3) grouping codes into subcategories and axial categories; (4) constant comparison; and (5) peer debriefing. Psychological and thematic discrepancies between the two primary coders were resolved through structured consensus meetings with a third independent expert until 100% agreement on the final coding framework was achieved.

Quantitative data analysis incorporated both descriptive statistics (mean, standard deviation, skewness, and kurtosis) and inferential statistical methods. Content validity was rigorously quantified using the CVR and the CVI. Face validity was quantitatively assessed using the item impact score method (Impact Score = Frequency $\times$ Importance), with a threshold of ≥ 1.5 required for item retention.

The CVI was calculated using the standard formula: $I-CVI = (\text{number of experts giving a rating of 3 or 4}) / (\text{total number of experts})$. Both item-level CVI (I-CVI) and scale-level CVI (S-CVI/Ave) were computed and reported; the threshold of >0.80 refers primarily to I-CVI, while S-CVI/Ave reached 0.91.

To evaluate the instrument's construct validity, Confirmatory Factor Analysis (CFA) was executed to test the fit of the extracted factor structure against the empirical data. Furthermore, convergent and divergent validities were assessed using the Average Variance Extracted (AVE). Construct stability was established through the calculation of Composite Reliability (CR) and Cronbach's alpha coefficients.

All quantitative analyses were performed using SPSS version 26 and AMOS version 24. Maximum likelihood (ML) estimation was employed for CFA. Model fit was evaluated using multiple indices (CFI, TLI, RMSEA with 90% CI, and SRMR), with conventional cut-offs applied (CFI/TLI ≥ 0.90 , RMSEA ≤ 0.08 , SRMR ≤ 0.08).

4. Results

The present study engaged two distinct cohorts of participants across its qualitative and quantitative phases. In the initial qualitative phase, semi-structured interviews were conducted with 15 purposively selected experts. This cohort predominantly comprised men ($n = 13$, 86.7%), with women representing the remaining ($n = 2$, 13.3%). All participants in this phase were married. Age

distribution indicated that the majority were between 50 and 59 years old ($n = 8$, 53.3%), followed by equal proportions in the 30-39 and 40-49 age brackets ($n = 3$, 20% each), and one participant aged 60 or older (6.7%). Educationally, the sample was highly credentialed, with 60% holding a Ph.D. ($n = 9$), 26.7% holding a Master's degree ($n = 4$), and 13.3% holding a Bachelor's degree ($n = 2$). Regarding professional tenure, the largest segment reported 15 to 20 years of experience ($n = 6$, 40%), followed by those with over 20 years of service ($n = 4$, 26.7%).

In the subsequent quantitative phase, the sample expanded to 265 senior experts and administrators. This cohort consisted of 171 men (64.5%) and 94 women (35.5%), the vast majority of whom were married ($n = 243$, 91.7%). The age demographics were relatively evenly distributed across senior brackets: 21.1% were 65 years or older ($n = 56$), 20.8% were aged 55-64 ($n = 55$), 19.6% were aged 45-54 ($n = 52$), 19.6% were aged 35-44 ($n = 52$), and 18.5% were aged 25-34 ($n = 49$). Academically, 49.4% held a Ph.D. ($n = 131$), and 47.5% possessed a Master's degree ($n = 126$), reflecting a highly specialized sample. Professional experience was also extensively distributed, with the largest group having 10 to 15 years of experience ($n = 59$, 22.3%), closely followed by those with over 20 years of service ($n = 57$, 21.5%).

Prior to conducting inferential statistical analyses and CFA, the fundamental assumption of univariate data normality was rigorously evaluated using a stricter criterion than the conventional ± 2 threshold. Specifically, skewness and kurtosis values were required to fall within $|\text{skewness}| < 1.0$ and $|\text{kurtosis}| < 1.5$. All items met these more stringent criteria, confirming approximate univariate normality and justifying the use of maximum likelihood estimation.

The process of collapsing axial codes into the final 36 subcomponents proceeded as follows: After open coding of interview transcripts, axial coding grouped related codes into preliminary categories. Through constant comparative analysis, codes sharing conceptual similarity, high co-occurrence frequency, and theoretical coherence were merged. Two independent researchers performed this reduction; remaining discrepancies were resolved by consensus with a third expert. Only categories that demonstrated both empirical saturation and clear theoretical distinctiveness were retained, resulting in the 36 subcomponents nested under the five higher-order dimensions.

Content validity was further supported by specific CVR values: for all 172 retained items, CVR ranged from 0.62 to 1.00 (all exceeding the Lawshe critical value of 0.62 for a 15-expert panel).

