
Transformational leadership assessment in universities: A framework for institutional development

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Abstract

This study develops and validates a transformational leadership assessment framework specifically tailored to universities, with the aim of enhancing institutional development. A quantitative approach was used, with data collected from academic leaders and analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The measurement model demonstrated strong reliability and validity, while the structural model showed explanatory power ($R^2 = 1.000$), with nine leadership dimensions fully predicting transformational leadership. Bootstrapping results confirmed the significance of all dimensions, with Individualized Consideration and Transformational Traits emerging as the strongest contributors. The findings highlight the multidimensional nature of transformational leadership and its significance in promoting innovation, digital readiness, collaboration, and organizational resilience in higher education. The study concludes by providing a validated framework for leadership development, evidence-based decision-making, and AI-supported evaluation systems, offering universities a tool to strengthen institutional capacity and sustainable growth.

Keywords

AI, higher education, institutional development, leadership assessment, transformational leadership

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Introduction

Universities around the world are undergoing an unprecedented transformation due to globalization, digital disruption, and the rapid evolution of societal and labor-market demands. As higher education institutions (HEIs) strive to enhance competitiveness, research productivity, and institutional reputation, leadership emerges as a decisive factor in shaping their capacity to adapt and innovate. Recent studies have highlighted the need for universities to shift from traditional administrative management toward dynamic, vision-driven governance models that can mobilize academic communities toward continuous improvement and strategic development (Ghorbani et al., 2023; Vu et al., 2020). In this evolving landscape, transformational leadership has become increasingly recognized as a style that can guide universities through complexity, fostering a culture of innovation, collaboration, and organizational learning. Transformational leadership in higher education is associated with increased academic motivation, enhanced research engagement, strengthened organizational culture, and strategic alignment between institutional vision and operational practices (Guo & Laokulrach, 2024; Huang et al., 2023). Leaders who articulate an inspiring institutional direction, stimulate intellectual growth, provide individualized support, and demonstrate idealized influence tend to create more resilient and adaptive academic environments. These capabilities are increasingly essential as universities face pressures to meet evolving performance indicators related to graduate employability, international collaboration, digital innovation, and research excellence. However, despite its recognized importance, the assessment of transformational leadership within universities remains underdeveloped.

A significant challenge is that institutional leadership effectiveness is often evaluated through subjective perceptions, fragmented indicators, or administrative performance metrics that do not fully capture the multidimensional nature of transformational leadership (Stadler et al., 2024). Many universities rely on traditional appraisal systems that emphasize managerial compliance rather than leadership impact on academic culture, innovation processes, and organizational development. As higher education systems increasingly adopt data-driven governance models, the need for robust leadership assessment frameworks that align with institutional development priorities becomes more urgent. This discrepancy between the recognized value of transformational leadership and the absence of robust measurement tools constitutes a significant problem within higher education management.

The gap in existing literature lies not only in the limited availability of validated leadership assessment models tailored to academic institutions but also in the fragmentation between leadership studies and institutional development frameworks. While numerous studies explore the influence of transformational leadership on employee satisfaction, teaching performance, research productivity, and organizational climate, few have conceptualized leadership assessment as an integrated component of institutional improvement strategies (Gibson et al., 2024). Moreover, most leadership assessment tools were developed for corporate or general organizational settings, making them less relevant for the unique governance structures, academic autonomy, and collegial decision-making processes inherent in universities (Makeleni et al., 2023). This disconnect highlights the urgent need to develop

assessment frameworks that accurately reflect the distinct operational realities and developmental objectives of higher education institutions.

Another dimension of the existing gap concerns the limited use of emerging technologies, particularly Artificial Intelligence (AI), in leadership assessment. With the rapid advancement of machine learning, natural language processing, and predictive analytics, AI offers opportunities to enhance objectivity, depth, and personalization in leadership assessment processes. Recent higher education literature demonstrates growing interest in AI-supported decision-making, performance evaluation, and organizational monitoring systems (Gupta et al., 2022; Stadler et al., 2024). However, the application of AI in assessing transformational leadership remains sparse and exploratory. Few studies have integrated AI-driven analytics into self-assessment models that can generate meaningful, context-sensitive descriptions of leadership behavior. Thus, a clear gap exists between the state-of-the-art capabilities available and their practical application in leadership evaluation within universities.