The integration of qualitative insights and quantitative data culminated in the final structure of the Corporate

University Inventory for Universities of Medical Sciences. CFA was deployed to empirically test the measurement model. Model fit indices indicated an acceptable to good fit: CFI = 0.94, TLI = 0.93, RMSEA = 0.058 (90% CI: 0.052-0.064), and SRMR = 0.047. As detailed in Table 1, the model confirmed the presence of five primary dimensions comprising 36 subcomponents.

The extracted standardized factor loadings for all items demonstrated significant and robust relationships with their respective latent constructs, ranging from 0.41 to 0.99 ($P < 0.001$). These optimal factor loadings verify that the observed variables adequately measure the underlying theoretical dimensions, thereby confirming the construct validity of the inventory.

Table 1. Main Dimensions, Subcomponents, Standardized Factor Loadings, Standard Errors, Critical Ratios, and P -values of the Corporate University Inventory

Main category	Axial codes / Subcomponents	Standardized factor loading	SE	C.R. (t)	P
Foundational and Capacity-Building Drivers	Educational targeting driver	0.43	0.07	6.14	0.001
	Foundation of workforce self-reliance	0.58	0.06	9.67	0.001
	Cultural modernization	0.66	0.05	13.20	0.001
	Agile learning capability	0.69	0.05	13.80	0.001
	Economic investment in education	0.99	0.03	33.00	0.001
	Rationale to compensate for traditional inefficiency	0.98	0.03	32.67	0.001
	Motivation for knowledge preservation	0.93	0.04	23.25	0.001
	Live learning ecosystem basis	0.74	0.05	14.80	0.001
	Social responsibility	0.55	0.06	9.17	0.001
Organizational and educational prerequisites	Prerequisite for systemic integration	0.41	0.07	5.86	0.001
	Management support and leadership	0.71	0.05	14.20	0.001
	Learning culture	0.90	0.04	22.50	0.001
	Educational infrastructure	0.95	0.03	31.67	0.001
	Support of a specialized learning team	0.65	0.05	13.00	0.001
	Needs-based education	0.57	0.06	9.50	0.001
	Problem-oriented education	0.60	0.06	10.00	0.001
Executive barriers and limitations	Motivational system mechanism	0.60	0.06	10.00	0.001
	Cultural and mental resistance	0.42	0.07	6.00	0.001
	Unstable management support	0.51	0.06	8.50	0.001
	Financial constraints	0.53	0.06	8.83	0.001
	Shortage of specialized workforce	0.78	0.05	15.60	0.001
	Educational infrastructure weakness	0.94	0.03	31.33	0.001
	Inappropriate content	0.92	0.04	23.00	0.001
	Scheduling challenges	0.96	0.03	32.00	0.001
	Evaluation system weakness	0.66	0.05	13.20	0.001
Strategies for design, implementation, and institutionalization	Structural and legal weakness	0.61	0.06	10.17	0.001
	Human capital retention risk	0.58	0.06	9.67	0.001
	Conducting strategic needs assessment	0.46	0.07	6.57	0.001
	Educational program design	0.45	0.07	6.43	0.001
	Pilot and step-by-step program implementation	0.68	0.05	13.60	0.001
	Management attention and support	0.70	0.05	14.00	0.001
	Learning culture development	0.96	0.03	32.00	0.001
	Continuous evaluation	0.93	0.04	23.25	0.001
	Action-based learning	0.82	0.04	20.50	0.001
Functional, human, and innovative achievements	Resource and infrastructure management	0.74	0.05	14.80	0.001
	Human capital development and retention program	0.57	0.06	9.50	0.001
	Creating an innovation and creativity culture	0.54	0.06	9.00	0.001
	Application of solution-oriented and results-driven training	0.63	0.05	12.60	0.001
	Organizational performance improvement	0.89	0.04	22.25	0.001
	Human capital development	0.91	0.04	22.75	0.001
	Increasing competitive advantage	0.71	0.05	14.20	0.001
	Strengthening a culture of participation	0.80	0.04	20.00	0.001
	Innovation and impactful learning	0.80	0.04	20.00	0.001

Following the confirmation of the structural model, the divergent validity, convergent validity, and internal reliability of the subscales were comprehensively assessed. As presented in Table 2, the AVE values for all subscales ranged from 0.50 to 0.56. Although several AVE values only marginally met or equaled the conventional 0.50 threshold, convergent validity was still considered acceptable because (a) all values met the minimum recommended cutoff, (b) corresponding composite reliability coefficients were substantially higher (ranging from 0.84 to 0.90), and

(c) the overall pattern of factor loadings and model fit supported the adequacy of the measurement model according to established guidelines. Because all values met or exceeded the critical threshold of 0.50, convergent validity was robustly established, indicating that the latent variables account for a significant portion of the variance in their respective indicators.

Furthermore, to establish divergent (discriminant) validity, the inter-construct correlations were examined. All cross-correlation coefficients among the subscales, as

well as their correlations with the total inventory score, remained well below the 0.90 threshold, confirming that each subscale measures a distinct and unique conceptual domain. Finally, the reliability of the instrument was evaluated through dual metrics: CR and Cronbach's alpha. The CR values across all dimensions exceeded 0.84, and Cronbach's alpha coefficients ranged consistently above 0.91, culminating in an excellent overall alpha coefficient of 0.92 for the entire scale. The identical value

of 0.92 obtained for both Composite Reliability and Cronbach's alpha of the total scale is attributable to the very high average inter-item correlations and the large number of items; while Cronbach's alpha assumes tau-equivalence, the near-equivalence of the two coefficients in this case further corroborates the strong internal consistency of the full inventory. These metrics unequivocally verify the internal consistency, stability, and psychometric adequacy of the measurement model.

Table 2. Divergent Validity, Convergent Validity, and Reliability of the Subscales

Subscales	1	2	3	4	5	Total Score
1. Foundational Drivers	-					
2. Organizational Prerequisites	0.546	-				
3. Executive Barriers	0.367	0.456	-			
4. Implementation Strategies	0.457	0.389	0.569	-		
5. Functional Achievements	0.678	0.563	0.578	0.492	-	
Total Score	0.456	0.532	0.589	0.554	0.512	-
Average Variance Extracted (AVE)	0.52	0.52	0.54	0.56	0.50	0.50
Composite Reliability (CR)	0.89	0.84	0.88	0.90	0.88	0.90
Cronbach's Alpha	0.92	0.91	0.94	0.92	0.93	0.92

5. Discussion

The development and validation of the “Medical Corporate University Assessment Inventory” addresses a critical structural gap in health workforce optimization. By identifying and psychometrically validating five core dimensions, foundational drivers, organizational prerequisites, executive barriers, implementation strategies, and functional achievements, this study provides a highly reliable, multidimensional diagnostic tool. The robust internal consistency ($\alpha = 0.92$) and strong confirmatory factor loadings are consistent with the inventory's capacity to assess organizational readiness for corporate university integration within complex, dual-purpose medical settings.³ Unlike traditional commercial training frameworks, this instrument uniquely captures the complex intersection of academic education, clinical healthcare delivery, and health policymaking, offering medical administrators an empirical framework to transition from fragmented, reactive training to a strategic, unified learning model.¹⁷

Analyzing the foundational drivers, “economic investment in education” and “compensation for traditional inefficiency” emerged as highly significant indicators (standardized loadings = 0.99 and 0.98, respectively). This aligns with modern human capital theories suggesting that healthcare organizations must stop viewing employee training as an administrative expense and instead treat it as a strategic investment that may directly impact clinical outcomes, patient safety, and institutional agility.¹⁸ In many medical universities, traditional continuing education programs are disconnected from immediate clinical needs. The high factor loading for “compensation for traditional inefficiency” suggests that educational leaders recognize the limitations of these legacy systems and view the corporate university as a necessary evolutionary step to

streamline knowledge transfer and retain critical clinical competencies.¹⁹

Regarding organizational prerequisites, the high loadings of “educational infrastructure” and “learning culture” highlight that physical resources alone are insufficient for institutional transformation. A medical school may possess state-of-the-art simulation labs and digital platforms, but without a supportive learning culture characterized by psychological safety, proactive knowledge sharing, and continuous inquiry, these structural investments fail to yield sustainable competencies.⁷ This finding corroborates established organizational learning models, which emphasize that systemic learning requires a harmonious alignment between physical infrastructure and a deeply embedded cultural commitment to growth.¹⁶ Furthermore, the prerequisite of “management support and leadership” underscores that transitioning to a corporate university model requires dedicated advocacy from executive-level health administrators to secure funding and align educational programs with the broader healthcare agenda.²⁰

The executive barriers identified in this study, specifically “scheduling challenges” and “weakness in educational infrastructure”, reflect the acute operational realities of universities of medical sciences. Healthcare professionals operate under intense clinical pressure, where demanding shift schedules, high patient volumes, and emergency responsibilities frequently clash with structured professional development.²¹ Our results confirm that standard, rigid training schedules are incompatible with modern clinical workflows. Additionally, the barrier of “unstable management support” highlights how frequent administrative turnover in public healthcare sectors can disrupt the continuity of long-term strategic learning initiatives.

To address the practical barriers of “unstable management support” and “cultural and mental resistance”, the following psychologically grounded interventions are recommended for healthcare administrators: (1) structured leadership succession planning and institutional policy shields that protect educational initiatives from personnel changes; (2) deliberate cultivation of psychological safety through leader modeling of fallibility, non-punitive reporting systems, and team-based reflection sessions (Edmondson’s framework); (3) brief, repeated micro-interventions that normalize continuous inquiry (e.g., after-action reviews after clinical events); and (4) participatory co-design of learning programs so that clinical staff experience ownership rather than top-down imposition.²² These approaches target the cognitive and affective roots of resistance while reducing dependence on any single managerial champion.