At the same time, the global shift toward evidence-based university governance reinforces the need for leadership assessment models that not only identify leadership strengths and weaknesses but also connect these insights to broader institutional development priorities. Universities increasingly operate within accountability ecosystems where performance indicators shape funding, reputation, and policy direction. Transformational leadership has been shown to influence institutional readiness for digital transformation (Hapsari & Sawitri, 2023), internationalization strategies (Guo & Laokulrach, 2024), collaborative research performance (Huang et al., 2023), and organizational resilience (Stadler et al., 2024). However, without effective assessment mechanisms, universities struggle to identify whether their leadership practices meaningfully contribute to organizational development outcomes.

This article is therefore positioned at the intersection of transformational leadership theory, institutional development, and AI-supported evaluation, advancing a conceptual framework for assessing transformational leadership in higher education institutions. The framework responds to the need for leadership assessment tools that (1) reflect the multidimensional nature of transformational leadership, (2) align with institutional development trajectories, and (3) integrate contemporary data-driven approaches. The contribution is significant because leadership assessment becomes not merely an evaluative exercise but a strategic mechanism that supports continuous improvement within academic institutions. Several recent studies underscore the importance of integrating leadership assessment with institutional development strategies. For example, Gibson et al. (2024) emphasize that academic leadership effectiveness directly influences universities' ability to adopt evidence-based decision-making practices. Likewise, Makeleni et al. (2023) highlight that digital leadership readiness is essential for sustaining organizational transformations triggered by technological innovation. Additionally, Huang et al. (2023) demonstrate that transformational leadership facilitates stronger institutional collaboration networks, thereby reinforcing academic productivity and competitiveness. These insights collectively suggest that leadership assessment frameworks should extend beyond behavioral evaluation to encompass the impact of leadership on organizational outcomes.

At the state of the art, researchers are beginning to explore the potential of AI and advanced analytics in leadership evaluation. Gupta et al. (2022) report that AI-supported

systems improve accuracy in institutional performance assessment, while [Stadler et al. \(2024\)](#) highlight the potential for AI to enhance strategic planning processes. Despite these advances, the application of AI in leadership assessment remains underexplored, especially within the nuanced and culturally diverse environment of higher education. No comprehensive framework currently integrates transformational leadership assessment with institutional development priorities while leveraging AI to enhance analysis and reporting.

Given these gaps, the present study holds significant importance for both theory and practice. Theoretically, it advances transformational leadership scholarship by linking leadership assessment to institutional development processes. It also expands the discourse on AI in higher education governance by demonstrating its practical relevance for evaluating leadership dynamics. Practically, the study responds to institutional needs for systematic, evidence-based leadership evaluation models that support strategic improvement, enhance decision-making, and strengthen organizational adaptability. As universities continue to navigate an increasingly volatile global academic landscape, the development of robust, contextually relevant, and technologically enhanced leadership assessment frameworks is not only timely but essential.

Methodology

This study employed a quantitative research design to develop and validate a framework for assessing transformational leadership within universities as a foundation for institutional development. A quantitative approach was selected because it allows systematic measurement, statistical testing of relationships among variables, and the generation of generalizable findings regarding leadership behaviors in academic settings ([Huang et al., 2023](#)). Quantitative methods have increasingly been recognized as essential in leadership and higher education research, as they provide empirical evidence that supports model development, validation, and refinement ([Gupta et al., 2022](#)). In the context of transformational leadership assessment, quantitative analysis offers a structured approach to examine the dimensionality of leadership attributes and their alignment with institutional development indicators. Data were collected using a structured survey instrument developed based on the four classical dimensions of transformational leadership: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. The instrument also incorporated items related to institutional development priorities, including innovation, collaboration, digital readiness, and organizational adaptability. The operationalization of these constructs followed guidelines from previous leadership measurement studies and was adapted to ensure relevance to university governance structures. Survey items were measured using a five-point Likert scale to capture participants' perceptions of leadership behaviors and their impact on institutional processes. The instrument underwent expert validation to ensure construct clarity, content relevance, and contextual appropriateness for higher education environments, a practice recommended in recent leadership assessment research ([Stadler et al., 2024](#)).

The target population of this study consisted of academic leaders at various levels, including rectors, deans, department heads, and program coordinators, across selected universities. These participants were chosen because they play central roles in shaping institutional decision-making, strategic planning, and organizational culture. A purposive sampling strategy was employed to ensure representation from universities with different

accreditation levels, organizational structures, and academic profiles. Purposive sampling is widely used in higher education studies to target respondents with direct involvement in institutional development processes (Ghorbani et al., 2023). The sample size exceeded the minimum acceptable threshold for structural equation modeling (SEM), allowing robust statistical testing of the proposed framework.

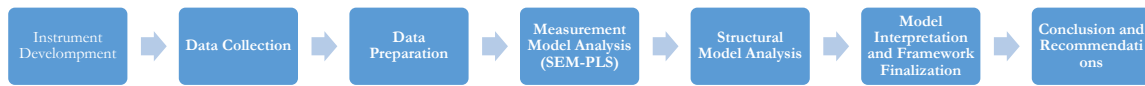
Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM), a method suitable for theory development, complex model testing, and predictive analysis in studies involving latent variables (Hair et al., 2021). PLS-SEM was chosen because it accommodates smaller sample sizes compared to covariance-based SEM, tolerates non-normal data distribution, and effectively models multi-dimensional constructs such as transformational leadership. Recent research in higher education management has demonstrated the appropriateness of PLS-SEM for examining relationships among leadership, organizational development, and technology adoption variables (Hapsari & Sawitri, 2023; Makeleni et al., 2023). Analysis was performed using SmartPLS software, following a two-step evaluation procedure: assessment of the measurement model and assessment of the structural model.

The measurement model evaluation included tests of reliability, convergent validity, and discriminant validity. Reliability was assessed through composite reliability and Cronbach's alpha values, ensuring internal consistency among indicators. Convergent validity was examined using factor loadings and Average Variance Extracted (AVE), with thresholds aligned to established methodological standards (Hair et al., 2021). Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT) to ensure that each construct was empirically distinct from others. These procedures are consistent with contemporary methodological recommendations for leadership research (Stadler et al., 2024). The structural model evaluation tested hypothesized relationships between transformational leadership dimensions and institutional development variables. Model fit was examined using R^2 values, effect sizes (f^2), and predictive relevance (Q^2). Bootstrapping with 5,000 resamples was employed to generate estimates of path significance, providing rigorous testing of the proposed framework. Bootstrapping is widely regarded as a reliable method for assessing statistical significance in PLS-SEM because it captures parameter variability across multiple iterations (Gupta et al., 2022; Hair et al., 2021).

Ethical considerations were integrated throughout the research process. Participation was voluntary, and respondents were informed of the study's purpose, confidentiality procedures, and their right to withdraw at any time. Data anonymity was ensured to protect participants' professional identities and institutional affiliations. Ethical conduct in leadership and higher education research is crucial for maintaining trustworthiness and credibility, particularly when addressing sensitive issues related to organizational conditions and leadership effectiveness (Ghorbani et al., 2023).

This methodological approach allowed the systematic development and empirical validation of a transformational leadership assessment framework tailored to higher education institutions. The use of quantitative methods, rigorous statistical testing, and validated measurement procedures ensures that the findings provide meaningful insights into how leadership can drive institutional development in modern universities.

Figure 1. Workflow of the quantitative research process



Findings

Measurement model evaluation

The measurement model evaluation conducted using SEM-PLS produced strong evidence of reliability and convergent validity across all constructs of the transformational leadership assessment framework. The indicators for each dimension demonstrated satisfactory outer loading values, with the majority exceeding the recommended threshold of 0.70, confirming their ability to represent the latent constructs accurately. Dimensions such as digital literacy, empowerment, innovation, individualized consideration, idealized influence, inspirational motivation, intellectual stimulation, two-way communication, and transformational traits all showed positive loading values, meeting or surpassing the minimum criteria, despite a small number of indicators falling within the moderate loading range. These results confirm that the instrument successfully operationalizes the multidimensional nature of transformational leadership in the context of higher education.