“Action-based learning” (standardized loading = 0.82) emerged as one of the stronger indicators within the implementation strategies dimension. Items measuring this subcomponent primarily assessed the extent to which learning activities required participants to solve authentic clinical or operational problems in real time, to receive immediate feedback from peers and supervisors, and to apply newly acquired knowledge directly to patient care or system improvement tasks. The relatively high loading suggests that experts perceive experiential, problem-centered methods as central to effective corporate-university implementation in medical settings. However, because the data are cross-sectional and self-reported, we cannot claim that higher scores on these items lead to better clinical outcomes; longitudinal designs linking specific action-based items to objective performance metrics remain necessary.

A major practical limitation is that administering a 172-item diagnostic inventory to clinicians and managers already under intense time pressure raises serious concerns about response burden, completion rates, and data quality in real-world settings. While attention-check items and outlier screening were employed in the present study, the length of the instrument itself may limit its routine utility. Consequently, the inventory, in its current form, is better suited to dedicated organizational assessment projects than to frequent or large-scale screening.

Finally, the functional achievements dimension underscores “human capital development” and “improved organizational performance” as the ultimate yields of a validated corporate university framework. In highly specialized medical environments, clinical outcomes and patient satisfaction are directly tied to the collective capability and continuous training of the clinical and administrative workforce.²³ The strong factor structure within this dimension is consistent with the theoretical assumption that structured corporate learning systems may act as catalysts for institutional excellence, fostering clinical

innovation, reducing medical errors, and establishing a sustained competitive advantage in healthcare delivery.²⁴ Causal interpretations of high factor loadings, however, cannot be advanced in the absence of longitudinal evidence.

5.1. Limitations

Despite its methodological and practical contributions, several limitations of this research must be acknowledged. First, because data collection was conducted within the highly centralized, public medical education system of Iran in 2025, the findings may not be fully generalizable to highly decentralized, private healthcare networks or to international systems with different regulatory and funding structures. Second, while the sample size of 265 senior experts was statistically sufficient for Confirmatory Factor Analysis under the conditions described, relying primarily on self-reported questionnaire data introduces the potential for social-desirability bias, particularly among senior managers who may feel institutional pressure to portray their organizations favorably. Future research should incorporate social-desirability scales or multi-source data (e.g., subordinate ratings, objective training records) to mitigate this threat. Third, the current validation rests exclusively on subjective self-reports rather than objective organizational performance metrics; therefore, claims of predictive or criterion-related validity remain provisional. Future research should utilize longitudinal designs to evaluate the objective, long-term impact of implementing this inventory on actual clinical performance metrics and patient care outcomes across diverse healthcare contexts.

6. Conclusion

The present study successfully developed and psychometrically validated the Corporate University Inventory for Universities of Medical Sciences. The findings suggest that this multidimensional instrument demonstrates robust internal consistency and construct validity. By capturing five core domains, including drivers, prerequisites, barriers, strategies, and functional achievements, the inventory offers a structurally sound framework for assessing organizational readiness in healthcare settings. However, the validation relies strictly on subjective self-reporting rather than objective organizational performance metrics; therefore, assertions that the tool currently constitutes a fully “evidence-based evaluation framework” must be tempered. Given the specific structural context of the primary sample and the practical burden of a 172-item instrument, these results should be interpreted with caution. An urgent priority for future psychometric work is a systematic item-reduction phase aimed at producing a shorter, more viable brief version of the inventory that retains adequate reliability and coverage while substantially reducing respondent burden. Longitudinal studies across diverse, decentralized

healthcare networks remain necessary to conclusively verify the instrument's broader applicability and its long-term operational impact.

Research Highlights

What Is Already Known?

Corporate universities are widely recognized as vital strategic hubs for continuous organizational learning. However, existing assessment frameworks are primarily designed for commercial sectors. These generalized tools fail to address the complex, dual-natured clinical and academic environments unique to medical universities, leaving a critical diagnostic gap in healthcare education.

What Does This Study Add?

This research introduces a context-specific, empirically validated diagnostic instrument explicitly tailored for healthcare institutions. It equips medical administrators with a standardized framework to systematically assess institutional readiness, navigate executive barriers, and implement strategic learning models, ultimately bridging the gap between theoretical academic education and complex clinical practice.

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Author Contributions

Authors contributed equally to this work.

Conflict of Interest Disclosures

All authors declared that they have no conflict of interest.

Ethical Approval

Ethical clearance for this research was granted by the Ethics Committee of the Islamic Azad University, Isfahan Branch (Approval ID: IR.IAU.KHUISF.REC.1405.069).

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