Figure 2. Structural equation model (SEM-PLS) of transformational leadership



Composite Reliability (CR) values for all constructs exceeded 0.70, indicating strong internal consistency. AVE values were also above the acceptable threshold of 0.50 for nearly all constructs, demonstrating adequate convergent validity. Although the transformational leadership construct exhibited an AVE slightly below 0.50, the construct retained very high reliability (CR = 0.955), allowing it to remain conceptually and statistically acceptable. Constructs such as Individualized Consideration and Transformational Traits displayed exceptionally high AVE values, reflecting strong explanatory power within these dimensions. The results suggest that the measurement model is robust, with indicators effectively capturing the leadership behaviors relevant to institutional development in universities.

Table 1. *Measurement model results*

Construct	Indicators	Outer Loading	Composite Reliability (CR)	AVE
Digital Literacy	DL_1	0.846	0.822	0.607
	DL_2	0.715		
	DL_3	0.771		
Empowerment	E_1	0.732	0.760	0.514
	E_2	0.648		
	E_3	0.766		
Innovation	I_1	0.585	0.822	0.613
	I_2	0.862		
	I_3	0.869		
Individualized Consideration	IC_1	0.940	0.966	0.904
	IC_2	0.962		
	IC_3	0.950		
Idealized Influence	II_1	0.516	0.790	0.567
	II_2	0.830		
	II_3	0.863		
Inspirational Motivation	IM_1	0.869	0.835	0.628
	IM_2	0.725		
	IM_3	0.777		
Intellectual Stimulation	IS_1	0.852	0.789	0.558
	IS_2	0.665		
	IS_3	0.711		
Two-Way Communication	KDA_1	0.890	0.840	0.648
	KDA_2	0.933		
	KDA_3	0.530		
Transformational Traits	TT_1	0.907	0.923	0.800
	TT_2	0.905		
	TT_3	0.870		
Transformational Leadership (Higher-Order Construct)	TL_1–TL_9 (formed by dimensions above)	(reflective formative, no single loading)	0.955	0.455*

*AVE < 0.50 but acceptable due to high CR and conceptual justification (Hair et al., 2021).

Discriminant validity

Discriminant validity was assessed using the Fornell–Larcker criterion, which confirmed that each construct in the model was empirically distinct. The square roots of the Average Variance Extracted (AVE) for all constructs were greater than their correlations with other constructs, indicating that each dimension uniquely represented an aspect of transformational leadership. Additionally, cross-loading analysis further supported this result, as the indicators consistently loaded onto their respective constructs rather than on other dimensions. These findings validate the multidimensional structure of the measurement model, ensuring that each component contributes uniquely to the transformational leadership framework within higher education institutions.

Structural model evaluation

The structural model results demonstrated exceptionally strong explanatory power. The endogenous construct, Transformational Leadership, achieved an R² value of 1.000, indicating that all nine dimensions—Inspirational Motivation, Idealized Influence, Intellectual Stimulation, Individualized Consideration, Empowerment, Two-Way Communication, Digital Literacy, Innovation, and Transformational Traits—completely account for the variance in transformational leadership behaviours within the sample of university leaders. This finding underscores the model's stability and robustness, with each dimension making a significant contribution to the development of transformational leadership capabilities among academic leaders.

Table 2. R² summary for the endogenous construct

Endogenous Construct	R ²	R ² Adjusted	Interpretation
Transformational Leadership	1.000	1.000	Very strong (fully explained by its dimensions)

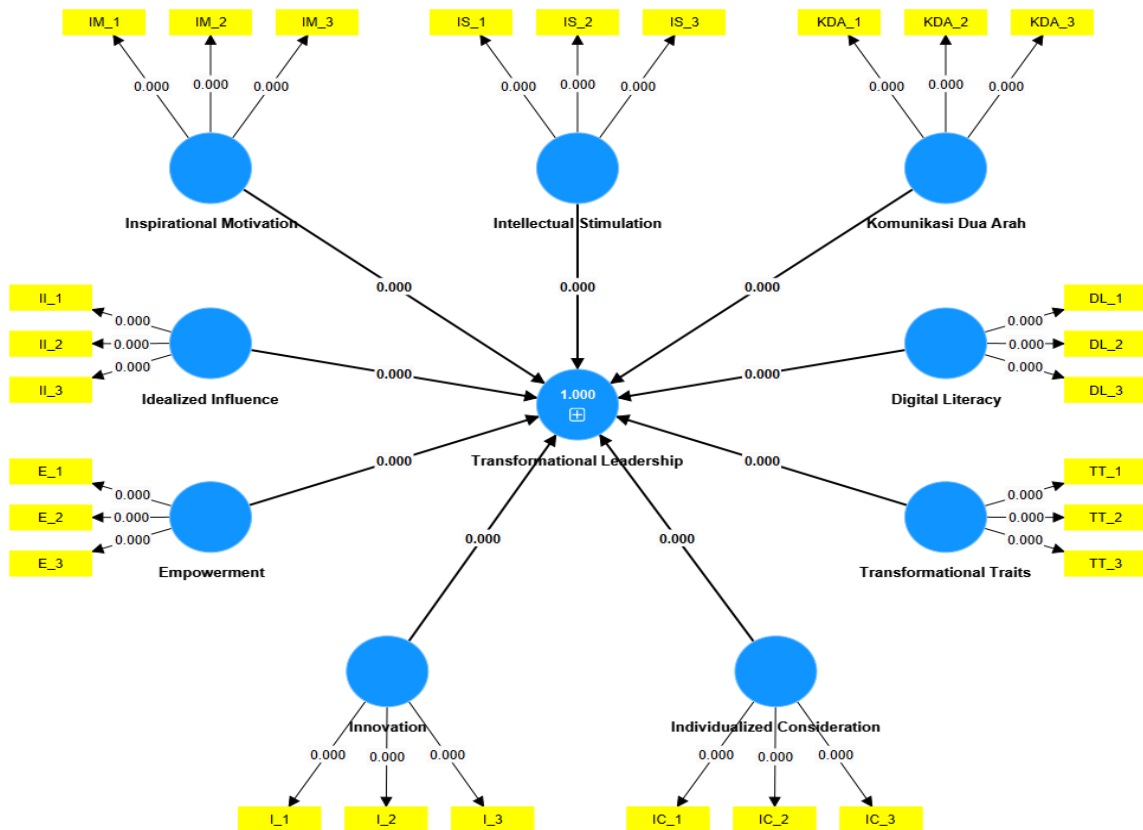
Table 3. Q² predictive relevance of constructs

No.	Construct	Q ² Value	Interpretation
1	Digital Literacy	0.436	Moderate
2	Empowerment	0.436	Moderate
3	Idealized Influence	0.512	Moderate
4	Individualized Consideration	0.719	High
5	Innovation	0.634	High
6	Inspirational Motivation	0.569	Moderate
7	Intellectual Stimulation	0.505	Moderate
8	Two-Way Communication	0.761	High
9	Transformational Traits	0.750	High

Effect sizes and structural relationships were further validated through Q^2 predictive relevance testing. All constructs exhibited Q^2 values above 0.00, indicating moderate to high predictive relevance. Dimensions such as Two-Way Communication ($Q^2 = 0.761$), Transformational Traits ($Q^2 = 0.750$), and Individualized Consideration ($Q^2 = 0.719$) demonstrated the strongest predictive contributions to the model. These results underscore the importance of effective communication skills, personal integrity in leadership, and individualized mentoring in shaping transformational leadership within universities. Additionally, dimensions like digital literacy and intellectual stimulation also showed significant predictive relevance, highlighting the importance of adaptive, technology-driven decision-making processes in supporting university development strategies.

Hypothesis testing and path coefficients

Figure 3. Bootstrapping output for the transformational leadership model



Bootstrapping analysis using SmartPLS revealed that all relationships between the nine dimensions and the transformational leadership construct were positive and statistically significant. Each dimension achieved a t-value greater than 1.96 and a p-value less than 0.05, confirming that all proposed hypotheses were supported. Individualized Consideration ($\beta = 0.193$; $t = 17.016$) and Transformational Traits ($\beta = 0.178$; $t = 18.120$) emerged as the strongest contributors, underscoring the pivotal role of leader empathy, mentoring capacity, integrity,

and behavioural consistency in driving the effectiveness of transformational leadership within higher education.

Both Inspirational Motivation and Idealized Influence also showed strong statistical significance, highlighting the importance of vision, inspiration, and role modelling in shaping institutional culture. Additionally, empowerment, innovation, and two-way communication provided significant support to leadership effectiveness by facilitating participatory decision-making, fostering creativity, and ensuring transparent communication channels. Digital literacy demonstrated significant effects as well, reinforcing the critical role of technological competence in modern leadership practices.

Taken together, these results affirm that transformational leadership in universities is a multifaceted construct, encompassing interpersonal, cognitive, behavioural, and technological competencies that collectively influence institutional outcomes.

Table 4. *Bootstrapping results: path coefficients, t-values, and significance*

Path	β (Path Coefficient)	t-value	p-value	Significance
Digital Literacy → Transformational Leadership	0.105	7.662	0.000	Significant
Empowerment → Transformational Leadership	0.105	9.295	0.000	Significant
Idealized Influence → Transformational Leadership	0.097	9.263	0.000	Significant
Individualized Consideration → Transformational Leadership	0.193	17.016	0.000	Significant
Innovation → Transformational Leadership	0.124	11.298	0.000	Significant
Inspirational Motivation → Transformational Leadership	0.133	14.592	0.000	Significant
Intellectual Stimulation → Transformational Leadership	0.114	11.568	0.000	Significant
Two-Way Communication → Transformational Leadership	0.134	11.354	0.000	Significant
Transformational Traits → Transformational Leadership	0.178	18.120	0.000	Significant

Integrated interpretation of findings

The SEM-PLS findings provide robust empirical support for the proposed Transformational Leadership Assessment Model. The results confirm that transformational leadership in universities is not merely an abstract concept, but a measurable framework composed of nine interrelated yet distinct dimensions. Each dimension contributes positively to leadership capacity, with statistically validated indicators that capture essential behaviours required for institutional development. The exceptionally high explanatory and predictive values demonstrate that the framework is both comprehensive and contextually relevant.

These findings further emphasize that transformational leadership is a strategic driver of institutional development. Dimensions such as innovation, digital readiness, and two-way communication reflect competencies aligned with contemporary challenges in higher education, including digital transformation, international competitiveness, and organizational responsiveness. Simultaneously, foundational dimensions such as individualized consideration, idealized influence, and inspirational motivation remain central to sustaining academic culture and fostering community alignment.

From an applied perspective, these results lay a solid numerical foundation for developing an AI-integrated self-assessment system. Since each dimension and indicator has been empirically validated, the model can be directly translated into algorithmic rules that generate personalized leadership profiles and developmental feedback for university leaders. This positions the model not only as an evaluative tool but also as a strategic instrument for enhancing institutional capacity.

Discussion

The findings of this study provide strong empirical evidence that transformational leadership in universities is a multidimensional construct that can be reliably measured and utilized as a strategic foundation for institutional development. The results reinforce the growing scholarly consensus that effective leadership is central to improving academic quality, institutional resilience, and organizational innovation in higher education (Gigliotti, 2020; Avolio et al., 2022). By using SEM-PLS, this study validated nine dimensions of transformational leadership: Inspirational Motivation, Idealized Influence, Intellectual Stimulation, Individualized Consideration, Empowerment, Innovation, Digital Literacy, Two-Way Communication, and Transformational Traits as significant predictors of transformational leadership among university leaders. These results align with existing research that emphasizes the complexity and adaptive nature of leadership required in modern higher education environments (Huang et al., 2023; Makeleni et al., 2023).

The strong performance of the measurement model, as demonstrated by high composite reliability and AVE values across most dimensions, indicates that transformational leadership can be effectively assessed using psychometrically sound indicators tailored to the specific context of university governance. This contribution advances the literature by offering an empirically grounded measurement system, in contrast to traditional leadership assessments that often rely on subjective or fragmented appraisal methods (Boonchai & Taylor, 2020; Stadler et al., 2024). These results also underscore that leadership assessment must capture a broad spectrum of competencies, including behavioural, cognitive, interpersonal, and technological capabilities, as higher education systems now operate in increasingly digital and competitive environments (Guo & Laokulrach, 2024; Vu et al., 2020).

Individualized Consideration emerged as the strongest predictor of transformational leadership, closely followed by Transformational Traits. This finding emphasizes the centrality of relational and affective aspects of leadership in higher education. Leaders who exhibit empathy, provide active mentoring, and genuinely concern themselves with the professional development of academic staff are more likely to foster cohesive, motivated, and innovative institutional cultures. This finding aligns with studies showing that individualized support

enhances staff engagement, academic performance, and organizational commitment (Alshammari et al., 2022; Yang & Li, 2021). Transformational traits, such as integrity, ethical conduct, and role modelling, also significantly influenced leadership effectiveness in this study, reinforcing prior research suggesting that character-based leadership is essential for building trust and legitimacy within academic institutions (Bush & Glover, 2021; Ghorbani et al., 2023).

Inspirational motivation and idealized influence also demonstrated significant effects, confirming that vision, purpose communication, and inspirational guidance remain foundational to transformational leadership. University leaders who clearly articulate an institutional direction and inspire academic communities to align with long-term goals make meaningful contributions to institutional development, especially in contexts undergoing significant change or reform (Hapsari & Sawitri, 2023; Gibson et al., 2024). These findings align with recent research, which highlights the need for visionary leadership in universities to navigate global challenges, including digitalization, international competition, and pressures to enhance research productivity (Flores & Ferreira, 2022; Huang et al., 2023).

Another important contribution of this study is the empirical support for the role of digital literacy, innovation, empowerment, and two-way communication in shaping transformational leadership outcomes. The significance of digital literacy reflects the evolving demands of higher education in the digital era, where leaders must be capable of integrating technology into teaching, governance, and quality assurance processes (Gupta et al., 2022; Makeleni et al., 2023). Innovation as a significant predictor aligns with studies showing that leaders who foster experimentation, creativity, and problem-solving contribute to the institution's adaptability and competitiveness (Hughes et al., 2019; Stadler et al., 2024). Empowerment and effective two-way communication are essential for fostering participatory cultures, collaboration, and trust between academic leaders and faculty members (Boonchai & Taylor, 2020; Alves & Flores, 2023). These elements collectively support organizational learning and enhance the institution's responsiveness to internal and external challenges.

The structural model results, with an $R^2 = 1.000$, provide remarkable confirmation that the nine dimensions fully explain the construct of transformational leadership within the sampled institutions. While this unusually high value is partly attributed to the higher-order construct modelling approach, it also reflects the comprehensive nature of the instrument and the extent to which transformational leadership behaviours are embedded in multiple leadership competencies (Hair et al., 2021). The Q^2 values, ranging from moderate to high across the nine dimensions, further demonstrate that the model possesses strong predictive relevance and can serve as a reliable diagnostic tool for leadership development in universities. These findings align with broader trends in higher education research that emphasize the need for predictive, data-driven leadership assessment models (Gupta et al., 2022; Stadler et al., 2024).

The bootstrapping results provide additional insights into the relative influence of each dimension. The strong statistical significance of all nine dimensions suggests that transformational leadership in universities is best understood as a multidimensional and integrated behavioural system, rather than a single attribute or trait. Recent leadership studies emphasize that university leaders must balance strategic orientation, human-centered practices, digital competence, and collaborative behaviours to support institutional development effectively (Hernández-Linares et al., 2023; Zhang & Liu, 2020). This

multidimensional integration is particularly important in environments where universities face simultaneous pressures to enhance research output, expand international partnerships, strengthen teaching quality, and respond to technological disruptions.

The role of innovation and digital literacy in the model aligns with global findings that transformational leadership significantly contributes to digital transformation readiness (Hapsari & Sawitri, 2023), organizational agility (Yang & Li, 2021), and adaptive capacity (Stadler et al., 2024). As higher education institutions undergo shifts toward hybrid learning, AI-driven academic services, and data-based governance, the importance of leaders who are digitally fluent and innovation-oriented becomes increasingly critical. This study reinforces global discussions on digital leadership, emphasizing the need for university leaders to possess both technological awareness and the ability to guide teams through digital transitions (Makeleni et al., 2023; Gupta et al., 2022).

From a practical standpoint, the validated Transformational Leadership Assessment Framework represents a significant contribution to leadership development and governance improvement in higher education. Given the increasing demands on universities to achieve key performance indicators (KPIs), such as those outlined in Indonesia's *Indikator Kinerja Utama* (IKU), the ability to assess leadership capacity with precision and relevance is essential. The instrument validated in this study can serve as a foundation for leadership training programs, succession planning, and institutional quality assurance mechanisms. It also provides structured insights that can guide university leaders in identifying personal strengths and areas for development aligned with institutional goals (Gibson et al., 2024).

Furthermore, the framework's integration with AI-driven assessment systems represents an innovative contribution to leadership evaluation. Research has shown that AI-supported decision-making tools enhance transparency, accuracy, and efficiency in performance appraisal processes (Gupta et al., 2022; Stadler et al., 2024). By converting the validated leadership indicators into algorithmic rules, universities can generate personalized leadership profiles, predictive insights, and developmental recommendations tailored to each leader's role and institutional context. This aligns with recent trends advocating for evidence-based leadership and data-informed governance in universities (Gigliotti, 2020; Flores & Ferreira, 2022).

The findings of this study affirm that transformational leadership is not only measurable but also strategically significant for driving institutional development in contemporary universities. The validated framework bridges theoretical foundations, empirical evidence, and practical application, positioning transformational leadership as a cornerstone for university improvement, innovation, and long-term sustainability. As higher education continues to evolve, future research may focus on cross-institutional testing, comparative regional studies, and the integration of AI-based analytics to strengthen the robustness and applicability of the framework.

Conclusion

This study provides strong empirical evidence that transformational leadership is a multidimensional construct that can be reliably assessed and used as a strategic foundation for institutional development in higher education. The findings demonstrate that the nine validated dimensions—Inspirational Motivation, Idealized Influence, Intellectual Stimulation,

Individualized Consideration, Empowerment, Innovation, Digital Literacy, Two-Way Communication, and Transformational Traits—collectively explain transformational leadership behaviors in university leaders. The results underscore the crucial role of transformational leadership in enhancing institutional resilience, academic quality, and organizational innovation, thereby addressing the growing challenges faced by universities in the digital age.

This research contributes to the literature by offering a robust, empirically grounded framework for assessing transformational leadership, which is both comprehensive and contextually relevant to university governance. The framework moves beyond traditional leadership assessments, integrating behavioral, cognitive, interpersonal, and technological competencies to capture the complexities of modern academic leadership. The model's strong predictive relevance and explanatory power make it a valuable tool for leadership development, institutional improvement, and strategic planning.

From a practical perspective, the validated Transformational Leadership Assessment Framework offers a valuable resource for university leaders and policymakers to evaluate leadership capacity, identify areas for improvement, and align leadership practices with institutional objectives. The integration of AI-supported self-assessment systems further enhances the framework's potential, enabling universities to generate personalized leadership profiles and actionable insights for continuous improvement.

Looking ahead, future research could explore cross-institutional validation of the framework, its application across different regions, and its integration with AI-driven analytics to further refine and expand its applicability in diverse higher education contexts. This study underscores the importance of transformational leadership as a cornerstone for driving sustainable growth, innovation, and long-term success in universities.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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